Transportation Impact Analysis

Cascade Center

Molalla, Oregon

March 2019

KITTELSON & ASSOCIATES

Transportation Impact Analysis

Cascade Center

Molalla, Oregon

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Section 1
Executive Summary

EXECUTIVE SUMMARY

I&E Construction proposes to develop up to 256 storage units, a 9,100 square-foot Dollar General, and up to 70,981 square feet of other retail, office, and restaurant uses on an approximately 15-acre site on OR 211 between Hezzie Lane and Ridings Avenue in Molalla, Oregon. The site will be served by three full-movement accesses, including a southward extension of Leroy Avenue across OR 211. The anticipated build-out year is 2020.

The results of this study indicate that the proposed Cascade Center development can be constructed while maintaining acceptable traffic operations and safety at the study intersections, assuming provision of the recommended mitigation measures.

FINDINGS

Existing Conditions

- All of the study intersections currently meet ODOT mobility standards during the weekday AM and PM peak hours.
- A review of historical crash data did not reveal any patterns or trends in the site vicinity that require mitigation associated with this project.

Year 2020 Background Traffic Conditions

- A 2.5-percent annual growth rate was applied to the existing traffic volumes to account for regional growth in the area.
- The *City of Molalla Transportation System Plan* identifies the future need to signalize the OR 211/Leroy Avenue intersection. The traffic signal was identified to provide motor vehicle capacity at the intersection to serve anticipated traffic growth and also serves as a north-south pedestrian crossing opportunity linking residents south of OR 211 with Molalla River Middle School to the north. Signalization is not currently funded.
- All but one of the study intersections are expected to continue meeting ODOT mobility standards during the weekday AM and PM peak hours prior to site development:
    - The all-way stop-controlled OR 211/Molalla Avenue intersection is projected to experience a volume-to-capacity (v/c) ratio greater than 0.90 on the eastbound approach during the PM peak hour. The *City of Molalla Transportation System Plan* identifies the future need to signalize the intersection; however, signalization is not currently funded.

Proposed Development Plan

- The proposed development is expected to generate approximately 4,112 weekday net new trips, of which 330 (193 in, 137 out) will occur during the AM peak hour and 349 (192 in, 157 out) will occur during the PM peak hour. The development is also expected to generate approximately 3,488 weekday pass-by trips, of which 226 (113 in, 113 out) will occur during the AM peak hour and 262 (131 in, 131 out) will occur during the PM peak hour.
- The City of Molalla has requested I&E Construction signalize the OR 211/Leroy Avenue intersection in conjunction with site development. Signalization requires ODOT approval; therefore, intersection operations were analyzed without and with a traffic signal in place for study purposes.

Year 2020 Total Traffic Conditions

- All but two of the study intersections are expected to continue meeting ODOT mobility standards during the weekday AM and PM peak hours after site development:
  - The northbound left turn at OR 211/Leroy Avenue is projected to experience a v/c ratio above the ODOT mobility target of 0.95 during the weekday PM peak hour, and projected northbound delays are expected to reach Level of Service "F".
  - Consistent with background conditions, the all-way stop-controlled OR 211/Molalla Avenue intersection is projected to continue to experience a v/c ratio greater than 0.90 on the eastbound approach during the PM peak hour as a result of full site buildout.

Traffic Signal and Turn Lane Considerations

- Per the MUTCD signal warrants and the estimated 24-hour volume profile of the OR 211/Molalla Avenue intersection, a traffic signal will be warranted at OR 211/Molalla Avenue prior to site development.
- Per the MUTCD signal warrants and the estimated 24-hour volume profile of the OR 211/Leroy Avenue intersection, a traffic signal will be warranted at OR 211/Leroy Avenue after the site is developed.
- A right turn lane with at least 100 feet of storage should be installed on eastbound OR 211 at the west site access per ODOT criteria. The eastbound OR 211 approach at Leroy Avenue also meets ODOT right turn lane criteria if unsignalized.
- A left turn lane with at least 75 feet of storage should be installed on westbound OR 211 at both the west site access and the east site access per ODOT criteria.

Year 2020 Total Traffic Conditions with Mitigation

- The OR 211/Leroy Avenue intersection satisfies ODOT v/c ratio mobility standards with signalization. Projected side street delays are much higher under stop control (resulting in weekday PM peak hour northbound approach Level of Service "F") as compared to a condition with signalization (resulting in weekday AM and PM peak hour intersection Level of Service "A").

95th-Percentile Queueing Analysis

- The proposed storage lengths at the study intersections are expected to accommodate each of the 95th-percentile queues in the AM and PM peak hours under 2020 total traffic conditions, assuming provision of the identified turn lanes and signalization.

RECOMMENDATIONS

The following are recommended in conjunction with site redevelopment:

- OR 211/Molalla Avenue:
  - Provide a traffic signal.
- OR 211/West Site Access:
  - Provide an eastbound right turn lane with at least 100 feet of storage.
  - Provide a westbound left turn lane with at least 75 feet of storage.
- OR 211/Leroy Avenue:
  - Restripe the north leg of the intersection to provide an exclusive left turn lane with at least 100 feet of storage and a shared thought/right lane on southbound Leroy Avenue.
  - Collaborate with City and ODOT staff to determine if and when signalization of the OR 211/Leroy Avenue intersection should be completed considering the following:
    - the City of Molalla's *Transportation System Plan* identifies the need for future signalization;
    - the City's desire for signalization in conjunction with site development;
    - the northbound left turn v/c ratio at the OR 211/Leroy Avenue intersection is forecast to exceed ODOT mobility targets after site build-out without signalization, but the intersection would meet ODOT mobility targets with signalization;
    - the projected intersection traffic volumes satisfy traffic signal warrants at site buildout; and

    - installation of a traffic signal would serve pedestrian crossings of OR 211, facilitating pedestrian access to Molalla River Middle School on Leroy Avenue and the Molalla Elementary School to the northwest.
  - Collaborate with the City and ODOT to further assess the need for an eastbound right turn lane at the OR 211/Leroy Avenue intersection pending decisions regarding signalization of the intersection.

- OR 211/East Site Access:
  - Provide a westbound left turn lane with at least 75 feet of storage.

- All landscaping, signage, and utilities near the site access points should be placed and maintained to provide adequate sight distance.

Additional details of the study methodology, findings, and recommendations are provided within this report.

Section 2
Introduction

INTRODUCTION

PROJECT DESCRIPTION

I&E Construction proposes to develop up to 256 storage units, a 9,100 square-foot Dollar General, and up to 70,981 square feet of other retail, office, and restaurant uses on an approximately 15-acre site on OR 211 between Hezzie Lane and Ridings Avenue in Molalla, Oregon. Figure 1 illustrates the site vicinity. The site will be served by three full-movement accesses, including a southward extension of Leroy Avenue across OR 211. The anticipated build-out year is 2020. Figure 2 illustrates the proposed site plan.

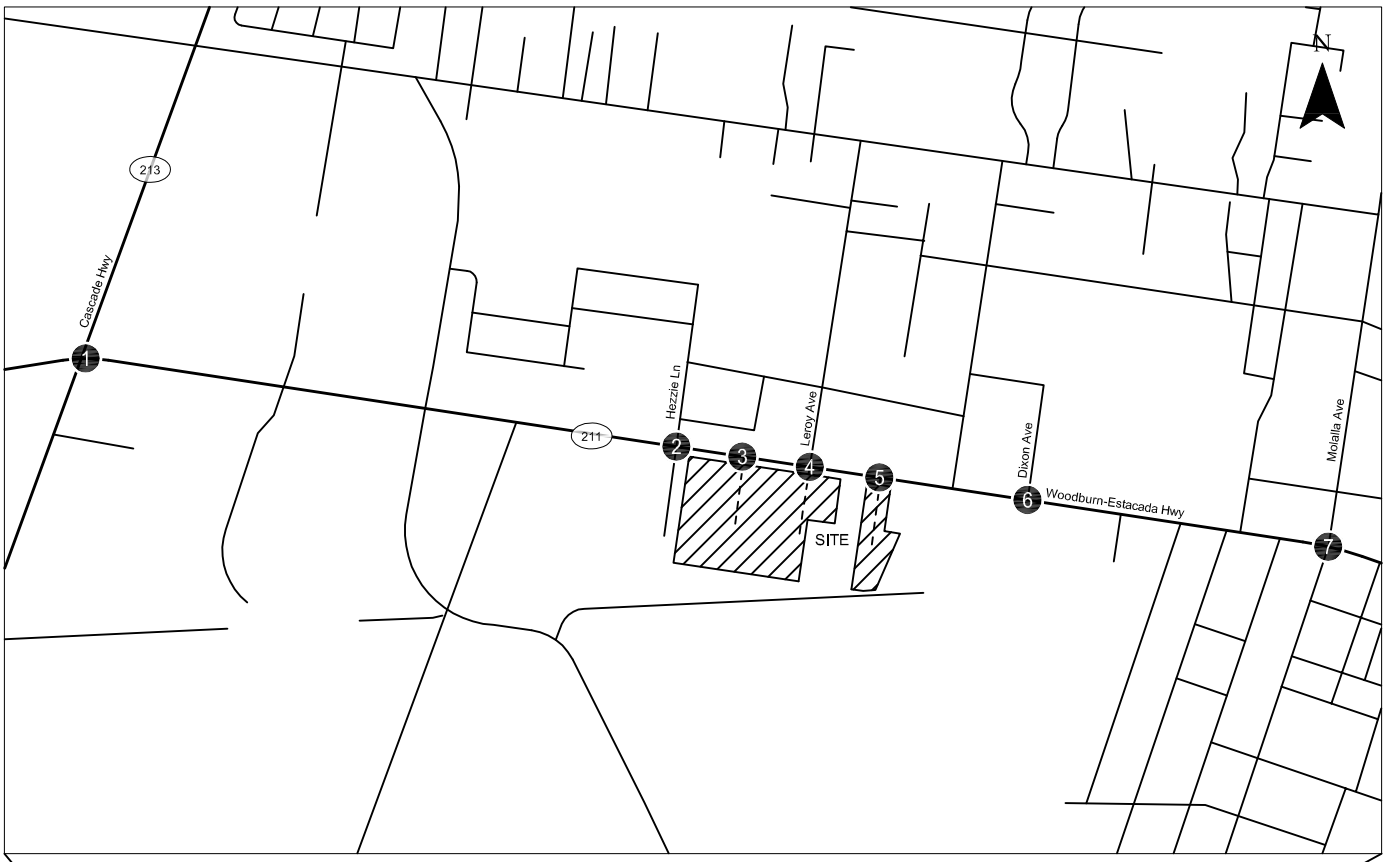
SCOPE OF THE REPORT

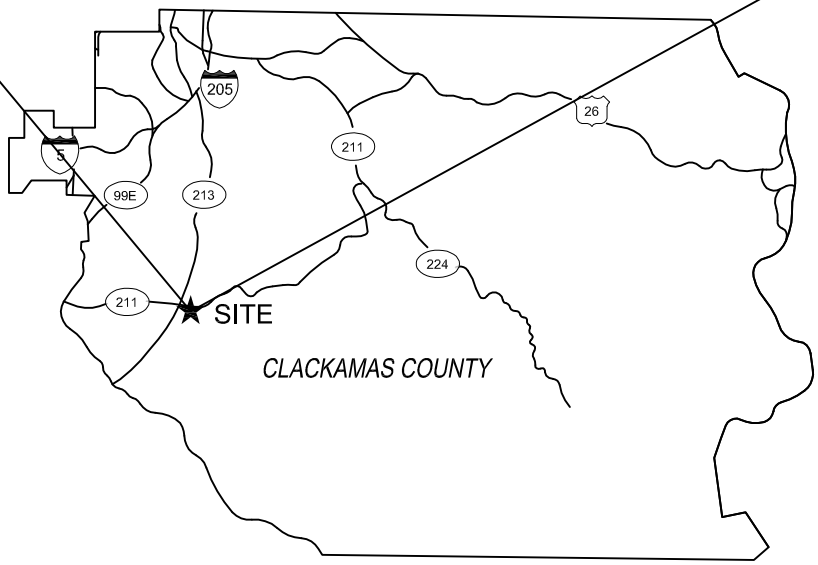
This analysis determines the transportation-related impacts associated with the proposed Cascade Center and was prepared in accordance with the City of Molalla and Oregon Department of Transportation (ODOT) requirements for traffic impact studies. The study intersections and scope of this project were selected in consultation with City and ODOT staff. Operational analyses were performed at these intersections:

1. OR 211 (Woodburn-Estacada Highway/Main Street)/OR 213 (Cascade Highway)
2. OR 211 (Woodburn-Estacada Highway/Main Street)/Hezzie Lane
3. OR 211 (Woodburn-Estacada Highway/Main Street)/West Site Access
4. OR 211 (Woodburn-Estacada Highway/Main Street)/Leroy Avenue
5. OR 211 (Woodburn-Estacada Highway/Main Street)/East Site Access
6. OR 211 (Woodburn-Estacada Highway/Main Street)/Dixon Avenue/Lowe Rd
7. OR 211 (Woodburn-Estacada Highway/Main Street)/Molalla Avenue

This report evaluates these transportation issues:

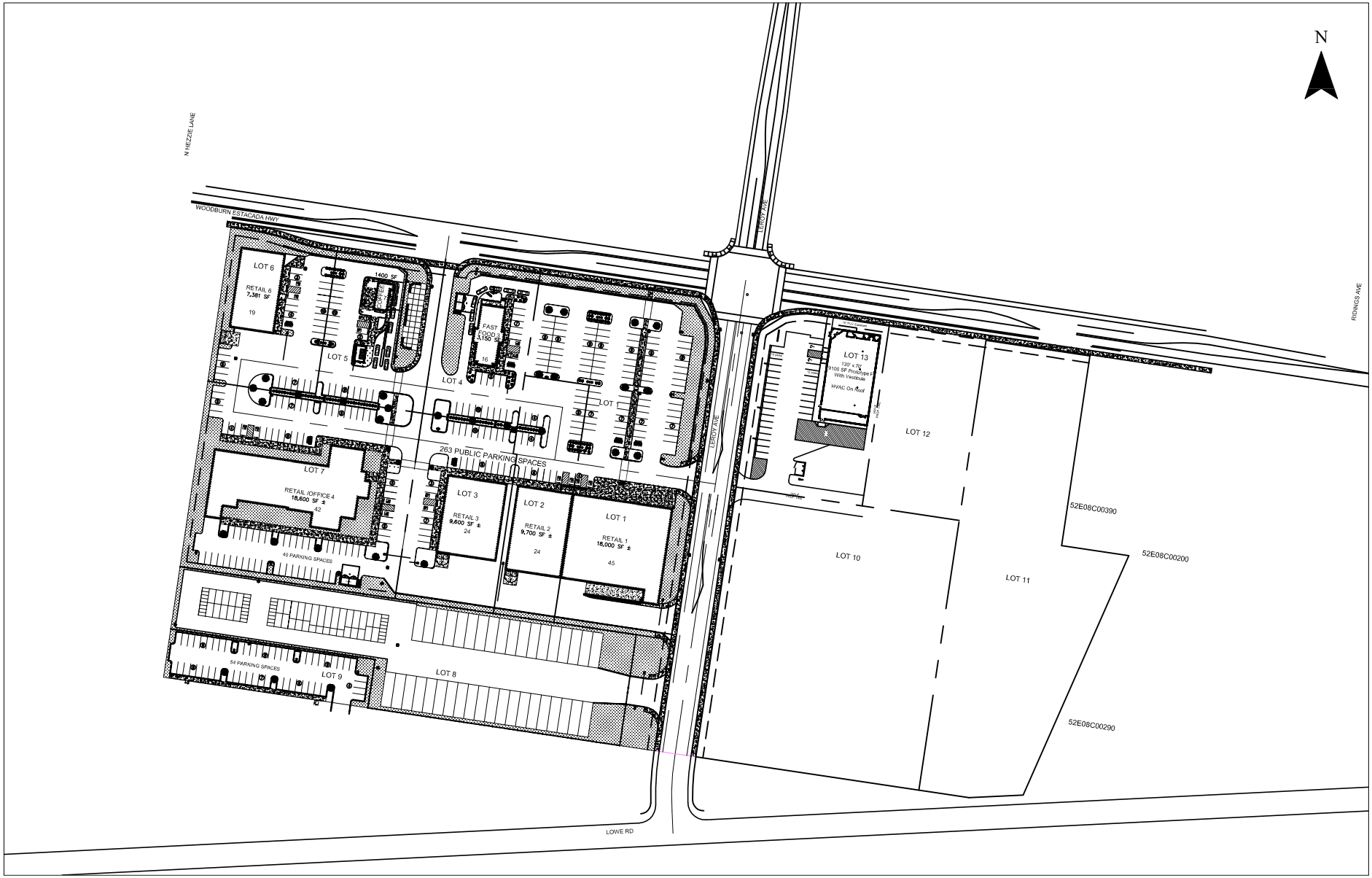
- Existing land-use and transportation-system conditions within the site vicinity during the weekday AM and PM peak hours;
- Developments and transportation improvements planned in the study area;
    - Forecast year 2020 background traffic conditions (without the proposed development) during the weekday AM and PM peak hours;
- Trip generation and distribution estimates for the proposed Cascade Center development;
- Forecast year 2020 (including the proposed development) total traffic conditions during the weekday AM and PM peak hours with build-out of the site;
- Traffic signal and turn lane considerations; and
- On-site traffic operations and circulation.





Site Vicinity Map
Molalla, Oregon

Figure
1



Site plan provided by I&E Construction on 2/25/2019

SCALE

0 200' 400'

Proposed Site Plan
Molalla, Oregon

Figure
2

K:\H_Projects\23\23301 - Molalla Commercial Project\dwgs\23301_figs.dwg Feb 27, 2019 - 6:41am - zbugg Layout Tab: 02 Site Plan

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Section 3
Existing Conditions

EXISTING CONDITIONS

The existing conditions analysis identifies the site conditions and current operational and geometric characteristics of the roadways within the study area. These conditions will be compared with future conditions later in this report.

Kittelson & Associates, Inc. (KAI) staff visited and inventoried the proposed development site and surrounding study area in October 2018. At that time, KAI collected information regarding site conditions, adjacent land uses, existing traffic operations, and transportation facilities in the study area.

SITE CONDITIONS AND ADJACENT LAND USES

The proposed site is within the City of Molalla limits, is currently occupied by nine single-family homes, and is zoned for commercial use. Adjacent land uses are predominantly residential and include the Stoneplace Apartments to the west and south. Northwest Self Storage borders the site to the east. Molalla River Middle School is located approximately one block north of OR 211 on the west side of Leroy Avenue.

TRANSPORTATION FACILITIES

Table 1 lists the existing transportation facilities and roadways in the study area.

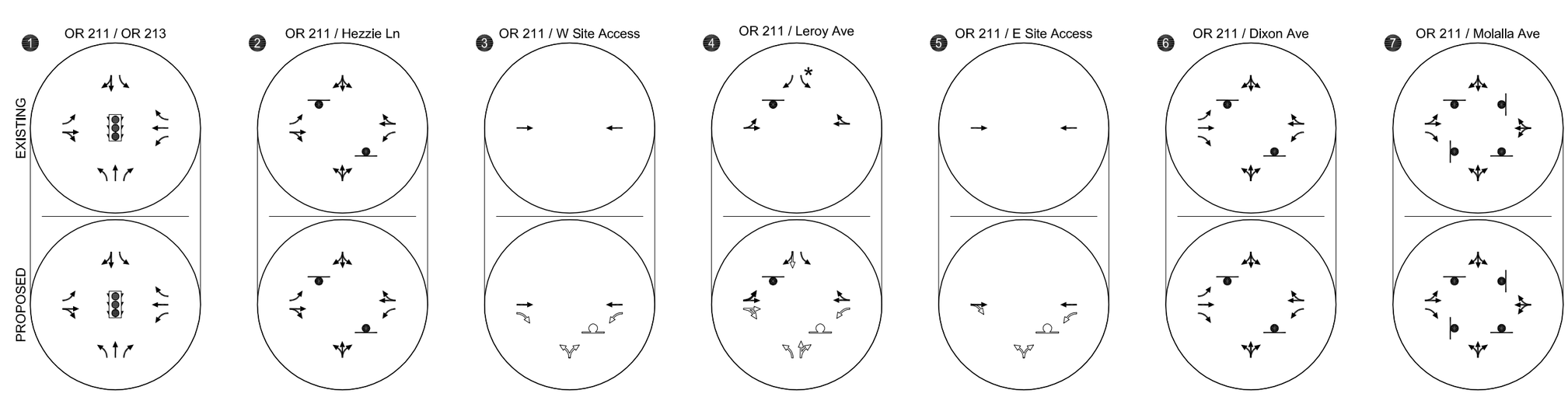
Table 1. Existing Transportation Facilities

Roadway	Functional Classification[1]	Number of Lanes	Posted Speed	Sidewalks	Bicycle Lanes	On-Street Parking
OR 211	Arterial (W of Molalla Forest Rd) Major Collector (E of Molalla Forest Rd)	2	45 mph (W of OR 213) 35 mph (OR 213 to Thelander Ln) 25 mph (E of Thelander Ln)	Partial[2]	Partial[3]	No
OR 213	Arterial	2-3	45 mph (N of OR 211) 40 mph (S of OR 211)	East Side	Yes	No
Hezzie Lane	Neighborhood Street	2	Not Posted	Both Sides	No	No
Leroy Avenue	Major Collector	2	Not Posted	Both Sides	No	Yes
Dixon Avenue	Local Street	2	Not Posted	No	No	Yes
Molalla Avenue	Arterial	2	25 mph	Both Sides	No	Yes

[1]Per City of Molalla Transportation System Plan (Reference 1)
[2]Sidewalks are provided on the north side from OR 213 to Commercial Parkway and east of Hezzie Lane. Sidewalks are provided on the south side along the Stoneplace Apartments frontage and east of Ridings Avenue.
[3]Bike lanes are provided west of Commercial Parkway, and paved shoulders are provided in some other areas of the corridor.

Roadway Facilities

Figure 3 illustrates the existing lane configurations and traffic control devices at the study intersections, as well as the proposed site improvements. All access to the site will be provided via OR 211 (Woodburn-Estacada Highway/Main Street), and the main site access will be a southward extension of Leroy Avenue across the intersection with OR 211. Leroy Avenue may be extended southward to Lowe Road as part of a future development.



*Sufficient roadway width is currently available for a separate left turn lane

- STOP SIGN
- TRAFFIC SIGNAL
- EXISTING
- PROPOSED

Existing and Proposed Lane Configurations
and Traffic Control Devices
Molalla, Oregon

Figure
3

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Pedestrian and Bicycle Facilities

No pedestrian or bicycle facilities are currently provided along the proposed site frontage. Sidewalks are provided on the north side from OR 213 to Commercial Parkway and east of Hezzie Lane. Sidewalks are provided on the south side along the Stoneplace Apartments frontage and east of Ridings Avenue. Bike lanes are provided on OR 211 west of Commercial Parkway, and paved shoulders are provided in some other areas of the corridor.

Transit Facilities

Local bus service is provided by South Clackamas Transportation District, which operates the Molalla City Route and the Molalla to Clackamas Community College route, both of which stop at OR 211/Leroy Avenue (Reference 2). Molalla City service is provided Monday through Friday from 7:30 AM to 5:35 PM, and Molalla to Clackamas Community College service is provided Monday through Friday from 5:00 AM to 8:30 PM and Saturday from 7:00 AM to 5:00 PM. Headways are approximately 30 minutes in peak periods and 60 minutes in off-peak periods.

TRAFFIC VOLUMES AND PEAK HOUR OPERATIONS

Turning movement count data were collected at the study intersections in October 2018 when school was in session. Counts were performed on a typical mid-week day from 7:00 to 9:00 AM and from 4:00 to 6:00 PM. The system-wide peak hours were identified as 7:00 to 8:00 AM and 4:15 to 5:15 PM.

Seasonal Adjustment

The ODOT Analysis Procedures Manual (APM), Chapter 5 describes how to develop existing year volumes (Reference 3). The nearest ODOT Automated Traffic Recorder (ATR) to the site is 03-014, which is located on OR 211 approximately 12 miles east of the site. This ATR is likely too far away from the development site to provide a meaningful seasonal adjustment, and traffic volumes there are likely more recreational and less influenced by commuter patterns.

The ODOT ATR Characteristic Table was used to identify an ATR with a similar volume, geometry, and seasonal trend to the development site. ATR 24-001 was selected due to its 2016 AADT (12,000) being similar to the 2017 AADT on OR 211 near the site (13,400), as well as having a similar geometry (two lanes) and seasonal trend (commuter pattern). Table 2 displays the percent of AADT experienced during the peak month (typically July through September) and the count month (October) for ATR 24-001. The years shaded in dark grey represent the highest and lowest values and were removed from the average percent of AADT calculation per the APM.

Table 2. ODOT ATR 24-001 (Characteristic) Percent of AADT by Year

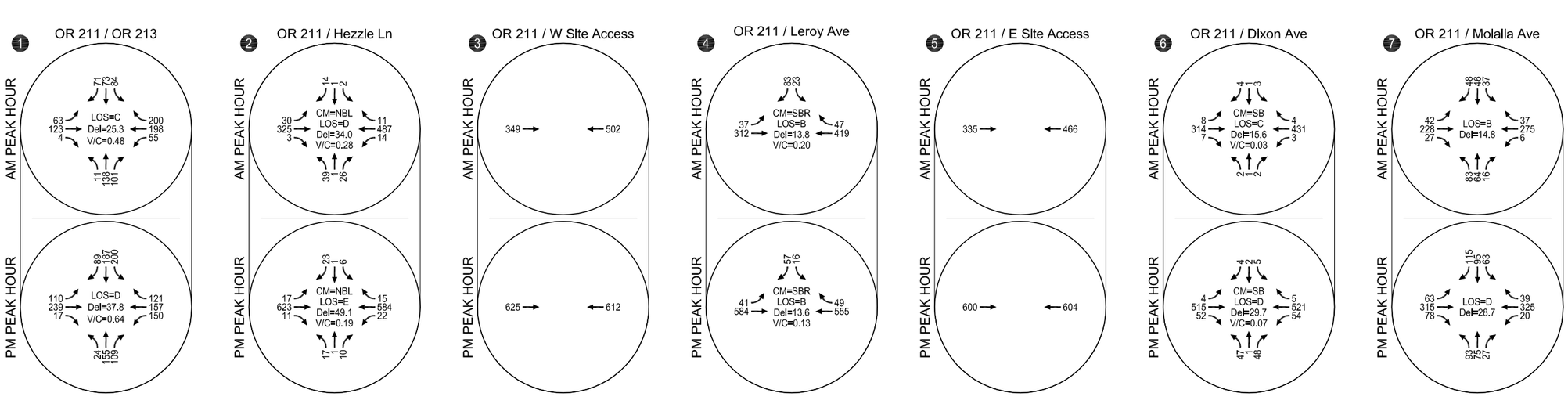
Year	2016	2015	2014	2013	2012
Peak Month	109	110	110	109	111
Count Month (October)	103	105	110	108	105

The seasonal adjustment was then calculated as (110 + 110 + 109) / (105 + 108 + 105) = 1.035 and applied to mainline traffic volumes along OR 211 and OR 213. Figure 4 provides a summary of the seasonally-adjusted turning movement counts at the study intersections. *Appendix "A" contains the traffic count worksheets used in this study.*

Current Intersection Operations

All traffic operations analyses described in this report were performed in accordance with the procedures stated in the 2000 *Highway Capacity Manual* (Reference 4) for signalized intersections and the *2010 Highway Capacity Manual* (Reference 5) for unsignalized intersections. Each of the study intersections is under the maintenance and jurisdiction of ODOT. The Oregon Highway Plan (Reference 6), Policy 1F establishes mobility targets for state highways based on volume-to-capacity ratio. Within the study area, OR 211 is a Regional Highway with a posted speed limit of 35 mph or less, which corresponds to a mobility target of 0.90. To meet ODOT standards, signalized intersections must not exceed an overall v/c ratio of 0.90. At unsignalized intersections, approaches on OR 211 must not exceed a v/c ratio of 0.90, and approaches on side streets must not exceed a v/c ratio of 0.95.

Figure 4 summarizes the operations analysis for the study intersections under the weekday AM and PM peak hour existing traffic conditions. All of the study intersections currently meet ODOT mobility standards during the weekday AM and PM peak hours. *Appendix "B" includes the level-of-service worksheets under existing traffic conditions.*



CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = CRITICAL MOVEMENT LEVEL OF SERVICE (SIGNALIZED)/
CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/
CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

Existing Traffic Conditions
Weekday AM and PM Peak Hours
Molalla, Oregon

Figure
4

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Traffic Safety

ODOT-reported crash data was reviewed for the most recent five-year period, from January 1, 2012 through December 31, 2016. Table 3 summarizes the crash data at the study intersections, as well as the intersection crash rates and critical crash rates (based on a 95 percent confidence level). None of the observed crash rates exceed the respective critical crash rates.

Table 3. Summary of Reported Crash Data (January 1, 2012 through December 31, 2016)

Intersection	Crash Severity		Crash Type				Total Crashes	Crash Rate[2]	Critical Crash Rate[2]
	Injury	PDO[1]	Angle	Rear End	Turning	Sideswipe			
OR 211 / OR 213	11	7	4	4	10	0	18	0.63	1.04
OR 211 / Hezzie Ln	1	0	0	0	1	0	1	0.04	0.63
OR 211 / Leroy Ave	5	3	0	6	1	1	8	0.34	0.51
OR 211 / Dixon Ave	2	0	1	0	1	0	2	0.09	0.65
OR 211 / Molalla Ave	1	7	3	2	3	0	8	0.33	*

[1]Property Damage Only

[2]Per million entering vehicles

ODOT maintains a ranking of intersections with potential safety issues known as the Safety Priority Index System (SPIS). Based upon a 2016 analysis, none of the study intersections ranked within the top five percent of the highest-scoring intersections in Region 1.

No other crash trends were identified at the study intersections.

Appendix "C" contains the reported crash data from ODOT.

Section 4
Transportation Impact Analysis

TRANSPORTATION IMPACT ANALYSIS

The transportation impact analysis identifies how the study area's transportation system will operate in the year the proposed development is expected to be fully built, year 2020. The impact of traffic generated by the proposed Cascade Center during the typical weekday AM and PM peak hours was examined as follows:

- Background conditions were developed by applying a 2.5-percent annual growth rate to the existing traffic volumes to account for regional growth in the site vicinity.
- Site-generated trips were estimated for build-out of the site.
- Site trip-distribution patterns were derived considering the existing traffic patterns and the major trip origins and destinations in the study area.
- Site-generated trips and pass-by trips were assigned to the study intersections and site accesses.
- Year 2020 (build-out year of the Cascade Center) total traffic conditions were analyzed at each of the study intersections and site-access points during the weekday AM and PM peak hours.
- On-site circulation issues and site-access operations were evaluated.
- Traffic signal warrant and turn lane needs were evaluated where appropriate.

YEAR 2020 BACKGROUND TRAFFIC CONDITIONS

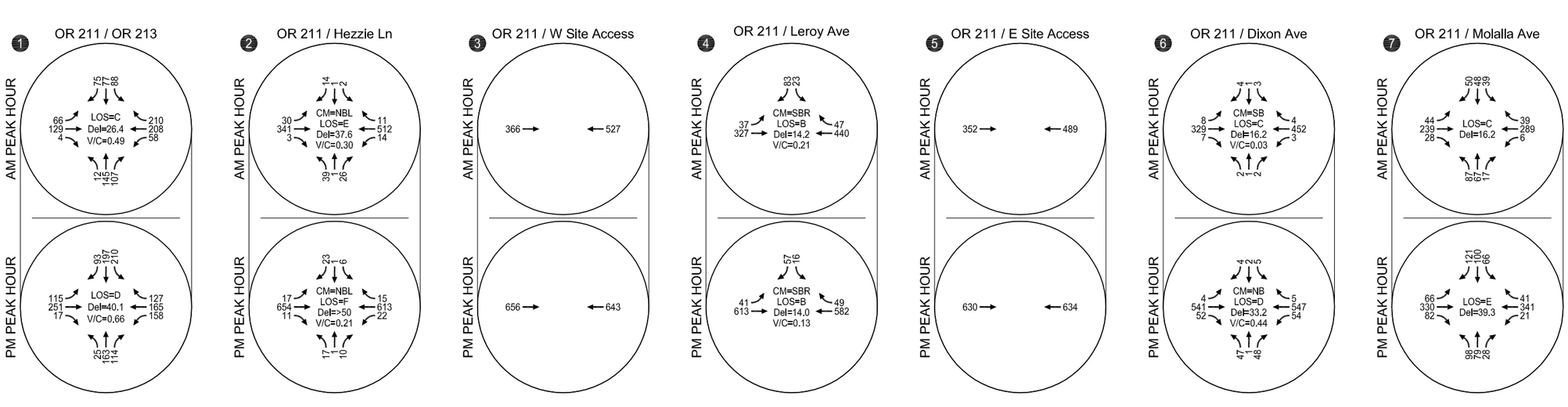
The year 2020 background traffic analysis identifies how the study area's transportation system will operate without the proposed Cascade Center. This analysis includes traffic attributed to planned developments within the study area and to general growth in the region but does not include traffic from the proposed development.

Traffic Volumes

The year 2020 background traffic volumes were developed by applying a 2.5-percent annual growth rate to the existing (seasonally adjusted) traffic volumes shown in Figure 4. This growth rate was identified from population and employment data in the Molalla TSP. Figure 5 displays the resulting 2020 background traffic volumes.

Operations Analysis

The weekday AM and PM peak-hour turning-movement volumes shown in Figure 5 were used to conduct an operational analysis at each study intersection to determine the year 2020 background traffic levels of service. All of the study intersections are expected to continue meeting ODOT mobility standards, with the exception of the OR 211/Molalla Avenue, which is expected to experience a v/c ratio above the ODOT



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V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

Year 2020 Background Traffic Conditions
Weekday AM and PM Peak Hours
Molalla, Oregon

Figure
5

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mobility target of 0.90 on the eastbound approach during the PM peak hour. Appendix "D" contains the year 2020 background traffic level-of-service worksheets.

PROPOSED DEVELOPMENT PLAN

I&E Construction proposes to develop up to 256 storage units, a 9,100 square-foot Dollar General, and up to 70,981 square feet of other retail, office, and restaurant uses on the study site. The existing on-site structures will be removed with redevelopment. The site will be served by three full-movement accesses, including a southward extension of Leroy Avenue across OR 211. Leroy Avenue may be extended southward to Lowe Road as part of a future development. The anticipated build-out year is 2020.

It is assumed that the Applicant will restripe the north leg of Leroy Avenue at OR 211 to provide an exclusive left turn lane with at least 100 feet of storage and a shared through/right lane on southbound Leroy Avenue, mirroring the proposed new northbound approach.

The City of Molalla requested that I&E Construction signalize the OR 211/Leroy Avenue intersection in conjunction with site development based in part on the *City of Molalla Transportation System Plan (TSP).* The TSP identifies the future signal need to provide motor vehicle capacity at the intersection serving anticipated traffic growth and also to serve as a north-south pedestrian crossing opportunity linking residents south of OR 211 with Molalla River Middle School and other points to the north along Leroy Avenue. Recognizing signalization requires ODOT approval, intersection operations were analyzed without and with a traffic signal in place.

Trip Generation

The projected weekday daily, AM, and PM peak-hour vehicle trip ends for the proposed development were based on the *Trip Generation Manual*, *10th Edition* (Reference 7). Pass-by trips for the retail and restaurant land uses, as well as internal trips between the retail and restaurant land uses, were estimated from *Trip Generation Handbook, 3rd Edition* (Reference 8). No pass-by or internal trips were assumed to be associated with the RV parking/storage units, and no internal trips were assumed to be associated with the Dollar General. As the split between the office and retail uses in Lot 4 is currently unknown, all 18,600 square feet of Lot 4 were assumed to be retail. Table 4 summarizes the anticipated number of trips that will be generated by the proposed Cascade Center.

As shown, the proposed development is expected to generate approximately 4,112 weekday net new trips, of which 330 will occur during the AM peak hour and 349 will occur during the PM peak hour. The development is also expected to generate approximately 3,488 weekday pass-by trips, of which 226 will occur during the AM peak hour and 262 will occur during the PM peak hour.

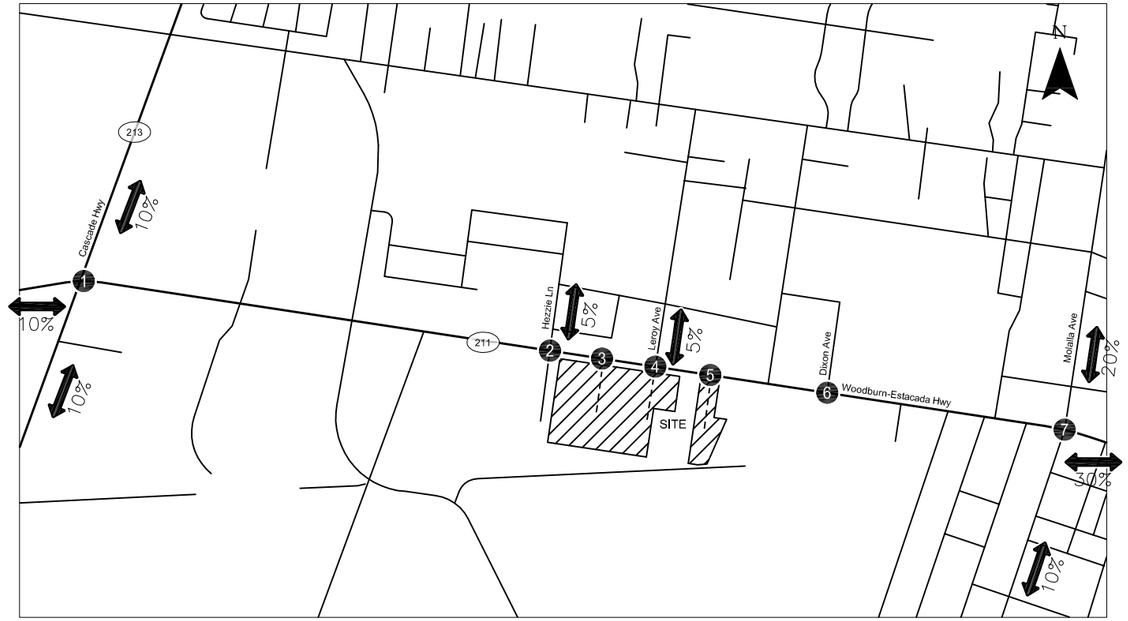
Table 4. Trip Generation

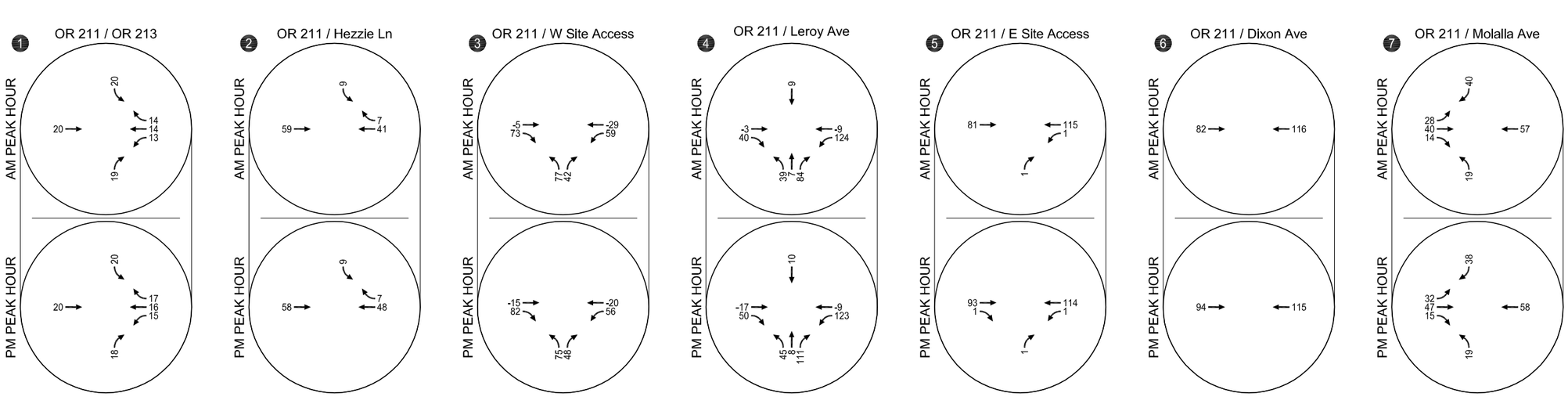
Land Use	ITE Code	Size	Weekday Daily Trips	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
Fast Food Restaurant with Drive Through	934	6,300 ft²	2,966	253	129	124	206	107	99
Less Internal (16% Daily, 3% AM, 13% PM)			*504*	*8*	*4*	*4*	*29*	*15*	*14*
Less Pass-by (50% Daily, 49% AM, 50% PM)			*1,232*	*120*	*60*	*60*	*88*	*44*	*44*
Coffee Shop with Drive Through	937	1,400 ft²	1,148	124	63	61	61	30	31
Less Internal (16% Daily, 3% AM, 13% PM)			*196*	*4*	*2*	*2*	*9*	*4*	*5*
Less Pass-by (89% Daily, 89% AM, 89% PM)			*848*	*106*	*53*	*53*	*46*	*23*	*23*
Shopping Center (fitted)*	820	63,281 ft²	4,404	184	114	70	387	209	178
Less Internal (16% Daily, 3% AM, 13% PM)			*748*	*6*	*3*	*3*	*54*	*29*	*25*
Less Pass-by (34% Daily, 34% PM)			*1,244*	*0*	*0*	*0*	*114*	*57*	*57*
Free-Standing Discount Store	815	9,100 ft²	484	11	8	3	44	22	22
Less Pass-by (34% Daily, 34% PM)			*164*	*0*	*0*	*0*	*14*	*7*	*7*
Storage Units	151	256 units	46	2	1	1	5	3	2
Gross Trips			9,048	574	315	259	703	371	332
Less Internal			*1,448*	*18*	*9*	*9*	*92*	*48*	*44*
Less Pass-by			*3,488*	*226*	*113*	*113*	*262*	*131*	*131*
Net New Trips			**4,112**	**330**	**193**	**137**	**349**	**192**	**157**

*Lot 4 represents a mix of 18,600 square feet of office and retail space. Recognizing the split between office and retail land uses is currently unknown and that the office space could range between relatively low trip generators such as an insurance agent to relatively high trip generators such medical-dental space, all 18,600 square feet was analyzed as retail.

Site Trip Distribution/Trip Assignment

The site-generated trips were distributed onto the study area roadway system according to the existing traffic patterns, as well as general population centers within the area. The estimated site-generated trips were assigned to the network by distributing the trips shown in Table 5 according to the trip distribution pattern shown in Figure 6. Figure 6 illustrates the site-generated trips that are expected to use the roadway system during the weekday AM and PM peak hours. Note that no trip reduction was made for the existing site structures that will be removed with the proposed site development.





Negative values indicate pass-by trips

Site-Generated Trips
Weekday AM and PM Peak Hours
Molalla, Oregon

Figure
6

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YEAR 2020 TOTAL TRAFFIC CONDITIONS

The total traffic conditions analysis forecasts how the study area's transportation system will operate with the traffic generated by the proposed Cascade Center development. The year 2020 background traffic volumes for the weekday AM and PM peak hours (shown in Figure 5) were added to the site-generated trips (shown in Figure 6) to arrive at the year 2020 total traffic volumes that are shown in Figure 7.

Intersection Operations

The weekday AM and PM peak hour turning-movement volumes shown in Figure 7 were used to conduct an operational analysis at each study intersection to determine the year 2020 total traffic levels of service. The results of the total traffic analysis shown in Figure 7 indicate that all of the study intersections and site access points are expected to continue meeting ODOT mobility standards, with the following exceptions:

- The northbound left turn at OR 211/Leroy Avenue is projected to experience a v/c ratio above the ODOT mobility target of 0.95 during the weekday PM peak hour, and projected northbound delays are expected to reach Level of Service "F".
- Consistent with background traffic conditions, the OR 211/Molalla Avenue intersection is projected to continue to experience a v/c ratio above the ODOT mobility target of 0.90 on the eastbound and westbound approaches during the weekday AM and PM peak hours.

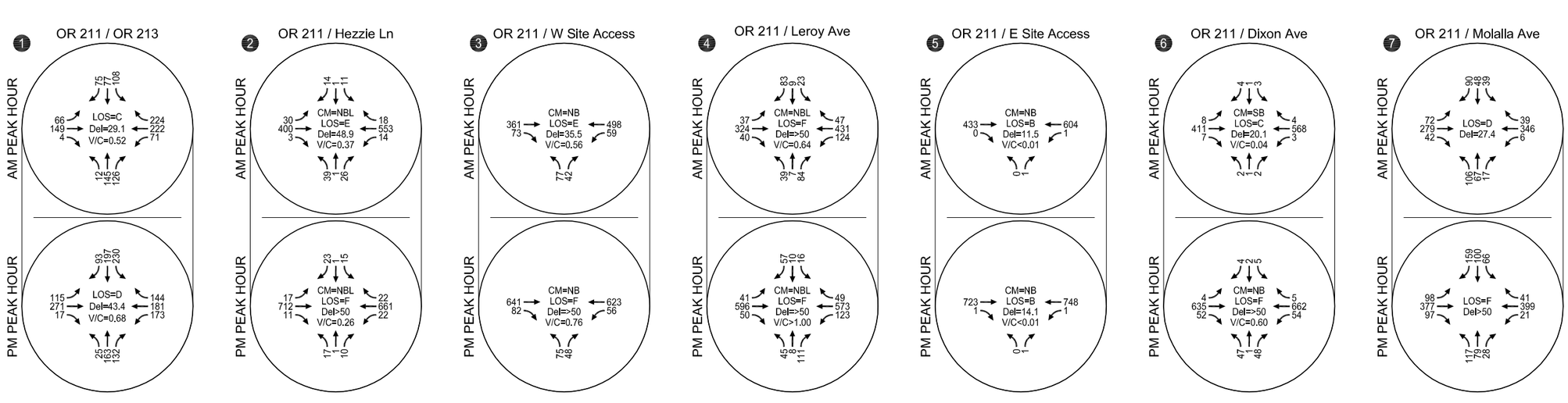
Appendix "E" contains the year 2020 total traffic level-of-service worksheets.

TRAFFIC SIGNAL AND TURN LANE CONSIDERATIONS

As previously noted, the *Molalla Transportation System Plan* (Reference 1) identifies an anticipated need for future signalization of the OR 211/Leroy Avenue and OR 211/Molalla Avenue intersections. This section of the report provides an assessment of potential intersection signalization and turn lane considerations associated with the proposed site development.

MUTCD Signal Warrants

The *Manual on Uniform Traffic Control Devices* (MUTCD, Reference 9) identifies nine warrants for traffic signal installation. The first two volume-based warrants (#1-Eight Hour and #2-Four Hour) were evaluated based on the existing and future traffic volumes at OR 211/Leroy Avenue and OR 211/Molalla Avenue. Weekday daily 24-hour volumes were estimated based on a 16-hour traffic volume count at the OR 211/Leroy Avenue intersection and peak hour volumes at the OR 211/Molalla Avenue intersection. Table 5 summarizes the warrant analysis results. As shown, the OR 211/Molalla Avenue intersection warrants



CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = CRITICAL MOVEMENT LEVEL OF SERVICE (SIGNALIZED)/
CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/
CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

Year 2020 Total Traffic Conditions
Weekday AM and PM Peak Hours
Molalla, Oregon

Figure
7

KITTELSON & ASSOCIATES

signalization prior to build-out of the site, and motor vehicle traffic volumes at the OR 211/Leroy Avenue intersection are forecast to warrant signalization with site build-out[1].

Table 5. Signal Warrant Analysis Results

Intersection	Scenario	Warrant Met?	
		Warrant #1: Eight Hour	Warrant #2: Four Hour
OR 211/Leroy Avenue	Existing	No	No
	2020 Background	No	No
	2020 Total	Yes	Yes
OR 211/Molalla Avenue	Existing	Yes	Yes
	2020 Background	Yes	Yes
	2020 Total	Yes	Yes

The City of Molalla requested signalization of the OR 211/Leroy Avenue intersection with site redevelopment to address both motor vehicle demand at the intersection and to provide a signalized pedestrian crossing of OR 211. The signalized pedestrian crossing would facilitate pedestrian connectivity between residential areas south of OR 211 and Molalla River Middle School, located on the west side of Leroy Avenue one block north of OR 211. The signalized crossing could also facilitate pedestrian connectivity with Molalla Elementary School to the northwest of the Middle School.

We recommend I&E Construction collaborate with City and ODOT staff to determine if and when signalization should be completed considering the following:

- the City of Molalla's *Transportation System Plan* identifies the need for future signalization;
- the City's desire for signalization in conjunction with site development;
- the northbound left turn v/c ratio at the OR 211/Leroy Avenue intersection is forecast exceed ODOT mobility standards during the PM peak hour after site build-out without signalization;
- projected side street delays at the OR 211/Leroy Avenue intersection are much higher under stop control (resulting in weekday PM peak hour northbound approach Level of Service "F") as compared to a condition with signalization (resulting in weekday AM and PM peak hour intersection Level of Service "A");
- the projected intersection traffic volumes satisfy traffic signal warrants at site buildout; and

[1] Currently there are no marked or signalized crosswalks of OR 211 within the site vicinity. Depending on Molalla School District busing and walking requirements, future pedestrian volumes at the OR 211/Leroy Avenue intersection may satisfy Warrant #5-School Crossing pending connectivity needs associated with the Molalla River Middle School (0.1 mile north of the intersection), Molalla Elementary School located to the northwest, and residential areas south of OR 211.

- installation of a traffic signal would serve pedestrian crossings of OR 211, facilitating pedestrian access to Molalla River Middle School and other points along Leroy Avenue.

Appendix "F" contains the signal warrant analysis worksheets.

ODOT Turn Lane Criteria

The *ODOT Analysis Procedures Manual* (Reference 3) identifies volume-based turn lane criteria at unsignalized intersections. The two proposed site accesses on OR 211 east and west of Leroy Avenue were evaluated for turn lane needs based on the 2020 total traffic AM and PM peak hour volumes. Based on this analysis, the right turn lane criteria are satisfied on eastbound OR 211 at the west site access, and the left turn lane criteria are satisfied on westbound OR 211 at the west site access. The Applicant proposes to construct a center left-turn lane along OR 211 providing a left-turn area for each of the three site accesses to provide a consistent three-lane section on OR 211 across the site frontage.

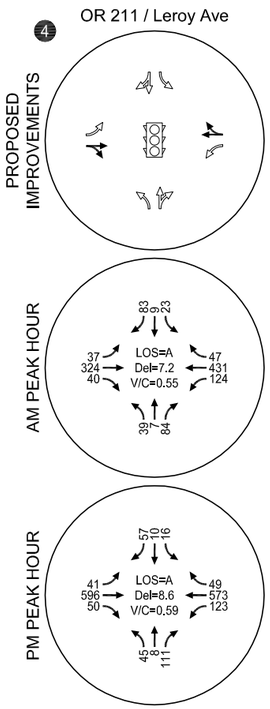
The ODOT right turn lane criteria are satisfied on eastbound OR 211 at Leroy Avenue if the intersection remains unsignalized; however, constructing a right-turn lane increases the north-south pedestrian crossing distance and would not be needed from a capacity perspective if the intersection is signalized. As such, we recommend the I&E Construction collaborate work with the City and ODOT to further assess the need for an eastbound right turn lane at the OR 211/Leroy Avenue intersection in conjunction with evaluation of intersection signalization requirements. *Appendix "G" contains the ODOT turn lane criteria analysis worksheets*.

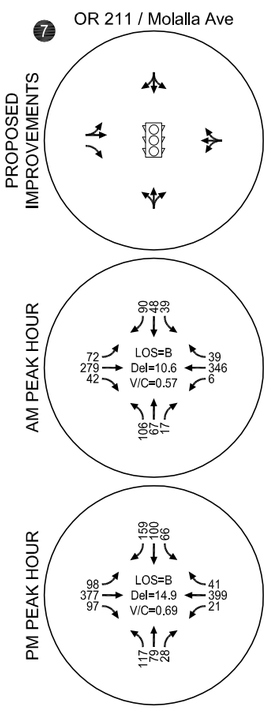
YEAR 2020 TOTAL TRAFFIC CONDITIONS WITH MITIGATION

Figure 8 displays the year 2020 total traffic conditions with signalization of the OR 211/Leroy Avenue and OR 211/Molalla Avenue intersections. With signalization, the OR 211/Molalla Avenue intersection is projected to operate with a v/c ratio of 0.57 during the weekday AM peak hour and a v/c ratio of 0.69 during the weekday PM peak hour, satisfying ODOT mobility standards. The OR 211/Leroy intersection is projected to operated well under capacity during both periods. *Appendix "H" contains the year 2020 total traffic with mitigation level-of-service worksheets.*

ON-SITE CIRCULATION/SITE-ACCESS OPERATIONS

KAI staff performed a preliminary field review of stopping and intersection sight distance based upon the proposed access locations shown on the project site plan and found that adequate sight lines can be provided. Landscaping, signage, and utilities near the site accesses and frontage should be placed and maintained to allow adequate site distance per applicable City and ODOT standards.





CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = CRITICAL MOVEMENT LEVEL OF SERVICE (SIGNALIZED)/ CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/ CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

↙ - EXISTING
↙ - PROPOSED IMPROVEMENTS

Year 2020 Total Traffic Conditions (with Mitigation)
Weekday AM and PM Peak Hours
Molalla, Oregon

Figure 8

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Site Access Spacing

The Oregon Highway Plan establishes a minimum access spacing standard of 350 feet for district highways with an Annual Average Daily Traffic (AADT) of more than 5,000 vehicles per day. The site access spacing shown on the proposed site plan satisfies this standard, as the proposed site accesses on OR 211 west and east of Leroy Avenue are both more than 350 feet from existing intersections along OR 211.

95th-percentile Queuing Analysis

95th-percentile queues at the study intersections were analyzed in Synchro for the weekday AM and PM peak hours for the existing, 2020 background, and 2020 total (before and after mitigation) conditions. Table 6 displays the results. As shown, all but one of the existing and proposed turn lane storage lengths is expected to accommodate the 95th-percentile queues under 2020 total traffic conditions, with the identified mitigations in place. The southbound left-turn 95th-percentile queue at OR 211/OR 213 is expected to exceed the striped storage length by 2020 background conditions, but the queue can still be accommodated by the upstream two-way left-turn lane. No additional mitigation measures are recommended to address 95th-percentile queues at the study intersections.

Table 6. Summary of 95th-percentile Queues

Intersection	Movement	Storage (ft)	AM Peak Hour 95th-percentile Queue (ft)			PM Peak Hour 95th-percentile Queue (ft)			Adequate Storage Provided?
			Existing	2020 Background	2020 Total Before/After Mitigation	Existing	2020 Background	2020 Total Before/After Mitigation	
1: OR 213/ OR 211	EB L	290	100	100	100	200	200	200	Yes
	EB T/R	>500	125	150	175	350	375	400	Yes
	WB L	330	100	100	125	250	250	275	Yes
	WB T	>400	200	225	250	200	225	250	Yes
	WB R	240	75	75	75	75	75	75	Yes
	NB L	250	50	50	50	75	75	75	Yes
	NB T	>400	175	175	200	225	250	250	Yes
	NB R	270	50	50	75	75	75	75	Yes
	SB L	310*	125	125	150	300	350	400	Yes
	SB T/R	>400	150	150	150	350	375	400	Yes
2: OR 211/ Hezzie Ln	EB L	210	25	25	25	25	25	25	Yes
	WB L	180	<25	<25	<25	25	25	25	Yes
	NB L	50	50	50	50	25	25	25	Yes
	NB T/R	>50	25	25	25	25	25	25	Yes
	SB L/T/R	>100	25	25	25	25	25	50	Yes
3: OR 211/ W Site Access	EB R	100	-	-	<25	-	-	<25	Yes
	WB L	75	-	-	25	-	-	25	Yes
	NB L/R	150	-	-	100	-	-	125	Yes
4: OR 211/ Leroy Ave	EB L	100	25	25	25 / 25	25	25	25 / 25	Yes
	EB T/R	>500	-	-	- / 100	-	-	- / 225	Yes
	WB L	100	-	-	25 / 50	-	-	25 / 50	Yes
	WB T/R	>500	-	-	- / 150	-	-	- / 200	Yes
	NB L	120	-	-	75 / 50	-	-	125 / 50	Yes
	NB T/R	>200	-	-	25 / 50	-	-	50 / 50	Yes
	SB L**	100**	25	25	50 / 25	25	25	50 / 25	Yes
	SB T/R	>500	25	25	50 / 50	25	25	50 / 50	Yes
5: OR 211/ E Site Access	WB L	70	-	-	<25	-	-	<25	Yes
	NB L/R	25	-	-	<25	-	-	<25	Yes
6: OR 211/ Dixon Ave	EB L	100	<25	<25	<25	<25	<25	<25	Yes
	EB R	130	<25	<25	<25	<25	<25	<25	Yes
	WB L	170	<25	<25	<25	25	25	25	Yes
	NB L/T/R	100	<25	<25	25	50	75	100	Yes
	SB L/T/R	>75	25	25	25	25	25	25	Yes
7: OR 211/ Molalla Ave	EB L/T	>350	100	100	200 / 200	225	275	500 / 350	Yes
	EB R	180	25	25	25 / 25	25	25	25 / 25	Yes
	WB L/T/R	>300	100	125	225 / 200	200	250	400 / 300	Yes
	NB L/T/R	>250	50	50	75 /125	75	75	100 / 200	Yes
	SB L/T/R	>250	25	50	50 /100	100	125	175 / 225	Yes

*Additional storage available in two-way left-turn lane (over 425 feet)
**Sufficient roadway width is currently available for a separate left turn lane. The left turn queues for existing and background conditions are shown to provide a baseline for assessment of queues after site build-out.

Section 5
Conclusions and Recommendations

CONCLUSIONS AND RECOMMENDATIONS

The results of the traffic impact analysis indicate that the proposed Cascade Center development can be constructed while maintaining acceptable study intersection operations as long as the appropriate mitigations are in place. The findings of this analysis and our recommendations are discussed below.

FINDINGS

Existing Conditions

- All of the study intersections currently meet ODOT mobility standards during the weekday AM and PM peak hours.
- A review of historical crash data did not reveal any patterns or trends in the site vicinity that require mitigation associated with this project.

Year 2020 Background Traffic Conditions

- A 2.5-percent annual growth rate was applied to the existing traffic volumes to account for regional growth in the area.
- The *City of Molalla Transportation System Plan* identifies the future need to signalize the OR 211/Leroy Avenue intersection. The traffic signal was identified to provide motor vehicle capacity at the intersection to serve anticipated traffic growth and also serves as a north-south pedestrian crossing opportunity linking residents south of OR 211 with Molalla River Middle School to the north. Signalization is not currently funded.
- All but one of the study intersections are expected to continue meeting ODOT mobility standards during the weekday AM and PM peak hours prior to site development:
    - The all-way stop-controlled OR 211/Molalla Avenue intersection is projected to experience a volume-to-capacity (v/c) ratio greater than 0.90 on the eastbound approach during the PM peak hour. The *City of Molalla Transportation System Plan* identifies the future need to signalize the intersection; however, signalization is not currently funded.

Proposed Development Plan

- The proposed development is expected to generate approximately 4,112 weekday net new trips, of which 330 (193 in, 137 out) will occur during the AM peak hour and 349 (192 in, 157 out) will occur during the PM peak hour. The development is also expected to generate approximately 3,488 weekday pass-by trips, of which 226 (113 in, 113 out) will occur during the AM peak hour and 262 (131 in, 131 out) will occur during the PM peak hour.
- The City of Molalla has requested I&E Construction signalize the OR 211/Leroy Avenue intersection in conjunction with site development. Signalization requires ODOT approval;

therefore, intersection operations were analyzed without and with a traffic signal in place for study purposes.

Year 2020 Total Traffic Conditions

- All but two of the study intersections are expected to continue meeting ODOT mobility standards during the weekday AM and PM peak hours after site development:
  - The northbound left turn at OR 211/Leroy Avenue is projected to experience a v/c ratio above the ODOT mobility target of 0.95 during the weekday PM peak hour, and projected northbound delays are expected to reach Level of Service "F".
  - Consistent with background conditions, the all-way stop-controlled OR 211/Molalla Avenue intersection is projected to continue to experience a v/c ratio greater than 0.90 on the eastbound approach during the PM peak hour as a result of full site buildout.

Traffic Signal and Turn Lane Considerations

- Per the MUTCD signal warrants and the estimated 24-hour volume profile of the OR 211/Molalla Avenue intersection, a traffic signal will be warranted at OR 211/Molalla Avenue prior to site development.
- Per the MUTCD signal warrants and the estimated 24-hour volume profile of the OR 211/Leroy Avenue intersection, a traffic signal will be warranted at OR 211/Leroy Avenue after the site is developed.
- A right turn lane with at least 100 feet of storage should be installed on eastbound OR 211 at the west site access per ODOT criteria. The eastbound OR 211 approach at Leroy Avenue also meets ODOT right turn lane criteria if unsignalized.
- A left turn lane with at least 75 feet of storage should be installed on westbound OR 211 at both the west site access and the east site access per ODOT criteria.

Year 2020 Total Traffic Conditions with Mitigation

- The OR 211/Leroy Avenue intersection satisfies ODOT v/c ratio mobility standards with signalization. Projected side street delays are much higher under stop control (resulting in weekday PM peak hour northbound approach Level of Service "F") as compared to a condition with signalization (resulting in weekday AM and PM peak hour intersection Level of Service "A").

95th-Percentile Queueing Analysis

- The proposed storage lengths at the study intersections are expected to accommodate each of the 95th-percentile queues in the AM and PM peak hours under 2020 total traffic conditions, assuming provision of the identified turn lanes and signalization.

RECOMMENDATIONS

The following are recommended in conjunction with site redevelopment:

- OR 211/Molalla Avenue:
  - Provide a traffic signal.
- OR 211/West Site Access:
  - Provide an eastbound right turn lane with at least 100 feet of storage.
  - Provide a westbound left turn lane with at least 75 feet of storage.
- OR 211/Leroy Avenue:
  - Restripe the north leg of the intersection to provide an exclusive left turn lane with at least 100 feet of storage and a shared thought/right lane on southbound Leroy Avenue.
  - Collaborate with City and ODOT staff to determine if and when signalization of the OR 211/Leroy Avenue intersection should be completed considering the following:
    - the City of Molalla's *Transportation System Plan* identifies the need for future signalization;
    - the City's desire for signalization in conjunction with site development;
    - the northbound left turn v/c ratio at the OR 211/Leroy Avenue intersection is forecast to exceed ODOT mobility targets after site build-out without signalization, but the intersection would meet ODOT mobility targets with signalization;
    - the projected intersection traffic volumes satisfy traffic signal warrants at site buildout; and
    - installation of a traffic signal would serve pedestrian crossings of OR 211, facilitating pedestrian access to Molalla River Middle School on Leroy Avenue and the Molalla Elementary School to the northwest.
  - Collaborate with the City and ODOT to further assess the need for an eastbound right turn lane at the OR 211/Leroy Avenue intersection pending decisions regarding signalization of the intersection.

- OR 211/East Site Access:
    - Provide a westbound left turn lane with at least 75 feet of storage.
- All landscaping, signage, and utilities near the site access points should be placed and maintained to provide adequate sight distance.

Section 6
References

REFERENCES

1. City of Molalla, OR. *City of Molalla Transportation System Plan*. 2018.
2. South Clackamas Transportation District. "Routes & Schedules." 2018. < http://sctd.org/routes.html>.
3. Oregon Department of Transportation (ODOT). *Analysis Procedures Manual, Version 2*. 2018.
4. Transportation Research Board of the National Academies. *Highway Capacity Manual 2000*.
5. Transportation Research Board of the National Academies. *Highway Capacity Manual 2010*.
6. Oregon Department of Transportation (ODOT). *Oregon Highway Plan*. 1999.
7. Institute of Transportation Engineers. *Trip Generation, 10th Edition*. 2017.
8. Institute of Transportation Engineers. *Trip Generation Handbook, 3rd Edition*. 2017.
9. *Manual on Uniform Traffic Control Devices.* 2009 Edition. 2009.

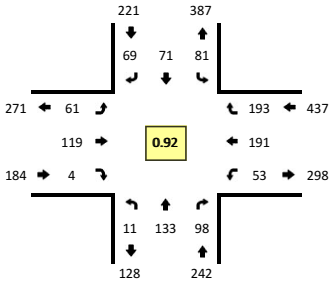
Appendix A
Turning Movement Counts

Type of peak hour being reported: User-Defined

Method for determining peak hour: Total Entering Volume

LOCATION: OR-213 -- OR-211
CITY/STATE: Molalla, OR

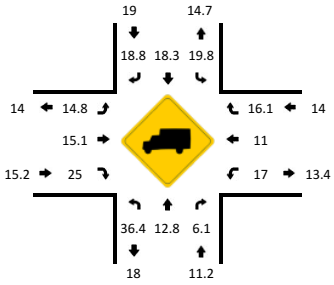
QC JOB #: 14815601
DATE: Tue, Oct 9 2018

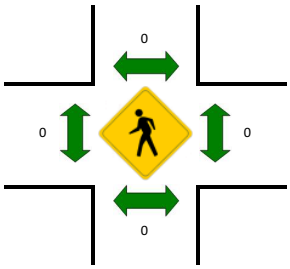


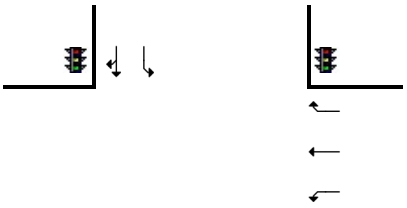
Peak-Hour: 7:00 AM -- 8:00 AM

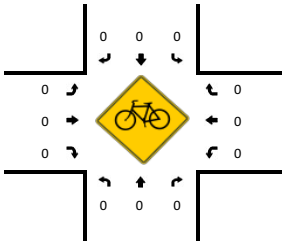
Peak 15-Min: 7:20 AM -- 7:35 AM

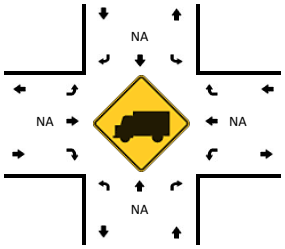
Quality Counts
DATA THAT DRIVES COMMUNITIES

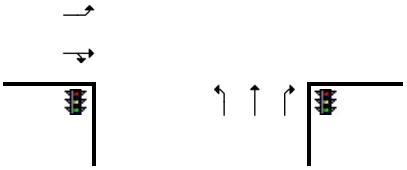


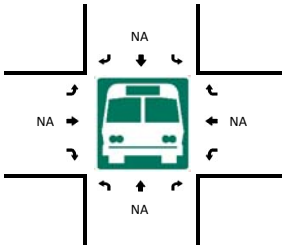












5-Min Count Period Beginning At	OR-213 (Northbound)				OR-213 (Southbound)				OR-211 (Eastbound)				OR-211 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	11	11	0	4	1	6	0	4	11	0	0	4	13	14	0	79	
7:05 AM	1	5	4	0	6	10	10	0	8	10	0	0	3	17	17	0	91	
7:10 AM	0	8	9	0	3	6	5	0	6	13	1	0	5	13	25	0	94	
7:15 AM	2	17	5	0	6	9	8	0	3	9	1	0	1	14	21	0	96	
7:20 AM	0	10	9	0	4	4	7	0	4	9	0	0	8	26	21	0	102	
7:25 AM	4	15	5	0	4	4	7	0	10	8	0	0	6	16	18	0	97	
7:30 AM	0	14	6	0	10	6	5	0	4	7	0	0	5	25	15	0	97	
7:35 AM	3	9	12	0	9	8	6	0	4	9	0	0	4	18	16	0	98	
7:40 AM	0	6	14	0	9	6	3	0	5	8	0	0	5	13	15	0	84	
7:45 AM	1	9	11	0	11	7	2	0	2	5	1	0	3	12	15	0	79	
7:50 AM	0	15	7	0	5	4	3	0	7	14	0	0	2	9	10	0	76	
7:55 AM	0	14	5	0	10	6	7	0	4	16	1	0	7	15	6	0	91	1084
8:00 AM	3	7	0	0	9	4	3	0	6	7	1	0	5	11	10	0	66	1071
8:05 AM	1	14	6	0	11	5	11	0	1	6	1	0	3	16	17	0	92	1072
8:10 AM	0	14	4	0	1	2	4	0	8	9	1	0	3	10	7	0	63	1041
8:15 AM	1	10	5	0	7	12	9	0	8	10	3	0	4	7	14	0	90	1035
8:20 AM	1	17	5	0	13	6	1	0	7	10	0	0	4	19	9	0	92	1025
8:25 AM	2	14	5	0	8	9	4	0	5	11	1	0	5	10	13	0	87	1015
8:30 AM	1	9	5	0	13	9	7	0	6	5	1	0	9	16	14	0	95	1013
8:35 AM	1	12	3	0	7	10	7	0	4	17	0	0	3	13	8	0	85	1000
8:40 AM	1	9	3	0	7	5	4	0	0	6	0	0	4	23	9	0	71	987
8:45 AM	1	12	5	0	10	7	11	0	7	11	0	0	0	22	9	0	95	1003
8:50 AM	2	13	7	0	10	3	12	0	4	14	1	0	7	16	7	0	96	1023
8:55 AM	1	9	6	0	12	7	5	0	7	14	2	0	2	11	10	0	86	1018

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	16	156	80	0	72	56	76	0	72	96	0	0	76	268	216	0	1184
Heavy Trucks	4	12	4		16	4	20		4	16	0		16	36	40		172
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

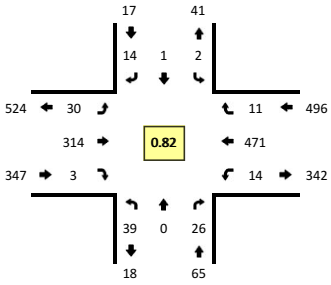
Report generated on 1/11/2019 9:14 AM

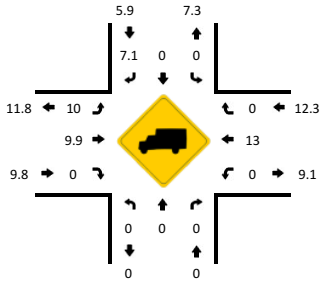
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

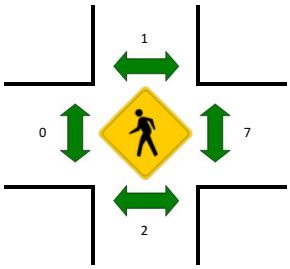
Type of peak hour being reported: User-Defined | Method for determining peak hour: Total Entering Volume

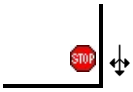
LOCATION: N Hezzie Ln -- OR-211 | **QC JOB #:** 14815603
CITY/STATE: Molalla, OR | **DATE:** Tue, Oct 9 2018

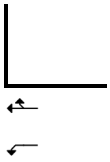
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:15 AM -- 7:30 AM

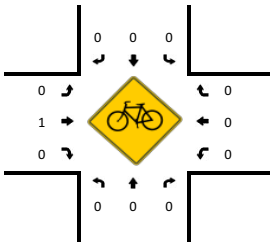


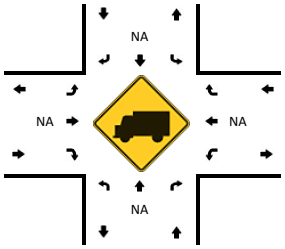


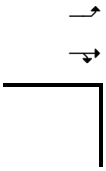


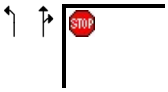


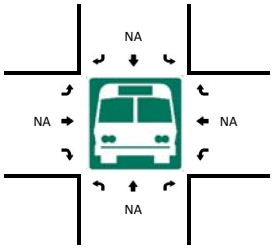












5-Min Count Period Beginning At	N Hezzie Ln (Northbound)				N Hezzie Ln (Southbound)				OR-211 (Eastbound)				OR-211 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	5	0	0	0	0	0	3	0	1	31	0	0	1	34	0	0	75	
7:05 AM	5	0	3	0	0	0	1	0	2	30	0	0	0	38	0	0	79	
7:10 AM	2	0	2	0	0	0	3	0	2	27	0	0	1	33	0	0	70	
7:15 AM	7	0	6	0	1	0	0	0	7	28	0	0	3	42	1	0	95	
7:20 AM	0	0	2	0	0	1	4	0	2	17	0	0	2	60	1	0	89	
7:25 AM	7	0	3	0	0	0	0	0	1	30	0	0	1	55	2	0	99	
7:30 AM	1	0	3	0	0	0	2	0	5	16	0	0	2	44	1	0	74	
7:35 AM	3	0	0	0	0	0	0	0	2	35	0	0	0	31	1	0	72	
7:40 AM	2	0	2	0	1	0	0	0	2	21	0	0	1	39	0	0	68	
7:45 AM	4	0	0	0	0	0	1	0	4	27	1	0	2	35	1	0	75	
7:50 AM	2	0	3	0	0	0	0	0	1	22	0	0	0	32	1	0	61	
7:55 AM	1	0	2	0	0	0	0	0	1	30	2	0	1	28	3	0	68	925
8:00 AM	1	0	0	0	0	0	0	0	4	22	0	0	1	38	0	0	66	916
8:05 AM	1	0	1	0	0	0	2	0	1	19	0	0	1	28	0	0	53	890
8:10 AM	1	0	3	0	1	0	0	0	1	20	0	0	0	31	0	0	57	877
8:15 AM	3	0	1	0	0	0	0	0	1	18	0	0	3	21	1	0	48	830
8:20 AM	1	0	1	0	0	0	0	0	3	20	0	1	1	33	0	0	60	801
8:25 AM	1	0	1	0	0	0	3	0	2	38	0	0	0	41	1	0	87	789
8:30 AM	2	0	0	0	0	0	3	0	3	18	0	0	0	27	0	1	54	769
8:35 AM	0	0	0	0	1	0	3	0	1	28	0	0	1	28	2	0	64	761
8:40 AM	2	0	1	0	1	1	2	0	1	23	0	0	0	40	1	0	72	765
8:45 AM	0	0	0	0	2	0	1	0	1	22	1	0	1	31	0	0	59	749
8:50 AM	4	0	0	0	1	0	1	0	2	27	0	0	2	25	4	0	66	754
8:55 AM	0	0	1	0	1	0	1	0	1	33	1	0	0	36	1	0	75	761

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	56	0	44	0	4	4	16	0	40	300	0	0	24	628	16	0	1132
Heavy Trucks	0	0	0		0	0	0		4	24	0		0	100	0		128
Pedestrians		4				0				0				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 1/11/2019 9:14 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

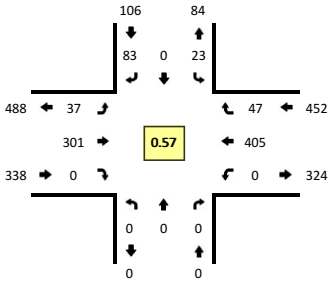
Type of peak hour being reported: User-Defined

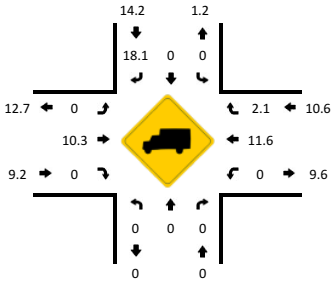
Method for determining peak hour: Total Entering Volume

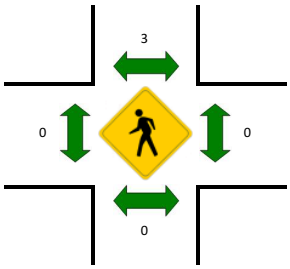
LOCATION: Leroy Ave -- OR-211
CITY/STATE: Molalla, OR

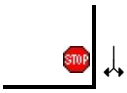
QC JOB #: 14815609
DATE: Tue, Oct 9 2018

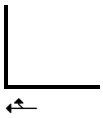
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:15 AM -- 7:30 AM

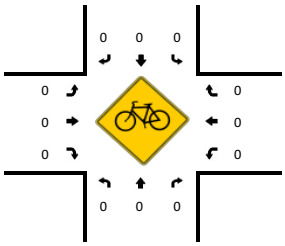


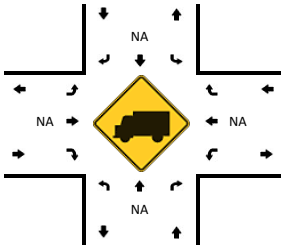


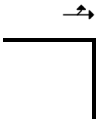


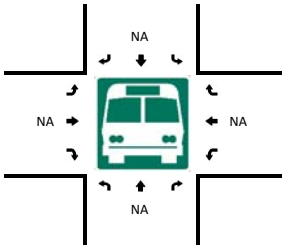












5-Min Count Period Beginning At	Leroy Ave (Northbound)				Leroy Ave (Southbound)				OR-211 (Eastbound)				OR-211 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	0	0	0	0	0	0	2	0	1	12	0	0	0	41	2	0	58	
6:05 AM	0	0	0	0	0	0	1	0	1	14	0	0	0	26	2	0	44	
6:10 AM	0	0	0	0	0	0	2	0	2	14	0	0	0	27	0	0	45	
6:15 AM	0	0	0	0	0	0	2	0	0	24	0	0	0	29	0	0	55	
6:20 AM	0	0	0	0	1	0	1	0	0	8	0	0	0	28	3	0	41	
6:25 AM	0	0	0	0	1	0	2	0	2	16	0	0	0	32	0	0	53	
6:30 AM	0	0	0	0	0	0	2	0	0	17	0	0	0	40	0	0	59	
6:35 AM	0	0	0	0	0	0	3	0	0	17	0	0	0	36	1	0	57	
6:40 AM	0	0	0	0	0	0	2	0	3	22	0	0	0	33	0	0	60	
6:45 AM	0	0	0	0	1	0	2	0	1	31	0	0	0	32	2	0	69	
6:50 AM	0	0	0	0	0	0	3	0	2	27	0	0	0	41	4	0	77	
6:55 AM	0	0	0	0	2	0	5	0	1	25	0	0	0	28	3	0	64	682
7:00 AM	0	0	0	0	0	0	4	0	2	29	0	0	0	26	4	0	65	689
7:05 AM	0	0	0	0	2	0	4	0	4	25	0	0	0	36	11	0	82	727
7:10 AM	0	0	0	0	1	0	6	0	6	27	0	0	0	28	5	0	73	755
7:15 AM	0	0	0	0	2	0	11	0	2	25	0	0	0	31	8	0	79	779
7:20 AM	0	0	0	0	2	0	15	0	6	23	0	0	0	46	9	0	101	839
7:25 AM	0	0	0	0	6	0	12	0	4	22	0	0	0	43	7	0	94	880
7:30 AM	0	0	0	0	2	0	14	0	5	19	0	0	0	37	1	0	78	899
7:35 AM	0	0	0	0	2	0	3	0	2	25	0	0	0	30	0	0	62	904
7:40 AM	0	0	0	0	0	0	6	0	4	21	0	0	0	36	0	0	67	911
7:45 AM	0	0	0	0	1	0	4	0	1	28	0	0	0	32	2	0	68	910
7:50 AM	0	0	0	0	2	0	1	0	1	27	0	0	0	30	0	0	61	894
7:55 AM	0	0	0	0	3	0	3	0	0	30	0	0	0	30	0	0	66	896
8:00 AM	0	0	0	0	1	0	0	0	3	16	0	0	0	32	0	0	52	883
8:05 AM	0	0	0	0	0	0	3	0	0	27	0	0	0	29	1	0	60	861
8:10 AM	0	0	0	0	0	0	3	0	0	22	0	0	0	31	2	0	58	846
8:15 AM	0	0	0	0	1	0	1	0	0	12	0	0	0	25	0	0	39	806
8:20 AM	0	0	0	0	0	0	4	0	3	30	0	0	0	27	3	0	67	772
8:25 AM	0	0	0	0	1	0	2	0	1	26	0	0	0	34	1	0	65	743
8:30 AM	0	0	0	0	1	0	5	0	3	20	0	0	0	26	0	0	55	720
8:35 AM	0	0	0	0	0	0	2	0	0	33	0	0	0	26	0	0	61	719
8:40 AM	0	0	0	0	0	0	1	0	3	18	0	0	0	41	4	0	67	719
8:45 AM	0	0	0	0	3	0	2	0	1	22	0	0	0	30	4	0	62	713
8:50 AM	0	0	0	0	0	0	8	0	0	31	0	0	0	26	3	0	68	720
8:55 AM	0	0	0	0	1	0	10	0	2	27	0	0	0	23	0	0	63	717

5-Min Count Period Beginning At	Leroy Ave (Northbound)				Leroy Ave (Southbound)				OR-211 (Eastbound)				OR-211 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
9:00 AM	0	0	0	0	1	0	4	0	2	29	0	0	0	31	4	0	71	736
9:05 AM	0	0	0	0	0	0	3	0	3	29	0	0	0	23	2	0	60	736
9:10 AM	0	0	0	0	0	0	1	0	0	31	0	0	0	38	1	0	71	749
9:15 AM	0	0	0	0	1	0	2	0	2	19	0	0	0	28	1	0	53	763
9:20 AM	0	0	0	0	0	0	3	0	1	22	0	0	0	31	5	0	62	758
9:25 AM	0	0	0	0	4	0	4	0	2	23	0	0	0	32	0	0	65	758
9:30 AM	0	0	0	0	0	0	3	0	2	18	0	0	0	31	1	0	55	758
9:35 AM	0	0	0	0	0	0	3	0	0	19	0	0	0	31	2	0	55	752
9:40 AM	0	0	0	0	1	0	4	0	2	21	0	0	0	27	0	0	55	740
9:45 AM	0	0	0	0	2	0	4	0	0	27	0	0	0	29	2	0	64	742
9:50 AM	0	0	0	0	0	0	1	0	0	25	0	0	0	32	3	0	61	735
9:55 AM	0	0	0	0	0	0	0	0	0	29	0	0	0	45	1	0	75	747
10:00 AM	0	0	0	0	0	0	3	0	1	29	0	0	0	37	1	0	71	747
10:05 AM	0	0	0	0	0	0	0	0	1	24	0	0	0	29	1	0	55	742
10:10 AM	0	0	0	0	1	0	1	0	0	33	0	0	0	32	2	0	69	740
10:15 AM	0	0	0	0	1	0	1	0	1	25	0	0	0	40	1	0	69	756
10:20 AM	0	0	0	0	1	0	3	0	1	27	0	0	0	28	3	0	63	757
10:25 AM	0	0	0	0	1	0	4	0	2	31	0	0	0	30	3	0	71	763
10:30 AM	0	0	0	0	0	0	2	0	0	31	0	0	0	35	0	0	68	776
10:35 AM	0	0	0	0	1	0	2	0	0	22	0	0	0	45	2	0	72	793
10:40 AM	0	0	0	0	0	0	2	0	1	23	0	0	0	27	2	0	55	793
10:45 AM	0	0	0	0	1	0	1	0	2	22	0	0	0	42	6	0	74	803
10:50 AM	0	0	0	0	0	0	2	0	0	34	0	0	0	52	2	0	90	832
10:55 AM	0	0	0	0	0	0	1	0	0	32	0	0	0	49	2	0	84	841
11:00 AM	0	0	0	0	1	0	0	0	2	25	0	0	0	45	1	0	74	844
11:05 AM	0	0	0	0	2	0	3	0	1	25	0	0	0	44	1	0	76	865
11:10 AM	0	0	0	0	1	0	2	0	3	43	0	0	0	37	5	0	91	887
11:15 AM	0	0	0	0	4	0	2	0	0	35	0	0	0	47	2	0	90	908
11:20 AM	0	0	0	0	1	0	4	0	1	35	0	0	0	36	1	0	78	923
11:25 AM	0	0	0	0	0	0	3	0	2	31	0	0	0	31	1	0	68	920
11:30 AM	0	0	0	0	1	0	3	0	0	35	0	0	0	34	1	0	74	926
11:35 AM	0	0	0	0	1	0	1	0	3	34	0	0	0	46	0	0	85	939
11:40 AM	0	0	0	0	2	0	1	0	4	31	0	0	0	38	4	0	80	964
11:45 AM	0	0	0	0	1	0	5	0	0	29	0	0	0	44	4	0	83	973
11:50 AM	0	0	0	0	4	0	0	0	1	31	0	0	0	44	1	0	81	964
11:55 AM	0	0	0	0	1	0	0	0	2	33	0	0	0	35	5	0	76	956
12:00 PM	0	0	0	0	1	0	4	0	1	40	0	0	0	47	3	0	96	978
12:05 PM	0	0	0	0	1	0	3	0	3	35	0	0	0	40	2	0	84	986
12:10 PM	0	0	0	0	1	0	7	0	0	38	0	0	0	33	2	0	81	976
12:15 PM	0	0	0	0	1	0	2	0	3	34	0	0	0	40	0	0	80	966
12:20 PM	0	0	0	0	2	0	2	0	2	38	0	0	0	23	0	0	67	955
12:25 PM	0	0	0	0	3	0	3	0	1	38	0	0	0	36	2	0	83	970
12:30 PM	0	0	0	0	3	0	2	0	3	33	0	0	0	35	0	0	76	972
12:35 PM	0	0	0	0	1	0	0	0	1	47	0	0	0	34	1	0	84	971
12:40 PM	0	0	0	0	1	0	1	0	1	24	0	0	0	36	0	0	63	954
12:45 PM	0	0	0	0	1	0	2	0	5	33	0	0	0	37	5	0	83	954
12:50 PM	0	0	0	0	0	0	3	0	1	38	0	0	0	35	1	0	78	951
12:55 PM	0	0	0	0	3	0	1	0	1	31	0	0	0	46	1	0	83	958
1:00 PM	0	0	0	0	0	0	0	0	1	35	0	0	0	28	0	0	64	926
1:05 PM	0	0	0	0	1	0	0	0	3	32	0	0	0	41	5	0	82	924
1:10 PM	0	0	0	0	2	0	4	0	2	28	0	0	0	37	4	0	77	920
1:15 PM	0	0	0	0	1	0	2	0	1	44	0	0	0	30	1	0	79	919
1:20 PM	0	0	0	0	1	0	3	0	1	42	0	0	0	38	4	0	89	941
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1:50 PM	0	0	0	0	4	0	2	0	3	34	0	0	0	39	2	0	84	973
1:55 PM	0	0	0	0	1	0	2	0	4	26	0	0	0	31	3	0	67	957
2:00 PM	0	0	0	0	3	0	2	0	1	32	0	0	0	43	3	0	84	977
2:05 PM	0	0	0	0	0	0	3	0	2	33	0	0	0	32	3	0	73	968
2:10 PM	0	0	0	0	0	0	3	0	4	40	0	0	0	37	3	0	87	978
2:15 PM	0	0	0	0	3	0	1	0	2	32	0	0	0	38	7	0	83	982
2:20 PM	0	0	0	0	2	0	9	0	2	37	0	0	0	30	3	0	83	976
2:25 PM	0	0	0	0	4	0	10	0	0	39	0	0	0	29	3	0	85	979
2:30 PM	0	0	0	0	3	0	4	0	1	40	0	0	0	31	2	0	81	968
2:35 PM	0	0	0	0	3	0	1	0	1	37	0	0	0	46	3	0	91	974
2:40 PM	0	0	0	0	1	0	1	0	1	43	0	0	0	34	1	0	81	964
2:45 PM	0	0	0	0	2	0	5	0	1	36	0	0	0	40	3	0	87	986
2:50 PM	0	0	0	0	1	0	5	0	3	37	0	0	0	39	2	0	87	989
2:55 PM	0	0	0	0	0	0	6	0	1	39	0	0	0	60	2	0	108	1030
3:00 PM	0	0	0	0	2	0	1	0	3	39	0	0	0	39	4	0	88	1034
3:05 PM	0	0	0	0	2	0	3	0	1	33	0	0	0	46	1	0	86	1047

5-Min Count Period Beginning At	Leroy Ave (Northbound)				Leroy Ave (Southbound)				OR-211 (Eastbound)				OR-211 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:10 PM	0	0	0	0	3	0	10	0	3	44	0	0	0	49	0	0	109	1069
3:15 PM	0	0	0	0	1	0	6	0	3	43	0	0	0	48	3	0	104	1090
3:20 PM	0	0	0	0	1	0	3	0	0	41	0	0	0	56	1	0	102	1109
3:25 PM	0	0	0	0	0	0	2	0	2	49	0	0	0	30	2	0	85	1109
3:30 PM	0	0	0	0	2	0	9	0	7	46	0	0	0	43	1	0	108	1136
3:35 PM	0	0	0	0	1	0	6	0	3	41	0	0	0	43	1	0	95	1140
3:40 PM	0	0	0	0	2	0	7	0	2	58	0	0	0	37	2	0	108	1167
3:45 PM	0	0	0	0	0	0	2	0	0	38	0	0	0	41	1	0	82	1162
3:50 PM	0	0	0	0	1	0	4	0	2	48	0	0	0	37	1	0	93	1168
3:55 PM	0	0	0	0	0	0	5	0	3	51	0	0	0	38	6	0	103	1163
4:00 PM	0	0	0	0	1	0	7	0	3	50	0	0	0	31	1	0	93	1168
4:05 PM	0	0	0	0	0	0	1	0	4	49	0	0	0	41	1	0	96	1178
4:10 PM	0	0	0	0	1	0	6	0	2	46	0	0	0	39	3	0	97	1166
4:15 PM	0	0	0	0	1	0	5	0	2	49	0	0	0	39	2	0	98	1160
4:20 PM	0	0	0	0	2	0	4	0	2	45	0	0	0	41	3	0	97	1155
4:25 PM	0	0	0	0	0	0	2	0	3	45	0	0	0	38	4	0	92	1162
4:30 PM	0	0	0	0	4	0	3	0	1	49	0	0	0	46	2	0	105	1159
4:35 PM	0	0	0	0	1	0	4	0	4	44	0	0	0	46	2	0	101	1165
4:40 PM	0	0	0	0	0	0	2	0	5	53	0	0	0	45	3	0	108	1165
4:45 PM	0	0	0	0	2	0	5	0	6	37	0	0	0	46	5	0	101	1184
4:50 PM	0	0	0	0	1	0	9	0	4	53	0	0	0	44	6	0	117	1208
4:55 PM	0	0	0	0	0	0	5	0	4	42	0	0	0	42	8	0	101	1206
5:00 PM	0	0	0	0	2	0	5	0	1	59	0	0	0	46	6	0	119	1232
5:05 PM	0	0	0	0	1	0	5	0	3	49	0	0	0	42	5	0	105	1241
5:10 PM	0	0	0	0	2	0	8	0	6	39	0	0	0	61	3	0	119	1263
5:15 PM	0	0	0	0	1	0	4	0	2	49	0	0	0	33	3	0	92	1257
5:20 PM	0	0	0	0	1	0	3	0	4	45	0	0	0	39	4	0	96	1256
5:25 PM	0	0	0	0	1	0	2	0	4	49	0	0	0	44	6	0	106	1270
5:30 PM	0	0	0	0	0	0	8	0	6	43	0	0	0	39	4	0	100	1265
5:35 PM	0	0	0	0	2	0	8	0	4	49	0	0	0	37	3	0	103	1267
5:40 PM	0	0	0	0	0	0	7	0	5	45	0	0	0	31	6	0	94	1253
5:45 PM	0	0	0	0	1	0	10	0	3	48	0	0	0	43	1	0	106	1258
5:50 PM	0	0	0	0	4	0	5	0	3	45	0	0	0	40	7	0	104	1245
5:55 PM	0	0	0	0	2	0	2	0	2	41	0	0	0	29	5	0	81	1225
6:00 PM	0	0	0	0	0	0	4	0	8	45	0	0	0	47	2	0	106	1212
6:05 PM	0	0	0	0	2	0	3	0	4	47	0	0	0	31	1	0	88	1195
6:10 PM	0	0	0	0	2	0	6	0	5	43	0	0	0	36	0	0	92	1168
6:15 PM	0	0	0	0	3	0	4	0	3	46	0	0	0	40	3	0	99	1175
6:20 PM	0	0	0	0	4	0	3	0	1	35	0	0	0	32	1	0	76	1155
6:25 PM	0	0	0	0	1	0	1	0	3	34	0	0	0	31	0	0	70	1119
6:30 PM	0	0	0	0	2	0	6	0	7	31	0	0	0	37	4	0	87	1106
6:35 PM	0	0	0	0	7	0	15	0	4	38	0	0	0	24	0	0	88	1091
6:40 PM	0	0	0	0	2	0	4	0	7	42	0	0	0	26	3	0	84	1081
6:45 PM	0	0	0	0	0	0	3	0	1	41	0	0	0	31	5	0	81	1056
6:50 PM	0	0	0	0	4	0	7	0	5	39	0	0	0	32	4	0	91	1043
6:55 PM	0	0	0	0	0	0	7	0	3	37	0	0	0	28	4	0	79	1041
7:00 PM	0	0	0	0	2	0	1	0	4	27	0	0	0	23	3	0	60	995
7:05 PM	0	0	0	0	9	0	12	0	3	23	0	0	0	18	3	0	68	975
7:10 PM	0	0	0	0	2	0	4	0	3	32	0	0	0	26	2	0	69	952
7:15 PM	0	0	0	0	3	0	1	0	1	28	0	0	0	30	2	0	65	918
7:20 PM	0	0	0	0	0	0	0	0	1	33	0	0	0	22	1	0	57	899
7:25 PM	0	0	0	0	0	0	2	0	2	23	0	0	0	18	2	0	47	876
7:30 PM	0	0	0	0	1	0	2	0	0	22	0	0	0	31	1	0	57	846
7:35 PM	0	0	0	0	0	0	2	0	0	14	0	0	0	27	5	0	48	806
7:40 PM	0	0	0	0	0	0	0	0	3	26	0	0	0	18	2	0	49	771
7:45 PM	0	0	0	0	2	0	1	0	2	18	0	0	0	18	1	0	42	732
7:50 PM	0	0	0	0	1	0	1	0	3	20	0	0	0	17	0	0	42	683
7:55 PM	0	0	0	0	2	0	1	0	2	7	0	0	0	14	0	0	26	630
8:00 PM	0	0	0	0	0	0	1	0	2	18	0	0	0	10	0	0	31	601
8:05 PM	0	0	0	0	1	0	2	0	1	17	0	0	0	16	2	0	39	572
8:10 PM	0	0	0	0	0	0	2	0	2	22	0	0	0	26	1	0	53	556
8:15 PM	0	0	0	0	1	0	2	0	2	15	0	0	0	16	1	0	37	528
8:20 PM	0	0	0	0	0	0	1	0	1	14	0	0	0	18	2	0	36	507
8:25 PM	0	0	0	0	0	0	2	0	3	19	0	0	0	11	0	0	35	495
8:30 PM	0	0	0	0	0	0	3	0	2	9	0	0	0	22	0	0	36	474
8:35 PM	0	0	0	0	0	0	1	0	2	18	0	0	0	18	0	0	39	465
8:40 PM	0	0	0	0	1	0	1	0	4	15	0	0	0	11	1	0	33	449
8:45 PM	0	0	0	0	0	0	1	0	1	16	0	0	0	23	1	0	42	449
8:50 PM	0	0	0	0	1	0	2	0	2	15	0	0	0	14	2	0	36	443
8:55 PM	0	0	0	0	1	0	2	0	2	14	0	0	0	21	2	0	42	459
9:00 PM	0	0	0	0	1	0	1	0	1	8	0	0	0	17	1	0	29	457
9:05 PM	0	0	0	0	0	0	2	0	0	9	0	0	0	9	0	0	20	438
9:10 PM	0	0	0	0	0	0	1	0	1	15	0	0	0	8	0	0	25	410
9:15 PM	0	0	0	0	1	0	0	0	4	17	0	0	0	14	0	0	36	409

5-Min Count Period Beginning At	Leroy Ave (Northbound)				Leroy Ave (Southbound)				OR-211 (Eastbound)				OR-211 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
9:20 PM	0	0	0	0	0	0	1	0	3	19	0	0	0	8	0	0	31	404
9:25 PM	0	0	0	0	0	0	1	0	0	18	0	0	0	6	0	0	25	394
9:30 PM	0	0	0	0	0	0	0	0	2	12	0	0	0	5	0	0	19	377
9:35 PM	0	0	0	0	0	0	0	0	1	8	0	0	0	9	1	0	19	357
9:40 PM	0	0	0	0	0	0	0	0	0	16	0	0	0	11	0	0	27	351
9:45 PM	0	0	0	0	1	0	1	0	0	7	0	0	0	8	0	0	17	326
9:50 PM	0	0	0	0	0	0	1	0	0	7	0	0	0	5	0	0	13	303
9:55 PM	0	0	0	0	0	0	2	0	1	9	0	0	0	4	1	0	17	278

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	40	0	152	0	48	280	0	0	0	480	96	0	1096
Heavy Trucks	0	0	0		0	0	36		0	24	0		0	64	0		124
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 1/11/2019 9:16 AM

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

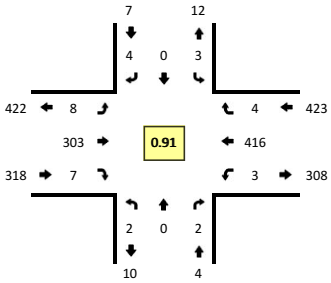
Type of peak hour being reported: User-Defined

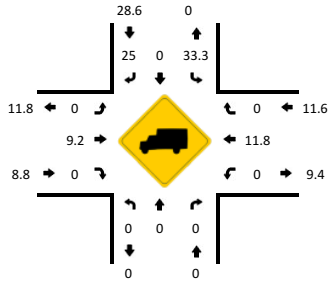
Method for determining peak hour: Total Entering Volume

LOCATION: Dixon Ave -- OR-211
CITY/STATE: Molalla, OR

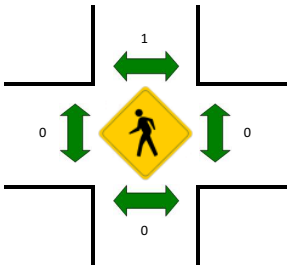
QC JOB #: 14815605
DATE: Tue, Oct 9 2018

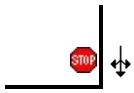
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:15 AM -- 7:30 AM

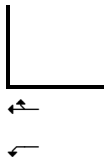


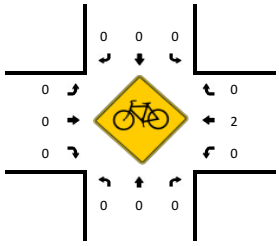


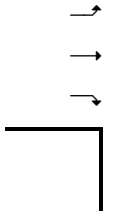
Quality Counts
DATA THAT DRIVES COMMUNITIES

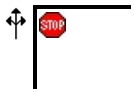


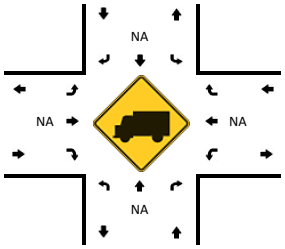


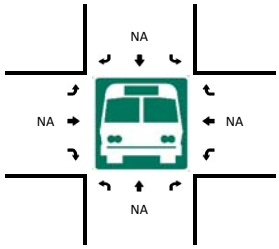












5-Min Count Period Beginning At	Dixon Ave (Northbound)				Dixon Ave (Southbound)				OR-211 (Eastbound)				OR-211 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	0	0	0	0	0	25	0	0	0	32	1	0	58	
7:05 AM	0	0	0	0	0	0	0	0	1	30	0	0	0	45	0	0	76	
7:10 AM	0	0	0	0	0	0	1	0	1	26	0	0	0	31	0	0	59	
7:15 AM	0	0	0	0	0	0	0	0	3	22	1	0	0	33	0	0	59	
7:20 AM	0	0	0	0	1	0	0	0	0	23	2	0	0	49	1	0	76	
7:25 AM	1	0	0	0	0	0	1	0	0	22	1	0	0	46	0	0	71	
7:30 AM	0	0	0	0	0	0	0	0	0	22	0	0	3	30	0	0	55	
7:35 AM	0	0	0	0	0	0	0	0	1	28	1	0	0	32	0	0	62	
7:40 AM	0	0	0	0	1	0	1	0	0	24	1	0	0	24	0	0	51	
7:45 AM	1	0	0	0	0	0	0	0	1	28	0	0	0	36	0	0	66	
7:50 AM	0	0	1	0	0	0	0	0	0	24	1	0	0	30	2	0	58	
7:55 AM	0	0	1	0	1	0	1	0	1	29	0	0	0	28	0	0	61	752
8:00 AM	0	0	0	0	0	0	1	0	0	18	0	0	0	37	1	0	57	751
8:05 AM	1	0	0	0	0	0	1	0	0	20	0	0	0	29	0	0	51	726
8:10 AM	0	0	0	0	1	0	1	0	0	25	0	0	1	27	1	0	56	723
8:15 AM	2	0	0	0	1	0	0	0	0	12	1	0	1	25	1	0	43	707
8:20 AM	2	0	0	0	0	0	0	0	0	29	2	0	0	27	0	0	60	691
8:25 AM	2	0	0	0	1	0	1	0	0	20	4	0	0	27	1	0	56	676
8:30 AM	0	0	1	0	1	0	1	0	0	25	0	0	1	21	1	0	51	672
8:35 AM	0	1	0	0	1	0	1	0	0	26	2	0	1	30	0	0	62	672
8:40 AM	1	0	1	0	1	0	2	0	0	18	0	0	1	33	0	0	57	678
8:45 AM	0	0	1	0	0	0	0	0	0	23	2	0	0	37	1	0	64	676
8:50 AM	0	0	0	0	1	0	0	0	0	23	4	0	2	28	0	0	58	676
8:55 AM	0	0	0	0	1	0	0	0	0	28	2	0	1	25	0	0	57	672

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	4	0	4	0	12	268	16	0	0	512	4	0	824
Heavy Trucks	0	0	0		0	0	0		0	20	0		0	60	0		80
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	1	0		1
Railroad																	
Stopped Buses																	

Comments:

Report generated on 1/11/2019 9:14 AM

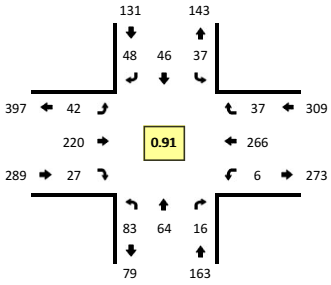
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: User-Defined

Method for determining peak hour: Total Entering Volume

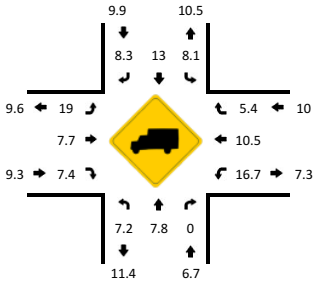
LOCATION: Molalla Ave -- OR-211
CITY/STATE: Molalla, OR

QC JOB #: 14815607
DATE: Tue, Oct 9 2018

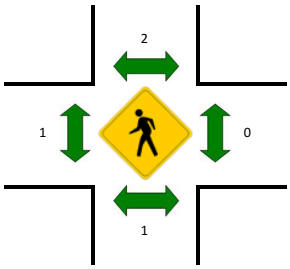


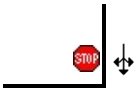
Peak-Hour: 7:00 AM -- 8:00 AM

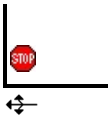
Peak 15-Min: 7:00 AM -- 7:15 AM

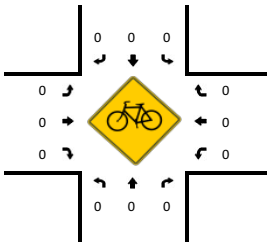


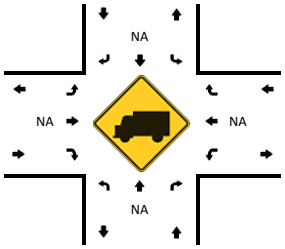
Quality Counts
DATA THAT DRIVES COMMUNITIES

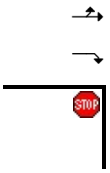


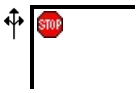


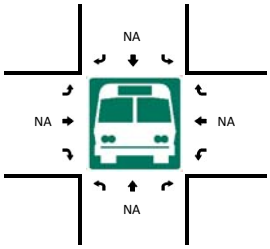












5-Min Count Period Beginning At	Molalla Ave (Northbound)				Molalla Ave (Southbound)				OR-211 (Eastbound)				OR-211 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	11	8	2	0	2	2	5	0	5	19	0	0	1	21	0	0	76	
7:05 AM	6	9	3	0	3	2	5	0	4	21	1	0	0	28	9	0	91	
7:10 AM	6	9	4	0	2	3	3	0	9	18	1	0	0	18	4	0	77	
7:15 AM	9	9	1	0	0	6	4	0	5	14	2	0	0	21	5	0	76	
7:20 AM	12	6	0	0	1	4	4	0	1	17	2	0	2	29	2	0	80	
7:25 AM	6	4	0	0	2	4	8	0	1	15	2	0	2	24	0	0	68	
7:30 AM	4	3	2	0	0	5	4	0	2	17	3	0	0	17	2	0	59	
7:35 AM	7	2	0	0	0	5	2	0	2	22	5	0	0	22	4	0	71	
7:40 AM	8	3	2	0	7	2	5	0	3	20	3	0	0	19	3	0	75	
7:45 AM	5	2	1	0	11	6	4	0	4	18	3	0	0	26	2	0	82	
7:50 AM	5	3	1	0	5	2	3	0	2	21	1	0	1	18	3	0	65	
7:55 AM	4	6	0	0	4	5	1	0	4	18	4	0	0	23	3	0	72	892
8:00 AM	10	4	1	0	5	1	4	0	3	19	0	0	0	23	6	0	76	892
8:05 AM	3	3	2	0	0	9	5	0	2	12	1	0	2	19	4	0	62	863
8:10 AM	7	1	4	0	3	2	1	0	1	20	5	0	1	17	8	0	70	856
8:15 AM	3	6	1	0	4	4	9	0	3	9	2	0	1	23	3	0	68	848
8:20 AM	4	6	1	0	1	3	3	0	4	23	0	0	0	13	4	0	62	830
8:25 AM	7	8	2	0	3	2	2	0	2	13	6	0	1	16	2	0	64	826
8:30 AM	5	5	0	0	2	4	1	0	4	15	3	0	0	13	4	0	56	823
8:35 AM	7	2	0	0	4	3	5	0	1	16	1	0	2	26	6	0	73	825
8:40 AM	8	8	1	0	1	3	2	0	2	16	3	0	1	22	3	0	70	820
8:45 AM	3	5	3	0	3	7	9	0	5	8	4	0	0	16	6	0	69	807
8:50 AM	8	4	3	0	7	4	2	0	2	14	3	0	0	13	5	0	65	807
8:55 AM	6	3	2	0	5	1	5	0	3	20	5	0	3	16	5	0	74	809

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	92	104	36	0	28	28	52	0	72	232	8	0	4	268	52	0	976
Heavy Trucks	4	4	0		0	0	12		16	36	0		4	28	4		108
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 1/11/2019 9:14 AM

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

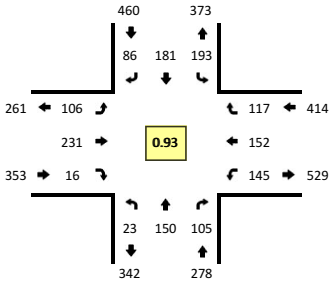
Type of peak hour being reported: User-Defined

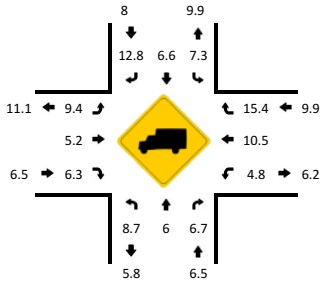
Method for determining peak hour: Total Entering Volume

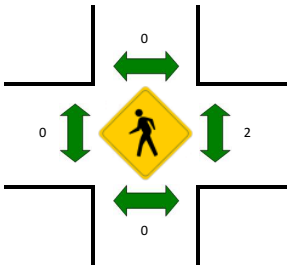
LOCATION: OR-213 -- OR-211
CITY/STATE: Molalla, OR

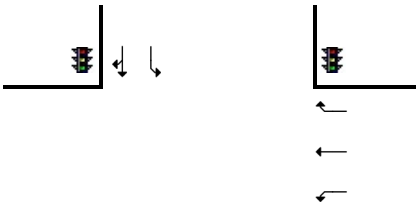
QC JOB #: 14815602
DATE: Tue, Oct 9 2018

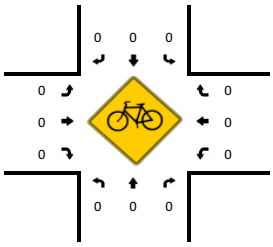
Peak-Hour: 4:15 PM -- 5:15 PM
Peak 15-Min: 4:50 PM -- 5:05 PM

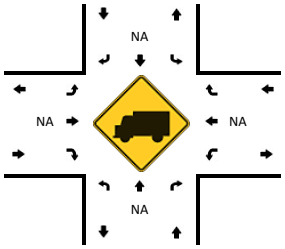


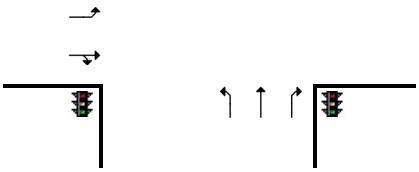


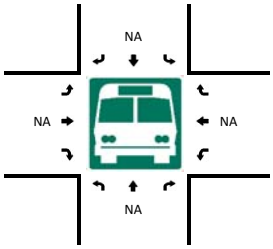












5-Min Count Period Beginning At	OR-213 (Northbound)				OR-213 (Southbound)				OR-211 (Eastbound)				OR-211 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	1	11	5	0	25	14	14	0	8	22	2	0	8	14	8	0	132	
4:05 PM	1	11	13	0	10	21	10	0	12	16	0	0	6	15	13	0	128	
4:10 PM	0	12	12	0	9	10	6	0	9	18	0	0	14	15	12	0	117	
4:15 PM	2	12	7	0	13	14	5	0	8	20	2	0	9	9	5	0	106	
4:20 PM	2	13	8	0	11	15	7	0	9	20	0	0	13	11	8	0	117	
4:25 PM	1	12	12	0	9	10	6	0	9	28	1	0	10	14	9	0	121	
4:30 PM	4	14	5	0	25	20	7	0	13	12	1	0	13	2	11	0	127	
4:35 PM	3	11	9	0	21	14	7	0	11	31	4	0	10	14	14	0	149	
4:40 PM	1	12	9	0	17	14	5	0	6	14	3	0	18	10	9	0	118	
4:45 PM	0	13	15	0	20	19	10	0	9	16	0	0	15	6	11	0	134	
4:50 PM	1	10	8	0	18	17	9	0	11	17	3	0	10	14	15	0	133	
4:55 PM	2	22	6	0	21	13	7	0	4	14	0	0	15	14	9	0	127	1509
5:00 PM	6	15	11	0	17	14	9	0	9	22	2	0	5	27	9	0	146	1523
5:05 PM	1	10	11	0	11	11	9	0	8	16	0	0	14	12	3	0	106	1501
5:10 PM	0	6	4	0	10	20	5	0	9	21	0	0	13	19	14	0	121	1505
5:15 PM	2	10	3	0	21	15	6	0	8	19	2	0	7	9	8	0	110	1509
5:20 PM	2	13	7	0	15	17	10	0	5	21	0	0	10	10	8	0	118	1510
5:25 PM	2	13	6	0	11	16	7	0	11	10	4	0	13	5	10	0	108	1497
5:30 PM	3	12	8	0	17	16	6	0	7	25	1	0	8	8	8	0	119	1489
5:35 PM	1	8	11	0	16	11	7	0	1	13	3	0	9	13	14	0	107	1447
5:40 PM	0	15	7	0	12	22	3	0	12	23	2	0	11	8	9	0	124	1453
5:45 PM	1	9	10	0	15	13	4	0	5	6	3	0	20	16	2	0	104	1423
5:50 PM	1	13	7	0	21	14	4	0	6	13	0	0	7	12	7	0	105	1395
5:55 PM	2	10	8	0	13	11	4	0	6	13	0	0	9	9	10	0	95	1363

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	36	188	100	0	224	176	100	0	96	212	20	0	120	220	132	0	1624
Heavy Trucks	4	16	4		16	4	12		8	20	0		0	20	8		112
Pedestrians		0				0				0				4			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

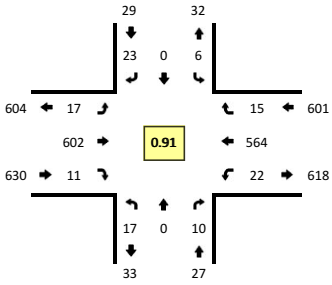
Report generated on 1/11/2019 9:16 AM

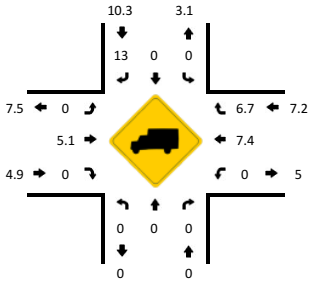
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

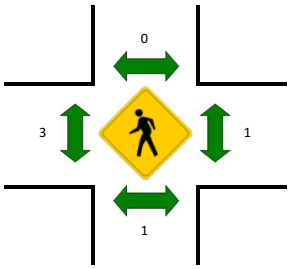
Type of peak hour being reported: User-Defined | Method for determining peak hour: Total Entering Volume

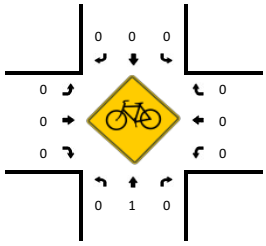
LOCATION: N Hezzie Ln -- OR-211 | **QC JOB #:** 14815604
CITY/STATE: Molalla, OR | **DATE:** Tue, Oct 9 2018

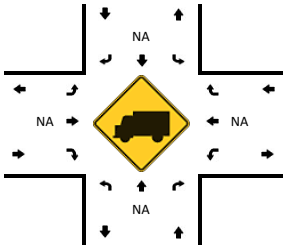
Peak-Hour: 4:15 PM -- 5:15 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

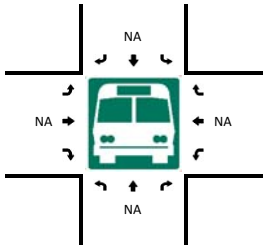












5-Min Count Period Beginning At	N Hezzie Ln (Northbound)				N Hezzie Ln (Southbound)				OR-211 (Eastbound)				OR-211 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	1	0	2	0	0	0	3	0	2	55	2	0	2	41	1	0	109	
4:05 PM	0	0	0	0	0	0	1	0	2	50	1	0	1	45	0	0	100	
4:10 PM	1	0	2	0	1	0	0	0	0	43	0	0	0	41	0	0	88	
4:15 PM	0	0	0	0	0	0	0	0	0	57	0	0	1	44	0	0	102	
4:20 PM	0	0	0	0	1	0	1	0	0	45	1	0	1	46	0	0	95	
4:25 PM	1	0	0	0	0	0	1	0	0	48	1	0	1	41	0	0	93	
4:30 PM	3	0	0	0	0	0	2	0	1	49	2	0	1	46	1	0	105	
4:35 PM	2	0	1	0	1	0	1	0	3	56	0	0	2	45	0	0	111	
4:40 PM	1	0	1	0	1	0	2	0	2	52	2	0	4	44	2	0	111	
4:45 PM	2	0	3	0	1	0	4	0	1	45	0	0	2	46	1	0	105	
4:50 PM	0	0	1	0	1	0	2	0	4	52	0	0	3	52	0	0	115	
4:55 PM	1	0	1	0	0	0	3	0	1	43	1	0	3	43	1	0	97	1231
5:00 PM	3	0	1	0	0	0	2	0	1	57	2	0	1	51	2	0	120	1242
5:05 PM	1	0	0	0	0	0	1	0	1	52	1	0	2	42	6	0	106	1248
5:10 PM	3	0	2	0	1	0	4	0	3	46	1	0	1	64	2	0	127	1287
5:15 PM	3	0	0	0	2	0	3	0	2	45	2	0	4	30	2	0	93	1278
5:20 PM	0	0	0	0	0	0	3	0	1	44	1	0	0	42	1	0	92	1275
5:25 PM	1	0	2	0	1	0	2	0	0	49	2	0	3	45	0	0	105	1287
5:30 PM	0	0	3	0	2	0	2	0	0	59	0	0	1	44	2	0	113	1295
5:35 PM	1	0	1	0	0	0	0	0	2	38	1	0	2	38	0	0	83	1267
5:40 PM	2	0	2	0	0	0	2	0	1	52	2	0	4	40	2	0	107	1263
5:45 PM	2	0	1	0	0	0	0	0	2	47	0	0	0	46	2	0	100	1258
5:50 PM	2	0	1	0	0	0	3	0	1	52	1	0	2	43	2	0	107	1250
5:55 PM	0	0	1	0	0	0	0	0	1	42	0	0	2	31	0	0	77	1230

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	28	0	12	0	4	0	28	0	20	620	16	0	16	628	40	0	1412
Heavy Trucks	0	0	0		0	0	4		0	40	0		0	12	4		60
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad Stopped Buses																	

Comments:

Report generated on 1/11/2019 9:16 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: User-Defined

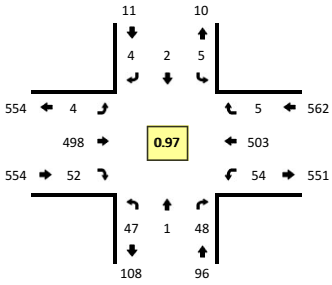
Method for determining peak hour: Total Entering Volume

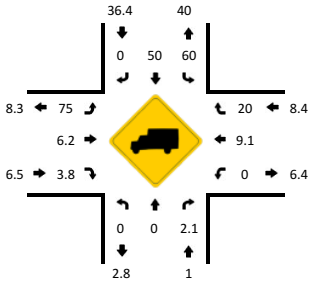
LOCATION: Dixon Ave -- OR-211
CITY/STATE: Molalla, OR

QC JOB #: 14815606
DATE: Tue, Oct 9 2018

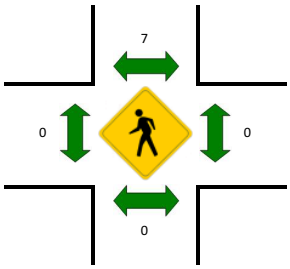
Peak-Hour: 4:15 PM -- 5:15 PM

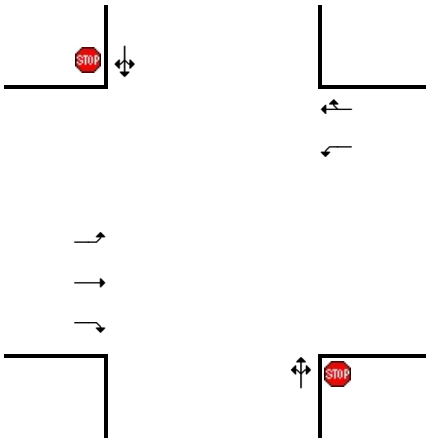
Peak 15-Min: 4:30 PM -- 4:45 PM

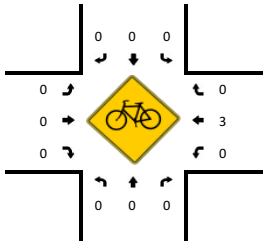


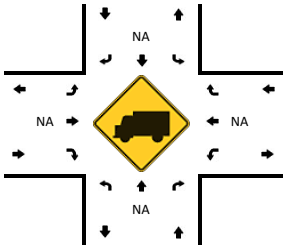


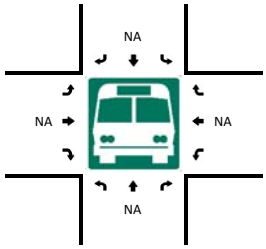
Quality Counts
DATA THAT DRIVES COMMUNITIES











5-Min Count Period Beginning At	Dixon Ave (Northbound)				Dixon Ave (Southbound)				OR-211 (Eastbound)				OR-211 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	4	0	3	0	0	0	0	0	0	38	7	0	2	32	0	0	86	
4:05 PM	3	0	4	0	1	0	1	0	0	50	7	0	1	38	0	0	105	
4:10 PM	3	0	7	0	0	0	1	0	0	41	8	0	4	33	1	0	98	
4:15 PM	7	0	5	0	0	0	1	0	1	43	4	0	5	31	0	0	97	
4:20 PM	6	0	6	0	1	0	1	0	0	41	3	0	4	38	0	0	100	
4:25 PM	1	1	3	0	1	0	0	0	1	40	3	0	5	39	1	0	95	
4:30 PM	3	0	5	0	0	0	0	0	0	49	6	0	4	44	1	0	112	
4:35 PM	2	0	2	0	1	0	0	0	0	34	6	0	5	43	0	0	93	
4:40 PM	2	0	7	0	0	0	0	0	0	43	6	0	4	48	1	0	111	
4:45 PM	3	0	5	0	1	1	0	0	1	36	2	0	8	41	0	0	98	
4:50 PM	6	0	4	0	0	0	0	0	0	44	6	0	4	41	2	0	107	
4:55 PM	1	0	4	0	1	0	2	0	0	40	2	0	2	43	0	0	95	1197
5:00 PM	4	0	2	0	0	0	0	0	0	53	3	0	2	47	0	0	111	1222
5:05 PM	4	0	3	0	0	0	0	0	0	41	6	0	6	48	0	0	108	1225
5:10 PM	8	0	2	0	0	1	0	0	1	34	5	0	5	40	0	0	96	1223
5:15 PM	6	0	6	0	0	0	2	0	0	45	5	0	1	29	0	0	94	1220
5:20 PM	3	0	4	0	0	0	0	0	0	34	8	0	3	40	1	0	93	1213
5:25 PM	1	0	2	0	2	0	0	0	1	46	4	0	2	46	1	0	105	1223
5:30 PM	1	1	4	0	1	0	0	0	0	31	5	0	0	41	0	0	84	1195
5:35 PM	5	0	4	0	0	0	0	0	1	46	10	0	7	31	0	0	104	1206
5:40 PM	4	0	2	0	0	0	0	0	0	36	5	0	4	37	0	0	88	1183
5:45 PM	3	0	3	0	1	0	0	0	1	39	3	0	4	41	0	0	95	1180
5:50 PM	7	0	3	0	0	0	0	0	0	38	3	0	4	41	0	0	96	1169
5:55 PM	2	0	3	0	1	0	0	0	0	39	8	0	4	30	0	0	87	1161

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	28	0	56	0	4	0	0	0	0	504	72	0	52	540	8	0	1264
Heavy Trucks	0	0	0		0	0	0		0	20	4		0	76	0		100
Pedestrians		0				12				0				0			12
Bicycles	0	0	0		0	0	0		0	0	0		0	1	0		1
Railroad																	
Stopped Buses																	

Comments:

Report generated on 1/11/2019 9:16 AM

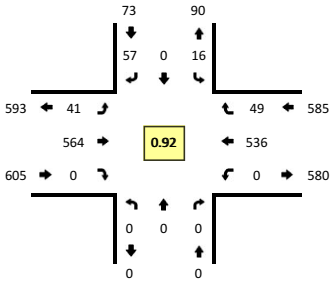
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: User-Defined

Method for determining peak hour: Total Entering Volume

LOCATION: Leroy Ave -- OR-211
CITY/STATE: Molalla, OR

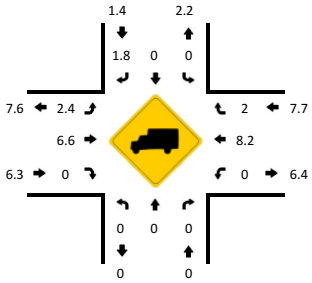
QC JOB #: 14815609
DATE: Tue, Oct 9 2018

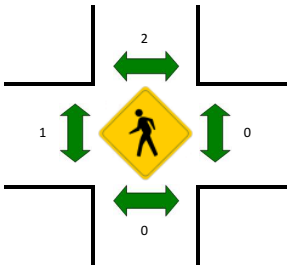


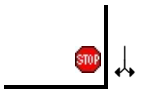
Peak-Hour: 4:15 PM -- 5:15 PM

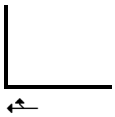
Peak 15-Min: 5:00 PM -- 5:15 PM

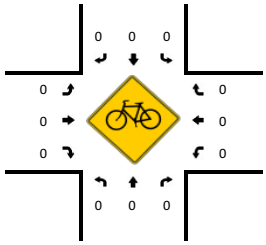
Quality Counts
DATA THAT DRIVES COMMUNITIES

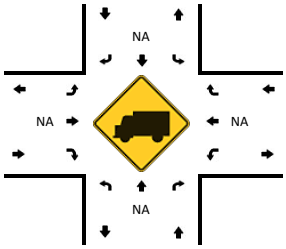


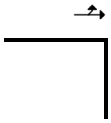


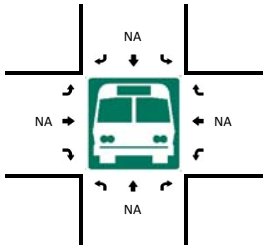












5-Min Count Period Beginning At	Leroy Ave (Northbound)				Leroy Ave (Southbound)				OR-211 (Eastbound)				OR-211 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	0	0	0	0	0	0	2	0	1	12	0	0	0	41	2	0	58	
6:05 AM	0	0	0	0	0	0	1	0	1	14	0	0	0	26	2	0	44	
6:10 AM	0	0	0	0	0	0	2	0	2	14	0	0	0	27	0	0	45	
6:15 AM	0	0	0	0	0	0	2	0	0	24	0	0	0	29	0	0	55	
6:20 AM	0	0	0	0	1	0	1	0	0	8	0	0	0	28	3	0	41	
6:25 AM	0	0	0	0	1	0	2	0	2	16	0	0	0	32	0	0	53	
6:30 AM	0	0	0	0	0	0	2	0	0	17	0	0	0	40	0	0	59	
6:35 AM	0	0	0	0	0	0	3	0	0	17	0	0	0	36	1	0	57	
6:40 AM	0	0	0	0	0	0	2	0	3	22	0	0	0	33	0	0	60	
6:45 AM	0	0	0	0	1	0	2	0	1	31	0	0	0	32	2	0	69	
6:50 AM	0	0	0	0	0	0	3	0	2	27	0	0	0	41	4	0	77	
6:55 AM	0	0	0	0	2	0	5	0	1	25	0	0	0	28	3	0	64	682
7:00 AM	0	0	0	0	0	0	4	0	2	29	0	0	0	26	4	0	65	689
7:05 AM	0	0	0	0	2	0	4	0	4	25	0	0	0	36	11	0	82	727
7:10 AM	0	0	0	0	1	0	6	0	6	27	0	0	0	28	5	0	73	755
7:15 AM	0	0	0	0	2	0	11	0	2	25	0	0	0	31	8	0	79	779
7:20 AM	0	0	0	0	2	0	15	0	6	23	0	0	0	46	9	0	101	839
7:25 AM	0	0	0	0	6	0	12	0	4	22	0	0	0	43	7	0	94	880
7:30 AM	0	0	0	0	2	0	14	0	5	19	0	0	0	37	1	0	78	899
7:35 AM	0	0	0	0	2	0	3	0	2	25	0	0	0	30	0	0	62	904
7:40 AM	0	0	0	0	0	0	6	0	4	21	0	0	0	36	0	0	67	911
7:45 AM	0	0	0	0	1	0	4	0	1	28	0	0	0	32	2	0	68	910
7:50 AM	0	0	0	0	2	0	1	0	1	27	0	0	0	30	0	0	61	894
7:55 AM	0	0	0	0	3	0	3	0	0	30	0	0	0	30	0	0	66	896
8:00 AM	0	0	0	0	1	0	0	0	3	16	0	0	0	32	0	0	52	883
8:05 AM	0	0	0	0	0	0	3	0	0	27	0	0	0	29	1	0	60	861
8:10 AM	0	0	0	0	0	0	3	0	0	22	0	0	0	31	2	0	58	846
8:15 AM	0	0	0	0	1	0	1	0	0	12	0	0	0	25	0	0	39	806
8:20 AM	0	0	0	0	0	0	4	0	3	30	0	0	0	27	3	0	67	772
8:25 AM	0	0	0	0	1	0	2	0	1	26	0	0	0	34	1	0	65	743
8:30 AM	0	0	0	0	1	0	5	0	3	20	0	0	0	26	0	0	55	720
8:35 AM	0	0	0	0	0	0	2	0	0	33	0	0	0	26	0	0	61	719
8:40 AM	0	0	0	0	0	0	1	0	3	18	0	0	0	41	4	0	67	719
8:45 AM	0	0	0	0	3	0	2	0	1	22	0	0	0	30	4	0	62	713
8:50 AM	0	0	0	0	0	0	8	0	0	31	0	0	0	26	3	0	68	720
8:55 AM	0	0	0	0	1	0	10	0	2	27	0	0	0	23	0	0	63	717

5-Min Count Period Beginning At	Leroy Ave (Northbound)				Leroy Ave (Southbound)				OR-211 (Eastbound)				OR-211 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
9:00 AM	0	0	0	0	1	0	4	0	2	29	0	0	0	31	4	0	71	736
9:05 AM	0	0	0	0	0	0	3	0	3	29	0	0	0	23	2	0	60	736
9:10 AM	0	0	0	0	0	0	1	0	0	31	0	0	0	38	1	0	71	749
9:15 AM	0	0	0	0	1	0	2	0	2	19	0	0	0	28	1	0	53	763
9:20 AM	0	0	0	0	0	0	3	0	1	22	0	0	0	31	5	0	62	758
9:25 AM	0	0	0	0	4	0	4	0	2	23	0	0	0	32	0	0	65	758
9:30 AM	0	0	0	0	0	0	3	0	2	18	0	0	0	31	1	0	55	758
9:35 AM	0	0	0	0	0	0	3	0	0	19	0	0	0	31	2	0	55	752
9:40 AM	0	0	0	0	1	0	4	0	2	21	0	0	0	27	0	0	55	740
9:45 AM	0	0	0	0	2	0	4	0	0	27	0	0	0	29	2	0	64	742
9:50 AM	0	0	0	0	0	0	1	0	0	25	0	0	0	32	3	0	61	735
9:55 AM	0	0	0	0	0	0	0	0	0	29	0	0	0	45	1	0	75	747
10:00 AM	0	0	0	0	0	0	3	0	1	29	0	0	0	37	1	0	71	747
10:05 AM	0	0	0	0	0	0	0	0	1	24	0	0	0	29	1	0	55	742
10:10 AM	0	0	0	0	1	0	1	0	0	33	0	0	0	32	2	0	69	740
10:15 AM	0	0	0	0	1	0	1	0	1	25	0	0	0	40	1	0	69	756
10:20 AM	0	0	0	0	1	0	3	0	1	27	0	0	0	28	3	0	63	757
10:25 AM	0	0	0	0	1	0	4	0	2	31	0	0	0	30	3	0	71	763
10:30 AM	0	0	0	0	0	0	2	0	0	31	0	0	0	35	0	0	68	776
10:35 AM	0	0	0	0	1	0	2	0	0	22	0	0	0	45	2	0	72	793
10:40 AM	0	0	0	0	0	0	2	0	1	23	0	0	0	27	2	0	55	793
10:45 AM	0	0	0	0	1	0	1	0	2	22	0	0	0	42	6	0	74	803
10:50 AM	0	0	0	0	0	0	2	0	0	34	0	0	0	52	2	0	90	832
10:55 AM	0	0	0	0	0	0	1	0	0	32	0	0	0	49	2	0	84	841
11:00 AM	0	0	0	0	1	0	0	0	2	25	0	0	0	45	1	0	74	844
11:05 AM	0	0	0	0	2	0	3	0	1	25	0	0	0	44	1	0	76	865
11:10 AM	0	0	0	0	1	0	2	0	3	43	0	0	0	37	5	0	91	887
11:15 AM	0	0	0	0	4	0	2	0	0	35	0	0	0	47	2	0	90	908
11:20 AM	0	0	0	0	1	0	4	0	1	35	0	0	0	36	1	0	78	923
11:25 AM	0	0	0	0	0	0	3	0	2	31	0	0	0	31	1	0	68	920
11:30 AM	0	0	0	0	1	0	3	0	0	35	0	0	0	34	1	0	74	926
11:35 AM	0	0	0	0	1	0	1	0	3	34	0	0	0	46	0	0	85	939
11:40 AM	0	0	0	0	2	0	1	0	4	31	0	0	0	38	4	0	80	964
11:45 AM	0	0	0	0	1	0	5	0	0	29	0	0	0	44	4	0	83	973
11:50 AM	0	0	0	0	4	0	0	0	1	31	0	0	0	44	1	0	81	964
11:55 AM	0	0	0	0	1	0	0	0	2	33	0	0	0	35	5	0	76	956
12:00 PM	0	0	0	0	1	0	4	0	1	40	0	0	0	47	3	0	96	978
12:05 PM	0	0	0	0	1	0	3	0	3	35	0	0	0	40	2	0	84	986
12:10 PM	0	0	0	0	1	0	7	0	0	38	0	0	0	33	2	0	81	976
12:15 PM	0	0	0	0	1	0	2	0	3	34	0	0	0	40	0	0	80	966
12:20 PM	0	0	0	0	2	0	2	0	2	38	0	0	0	23	0	0	67	955
12:25 PM	0	0	0	0	3	0	3	0	1	38	0	0	0	36	2	0	83	970
12:30 PM	0	0	0	0	3	0	2	0	3	33	0	0	0	35	0	0	76	972
12:35 PM	0	0	0	0	1	0	0	0	1	47	0	0	0	34	1	0	84	971
12:40 PM	0	0	0	0	1	0	1	0	1	24	0	0	0	36	0	0	63	954
12:45 PM	0	0	0	0	1	0	2	0	5	33	0	0	0	37	5	0	83	954
12:50 PM	0	0	0	0	0	0	3	0	1	38	0	0	0	35	1	0	78	951
12:55 PM	0	0	0	0	3	0	1	0	1	31	0	0	0	46	1	0	83	958
1:00 PM	0	0	0	0	0	0	0	0	1	35	0	0	0	28	0	0	64	926
1:05 PM	0	0	0	0	1	0	0	0	3	32	0	0	0	41	5	0	82	924
1:10 PM	0	0	0	0	2	0	4	0	2	28	0	0	0	37	4	0	77	920
1:15 PM	0	0	0	0	1	0	2	0	1	44	0	0	0	30	1	0	79	919
1:20 PM	0	0	0	0	1	0	3	0	1	42	0	0	0	38	4	0	89	941
1:25 PM	0	0	0	0	1	0	2	0	0	35	0	0	0	41	3	0	82	940
1:30 PM	0	0	0	0	1	0	2	0	3	55	0	0	0	30	1	0	92	956
1:35 PM	0	0	0	0	2	0	3	0	3	34	0	0	0	42	1	0	85	957
1:40 PM	0	0	0	0	1	0	2	0	3	38	0	0	0	44	3	0	91	985
1:45 PM	0	0	0	0	1	0	3	0	0	27	0	0	0	33	1	0	65	967
1:50 PM	0	0	0	0	4	0	2	0	3	34	0	0	0	39	2	0	84	973
1:55 PM	0	0	0	0	1	0	2	0	4	26	0	0	0	31	3	0	67	957
2:00 PM	0	0	0	0	3	0	2	0	1	32	0	0	0	43	3	0	84	977
2:05 PM	0	0	0	0	0	0	3	0	2	33	0	0	0	32	3	0	73	968
2:10 PM	0	0	0	0	0	0	3	0	4	40	0	0	0	37	3	0	87	978
2:15 PM	0	0	0	0	3	0	1	0	2	32	0	0	0	38	7	0	83	982
2:20 PM	0	0	0	0	2	0	9	0	2	37	0	0	0	30	3	0	83	976
2:25 PM	0	0	0	0	4	0	10	0	0	39	0	0	0	29	3	0	85	979
2:30 PM	0	0	0	0	3	0	4	0	1	40	0	0	0	31	2	0	81	968
2:35 PM	0	0	0	0	3	0	1	0	1	37	0	0	0	46	3	0	91	974
2:40 PM	0	0	0	0	1	0	1	0	1	43	0	0	0	34	1	0	81	964
2:45 PM	0	0	0	0	2	0	5	0	1	36	0	0	0	40	3	0	87	986
2:50 PM	0	0	0	0	1	0	5	0	3	37	0	0	0	39	2	0	87	989
2:55 PM	0	0	0	0	0	0	6	0	1	39	0	0	0	60	2	0	108	1030
3:00 PM	0	0	0	0	2	0	1	0	3	39	0	0	0	39	4	0	88	1034
3:05 PM	0	0	0	0	2	0	3	0	1	33	0	0	0	46	1	0	86	1047

5-Min Count Period Beginning At	Leroy Ave (Northbound)				Leroy Ave (Southbound)				OR-211 (Eastbound)				OR-211 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:10 PM	0	0	0	0	3	0	10	0	3	44	0	0	0	49	0	0	109	1069
3:15 PM	0	0	0	0	1	0	6	0	3	43	0	0	0	48	3	0	104	1090
3:20 PM	0	0	0	0	1	0	3	0	0	41	0	0	0	56	1	0	102	1109
3:25 PM	0	0	0	0	0	0	2	0	2	49	0	0	0	30	2	0	85	1109
3:30 PM	0	0	0	0	2	0	9	0	7	46	0	0	0	43	1	0	108	1136
3:35 PM	0	0	0	0	1	0	6	0	3	41	0	0	0	43	1	0	95	1140
3:40 PM	0	0	0	0	2	0	7	0	2	58	0	0	0	37	2	0	108	1167
3:45 PM	0	0	0	0	0	0	2	0	0	38	0	0	0	41	1	0	82	1162
3:50 PM	0	0	0	0	1	0	4	0	2	48	0	0	0	37	1	0	93	1168
3:55 PM	0	0	0	0	0	0	5	0	3	51	0	0	0	38	6	0	103	1163
4:00 PM	0	0	0	0	1	0	7	0	3	50	0	0	0	31	1	0	93	1168
4:05 PM	0	0	0	0	0	0	1	0	4	49	0	0	0	41	1	0	96	1178
4:10 PM	0	0	0	0	1	0	6	0	2	46	0	0	0	39	3	0	97	1166
4:15 PM	0	0	0	0	1	0	5	0	2	49	0	0	0	39	2	0	98	1160
4:20 PM	0	0	0	0	2	0	4	0	2	45	0	0	0	41	3	0	97	1155
4:25 PM	0	0	0	0	0	0	2	0	3	45	0	0	0	38	4	0	92	1162
4:30 PM	0	0	0	0	4	0	3	0	1	49	0	0	0	46	2	0	105	1159
4:35 PM	0	0	0	0	1	0	4	0	4	44	0	0	0	46	2	0	101	1165
4:40 PM	0	0	0	0	0	0	2	0	5	53	0	0	0	45	3	0	108	1165
4:45 PM	0	0	0	0	2	0	5	0	6	37	0	0	0	46	5	0	101	1184
4:50 PM	0	0	0	0	1	0	9	0	4	53	0	0	0	44	6	0	117	1208
4:55 PM	0	0	0	0	0	0	5	0	4	42	0	0	0	42	8	0	101	1206
5:00 PM	0	0	0	0	2	0	5	0	1	59	0	0	0	46	6	0	119	1232
5:05 PM	0	0	0	0	1	0	5	0	3	49	0	0	0	42	5	0	105	1241
5:10 PM	0	0	0	0	2	0	8	0	6	39	0	0	0	61	3	0	119	1263
5:15 PM	0	0	0	0	1	0	4	0	2	49	0	0	0	33	3	0	92	1257
5:20 PM	0	0	0	0	1	0	3	0	4	45	0	0	0	39	4	0	96	1256
5:25 PM	0	0	0	0	1	0	2	0	4	49	0	0	0	44	6	0	106	1270
5:30 PM	0	0	0	0	0	0	8	0	6	43	0	0	0	39	4	0	100	1265
5:35 PM	0	0	0	0	2	0	8	0	4	49	0	0	0	37	3	0	103	1267
5:40 PM	0	0	0	0	0	0	7	0	5	45	0	0	0	31	6	0	94	1253
5:45 PM	0	0	0	0	1	0	10	0	3	48	0	0	0	43	1	0	106	1258
5:50 PM	0	0	0	0	4	0	5	0	3	45	0	0	0	40	7	0	104	1245
5:55 PM	0	0	0	0	2	0	2	0	2	41	0	0	0	29	5	0	81	1225
6:00 PM	0	0	0	0	0	0	4	0	8	45	0	0	0	47	2	0	106	1212
6:05 PM	0	0	0	0	2	0	3	0	4	47	0	0	0	31	1	0	88	1195
6:10 PM	0	0	0	0	2	0	6	0	5	43	0	0	0	36	0	0	92	1168
6:15 PM	0	0	0	0	3	0	4	0	3	46	0	0	0	40	3	0	99	1175
6:20 PM	0	0	0	0	4	0	3	0	1	35	0	0	0	32	1	0	76	1155
6:25 PM	0	0	0	0	1	0	1	0	3	34	0	0	0	31	0	0	70	1119
6:30 PM	0	0	0	0	2	0	6	0	7	31	0	0	0	37	4	0	87	1106
6:35 PM	0	0	0	0	7	0	15	0	4	38	0	0	0	24	0	0	88	1091
6:40 PM	0	0	0	0	2	0	4	0	7	42	0	0	0	26	3	0	84	1081
6:45 PM	0	0	0	0	0	0	3	0	1	41	0	0	0	31	5	0	81	1056
6:50 PM	0	0	0	0	4	0	7	0	5	39	0	0	0	32	4	0	91	1043
6:55 PM	0	0	0	0	0	0	7	0	3	37	0	0	0	28	4	0	79	1041
7:00 PM	0	0	0	0	2	0	1	0	4	27	0	0	0	23	3	0	60	995
7:05 PM	0	0	0	0	9	0	12	0	3	23	0	0	0	18	3	0	68	975
7:10 PM	0	0	0	0	2	0	4	0	3	32	0	0	0	26	2	0	69	952
7:15 PM	0	0	0	0	3	0	1	0	1	28	0	0	0	30	2	0	65	918
7:20 PM	0	0	0	0	0	0	0	0	1	33	0	0	0	22	1	0	57	899
7:25 PM	0	0	0	0	0	0	2	0	2	23	0	0	0	18	2	0	47	876
7:30 PM	0	0	0	0	1	0	2	0	0	22	0	0	0	31	1	0	57	846
7:35 PM	0	0	0	0	0	0	2	0	0	14	0	0	0	27	5	0	48	806
7:40 PM	0	0	0	0	0	0	0	0	3	26	0	0	0	18	2	0	49	771
7:45 PM	0	0	0	0	2	0	1	0	2	18	0	0	0	18	1	0	42	732
7:50 PM	0	0	0	0	1	0	1	0	3	20	0	0	0	17	0	0	42	683
7:55 PM	0	0	0	0	2	0	1	0	2	7	0	0	0	14	0	0	26	630
8:00 PM	0	0	0	0	0	0	1	0	2	18	0	0	0	10	0	0	31	601
8:05 PM	0	0	0	0	1	0	2	0	1	17	0	0	0	16	2	0	39	572
8:10 PM	0	0	0	0	0	0	2	0	2	22	0	0	0	26	1	0	53	556
8:15 PM	0	0	0	0	1	0	2	0	2	15	0	0	0	16	1	0	37	528
8:20 PM	0	0	0	0	0	0	1	0	1	14	0	0	0	18	2	0	36	507
8:25 PM	0	0	0	0	0	0	2	0	3	19	0	0	0	11	0	0	35	495
8:30 PM	0	0	0	0	0	0	3	0	2	9	0	0	0	22	0	0	36	474
8:35 PM	0	0	0	0	0	0	1	0	2	18	0	0	0	18	0	0	39	465
8:40 PM	0	0	0	0	1	0	1	0	4	15	0	0	0	11	1	0	33	449
8:45 PM	0	0	0	0	0	0	1	0	1	16	0	0	0	23	1	0	42	449
8:50 PM	0	0	0	0	1	0	2	0	2	15	0	0	0	14	2	0	36	443
8:55 PM	0	0	0	0	1	0	2	0	2	14	0	0	0	21	2	0	42	459
9:00 PM	0	0	0	0	1	0	1	0	1	8	0	0	0	17	1	0	29	457
9:05 PM	0	0	0	0	0	0	2	0	0	9	0	0	0	9	0	0	20	438
9:10 PM	0	0	0	0	0	0	1	0	1	15	0	0	0	8	0	0	25	410
9:15 PM	0	0	0	0	1	0	0	0	4	17	0	0	0	14	0	0	36	409

5-Min Count Period Beginning At	Leroy Ave (Northbound)				Leroy Ave (Southbound)				OR-211 (Eastbound)				OR-211 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
9:20 PM	0	0	0	0	0	0	1	0	3	19	0	0	0	8	0	0	31	404
9:25 PM	0	0	0	0	0	0	1	0	0	18	0	0	0	6	0	0	25	394
9:30 PM	0	0	0	0	0	0	0	0	2	12	0	0	0	5	0	0	19	377
9:35 PM	0	0	0	0	0	0	0	0	1	8	0	0	0	9	1	0	19	357
9:40 PM	0	0	0	0	0	0	0	0	0	16	0	0	0	11	0	0	27	351
9:45 PM	0	0	0	0	1	0	1	0	0	7	0	0	0	8	0	0	17	326
9:50 PM	0	0	0	0	0	0	1	0	0	7	0	0	0	5	0	0	13	303
9:55 PM	0	0	0	0	0	0	2	0	1	9	0	0	0	4	1	0	17	278

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	20	0	72	0	40	588	0	0	0	596	56	0	1372
Heavy Trucks	0	0	0		0	0	0		0	44	0		0	20	0		64
Pedestrians		0				4				0				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 1/11/2019 9:18 AM

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

Type of peak hour being reported: User-Defined

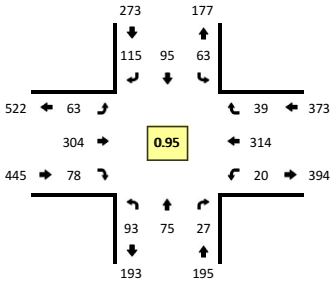
Method for determining peak hour: Total Entering Volume

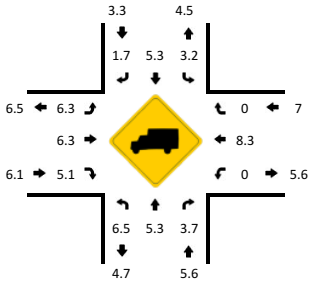
LOCATION: Molalla Ave -- OR-211
CITY/STATE: Molalla, OR

QC JOB #: 14815608
DATE: Tue, Oct 9 2018

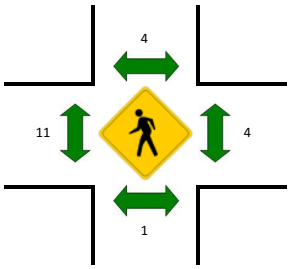
Peak-Hour: 4:15 PM -- 5:15 PM

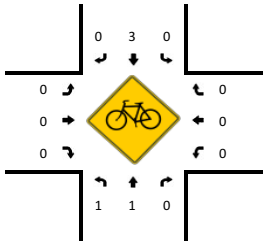
Peak 15-Min: 4:40 PM -- 4:55 PM

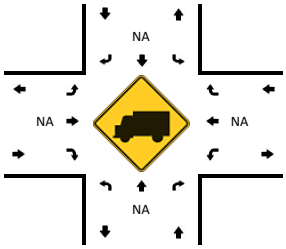


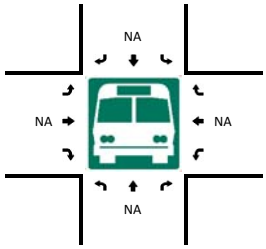


Quality Counts
DATA THAT DRIVES COMMUNITIES









5-Min Count Period Beginning At	Molalla Ave (Northbound)				Molalla Ave (Southbound)				OR-211 (Eastbound)				OR-211 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	5	9	3	0	11	10	10	0	5	30	4	0	3	10	7	0	107	
4:05 PM	6	5	2	0	9	10	7	0	6	27	9	0	3	26	4	0	114	
4:10 PM	2	5	1	0	10	9	7	0	4	28	6	0	1	26	2	0	101	
4:15 PM	6	6	1	0	1	11	10	0	9	20	5	0	2	18	4	0	93	
4:20 PM	10	11	3	0	5	8	6	0	8	21	6	0	4	23	0	0	105	
4:25 PM	7	5	2	0	4	13	9	0	5	29	10	0	3	30	2	0	119	
4:30 PM	6	6	1	0	5	3	8	0	3	32	6	0	1	31	4	0	106	
4:35 PM	11	8	4	0	4	13	6	0	4	23	4	0	1	22	4	0	104	
4:40 PM	11	4	3	0	8	6	8	0	5	31	8	0	1	33	2	0	120	
4:45 PM	4	10	2	0	7	9	11	0	4	28	6	0	2	25	2	0	110	
4:50 PM	5	4	3	0	7	7	11	0	4	28	9	0	0	27	4	0	109	
4:55 PM	9	2	3	0	4	4	17	0	6	20	3	0	3	29	1	0	101	1289
5:00 PM	7	4	1	0	5	11	5	0	3	25	9	0	3	30	3	0	106	1288
5:05 PM	11	8	2	0	5	4	12	0	8	20	7	0	0	23	5	0	105	1279
5:10 PM	6	7	2	0	8	6	12	0	4	27	5	0	0	23	8	0	108	1286
5:15 PM	4	9	0	0	6	11	7	0	7	22	8	0	1	19	4	0	98	1291
5:20 PM	11	3	2	0	3	11	11	0	5	21	2	0	1	23	2	0	95	1281
5:25 PM	10	9	1	0	4	12	10	0	5	21	6	0	7	21	0	0	106	1268
5:30 PM	3	6	1	0	7	7	12	0	1	27	9	0	2	30	3	0	108	1270
5:35 PM	4	9	1	0	3	9	4	0	10	23	12	0	3	18	6	0	102	1268
5:40 PM	7	10	1	0	7	8	5	0	4	24	4	0	2	29	1	0	102	1250
5:45 PM	10	5	1	0	6	10	8	0	7	23	7	0	1	29	3	0	110	1250
5:50 PM	8	8	1	0	4	8	16	0	10	17	11	0	0	19	5	0	107	1248
5:55 PM	7	2	4	0	4	10	7	0	3	29	7	0	3	20	0	0	96	1243

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	80	72	32	0	88	88	120	0	52	348	92	0	12	340	32	0	1356
Heavy Trucks	0	0	0		4	4	4		4	16	0		0	28	0		60
Pedestrians		0				0				0				4			4
Bicycles	0	0	0		0	2	0		0	0	0		0	0	0		2
Railroad																	
Stopped Buses																	

Comments:

Report generated on 1/11/2019 9:16 AM

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

Appendix B
Existing Conditions
Traffic Analysis Worksheets

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	68	138	60	215	217	12	150	110	91	156
v/c Ratio	0.34	0.29	0.32	0.45	0.40	0.11	0.49	0.30	0.41	0.32
Control Delay	40.6	26.3	40.9	28.9	6.5	43.0	37.8	9.5	40.0	19.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.6	26.3	40.9	28.9	6.5	43.0	37.8	9.5	40.0	19.9
Queue Length 50th (ft)	29	49	25	82	0	5	62	0	38	38
Queue Length 95th (ft)	87	124	79	192	55	27	155	46	107	128
Internal Link Dist (ft)		465		3507			611			497
Turn Bay Length (ft)	260		320		230	260		280	260	
Base Capacity (vph)	717	1068	704	1113	968	612	1104	1032	680	964
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.13	0.09	0.19	0.22	0.02	0.14	0.11	0.13	0.16

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	123	4	55	198	200	11	138	101	84	73	71
Future Volume (vph)	63	123	4	55	198	200	11	138	101	84	73	71
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		0%			0%			-2%			2%	
Total Lost time (s)	5.0	5.3		5.0	5.3	5.3	5.0	5.3	5.3	5.0	5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1446	1511		1421	1577	1282	1235	1564	1417	1372	1354	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1446	1511		1421	1577	1282	1235	1564	1417	1372	1354	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	68	134	4	60	215	217	12	150	110	91	79	77
RTOR Reduction (vph)	0	1	0	0	0	154	0	0	85	0	18	0
Lane Group Flow (vph)	68	137	0	60	215	63	12	150	25	91	138	0
Heavy Vehicles (%)	15%	15%	25%	17%	11%	16%	36%	13%	6%	20%	18%	19%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	7.3	22.2		6.9	21.8	21.8	1.1	17.1	17.1	8.7	24.7	
Effective Green, g (s)	7.3	22.2		6.9	21.8	21.8	1.1	17.1	17.1	8.7	24.7	
Actuated g/C Ratio	0.10	0.29		0.09	0.29	0.29	0.01	0.23	0.23	0.12	0.33	
Clearance Time (s)	5.0	5.3		5.0	5.3	5.3	5.0	5.3	5.3	5.0	5.3	
Vehicle Extension (s)	2.3	5.0		2.3	5.0	5.0	2.3	2.0	2.0	2.3	2.0	
Lane Grp Cap (vph)	139	444		129	455	370	17	354	320	158	442	
v/s Ratio Prot	c0.05	0.09		0.04	c0.14		0.01	c0.10		c0.07	0.10	
v/s Ratio Perm						0.05			0.02			
v/c Ratio	0.49	0.31		0.47	0.47	0.17	0.71	0.42	0.08	0.58	0.31	
Uniform Delay, d1	32.3	20.7		32.5	22.1	20.1	37.0	25.0	23.0	31.7	19.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.6	0.8		1.5	1.6	0.5	76.6	0.3	0.0	3.7	0.1	
Delay (s)	33.9	21.5		34.1	23.7	20.5	113.7	25.3	23.0	35.4	19.2	
Level of Service	C	C		C	C	C	F	C	C	D	B	
Approach Delay (s)		25.6			23.6			28.3			25.1	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	75.5	Sum of lost time (s)	20.6
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	325	3	14	487	11	39	1	26	2	1	14
Future Vol, veh/h	30	325	3	14	487	11	39	1	26	2	1	14
Conflicting Peds, #/hr	1	0	2	2	0	1	0	0	7	7	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	190	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	2	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	10	10	0	0	13	0	0	0	0	0	0	7
Mvmt Flow	37	396	4	17	594	13	48	1	32	2	1	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	608	0	0	402	0	0	1117	1115	407	1131	1111	602
Stage 1	-	-	-	-	-	-	473	473	-	636	636	-
Stage 2	-	-	-	-	-	-	644	642	-	495	475	-
Critical Hdwy	4.2	-	-	4.1	-	-	7.1	6.5	6.2	7.5	6.9	6.47
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.5	5.9	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.5	5.9	-
Follow-up Hdwy	2.29	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.363
Pot Cap-1 Maneuver	933	-	-	1168	-	-	186	210	648	161	186	474
Stage 1	-	-	-	-	-	-	576	562	-	437	443	-
Stage 2	-	-	-	-	-	-	465	472	-	530	532	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	933	-	-	1160	-	-	171	198	642	145	176	474
Mov Cap-2 Maneuver	-	-	-	-	-	-	171	198	-	145	176	-
Stage 1	-	-	-	-	-	-	552	539	-	419	436	-
Stage 2	-	-	-	-	-	-	440	465	-	480	510	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	0.2	24.8	16
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	171	593	933	-	-	1160	-	-	347
HCM Lane V/C Ratio	0.278	0.056	0.039	-	-	0.015	-	-	0.06
HCM Control Delay (s)	34	11.4	9	-	-	8.2	-	-	16
HCM Lane LOS	D	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	1.1	0.2	0.1	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	37	312	419	47	23	83
Future Vol, veh/h	37	312	419	47	23	83
Conflicting Peds, #/hr	3	0	0	3	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	0	10	12	2	0	18
Mvmt Flow	45	380	511	57	28	101

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	571	0	-	0	1014	543
Stage 1	-	-	-	-	543	-
Stage 2	-	-	-	-	471	-
Critical Hdwy	4.1	-	-	-	6.4	6.38
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.462
Pot Cap-1 Maneuver	1012	-	-	-	267	510
Stage 1	-	-	-	-	586	-
Stage 2	-	-	-	-	632	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1012	-	-	-	251	509
Mov Cap-2 Maneuver	-	-	-	-	251	-
Stage 1	-	-	-	-	584	-
Stage 2	-	-	-	-	595	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	15.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1012	-	-	-	251	509
HCM Lane V/C Ratio	0.045	-	-	-	0.112	0.199
HCM Control Delay (s)	8.7	0	-	-	21.1	13.8
HCM Lane LOS	A	A	-	-	C	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4	0.7

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	314	7	3	431	4	2	1	2	3	1	4
Future Vol, veh/h	8	314	7	3	431	4	2	1	2	3	1	4
Conflicting Peds, #/hr	1	0	0	0	0	1	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	90	-	120	190	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	9	0	0	12	0	0	0	0	33	0	25
Mvmt Flow	9	345	8	3	474	4	2	1	2	3	1	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	479	0	0	345	0	0	848	849	345	847	846	477
Stage 1	-	-	-	-	-	-	363	363	-	483	483	-
Stage 2	-	-	-	-	-	-	485	486	-	364	363	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.43	6.5	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.43	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.43	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.797	4	3.525
Pot Cap-1 Maneuver	1094	-	-	1225	-	-	284	300	702	250	301	544
Stage 1	-	-	-	-	-	-	660	628	-	511	556	-
Stage 2	-	-	-	-	-	-	567	554	-	596	628	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1094	-	-	1225	-	-	279	297	702	246	298	543
Mov Cap-2 Maneuver	-	-	-	-	-	-	279	297	-	246	298	-
Stage 1	-	-	-	-	-	-	655	623	-	506	554	-
Stage 2	-	-	-	-	-	-	560	552	-	588	623	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.1	14.8	15.6
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	374	1094	-	-	1225	-	-	349
HCM Lane V/C Ratio	0.015	0.008	-	-	0.003	-	-	0.025
HCM Control Delay (s)	14.8	8.3	-	-	7.9	-	-	15.6
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.1

Intersection	
Intersection Delay, s/veh	14.8
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	42	228	27	0	6	275	37	0	83	64	16
Future Vol, veh/h	0	42	228	27	0	6	275	37	0	83	64	16
Peak Hour Factor	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	19	8	7	2	17	11	5	2	7	8	0
Mvmt Flow	0	46	251	30	0	7	302	41	0	91	70	18
Number of Lanes	0	0	1	1	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	2	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	15.7	16.5	12.4
HCM LOS	C	C	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	51%	16%	0%	2%	28%
Vol Thru, %	39%	84%	0%	86%	35%
Vol Right, %	10%	0%	100%	12%	37%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	163	270	27	318	131
LT Vol	83	42	0	6	37
Through Vol	64	228	0	275	46
RT Vol	16	0	27	37	48
Lane Flow Rate	179	297	30	349	144
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.316	0.532	0.045	0.569	0.251
Departure Headway (Hd)	6.356	6.45	5.47	5.858	6.266
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	561	558	650	612	569
Service Time	4.446	4.221	3.241	3.929	4.359
HCM Lane V/C Ratio	0.319	0.532	0.046	0.57	0.253
HCM Control Delay	12.4	16.4	8.5	16.5	11.5
HCM Lane LOS	B	C	A	C	B
HCM 95th-tile Q	1.3	3.1	0.1	3.6	1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Traffic Vol, veh/h	0	37	46	48
Future Vol, veh/h	0	37	46	48
Peak Hour Factor	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	8	13	8
Mvmt Flow	0	41	51	53
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	11.5
HCM LOS	B

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	118	275	161	169	130	26	167	117	215	297
v/c Ratio	0.57	0.66	0.63	0.38	0.29	0.25	0.61	0.36	0.67	0.54
Control Delay	59.7	46.2	57.2	36.5	7.9	62.5	54.4	11.7	53.3	33.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.7	46.2	57.2	36.5	7.9	62.5	54.4	11.7	53.3	33.7
Queue Length 50th (ft)	73	160	99	89	0	17	103	0	129	157
Queue Length 95th (ft)	176	337	226	200	51	58	223	55	293	328
Internal Link Dist (ft)		465		3507			611			497
Turn Bay Length (ft)	260		320		230	260		280	260	
Base Capacity (vph)	466	840	484	803	722	470	849	754	470	779
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.33	0.33	0.21	0.18	0.06	0.20	0.16	0.46	0.38

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	239	17	150	157	121	24	155	109	200	187	89
Future Volume (vph)	110	239	17	150	157	121	24	155	109	200	187	89
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		0%			0%			-2%			2%	
Total Lost time (s)	5.0	5.3		5.0	5.3	5.3	5.0	5.3	5.3	5.0	5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1525	1649		1583	1577	1293	1540	1667	1371	1538	1513	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1525	1649		1583	1577	1293	1540	1667	1371	1538	1513	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	118	257	18	161	169	130	26	167	117	215	201	96
RTOR Reduction (vph)	0	1	0	0	0	94	0	0	95	0	8	0
Lane Group Flow (vph)	118	274	0	161	169	36	26	167	22	215	289	0
Confl. Peds. (#/hr)									2	2		
Heavy Vehicles (%)	9%	5%	6%	5%	11%	15%	9%	6%	7%	7%	7%	13%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	14.3	26.7		17.0	29.4	29.4	4.3	20.1	20.1	22.2	38.0	
Effective Green, g (s)	14.3	26.7		17.0	29.4	29.4	4.3	20.1	20.1	22.2	38.0	
Actuated g/C Ratio	0.13	0.25		0.16	0.28	0.28	0.04	0.19	0.19	0.21	0.36	
Clearance Time (s)	5.0	5.3		5.0	5.3	5.3	5.0	5.3	5.3	5.0	5.3	
Vehicle Extension (s)	2.3	5.0		2.3	5.0	5.0	2.3	2.0	2.0	2.3	2.0	
Lane Grp Cap (vph)	204	413		252	434	356	62	314	258	320	539	
v/s Ratio Prot	0.08	c0.17		c0.10	c0.11		0.02	0.10		c0.14	c0.19	
v/s Ratio Perm						0.03			0.02			
v/c Ratio	0.58	0.66		0.64	0.39	0.10	0.42	0.53	0.09	0.67	0.54	
Uniform Delay, d1	43.3	35.9		41.9	31.3	28.8	49.9	39.0	35.7	38.8	27.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.9	5.2		4.3	1.2	0.3	2.7	0.9	0.1	4.7	0.5	
Delay (s)	46.2	41.1		46.2	32.5	29.0	52.6	39.9	35.7	43.6	27.8	
Level of Service	D	D		D	C	C	D	D	D	D	C	
Approach Delay (s)		42.7			36.3			39.4			34.4	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	37.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	106.6	Sum of lost time (s)	20.6
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	623	11	22	584	15	17	1	10	6	1	23
Future Vol, veh/h	17	623	11	22	584	15	17	1	10	6	1	23
Conflicting Peds, #/hr	0	0	1	1	0	0	3	0	1	1	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	190	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	2	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	5	0	0	7	7	0	0	0	0	0	13
Mvmt Flow	19	685	12	24	642	16	19	1	11	7	1	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	658	0	0	698	0	0	1444	1436	693	1433	1433	653
Stage 1	-	-	-	-	-	-	729	729	-	698	698	-
Stage 2	-	-	-	-	-	-	715	707	-	735	735	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.5	6.9	6.53
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.5	5.9	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.5	5.9	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.417
Pot Cap-1 Maneuver	939	-	-	908	-	-	111	135	447	96	115	432
Stage 1	-	-	-	-	-	-	417	431	-	402	412	-
Stage 2	-	-	-	-	-	-	425	441	-	382	395	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	936	-	-	907	-	-	100	129	446	90	110	431
Mov Cap-2 Maneuver	-	-	-	-	-	-	100	129	-	90	110	-
Stage 1	-	-	-	-	-	-	408	422	-	394	401	-
Stage 2	-	-	-	-	-	-	387	429	-	364	387	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.3	35.8	23.1
HCM LOS			E	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	100	365	936	-	-	907	-	-	232
HCM Lane V/C Ratio	0.187	0.033	0.02	-	-	0.027	-	-	0.142
HCM Control Delay (s)	49.1	15.2	8.9	-	-	9.1	-	-	23.1
HCM Lane LOS	E	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.6	0.1	0.1	-	-	0.1	-	-	0.5

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	41	584	555	49	16	57
Future Vol, veh/h	41	584	555	49	16	57
Conflicting Peds, #/hr	2	0	0	2	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	7	8	2	0	2
Mvmt Flow	45	635	603	53	17	62

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	659	0	-	0	1356	633
Stage 1	-	-	-	-	632	-
Stage 2	-	-	-	-	724	-
Critical Hdwy	4.12	-	-	-	6.4	6.22
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.218	-	-	-	3.5	3.318
Pot Cap-1 Maneuver	929	-	-	-	166	480
Stage 1	-	-	-	-	534	-
Stage 2	-	-	-	-	484	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	928	-	-	-	153	479
Mov Cap-2 Maneuver	-	-	-	-	153	-
Stage 1	-	-	-	-	533	-
Stage 2	-	-	-	-	447	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	17.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	928	-	-	-	153	479
HCM Lane V/C Ratio	0.048	-	-	-	0.114	0.129
HCM Control Delay (s)	9.1	0	-	-	31.5	13.6
HCM Lane LOS	A	A	-	-	D	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.4	0.4

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	515	52	54	521	5	47	1	48	5	2	4
Future Vol, veh/h	4	515	52	54	521	5	47	1	48	5	2	4
Conflicting Peds, #/hr	7	0	0	0	0	7	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	90	-	120	190	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	75	6	4	0	9	20	0	0	2	60	50	0
Mvmt Flow	4	531	54	56	537	5	48	1	49	5	2	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	549	0	0	531	0	0	1193	1200	531	1222	1197	547
Stage 1	-	-	-	-	-	-	539	539	-	658	658	-
Stage 2	-	-	-	-	-	-	654	661	-	564	539	-
Critical Hdwy	4.85	-	-	4.1	-	-	7.1	6.5	6.22	7.7	7	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.7	6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.7	6	-
Follow-up Hdwy	2.875	-	-	2.2	-	-	3.5	4	3.318	4.04	4.45	3.3
Pot Cap-1 Maneuver	738	-	-	1047	-	-	165	187	548	120	151	541
Stage 1	-	-	-	-	-	-	530	525	-	370	395	-
Stage 2	-	-	-	-	-	-	459	463	-	421	451	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	738	-	-	1047	-	-	155	175	548	103	141	537
Mov Cap-2 Maneuver	-	-	-	-	-	-	155	175	-	103	141	-
Stage 1	-	-	-	-	-	-	527	522	-	366	371	-
Stage 2	-	-	-	-	-	-	429	435	-	380	449	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.8	29.8	29.7
HCM LOS			D	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	242	738	-	-	1047	-	-	157
HCM Lane V/C Ratio	0.409	0.006	-	-	0.053	-	-	0.072
HCM Control Delay (s)	29.8	9.9	-	-	8.6	-	-	29.7
HCM Lane LOS	D	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	1.9	0	-	-	0.2	-	-	0.2

Intersection	
Intersection Delay, s/veh	28.7
Intersection LOS	D

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	63	315	78	0	20	325	39	0	93	75	27
Future Vol, veh/h	0	63	315	78	0	20	325	39	0	93	75	27
Peak Hour Factor	0.92	0.95	0.95	0.95	0.92	0.95	0.95	0.95	0.92	0.95	0.95	0.95
Heavy Vehicles, %	2	6	6	5	2	0	8	0	2	6	5	4
Mvmt Flow	0	66	332	82	0	21	342	41	0	98	79	28
Number of Lanes	0	0	1	1	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	2	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	34.3	33.1	17.8
HCM LOS	D	D	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	48%	17%	0%	5%	23%
Vol Thru, %	38%	83%	0%	85%	35%
Vol Right, %	14%	0%	100%	10%	42%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	195	378	78	384	273
LT Vol	93	63	0	20	63
Through Vol	75	315	0	325	95
RT Vol	27	0	78	39	115
Lane Flow Rate	205	398	82	404	287
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.459	0.84	0.155	0.8	0.596
Departure Headway (Hd)	8.046	7.603	6.797	7.122	7.469
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	445	473	525	505	483
Service Time	6.129	5.368	4.563	5.189	5.543
HCM Lane V/C Ratio	0.461	0.841	0.156	0.8	0.594
HCM Control Delay	17.8	39.1	10.8	33.1	21.1
HCM Lane LOS	C	E	B	D	C
HCM 95th-tile Q	2.4	8.3	0.5	7.5	3.8

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Traffic Vol, veh/h	0	63	95	115
Future Vol, veh/h	0	63	95	115
Peak Hour Factor	0.92	0.95	0.95	0.95
Heavy Vehicles, %	2	3	5	2
Mvmt Flow	0	66	100	121
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	21.1
HCM LOS	C

Appendix C
ODOT Crash Data

160 CASCADE HWY SOUTH

Crashes Occurring at the Intersection of Cascade Hwy 160 (MP 16.10) and Woodburn-Estacada Hwy 161(MP 11.31), near Molalla OR, 2012-2016

SER# / INVEST / UNLOC?	SPEED	ALCOHOL	DRUGS	SCHOOL BUS	WORK ZONE	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# / CMPT/MILEPNT / LRS	FC / MLG / CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
02061	N	N	N	N	N	06/11/2013	CLACKAMAS	1	16	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											07
COUNTY						Tue 11A		MN 0		N		L-GRN-SIG	N	DRY	REAR		PRVTE	N S										000		00
							MOLALLA UA	16.10		06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	23	M	OR-Y		043,026	000		07
No	*45*	*9*	*2.53*	*-122*	*36 22.92*			016000100S00																OR<25					
																02	NONE 0	STOP										012		00
																	PRVTE	N S												
																	PSNGR CAR		01	DRVR	INJC	61	F	OR-Y		000	000		00
																								OR<25					
05335	N	N	N			12/31/2014	CLACKAMAS	1	16	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT												29
NONE						Wed 5P		MN 0		N		TRF SIGNAL	N	DRY	REAR		PRVTE	N S										000		00
							MOLALLA UA	16.10		06	0		N	DLIT	PDO		PSNGR CAR		01	DRVR	NONE	51	F	OR-Y		026	000		29
No	*45*	*9*	*2.53*	*-122*	*36 22.92*			016000100S00																OR<25					
																02	NONE 0	STOP										011		00
																	UNKN	N S												
																	PSNGR CAR		01	DRVR	NONE	00	M	UNK		000	000		00
																								UNK					
02845	N	N	N			08/03/2012	CLACKAMAS	1	16	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT												07
NONE						Fri 7A		MN 0		E		TRF SIGNAL	N	DRY	REAR		UNKN	E W										000		00
							MOLALLA UA	16.10		06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	00	M	OR-Y		026	000		07
No	*45*	*9*	*2.53*	*-122*	*36 22.92*			016000100S00																UNK					
																02	NONE 0	STOP										011		00
																	PRVTE	E W												
																	PSNGR CAR		01	DRVR	INJC	38	F	OR-Y		000	000		00
																								OR<25					
03184	N	N	N	N	N	07/15/2016	CLACKAMAS	1	16	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT												07
CITY						Fri 3P		MN 0		W		TRF SIGNAL	N	DRY	REAR		RENTL	W E										000		00
							MOLALLA UA	16.10		06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	51	M	OR-Y		043	000		07
No	*45*	*9*	*2.53*	*-122*	*36 22.92*			016000100S00																OR>25					
																02	NONE 0	STOP										011		00
																	PRVTE	W E												
																	PSNGR CAR		01	DRVR	INJC	17	F	OR-Y		000	000		00
																								OR<25					
04148	N	N	N	N	N	09/09/2016	CLACKAMAS	1	16	INTER	CROSS	N	N	CLR	ANGL-STP	01	NONE 9	TURN-L												08,32
CITY						Fri 6P		MN 0		W		TRF SIGNAL	N	DRY	TURN		N/A	S W										000		00
							MOLALLA UA	16.10		06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	U	UNK		000	000		00
No	*45*	*9*	*2.53*	*-122*	*36 22.92*			016000100S00																UNK					
																02	NONE 9	STOP										011		00
																	N/A	W E												
																	PSNGR CAR		01	DRVR	NONE	00	U	UNK		000	000		00
																								UNK					

160 CASCADE HWY SOUTH

Crashes Occurring at the Intersection of Cascade Hwy 160 (MP 16.10) and Woodburn-Estacada Hwy 161(MP 11.31), near Molalla OR, 2012-2016

SER# / INVEST / UNLOC?	S P E D	R S W A U C O L G H R L K	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# FC CMPT/MLG MILEPNT LRS	CONN # FIRST STREET SECOND STREET INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS (#LANES)	INT-REL TRAF- CNTL	OFFRD RNDBT DRVWY	WTHR SURF LIGHT	CRASH TYP COLL TYP SVRTY	V#	SPCL USE TRLR QTY OWNER VEH TYPE	MOVE FROM TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACTN EVENT	CAUSE
02891	N N N		08/06/2012	CLACKAMAS	1 16		INTER	CROSS	N	N	CLR	O-1 L-TURN	01	NONE 0	STRGHT										02
NONE			Mon 6P		MN 0		CN		TRF SIGNAL	N	DRY	TURN		PRVTE	N S									000	00
				MOLALLA UA	16.10		01	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	52	M	OR-Y		000	000	00
No	*45 9 2.53*		*-122 36 22.92*		016000100S00																OR<25				
													02	NONE 0	TURN-L										
														PRVTE	S W									000	00
														PSNGR CAR		01	DRVR	INJC	26	F	OR-Y		028,004	000	02
																					OR<25				
																02	PSNG	INJC	13	F			000	000	00
																03	PSNG	NO<5	04	M			000	000	00
																04	PSNG	NO<5	02	M			000	000	00
02238	N N N N N		06/11/2014	CLACKAMAS	1 16		INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT										04
CITY			Wed 1P		MN 0		CN		TRF SIGNAL	N	DRY	ANGL		PRVTE	E W									000	00
				MOLALLA UA	16.10		01	9		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	63	M	OR-Y		097	000	00
No	*45 9 2.53*		*-122 36 22.92*		016000100S00																OR<25				
													02	NONE 0	STRGHT										
														PRVTE	N S									000	00
														PSNGR CAR		01	DRVR	NONE	53	M	OTH-Y		097	000	00
																					N-RES				
04924	N N N N N		12/05/2014	CLACKAMAS	1 16		INTER	CROSS	N	N	FOG	O-1 L-TURN	01	NONE 0	STRGHT										02,08
CITY			Fri 5P		MN 0		CN		TRF SIGNAL	N	WET	TURN		PRVTE	N S									000	00
				MOLALLA UA	16.10		01	0		N	DLIT	INJ		PSNGR CAR		01	DRVR	NONE	29	M	OR-Y		000	000	00
No	*45 9 2.53*		*-122 36 22.92*		016000100S00																OR<25				
													02	NONE 0	TURN-L										
														PRVTE	S W									000	00
														PSNGR CAR		01	DRVR	INJC	24	F	OR-Y		028,004	000	02,08
																					OR<25				
																02	PSNG	INJC	07	M			000	000	00
04937	N N N		12/05/2014	CLACKAMAS	1 16		INTER	CROSS	N	N	CLR	O-1 L-TURN	01	NONE 0	STRGHT										02
NONE			Fri 5P		MN 0		CN		TRF SIGNAL	N	DRY	TURN		PRVTE	N S									000	00
				MOLALLA UA	16.10		01	0		N	DLIT	PDO		PSNGR CAR		01	DRVR	NONE	24	M	UNK		000	000	00
No	*45 9 2.53*		*-122 36 22.92*		016000100S00																OR<25				
													02	NONE 0	TURN-L										
														PRVTE	S W									000	00
														PSNGR CAR		01	DRVR	NONE	21	F	OR-Y		028,004	000	02
																					OR<25				
02424	N N N		07/06/2012	CLACKAMAS	1 16		INTER	CROSS	N	N	CLR	O-1 L-TURN	01	NONE 0	TURN-L										02
CITY			Fri 8P		MN 0		CN		TRF SIGNAL	N	DRY	TURN		PRVTE	E S									000	00
				MOLALLA UA	16.10		03	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	19	M	OR-Y		028,004	000	02
No	*45 9 2.53*		*-122 36 22.92*		016000100S00																OR<25				

160 CASCADE HWY SOUTH

Crashes Occurring at the Intersection of Cascade Hwy 160 (MP 16.10) and Woodburn-Estacada Hwy 161(MP 11.31), near Molalla OR, 2012-2016

SER# INVEST UNLOC?	S P E E D R A U C O S L G H R D C S L K	DATE DAY/TIME *LAT/LONG*	COUNTY CITY URBAN AREA	RD# FC CMPT/MLG MILEPNT LRS	CONN # FIRST STREET SECOND STREET INTERSECTION SEQ#	RD CHAR DIRECT LOCTN	INT-TYP (MEDIAN) LEGS (#LANES)	INT-REL TRAF- CNTL	OFFRD RNDBT DRVWY	WTHR SURF LIGHT	CRASH TYP COLL TYP SVRTY	V#	SPCL USE TRLR QTY OWNER VEH TYPE	MOVE FROM TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN EVENT	CAUSE
												02	NONE 0	STRGHT										
													PRVTE	W E									000	00
													PSNGR CAR		01	DRVR	NONE	18	M	OR-Y		000	000	00
																				OR<25				
04026	N N N N N	10/27/2012	CLACKAMAS	1 16		INTER	CROSS	N	N	RAIN	O-1 L-TURN	01	NONE 0	STRGHT										02
CITY		Sat 7A		MN 0		CN		TRF SIGNAL	N	WET	TURN		PRVTE	W E									000	00
			MOLALLA UA	16.10		03	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	29	M	SUSP		000	000	00
No		*45 9 2.53 -122 36 22.92*		016000100S00																OR<25				
												02	NONE 0	TURN-L										
													PRVTE	E S									000	00
													PSNGR CAR		01	DRVR	INJC	31	M	OR-Y		028,004	000	02
																				OR<25				
															02	PSNG	INJB	11	U			000	000	00
00851	N N N	02/28/2014	CLACKAMAS	1 16		INTER	CROSS	N	N	CLR	O-1 L-TURN	01	NONE 0	STRGHT										02
NONE		Fri 3P		MN 0		CN		TRF SIGNAL	N	DRY	TURN		PRVTE	W E									000	00
			MOLALLA UA	16.10		03	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	25	M	OR-Y		000	000	00
No		*45 9 2.53 -122 36 22.92*		016000100S00																OR<25				
												02	NONE 0	TURN-L										
													PRVTE	E S									000	00
													PSNGR CAR		01	DRVR	NONE	72	M	OR-Y		028,004	000	02
																				OR<25				
02542	N N N	06/30/2014	CLACKAMAS	1 16		INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT										04
CITY		Mon 2P		MN 0		CN		TRF SIGNAL	N	DRY	ANGL		PRVTE	N S									000	00
			MOLALLA UA	16.10		03	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	17	M	OR-Y		020	000	04
No		*45 9 2.53 -122 36 22.92*		016000100S00																OR<25				
															02	PSNG	INJC	36	F			000	000	00
															03	PSNG	NONE	05	M			000	000	00
												02	NONE 0	STRGHT										
													PRVTE	W E									000	00
													PSNGR CAR		01	DRVR	NONE	24	M	OR-Y		000	000	00
																				OR>25				
05191	N N N N N	12/06/2015	CLACKAMAS	1 16		INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT										04
CITY		Sun 10A		MN 0		CN		TRF SIGNAL	N	DRY	ANGL		PRVTE	W E									000	00
			MOLALLA UA	16.10		03	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	39	F	OR-Y		020	000	04
No		*45 9 2.53 -122 36 22.92*		016000100S00																OR<25				
												02	NONE 0	STRGHT										
													PRVTE	N S									000	00
													PSNGR CAR		01	DRVR	NONE	62	F	OR-Y		000	000	00
																				OR<25				

160 CASCADE HWY SOUTH

Crashes Occurring at the Intersection of Cascade Hwy 160 (MP 16.10) and Woodburn-Estacada Hwy 161(MP 11.31), near Molalla OR, 2012-2016

SER# / INVEST / UNLOC?	SPEED	ALCOHOL	DRUGS	SCHL ZONE	WORK ZONE	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# / CMPT/MILE / LRS	FC / PNT / SECOND STREET	CONN # / FIRST STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN EVENT	CAUSE
01405	N	N	N	N	N	03/27/2016	CLACKAMAS	1	16		INTER	CROSS	N	N	CLD	O-1 L-TURN	01	NONE 0	STRGHT										02
CITY						Sun 8P		MN	0		CN		TRF SIGNAL	N	WET	TURN		PRVTE	W E									000	00
							MOLALLA UA	16.10			03	0		N	DUSK	INJ		PSNGR CAR		01	DRVR	INJC	20	F	OR-Y		000	000	00
No	*45*	*9*	*2.53*	*-122*	*36*	*22.92*		016000100S00																		OR<25				
																	02	NONE 0	TURN-L										
																		PRVTE	E S									000	00
																		PSNGR CAR		01	DRVR	INJC	54	F	OR-Y		028,004	000	02
																									OR<25				
																				02	PSNG	INJC	22	F			000	000	00
02329	N	N	N			05/23/2016	CLACKAMAS	1	16		INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 9	STRGHT										04
NONE						Mon 4A		MN	0		CN		TRF SIGNAL	N	DRY	ANGL		N/A	N S									000	00
							MOLALLA UA	16.10			03	0		N	DLIT	PDO		PSNGR CAR		01	DRVR	NONE	00	U	UNK		000	000	00
No	*45*	*9*	*2.53*	*-122*	*36*	*22.92*		016000100S00																		UNK				
																	02	NONE 9	STRGHT										
																		N/A	E W									000	00
																		PSNGR CAR		01	DRVR	NONE	00	U	UNK		000	000	00
																									UNK				
04052	N	N	N	N	N	08/30/2016	CLACKAMAS	1	16		INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT										04
CITY						Tue 6P		MN	0		CN		L-GRN-SIG	N	DRY	TURN		PRVTE	N S									000	00
							MOLALLA UA	16.10			03	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	64	M	OR-Y		020	000	04
No	*45*	*9*	*2.53*	*-122*	*36*	*22.92*		016000100S00																		OR<25				
																	02	NONE 0	TURN-L										
																		PRVTE	W N									000	00
																		PSNGR CAR		01	DRVR	NONE	61	M	OR-Y		000	000	00
																									OR<25				
																				02	PSNG	INJB	61	F			000	000	00
05284	N	N	N			11/14/2016	CLACKAMAS	1	16		INTER	CROSS	N	N	RAIN	O-1 L-TURN	01	NONE 0	STRGHT										02
CITY						Mon 11A		MN	0		CN		TRF SIGNAL	N	WET	TURN		PRVTE	S N									000	00
							MOLALLA UA	16.10			04	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	20	F	OR-Y		000	000	00
No	*45*	*9*	*2.53*	*-122*	*36*	*22.92*		016000100S00																		OR<25				
																	02	NONE 0	TURN-L										
																		PRVTE	N E									000	00
																		PSNGR CAR		01	DRVR	NONE	28	M	OR-Y		028,004	000	02
																									OR<25				

161 WOODBURN-ESTACADA

Crashes at the Intersection of Main St (Hwy 161; MP 12.04) & Hezzie Ln, 2012-2016

SER# / INVEST / UNLOC?	SPEED	ALCOHOL	DRUGS	SCHL ZONE	WORK ZONE	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# CMPT/MLG MILEPNT LRS	FC CONN # FIRST STREET SECOND STREET INTERSECTION SEQ#	RD CHAR DIRECT LOCTN	INT-TYP (MEDIAN) LEGS (#LANES)	INT-REL TRAF- CNTL	OFFRD RNDBT DRVWY	WTHR SURF LIGHT	CRASH TYP COLL TYP SVRTY	V#	SPCL USE TRLR QTY OWNER VEH TYPE	MOVE FROM TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN EVENT	CAUSE
04863	N	N	N		Y	12/16/2013	CLACKAMAS	1 16		INTER	3-LEG	N		N	CLD	ANGL-OTH	01	NONE 0	STRGHT										02
CITY						Mon 10A	MOLALLA	MN 0	S HEZZIE LN	CN		NONE		N	WET	TURN		PRVTE	W E								000	00
							MOLALLA UA	12.00	MAIN ST	04	0			Y	DAY	INJ		PSNGR CAR		01	DRVR	INJB	80	F	OR-Y		000	000	00
No						*45 8 56.95 -122 35 32.48*		016100100S00	1																OR<25				
																	02	NONE 0	TURN-L										
																		PRVTE	S W								018	00
																		PSNGR CAR		01	DRVR	NONE	23	M	OR-Y		028	000	02
																									OR<25				

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

CONTINUOUS SYSTEM CRASH LISTING

161 WOODBURN-ESTACADA

Crashes at the Intersection of Main St (Hwy 161; MP 12.16) & Leroy Ave, 2012-2016

```
       S  D
       P  R S W                                  RD#  FC   CONN #                         INT-TYP                                      SPCL USE
SER#   E A U C O DATE         COUNTY             CMPT/MLG  FIRST  STREET       RD CHAR (MEDIAN)  INT-REL  OFFRD WTHR  CRASH TYP    TRLR QTY  MOVE                       A  S
INVEST E L G H R DAY/TIME     CITY               MILEPNT   SECOND STREET       DIRECT     LEGS   TRAF-    RNDBT SURF  COLL TYP     OWNER     FROM       PRTC  INJ     G  E  LICNS  PED
UNLOC? D C S L K LAT/LONG     URBAN AREA         LRS       INTERSECTION SEQ#   LOCTN   (#LANES)  CNTL     DRVWY LIGHT SVRTY     V# VEH TYPE  TO      P# TYPE  SVRTY   E  X  RES    LOC  ERROR        ACTN EVENT       CAUSE

02968  N N N     07/25/2012  CLACKAMAS          1    16                        INTER      3-LEG  N        N CLR   S-1STOP   01 NONE    0 STRGHT                                                                          07
NONE             Wed    5P   MOLALLA            MN    0   LEROY AVE            W                 UNKNOWN  N DRY   REAR         PRVTE     W  E                                                          000              00
                             MOLALLA UA          12.16    MAIN ST              06           0             N DAY   PDO         PSNGR CAR          01 DRVR NONE  20 M  OR-Y       026          000              07
No     45  8 55.77  -122 35 21.09               016100100S00             1                                                                                        OR<25

                                                                                                                            02 NONE    0 STOP
                                                                                                                               PRVTE     W  E                                                          012              00
                                                                                                                              PSNGR CAR          01 DRVR NONE  40 M  OR-Y       000          000              00
                                                                                                                                                                      OR<25

02996  N N N     08/14/2012  CLACKAMAS          1    16                        INTER      3-LEG  N        N CLR   S-1STOP   01 NONE    0 STRGHT                                                                          07
NO RPT           Tue   12P   MOLALLA            MN    0   LEROY AVE            W                 UNKNOWN  N DRY   REAR         PRVTE     W  E                                                          000              00
                             MOLALLA UA          12.16    MAIN ST              06           0             N DAY   INJ         PSNGR CAR          01 DRVR NONE  21 M  OR-Y       026          000              07
No     45  8 55.77  -122 35 21.09               016100100S00             1                                                                                        OR<25

                                                                                                                            02 NONE    0 STOP
                                                                                                                               PRVTE     W  E                                                          012              00
                                                                                                                              PSNGR CAR          01 DRVR INJC  37 F  OR-Y       000          000              00
                                                                                                                                                                      OR<25

02379  N N N     07/03/2013  CLACKAMAS          1    16                        INTER      3-LEG  N        N CLR   S-1STOP   01 NONE    0 STRGHT                                                                          07
NONE             Wed    7P   MOLALLA            MN    0   LEROY AVE            W                 UNKNOWN  N DRY   REAR         PRVTE     W  E                                                          000              00
                             MOLALLA UA          12.16    MAIN ST              06           0             N DAY   PDO         PSNGR CAR          01 DRVR NONE  22 M  OR-Y       026          000              07
No     45  8 55.77  -122 35 21.09               016100100S00             1                                                                                        OR<25

                                                                                                                            02 NONE    0 STOP
                                                                                                                               PRVTE     W  E                                                          012              00
                                                                                                                              PSNGR CAR          01 DRVR NONE  22 M  OR-Y       000          000              00
                                                                                                                                                                      OR<25

00645  Y N N N N 02/19/2015  CLACKAMAS          1    16                        INTER      3-LEG  N        N CLR   S-1STOP   01 NONE    0 STRGHT                                                               013        01,07,29
CITY             Thu    6P   MOLALLA            MN    0   LEROY AVE            W                 NONE     N DRY   REAR         PRVTE     W  E                                                          000              00
                             MOLALLA UA          12.16    MAIN ST              06           0             N DARK  INJ         PSNGR CAR          01 DRVR INJC  18 M  OR-Y       047,043,026  038              01,07,29
No     45  8 55.77  -122 35 21.09               016100100S00             1                                                                                        OR<25

                                                                                                                            02 NONE    0 STOP
                                                                                                                               PRVTE     W  E                                                          011  013         00
                                                                                                                              PSNGR CAR          01 DRVR INJC  40 F  OR-Y       000          000              00
                                                                                                                                                                      OR>25

                                                                                                                            03 NONE    0 STOP
                                                                                                                               PRVTE     W  E                                                          022              00
                                                                                                                              PSNGR CAR          01 DRVR INJC  32 F  OR-Y       000          000              00
                                                                                                                                                                      OR<25
                                                                                                                                                 02 PSNG NO<5  01 F             000          000              00

02552  N N N N N 06/07/2016  CLACKAMAS          1    16                        INTER      3-LEG  N        N CLR   S-1STOP   01 NONE    0 STRGHT                                                                          07,29
CITY             Tue    9A   MOLALLA            MN    0   LEROY AVE            W                 NONE     N DRY   REAR         PRVTE     W  E                                                          000              00
                             MOLALLA UA          12.16    MAIN ST              06           0             N DAY   INJ         PSNGR CAR          01 DRVR NONE  29 F  OR-Y       043,026      000              07,29
No     45  8 55.77  -122 35 21.09               016100100S00             1                                                                                        OR<25
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161 WOODBURN-ESTACADA

Crashes at the Intersection of Main St (Hwy 161; MP 12.16) & Leroy Ave, 2012-2016

SER# / INVEST / UNLOC?	S P E D	R S W A U C O L G H R K	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# FC / CMPT/MLG / MILEPNT / LRS	CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACTN EVENT	CAUSE
													02	NONE 0	STOP										
														PRVTE	W E									012	00
														PSNGR CAR		01	DRVR	INJB	32	F	OR-Y		000	000	00
																					OR<25				
00603	N N N N N	N	02/21/2013	CLACKAMAS	1 16		INTER	3-LEG	N	N	RAIN	O-1 L-TURN	01	NONE 0	STRGHT										02
CITY			Thu 1P	MOLALLA	MN 0	LEROY AVE	CN		NONE	N	WET	TURN		PRVTE	E W									000	00
				MOLALLA UA	12.16	MAIN ST	02	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	23	M	OR-Y		000	000	00
No	*45 8 55.77*		*-122 35 21.09*		016100100S00	1															OR<25				
																02	PSNG	INJC	18	M			000	000	00
													02	NONE 0	TURN-L										
														PRVTE	W N									000	00
														TRUCK		01	DRVR	NONE	58	M	OR-Y		028,004	000	02
																					OR<25				
03095	N N N N N		08/09/2014	CLACKAMAS	1 16		INTER	3-LEG	N	N	CLR	O-STRGHT	01	NONE 0	STRGHT										27,05
COUNTY			Sat 6P	MOLALLA	MN 0	LEROY AVE	CN		UNKNOWN	N	DRY	SS-M		PRVTE	W E									000	00
				MOLALLA UA	12.16	MAIN ST	02	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	59	M	OR-Y		016,080	038	27,05
No	*45 8 55.77*		*-122 35 21.09*		016100100S00	1															OR<25				
													02	NONE 0	STRGHT										
														PRVTE	E W									000	00
														PSNGR CAR		01	DRVR	INJB	19	F	OR-Y		000	000	00
																					OR<25				
00673	N N N		02/21/2012	CLACKAMAS	1 16		INTER	3-LEG	N	N	RAIN	S-1STOP	01	NONE 0	STRGHT										07
NO RPT			Tue 4P	MOLALLA	MN 0	LEROY AVE	CN		UNKNOWN	N	WET	REAR		PRVTE	W E									000	00
				MOLALLA UA	12.16	MAIN ST	03	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	18	M	OR-Y		026	000	07
No	*45 8 55.77*		*-122 35 21.09*		016100100S00	1															OR<25				
													02	NONE 0	STOP										
														PRVTE	W E									012	00
														PSNGR CAR		01	DRVR	NONE	21	M	OR-Y		000	000	00
																					OR<25				
																02	PSNG	NO<5	02	M			000	000	00

161 WOODBURN-ESTACADA

Crashes at the Intersection of Main St (Hwy 161; MP 12.41) & Dixon Ave, 2012-2016

SER# / INVEST / UNLOC?	SPEED	ALCOHOL	DRUGS	SCHL	WORK	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / MILEPNT / LRS	FC	CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
02547	N	N	N	N	N	06/07/2016	CLACKAMAS	1	16		INTER	3-LEG	N	N	CLR	BIKE	01	NONE	0	TURN-L										084	
CITY						Tue 1P	MOLALLA	MN	0	DIXON AVE	NE		STOP SIGN	N	DRY	TURN		PRVTE		NE SE								015		
							MOLALLA UA	12.41		MAIN ST	06	0		N	DAY	INJ		PSNGR CAR			01	DRVR	NONE	70	M	OR-Y		027	000	084	02
No						*45 8 53.84 -122 35 2.84*		016100100		S00 1																OR<25					
																				STRGHT	01	BIKE	INJA	42	F		01	055	034	084	00
																				NW SE										
04089	N	N	N	N	N	10/15/2014	CLACKAMAS	1	16		INTER	3-LEG	N	N	UNK	ANGL-OTH	01	NONE	1	STRGHT											02
CITY						Wed 1P	MOLALLA	MN	0	DIXON AVE	CN		STOP SIGN	N	WET	ANGL		PRVTE		SE NW								000		00
							MOLALLA UA	12.41		MAIN ST	01	0		N	DAY	INJ		SEMI TOW			01	DRVR	NONE	56	M	OR-Y		000	000		00
No						*45 8 53.84 -122 35 2.84*		016100100		S00 1																OR<25					
																	02	NONE	0	STRGHT											
																		PRVTE		NE SW								015		00
																		PSNGR CAR			01	DRVR	INJB	67	F	OR-Y		028	000		02
																										OR<25					

161 WOODBURN-ESTACADA

Crashes at the Intersection of Main St (Hwy 161; MP 12.76) & Molalla Ave, 2012-2016

SER# / INVEST / UNLOC?	SPEED	ALCOHOL	DRUGS	SCHOOL BUS	WORK ZONE	DATE / DAY / TIME / LAT/LONG	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / MILEPNT / LRS	FC / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	CONN #	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
00674	N	N	N	N	N	02/26/2013	CLACKAMAS	1 16			INTER	CROSS	N	N	CLD	O-OTHER	01	NONE 0	TURN-L										013	
CITY						Tue 3P	MOLALLA	MN 0	MAIN ST		NW		FLASHBCN-R	N	DRY	TURN		PRVTE	SW NW									015	00
							MOLALLA UA	12.76	MOLALLA AVE		05	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	34	F	OR-Y		028,004	000		08,02
No						*45 8 51.09 -122 34 37.54*		016100100S00		1															OR<25					
																	02	NONE 0	TURN-R									015	013	00
																		PRVTE	NE NW											
																		PSNGR CAR		01	DRVR	NONE	84	M	OR-Y		000	000		00
																									OR<25					
																	03	NONE 0	PRKD-P											
																		PRVTE	SE NW									008		00
																		PSNGR CAR												
03966	N	N	N			10/17/2013	CLACKAMAS	1 16			INTER	CROSS	N	N	FOG	S-1STOP	01	NONE 0	STRGHT												07
NO RPT						Thu 8A	MOLALLA	MN 0	MAIN ST		NW		STOP SIGN	N	DRY	REAR		PRVTE	NW SE									000		00
							MOLALLA UA	12.76	MOLALLA AVE		06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	71	F	OR-Y		026	000		07
No						*45 8 51.09 -122 34 37.54*		016100100S00		1															OR<25					
																	02	NONE 0	STOP											
																		PRVTE	NW SE									012		00
																		PSNGR CAR		01	DRVR	NONE	64	F	OR-Y		000	000		00
																									OR<25					
02613	N	N	N			06/09/2016	CLACKAMAS	1 16			INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 9	STRGHT												29
NONE						Thu 9A	MOLALLA	MN 0	MAIN ST		NW		STOP SIGN	N	DRY	REAR		N/A	NW SE									000		00
							MOLALLA UA	12.76	MOLALLA AVE		06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	U	UNK		000	000		00
No						*45 8 51.09 -122 34 37.54*		016100100S00		1															UNK					
																	02	NONE 9	STOP											
																		N/A	NW SE									011		00
																		PSNGR CAR		01	DRVR	NONE	00	U	UNK		000	000		00
																									UNK					
02518	N	N	N			06/04/2016	CLACKAMAS	1 16			INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 9	STRGHT												02
NONE						Sat 10A	MOLALLA	MN 0	MAIN ST		CN		STOP SIGN	N	DRY	ANGL		N/A	NE SW									015		00
							MOLALLA UA	12.76	MOLALLA AVE		01	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	U	UNK		000	000		00
No						*45 8 51.09 -122 34 37.54*		016100100S00		1															UNK					
																	02	NONE 9	STRGHT											
																		N/A	SE NW									015		00
																		PSNGR CAR		01	DRVR	NONE	00	U	UNK		000	000		00
																									UNK					
00342	N	N	N			01/25/2012	CLACKAMAS	1 16			INTER	CROSS	N	N	RAIN	ANGL-OTH	01	NONE 0	STRGHT												02
NONE						Wed 7P	MOLALLA	MN 0	MAIN ST		CN		FLASHBCN-R	N	WET	ANGL		PRVTE	W E									000		00
							MOLALLA UA	12.76	MOLALLA AVE		03	0		N	DLIT	INJ		PSNGR CAR		01	DRVR	NONE	00	U	OR-Y		028	000		02
No						*45 8 51.09 -122 34 37.54*		016100100S00		1															OR<25					

161 WOODBURN-ESTACADA

Crashes at the Intersection of Main St (Hwy 161; MP 12.76) & Molalla Ave, 2012-2016

SER# / INVEST / UNLOC?	S P E D	R S W A U C O H R K	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# FC / CMPT/MLG / MILEPNT / LRS	CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACTN EVENT	CAUSE
													02	NONE 0 PRVTE	STRGHT N S									015	00
														PSNGR CAR		01	DRVR	INJC	48	F	OR-Y OR<25		000	000	00
04041 NO RPT	N	N N	10/22/2013 Tue 10A	CLACKAMAS MOLALLA	1 16 MN 0	MAIN ST	INTER CN	CROSS	N TRF SIGNAL	N	CLR DRY	S-1TURN TURN	01	NONE 0 PRVTE	TURN-R NW SW									000	08 00
No			*45 8 51.09 -122 34 37.54*	MOLALLA UA	12.76 016100100S00	MOLALLA AVE	03 1	0		N	DAY	PDO		TRUCK		01	DRVR	NONE	29	M	OR-Y OR<25		006,001	000	08
													02	NONE 0 PRVTE	TURN-R NW SW									000	00
														PSNGR CAR		01	DRVR	NONE	31	M	OR-Y OR<25		000	000	00
																02	PSNG	NO<5	01	F			000	000	00
01579 NONE	N	N N	05/07/2013 Tue 11A	CLACKAMAS MOLALLA	1 16 MN 0	MAIN ST	INTER CN	CROSS	N FLASHBCN-R	N	CLR DRY	ANGL-OTH TURN	01	NONE 0 PRVTE	STRGHT W E									015	04 00
No			*45 8 51.09 -122 34 37.54*	MOLALLA UA	12.76 016100100S00	METZLER AVE	04 1	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	M	UNK OR<25		003	000	04
													02	NONE 0 PRVTE	TURN-L S W									015	00
														PSNGR CAR		01	DRVR	NONE	30	M	OR-Y OR<25		000	000	00
04906 NO RPT	N	Y N	10/23/2016 Sun 9P	CLACKAMAS MOLALLA	1 16 MN 0	MAIN ST	INTER CN	CROSS	N STOP SIGN	N	CLR DRY	ANGL-OTH ANGL	01	NONE 9 N/A	STRGHT S N									000	03 00
No			*45 8 51.09 -122 34 37.54*	MOLALLA UA	12.76 016100100S00	MOLALLA AVE	04 1	0		N	DLIT	PDO		PSNGR CAR		01	DRVR	NONE	00	U	UNK UNK		000	000	00
													02	NONE 9 N/A	STRGHT W E									000	00
														PSNGR CAR		01	DRVR	NONE	00	U	UNK UNK		000	000	00

ACTION CODE TRANSLATION LIST

ACTION CODE	SHORT DESCRIPTION	LONG DESCRIPTION
000	NONE	NO ACTION OR NON-WARRANTED
001	SKIDDED	SKIDDED
002	ON/OFF V	GETTING ON OR OFF STOPPED OR PARKED VEHICLE
003	LOAD OVR	OVERHANGING LOAD STRUCK ANOTHER VEHICLE, ETC.
006	SLOW DN	SLOWED DOWN
007	AVOIDING	AVOIDING MANEUVER
008	PAR PARK	PARALLEL PARKING
009	ANG PARK	ANGLE PARKING
010	INTERFERE	PASSENGER INTERFERING WITH DRIVER
011	STOPPED	STOPPED IN TRAFFIC NOT WAITING TO MAKE A LEFT TURN
012	STP/L TRN	STOPPED BECAUSE OF LEFT TURN SIGNAL OR WAITING, ETC.
013	STP TURN	STOPPED WHILE EXECUTING A TURN
014	EMR V PKD	EMERGENCY VEHICLE LEGALLY PARKED IN THE ROADWAY
015	GO A/STOP	PROCEED AFTER STOPPING FOR A STOP SIGN/FLASHING RED.
016	TRN A/RED	TURNED ON RED AFTER STOPPING
017	LOSTCTRL	LOST CONTROL OF VEHICLE
018	EXIT DWY	ENTERING STREET OR HIGHWAY FROM ALLEY OR DRIVEWAY
019	ENTR DWY	ENTERING ALLEY OR DRIVEWAY FROM STREET OR HIGHWAY
020	STR ENTR	BEFORE ENTERING ROADWAY, STRUCK PEDESTRIAN, ETC. ON SIDEWALK OR SHOULDER
021	NO DRVR	CAR RAN AWAY - NO DRIVER
022	PREV COL	STRUCK, OR WAS STRUCK BY, VEHICLE OR PEDESTRIAN IN PRIOR COLLISION BEFORE ACC. STABILIZED
023	STALLED	VEHICLE STALLED OR DISABLED
024	DRVR DEAD	DEAD BY UNASSOCIATED CAUSE
025	FATIGUE	FATIGUED, SLEEPY, ASLEEP
026	SUN	DRIVER BLINDED BY SUN
027	HDLGHTS	DRIVER BLINDED BY HEADLIGHTS
028	ILLNESS	PHYSICALLY ILL
029	THRU MED	VEHICLE CROSSED, PLUNGED OVER, OR THROUGH MEDIAN BARRIER
030	PURSUIT	PURSUING OR ATTEMPTING TO STOP A VEHICLE
031	PASSING	PASSING SITUATION
032	PRKOFFRD	VEHICLE PARKED BEYOND CURB OR SHOULDER
033	CROS MED	VEHICLE CROSSED EARTH OR GRASS MEDIAN
034	X N/SGNL	CROSSING AT INTERSECTION - NO TRAFFIC SIGNAL PRESENT
035	X W/ SGNL	CROSSING AT INTERSECTION - TRAFFIC SIGNAL PRESENT
036	DIAGONAL	CROSSING AT INTERSECTION - DIAGONALLY
037	BTWN INT	CROSSING BETWEEN INTERSECTIONS
038	DISTRACT	DRIVER'S ATTENTION DISTRACTED
039	W/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER WITH TRAFFIC
040	A/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER FACING TRAFFIC
041	W/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT WITH TRAFFIC
042	A/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT FACING TRAFFIC
043	PLAYINRD	PLAYING IN STREET OR ROAD
044	PUSH MV	PUSHING OR WORKING ON VEHICLE IN ROAD OR ON SHOULDER
045	WORK ON	WORKING IN ROADWAY OR ALONG SHOULDER
046	W/ TRAFIC	NON-MOTORIST WALKING, RUNNING, RIDING, ETC. WITH TRAFFIC
047	A/ TRAFIC	NON-MOTORIST WALKING, RUNNING, RIDING, ETC. FACING TRAFFIC
050	LAY ON RD	STANDING OR LYING IN ROADWAY
051	ENT OFFRD	ENTERING / STARTING IN TRAFFIC LANE FROM OFF ROAD
052	MERGING	MERGING

ACTION CODE TRANSLATION LIST

ACTION CODE	SHORT DESCRIPTION	LONG DESCRIPTION
055	SPRAY	BLINDED BY WATER SPRAY
088	OTHER	OTHER ACTION
099	UNK	UNKNOWN ACTION

CAUSE CODE TRANSLATION LIST

CAUSE CODE	SHORT DESCRIPTION	LONG DESCRIPTION
00	NO CODE	NO CAUSE ASSOCIATED AT THIS LEVEL
01	TOO-FAST	TOO FAST FOR CONDITIONS (NOT EXCEED POSTED SPEED
02	NO-YIELD	DID NOT YIELD RIGHT-OF-WAY
03	PAS-STOP	PASSED STOP SIGN OR RED FLASHER
04	DIS SIG	DISREGARDED TRAFFIC SIGNAL
05	LEFT-CTR	DROVE LEFT OF CENTER ON TWO-WAY ROAD; STRADDLING
06	IMP-OVER	IMPROPER OVERTAKING
07	TOO-CLOS	FOLLOWED TOO CLOSELY
08	IMP-TURN	MADE IMPROPER TURN
09	DRINKING	ALCOHOL OR DRUG INVOLVED
10	OTHR-IMP	OTHER IMPROPER DRIVING
11	MECH-DEF	MECHANICAL DEFECT
12	OTHER	OTHER (NOT IMPROPER DRIVING)
13	IMP LN C	IMPROPER CHANGE OF TRAFFIC LANES
14	DIS TCD	DISREGARDED OTHER TRAFFIC CONTROL DEVICE
15	WRNG WAY	WRONG WAY ON ONE-WAY ROAD; WRONG SIDE DIVIDED RO
16	FATIGUE	DRIVER DROWSY/FATIGUED/SLEEPY
17	ILLNESS	PHYSICAL ILLNESS
18	IN RDWY	NON-MOTORIST ILLEGALLY IN ROADWAY
19	NT VISBL	NON-MOTORIST NOT VISIBLE; NON-REFLECTIVE CLOTHIN
20	IMP PKNG	VEHICLE IMPROPERLY PARKED
21	DEF STER	DEFECTIVE STEERING MECHANISM
22	DEF BRKE	INADEQUATE OR NO BRAKES
24	LOADSHFT	VEHICLE LOST LOAD OR LOAD SHIFTED
25	TIREFAIL	TIRE FAILURE
26	PHANTOM	PHANTOM / NON-CONTACT VEHICLE
27	INATTENT	INATTENTION
28	NM INATT	NON-MOTORIST INATTENTION
29	F AVOID	FAILED TO AVOID VEHICLE AHEAD
30	SPEED	DRIVING IN EXCESS OF POSTED SPEED
31	RACING	SPEED RACING (PER PAR)
32	CARELESS	CARELESS DRIVING (PER PAR)
33	RECKLESS	RECKLESS DRIVING (PER PAR)
34	AGGRESV	AGGRESSIVE DRIVING (PER PAR)
35	RD RAGE	ROAD RAGE (PER PAR)
40	VIEW OBS	VIEW OBSCURED
50	USED MDN	IMPROPER USE OF MEDIAN OR SHOULDER
51	FAIL LN	FAILED TO MAINTAIN LANE
52	OFF RD	RAN OFF ROAD

COLLISION TYPE CODE TRANSLATION LIST

COLL CODE	SHORT DESCRIPTION	LONG DESCRIPTION
&	OTH	MISCELLANEOUS
-	BACK	BACKING
0	PED	PEDESTRIAN
1	ANGL	ANGLE
2	HEAD	HEAD-ON
3	REAR	REAR-END
4	SS-M	SIDESWIPE - MEETING
5	SS-O	SIDESWIPE - OVERTAKING
6	TURN	TURNING MOVEMENT
7	PARK	PARKING MANEUVER
8	NCOL	NON-COLLISION
9	FIX	FIXED OBJECT OR OTHER OBJECT

CRASH TYPE CODE TRANSLATION LIST

CRASH TYPE	SHORT DESCRIPTION	LONG DESCRIPTION
&	OVERTURN	OVERTURNED
0	NON-COLL	OTHER NON-COLLISION
1	OTH RDWY	MOTOR VEHICLE ON OTHER ROADWAY
2	PRKD MV	PARKED MOTOR VEHICLE
3	PED	PEDESTRIAN
4	TRAIN	RAILWAY TRAIN
6	BIKE	PEDALCYCLIST
7	ANIMAL	ANIMAL
8	FIX OBJ	FIXED OBJECT
9	OTH OBJ	OTHER OBJECT
A	ANGL-STP	ENTERING AT ANGLE - ONE VEHICLE STOPPED
B	ANGL-OTH	ENTERING AT ANGLE - ALL OTHERS
C	S-STRGHT	FROM SAME DIRECTION - BOTH GOING STRAIGHT
D	S-1TURN	FROM SAME DIRECTION - ONE TURN, ONE STRAIGHT
E	S-1STOP	FROM SAME DIRECTION - ONE STOPPED
F	S-OTHER	FROM SAME DIRECTION-ALL OTHERS, INCLUDING PARKING
G	O-STRGHT	FROM OPPOSITE DIRECTION - BOTH GOING STRAIGHT
H	O-1 L-TURN	FROM OPPOSITE DIRECTION-ONE LEFT TURN,ONE STRAIGHT
I	O-1STOP	FROM OPPOSITE DIRECTION - ONE STOPPED
J	O-OTHER	FROM OPPOSITE DIRECTION-ALL OTHERS INCL. PARKING

DRIVER LICENSE CODE TRANSLATION LIST

LIC CODE	SHORT DESC	LONG DESCRIPTION
0	NONE	NOT LICENSED (HAD NEVER BEEN LICENSED)
1	OR-Y	VALID OREGON LICENSE
2	OTH-Y	VALID LICENSE, OTHER STATE OR COUNTRY
3	SUSP	SUSPENDED/REVOKED
4	EXP	EXPIRED
8	N-VAL	OTHER NON-VALID LICENSE
9	UNK	UNKNOWN IF DRIVER WAS LICENSED AT TIME OF CRASH

DRIVER RESIDENCE CODE TRANSLATION LIST

RES CODE	SHORT DESC	LONG DESCRIPTION
1	OR<25	OREGON RESIDENT WITHIN 25 MILE OF HOME
2	OR>25	OREGON RESIDENT 25 OR MORE MILES FROM HOME
3	OR-?	OREGON RESIDENT - UNKNOWN DISTANCE FROM HOME
4	N-RES	NON-RESIDENT
9	UNK	UNKNOWN IF OREGON RESIDENT

ERROR CODE TRANSLATION LIST

ERROR CODE	SHORT DESCRIPTION	FULL DESCRIPTION
000	NONE	NO ERROR
001	WIDE TRN	WIDE TURN
002	CUT CORN	CUT CORNER ON TURN
003	FAIL TRN	FAILED TO OBEY MANDATORY TRAFFIC TURN SIGNAL, SIGN OR LANE MARKINGS
004	L IN TRF	LEFT TURN IN FRONT OF ONCOMING TRAFFIC
005	L PROHIB	LEFT TURN WHERE PROHIBITED
006	FRM WRNG	TURNED FROM WRONG LANE
007	TO WRONG	TURNED INTO WRONG LANE
008	ILLEG U	U-TURNED ILLEGALLY
009	IMP STOP	IMPROPERLY STOPPED IN TRAFFIC LANE
010	IMP SIG	IMPROPER SIGNAL OR FAILURE TO SIGNAL
011	IMP BACK	BACKING IMPROPERLY (NOT PARKING)
012	IMP PARK	IMPROPERLY PARKED
013	UNPARK	IMPROPER START LEAVING PARKED POSITION
014	IMP STRT	IMPROPER START FROM STOPPED POSITION
015	IMP LGHT	IMPROPER OR NO LIGHTS (VEHICLE IN TRAFFIC)
016	INATTENT	INATTENTION (FAILURE TO DIM LIGHTS PRIOR TO 4/1/97)
017	UNSF VEH	DRIVING UNSAFE VEHICLE (NO OTHER ERROR APPARENT)
018	OTH PARK	ENTERING/EXITING PARKED POSITION W/ INSUFFICIENT CLEARANCE; OTHER IMPROPER PARKING MANEUVER
019	DIS DRIV	DISREGARDED OTHER DRIVER'S SIGNAL
020	DIS SGNL	DISREGARDED TRAFFIC SIGNAL
021	RAN STOP	DISREGARDED STOP SIGN OR FLASHING RED
022	DIS SIGN	DISREGARDED WARNING SIGN, FLARES OR FLASHING AMBER
023	DIS OFCR	DISREGARDED POLICE OFFICER OR FLAGMAN
024	DIS EMER	DISREGARDED SIREN OR WARNING OF EMERGENCY VEHICLE
025	DIS RR	DISREGARDED RR SIGNAL, RR SIGN, OR RR FLAGMAN
026	REAR-END	FAILED TO AVOID STOPPED OR PARKED VEHICLE AHEAD OTHER THAN SCHOOL BUS
027	BIKE ROW	DID NOT HAVE RIGHT-OF-WAY OVER PEDALCYCLIST
028	NO ROW	DID NOT HAVE RIGHT-OF-WAY
029	PED ROW	FAILED TO YIELD RIGHT-OF-WAY TO PEDESTRIAN
030	PAS CURV	PASSING ON A CURVE
031	PAS WRNG	PASSING ON THE WRONG SIDE
032	PAS TANG	PASSING ON STRAIGHT ROAD UNDER UNSAFE CONDITIONS
033	PAS X-WK	PASSED VEHICLE STOPPED AT CROSSWALK FOR PEDESTRIAN
034	PAS INTR	PASSING AT INTERSECTION
035	PAS HILL	PASSING ON CREST OF HILL
036	N/PAS ZN	PASSING IN "NO PASSING" ZONE
037	PAS TRAF	PASSING IN FRONT OF ONCOMING TRAFFIC
038	CUT-IN	CUTTING IN (TWO LANES - TWO WAY ONLY)
039	WRNGSIDE	DRIVING ON WRONG SIDE OF THE ROAD (2-WAY UNDIVIDED ROADWAYS)

ERROR CODE TRANSLATION LIST

ERROR CODE	SHORT DESCRIPTION	FULL DESCRIPTION
040	THRU MED	DRIVING THROUGH SAFETY ZONE OR OVER ISLAND
041	F/ST BUS	FAILED TO STOP FOR SCHOOL BUS
042	F/SLO MV	FAILED TO DECREASE SPEED FOR SLOWER MOVING VEHICLE
043	TOO CLOSE	FOLLOWING TOO CLOSELY (MUST BE ON OFFICER'S REPORT)
044	STRDL LN	STRADDLING OR DRIVING ON WRONG LANES
045	IMP CHG	IMPROPER CHANGE OF TRAFFIC LANES
046	WRNG WAY	WRONG WAY ON ONE-WAY ROADWAY; WRONG SIDE DIVIDED ROAD
047	BASCRULE	DRIVING TOO FAST FOR CONDITIONS (NOT EXCEEDING POSTED SPEED)
048	OPN DOOR	OPENED DOOR INTO ADJACENT TRAFFIC LANE
049	IMPEDING	IMPEDING TRAFFIC
050	SPEED	DRIVING IN EXCESS OF POSTED SPEED
051	RECKLESS	RECKLESS DRIVING (PER PAR)
052	CARELESS	CARELESS DRIVING (PER PAR)
053	RACING	SPEED RACING (PER PAR)
054	X N/SGNL	CROSSING AT INTERSECTION, NO TRAFFIC SIGNAL PRESENT
055	X W/SGNL	CROSSING AT INTERSECTION, TRAFFIC SIGNAL PRESENT
056	DIAGONAL	CROSSING AT INTERSECTION - DIAGONALLY
057	BTWN INT	CROSSING BETWEEN INTERSECTIONS
059	W/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER WITH TRAFFIC
060	A/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER FACING TRAFFIC
061	W/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT WITH TRAFFIC
062	A/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT FACING TRAFFIC
063	PLAYINRD	PLAYING IN STREET OR ROAD
064	PUSH MV	PUSHING OR WORKING ON VEHICLE IN ROAD OR ON SHOULDER
065	WORK IN RD	WORKING IN ROADWAY OR ALONG SHOULDER
070	LAY ON RD	STANDING OR LYING IN ROADWAY
071	NM IMP USE	IMPROPER USE OF TRAFFIC LANE BY NON-MOTORIST
073	ELUDING	ELUDING / ATTEMPT TO ELUDE
079	F NEG CURV	FAILED TO NEGOTIATE A CURVE
080	FAIL LN	FAILED TO MAINTAIN LANE
081	OFF RD	RAN OFF ROAD
082	NO CLEAR	DRIVER MISJUDGED CLEARANCE
083	OVRSTEER	OVER-CORRECTING
084	NOT USED	CODE NOT IN USE
085	OVRLOAD	OVERLOADING OR IMPROPER LOADING OF VEHICLE WITH CARGO OR PASSENGERS
097	UNA DIS TC	UNABLE TO DETERMINE WHICH DRIVER DISREGARDED TRAFFIC CONTROL DEVICE

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
001	FEL/JUMP	OCCUPANT FELL, JUMPED OR WAS EJECTED FROM MOVING VEHICLE
002	INTERFER	PASSENGER INTERFERED WITH DRIVER
003	BUG INTF	ANIMAL OR INSECT IN VEHICLE INTERFERED WITH DRIVER
004	INDRCT PED	PEDESTRIAN INDIRECTLY INVOLVED (NOT STRUCK)
005	SUB-PED	"SUB-PED": PEDESTRIAN INJURED SUBSEQUENT TO COLLISION, ETC.
006	INDRCT BIK	PEDALCYCLIST INDIRECTLY INVOLVED (NOT STRUCK)
007	HITCHIKR	HITCHHIKER (SOLICITING A RIDE)
008	PSNGR TOW	PASSENGER OR NON-MOTORIST BEING TOWED OR PUSHED ON CONVEYANCE
009	ON/OFF V	GETTING ON/OFF STOPPED/PARKED VEHICLE (OCCUPANTS ONLY; MUST HAVE PHYSICAL CONTACT W/ VEHIC
010	SUB OTRN	OVERTURNED AFTER FIRST HARMFUL EVENT
011	MV PUSHD	VEHICLE BEING PUSHED
012	MV TOWED	VEHICLE TOWED OR HAD BEEN TOWING ANOTHER VEHICLE
013	FORCED	VEHICLE FORCED BY IMPACT INTO ANOTHER VEHICLE, PEDALCYCLIST OR PEDESTRIAN
014	SET MOTN	VEHICLE SET IN MOTION BY NON-DRIVER (CHILD RELEASED BRAKES, ETC.)
015	RR ROW	AT OR ON RAILROAD RIGHT-OF-WAY (NOT LIGHT RAIL)
016	LT RL ROW	AT OR ON LIGHT-RAIL RIGHT-OF-WAY
017	RR HIT V	TRAIN STRUCK VEHICLE
018	V HIT RR	VEHICLE STRUCK TRAIN
019	HIT RR CAR	VEHICLE STRUCK RAILROAD CAR ON ROADWAY
020	JACKNIFE	JACKKNIFE; TRAILER OR TOWED VEHICLE STRUCK TOWING VEHICLE
021	TRL OTRN	TRAILER OR TOWED VEHICLE OVERTURNED
022	CN BROKE	TRAILER CONNECTION BROKE
023	DETACH TRL	DETACHED TRAILING OBJECT STRUCK OTHER VEHICLE, NON-MOTORIST, OR OBJECT
024	V DOOR OPN	VEHICLE DOOR OPENED INTO ADJACENT TRAFFIC LANE
025	WHEELOFF	WHEEL CAME OFF
026	HOOD UP	HOOD FLEW UP
028	LOAD SHIFT	LOST LOAD, LOAD MOVED OR SHIFTED
029	TIREFAIL	TIRE FAILURE
030	PET	PET: CAT, DOG AND SIMILAR
031	LVSTOCK	STOCK: COW, CALF, BULL, STEER, SHEEP, ETC.
032	HORSE	HORSE, MULE, OR DONKEY
033	HRSE&RID	HORSE AND RIDER
034	GAME	WILD ANIMAL, GAME (INCLUDES BIRDS; NOT DEER OR ELK)
035	DEER ELK	DEER OR ELK, WAPITI
036	ANML VEH	ANIMAL-DRAWN VEHICLE
037	CULVERT	CULVERT, OPEN LOW OR HIGH MANHOLE
038	ATENUATN	IMPACT ATTENUATOR
039	PK METER	PARKING METER
040	CURB	CURB (ALSO NARROW SIDEWALKS ON BRIDGES)
041	JIGGLE	JIGGLE BAR OR TRAFFIC SNAKE FOR CHANNELIZATION
042	GDRL END	LEADING EDGE OF GUARDRAIL
043	GARDRAIL	GUARD RAIL (NOT METAL MEDIAN BARRIER)
044	BARRIER	MEDIAN BARRIER (RAISED OR METAL)
045	WALL	RETAINING WALL OR TUNNEL WALL
046	BR RAIL	BRIDGE RAILING OR PARAPET (ON BRIDGE OR APPROACH)
047	BR ABUTMNT	BRIDGE ABUTMENT (INCLUDED "APPROACH END" THRU 2013)
048	BR COLMN	BRIDGE PILLAR OR COLUMN
049	BR GIRDR	BRIDGE GIRDER (HORIZONTAL BRIDGE STRUCTURE OVERHEAD)
050	ISLAND	TRAFFIC RAISED ISLAND
051	GORE	GORE
052	POLE UNK	POLE - TYPE UNKNOWN
053	POLE UTL	POLE - POWER OR TELEPHONE
054	ST LIGHT	POLE - STREET LIGHT ONLY
055	TRF SGNL	POLE - TRAFFIC SIGNAL AND PED SIGNAL ONLY
056	SGN BRDG	POLE - SIGN BRIDGE
057	STOPSIGN	STOP OR YIELD SIGN

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
058	OTH SIGN	OTHER SIGN, INCLUDING STREET SIGNS
059	HYDRANT	HYDRANT
060	MARKER	DELINEATOR OR MARKER (REFLECTOR POSTS)
061	MAILBOX	MAILBOX
062	TREE	TREE, STUMP OR SHRUBS
063	VEG OHED	TREE BRANCH OR OTHER VEGETATION OVERHEAD, ETC.
064	WIRE/CBL	WIRE OR CABLE ACROSS OR OVER THE ROAD
065	TEMP SGN	TEMPORARY SIGN OR BARRICADE IN ROAD, ETC.
066	PERM SGN	PERMANENT SIGN OR BARRICADE IN/OFF ROAD
067	SLIDE	SLIDES, FALLEN OR FALLING ROCKS
068	FRGN OBJ	FOREIGN OBSTRUCTION/DEBRIS IN ROAD (NOT GRAVEL)
069	EQP WORK	EQUIPMENT WORKING IN/OFF ROAD
070	OTH EQP	OTHER EQUIPMENT IN OR OFF ROAD (INCLUDES PARKED TRAILER, BOAT)
071	MAIN EQP	WRECKER, STREET SWEEPER, SNOW PLOW OR SANDING EQUIPMENT
072	OTHER WALL	ROCK, BRICK OR OTHER SOLID WALL
073	IRRGL PVMT	OTHER BUMP (NOT SPEED BUMP), POTHOLE OR PAVEMENT IRREGULARITY (PER PAR)
074	OVERHD OBJ	OTHER OVERHEAD OBJECT (HIGHWAY SIGN, SIGNAL HEAD, ETC.); NOT BRIDGE
075	CAVE IN	BRIDGE OR ROAD CAVE IN
076	HI WATER	HIGH WATER
077	SNO BANK	SNOW BANK
078	LO-HI EDGE	LOW OR HIGH SHOULDER AT PAVEMENT EDGE
079	DITCH	CUT SLOPE OR DITCH EMBANKMENT
080	OBJ FRM MV	STRUCK BY ROCK OR OTHER OBJECT SET IN MOTION BY OTHER VEHICLE (INCL. LOST LOADS)
081	FLY-OBJ	STRUCK BY ROCK OR OTHER MOVING OR FLYING OBJECT (NOT SET IN MOTION BY VEHICLE)
082	VEH HID	VEHICLE OBSCURED VIEW
083	VEG HID	VEGETATION OBSCURED VIEW
084	BLDG HID	VIEW OBSCURED BY FENCE, SIGN, PHONE BOOTH, ETC.
085	WIND GUST	WIND GUST
086	IMMERSED	VEHICLE IMMERSED IN BODY OF WATER
087	FIRE/EXP	FIRE OR EXPLOSION
088	FENC/BLD	FENCE OR BUILDING, ETC.
089	OTHR CRASH	CRASH RELATED TO ANOTHER SEPARATE CRASH
090	TO 1 SIDE	TWO-WAY TRAFFIC ON DIVIDED ROADWAY ALL ROUTED TO ONE SIDE
091	BUILDING	BUILDING OR OTHER STRUCTURE
092	PHANTOM	OTHER (PHANTOM) NON-CONTACT VEHICLE
093	CELL PHONE	CELL PHONE (ON PAR OR DRIVER IN USE)
094	VIOL GDL	TEENAGE DRIVER IN VIOLATION OF GRADUATED LICENSE PGM
095	GUY WIRE	GUY WIRE
096	BERM	BERM (EARTHEN OR GRAVEL MOUND)
097	GRAVEL	GRAVEL IN ROADWAY
098	ABR EDGE	ABRUPT EDGE
099	CELL WTNSD	CELL PHONE USE WITNESSED BY OTHER PARTICIPANT
100	UNK FIXD	FIXED OBJECT, UNKNOWN TYPE.
101	OTHER OBJ	NON-FIXED OBJECT, OTHER OR UNKNOWN TYPE
102	TEXTING	TEXTING
103	WZ WORKER	WORK ZONE WORKER
104	ON VEHICLE	PASSENGER RIDING ON VEHICLE EXTERIOR
105	PEDAL PSGR	PASSENGER RIDING ON PEDALCYCLE
106	MAN WHLCHR	PEDESTRIAN IN NON-MOTORIZED WHEELCHAIR
107	MTR WHLCHR	PEDESTRIAN IN MOTORIZED WHEELCHAIR
108	OFFICER	LAW ENFORCEMENT / POLICE OFFICER
109	SUB-BIKE	"SUB-BIKE": PEDALCYCLIST INJURED SUBSEQUENT TO COLLISION, ETC.
110	N-MTR	NON-MOTORIST STRUCK VEHICLE
111	S CAR VS V	STREET CAR/TROLLEY (ON RAILS OR OVERHEAD WIRE SYSTEM) STRUCK VEHICLE
112	V VS S CAR	VEHICLE STRUCK STREET CAR/TROLLEY (ON RAILS OR OVERHEAD WIRE SYSTEM)
113	S CAR ROW	AT OR ON STREET CAR OR TROLLEY RIGHT-OF-WAY

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
114	RR EQUIP	VEHICLE STRUCK RAILROAD EQUIPMENT (NOT TRAIN) ON TRACKS
115	DSTRCT GPS	DISTRACTED BY NAVIGATION SYSTEM OR GPS DEVICE
116	DSTRCT OTH	DISTRACTED BY OTHER ELECTRONIC DEVICE
117	RR GATE	RAIL CROSSING DROP-ARM GATE
118	EXPNSN JNT	EXPANSION JOINT
119	JERSEY BAR	JERSEY BARRIER
120	WIRE BAR	WIRE OR CABLE MEDIAN BARRIER
121	FENCE	FENCE
123	OBJ IN VEH	LOOSE OBJECT IN VEHICLE STRUCK OCCUPANT
124	SLIPPERY	SLIDING OR SWERVING DUE TO WET, ICY, SLIPPERY OR LOOSE SURFACE (NOT GRAVEL)
125	SHLDR	SHOULDER GAVE WAY
126	BOULDER	ROCK(S), BOULDER (NOT GRAVEL; NOT ROCK SLIDE)
127	LAND SLIDE	ROCK SLIDE OR LAND SLIDE
128	CURVE INV	CURVE PRESENT AT CRASH LOCATION
129	HILL INV	VERTICAL GRADE / HILL PRESENT AT CRASH LOCATION
130	CURVE HID	VIEW OBSCURED BY CURVE
131	HILL HID	VIEW OBSCURED BY VERTICAL GRADE / HILL
132	WINDOW HID	VIEW OBSCURED BY VEHICLE WINDOW CONDITIONS
133	SPRAY HID	VIEW OBSCURED BY WATER SPRAY
134	TORRENTIAL	TORRENTIAL RAIN (EXCEPTIONALLY HEAVY RAIN)

FUNCTIONAL CLASSIFICATION TRANSLATION LIST

FUNC CLASS	DESCRIPTION
01	RURAL PRINCIPAL ARTERIAL - INTERSTATE
02	RURAL PRINCIPAL ARTERIAL - OTHER
06	RURAL MINOR ARTERIAL
07	RURAL MAJOR COLLECTOR
08	RURAL MINOR COLLECTOR
09	RURAL LOCAL
11	URBAN PRINCIPAL ARTERIAL - INTERSTATE
12	URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXP
14	URBAN PRINCIPAL ARTERIAL - OTHER
16	URBAN MINOR ARTERIAL
17	URBAN MAJOR COLLECTOR
18	URBAN MINOR COLLECTOR
19	URBAN LOCAL
78	UNKNOWN RURAL SYSTEM
79	UNKNOWN RURAL NON-SYSTEM
98	UNKNOWN URBAN SYSTEM
99	UNKNOWN URBAN NON-SYSTEM

HIGHWAY COMPONENT TRANSLATION LIST

CODE	DESCRIPTION
0	MAINLINE STATE HIGHWAY
1	COUPLET
3	FRONTAGE ROAD
6	CONNECTION
8	HIGHWAY - OTHER

INJURY SEVERITY CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
1	KILL	FATAL INJURY
2	INJA	INCAPACITATING INJURY - BLEEDING, BROKEN BONES
3	INJB	NON-INCAPACITATING INJURY
4	INJC	POSSIBLE INJURY - COMPLAINT OF PAIN
5	PRI	DIED PRIOR TO CRASH
7	NO<5	NO INJURY - 0 TO 4 YEARS OF AGE
9	NONE	PARTICIPANT UNINJURED, OVER THE AGE OF 4

LIGHT CONDITION CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	DAY	DAYLIGHT
2	DLIT	DARKNESS - WITH STREET LIGHTS
3	DARK	DARKNESS - NO STREET LIGHTS
4	DAWN	DAWN (TWILIGHT)
5	DUSK	DUSK (TWILIGHT)

MEDIAN TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	NONE	NO MEDIAN
1	RSDMD	SOLID MEDIAN BARRIER
2	DIVMD	EARTH, GRASS OR PAVED MEDIAN

MILEAGE TYPE CODE TRANSLATION LIST

CODE	LONG DESCRIPTION
0	REGULAR MILEAGE
T	TEMPORARY
Y	SPUR
Z	OVERLAPPING

MOVEMENT TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	STRGHT	STRAIGHT AHEAD
2	TURN-R	TURNING RIGHT
3	TURN-L	TURNING LEFT
4	U-TURN	MAKING A U-TURN
5	BACK	BACKING
6	STOP	STOPPED IN TRAFFIC
7	PRKD-P	PARKED - PROPERLY
8	PRKD-I	PARKED - IMPROPERLY
9	PARKNG	PARKING MANEUVER

NON-MOTORIST LOCATION CODE TRANSLATION LIST

CODE	LONG DESCRIPTION
00	AT INTERSECTION - NOT IN ROADWAY
01	AT INTERSECTION - INSIDE CROSSWALK
02	AT INTERSECTION - IN ROADWAY, OUTSIDE CROSSWALK
03	AT INTERSECTION - IN ROADWAY, XWALK AVAIL UNKNWN
04	NOT AT INTERSECTION - IN ROADWAY
05	NOT AT INTERSECTION - ON SHOULDER
06	NOT AT INTERSECTION - ON MEDIAN
07	NOT AT INTERSECTION - WITHIN TRAFFIC RIGHT-OF-WAY
08	NOT AT INTERSECTION - IN BIKE PATH OR PARKING LANE
09	NOT-AT INTERSECTION - ON SIDEWALK
10	OUTSIDE TRAFFICWAY BOUNDARIES
13	AT INTERSECTION - IN BIKE LANE
14	NOT AT INTERSECTION - IN BIKE LANE
15	NOT AT INTERSECTION - INSIDE MID-BLOCK CROSSWALK
16	NOT AT INTERSECTION - IN PARKING LANE
18	OTHER, NOT IN ROADWAY
99	UNKNOWN LOCATION

ROAD CHARACTER CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	INTER	INTERSECTION
2	ALLEY	DRIVEWAY OR ALLEY
3	STRGHT	STRAIGHT ROADWAY
4	TRANS	TRANSITION
5	CURVE	CURVE (HORIZONTAL CURVE)
6	OPENAC	OPEN ACCESS OR TURNOUT
7	GRADE	GRADE (VERTICAL CURVE)
8	BRIDGE	BRIDGE STRUCTURE
9	TUNNEL	TUNNEL

PARTICIPANT TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	OCC	UNKNOWN OCCUPANT TYPE
1	DRVR	DRIVER
2	PSNG	PASSENGER
3	PED	PEDESTRIAN
4	CONV	PEDESTRIAN USING A PEDESTRIAN CONVEYA
5	PTOW	PEDESTRIAN TOWING OR TRAILERING AN OB
6	BIKE	PEDALCYCLIST
7	BTOW	PEDALCYCLIST TOWING OR TRAILERING AN
8	PRKD	OCCUPANT OF A PARKED MOTOR VEHICLE
9	UNK	UNKNOWN TYPE OF NON-MOTORIST

TRAFFIC CONTROL DEVICE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
000	NONE	NO CONTROL
001	TRF SIGNAL	TRAFFIC SIGNALS
002	FLASHBCN-R	FLASHING BEACON - RED (STOP)
003	FLASHBCN-A	FLASHING BEACON - AMBER (SLOW)
004	STOP SIGN	STOP SIGN
005	SLOW SIGN	SLOW SIGN
006	REG-SIGN	REGULATORY SIGN
007	YIELD	YIELD SIGN
008	WARNING	WARNING SIGN
009	CURVE	CURVE SIGN
010	SCHL X-ING	SCHOOL CROSSING SIGN OR SPECIAL SIGNAL
011	OFCR/FLAG	POLICE OFFICER, FLAGMAN - SCHOOL PATROL
012	BRDG-GATE	BRIDGE GATE - BARRIER
013	TEMP-BARR	TEMPORARY BARRIER
014	NO-PASS-ZN	NO PASSING ZONE
015	ONE-WAY	ONE-WAY STREET
016	CHANNEL	CHANNELIZATION
017	MEDIAN BAR	MEDIAN BARRIER
018	PILOT CAR	PILOT CAR
019	SP PED SIG	SPECIAL PEDESTRIAN SIGNAL
020	X-BUCK	CROSSBUCK
021	THR-GN-SIG	THROUGH GREEN ARROW OR SIGNAL
022	L-GRN-SIG	LEFT TURN GREEN ARROW, LANE MARKINGS, OR SIGNAL
023	R-GRN-SIG	RIGHT TURN GREEN ARROW, LANE MARKINGS, OR SIGNAL
024	WIGWAG	WIGWAG OR FLASHING LIGHTS W/O DROP-ARM GATE
025	X-BUCK WRN	CROSSBUCK AND ADVANCE WARNING
026	WW W/ GATE	FLASHING LIGHTS WITH DROP-ARM GATES
027	OVRHD SGNL	SUPPLEMENTAL OVERHEAD SIGNAL (RR XING ONLY)
028	SP RR STOP	SPECIAL RR STOP SIGN
029	ILUM GRD X	ILLUMINATED GRADE CROSSING
037	RAMP METER	METERED RAMPS
038	RUMBLE STR	RUMBLE STRIP
090	L-TURN REF	LEFT TURN REFUGE (WHEN REFUGE IS INVOLVED)
091	R-TURN ALL	RIGHT TURN AT ALL TIMES SIGN, ETC.
092	EMR SGN/FL	EMERGENCY SIGNS OR FLARES
093	ACCEL LANE	ACCELERATION OR DECELERATION LANES
094	R-TURN PRO	RIGHT TURN PROHIBITED ON RED AFTER STOPPING
095	BUS STPSGN	BUS STOP SIGN AND RED LIGHTS

VEHICLE TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
00	PDO	NOT COLLECTED FOR PDO CRASHES
01	PSNGR CAR	PASSENGER CAR, PICKUP, LIGHT DELIVERY, ETC.
02	BOBTAIL	TRUCK TRACTOR WITH NO TRAILERS (BOBTAIL)
03	FARM TRCTR	FARM TRACTOR OR SELF-PROPELLED FARM EQUIPMENT
04	SEMI TOW	TRUCK TRACTOR WITH TRAILER/MOBILE HOME IN TOW
05	TRUCK	TRUCK WITH NON-DETACHABLE BED, PANEL, ETC.
06	MOPED	MOPED, MINIBIKE, SEATED MOTOR SCOOTER, MOTOR BIKE
07	SCHL BUS	SCHOOL BUS (INCLUDES VAN)
08	OTH BUS	OTHER BUS
09	MTRCYCLE	MOTORCYCLE, DIRT BIKE
10	OTHER	OTHER: FORKLIFT, BACKHOE, ETC.
11	MOTRHOME	MOTORHOME
12	TROLLEY	MOTORIZED STREET CAR/TROLLEY (NO RAILS/WIRES)
13	ATV	ATV
14	MTRSCTR	MOTORIZED SCOOTER (STANDING)
15	SNOWMOBILE	SNOWMOBILE
99	UNKNOWN	UNKNOWN VEHICLE TYPE

099 UNKNOWN UNKNOWN OR NOT DEFINITE

WEATHER CONDITION CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	CLR	CLEAR
2	CLD	CLOUDY
3	RAIN	RAIN
4	SLT	SLEET
5	FOG	FOG
6	SNOW	SNOW
7	DUST	DUST
8	SMOK	SMOKE
9	ASH	ASH

Appendix D
Year 2020 Background Conditions
Traffic Analysis Worksheets

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	72	144	63	226	228	13	158	116	96	166
v/c Ratio	0.36	0.31	0.34	0.47	0.42	0.12	0.50	0.31	0.42	0.34
Control Delay	42.3	27.2	42.7	30.1	6.6	45.0	39.0	9.5	41.5	20.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.3	27.2	42.7	30.1	6.6	45.0	39.0	9.5	41.5	20.7
Queue Length 50th (ft)	32	53	28	90	0	6	68	0	42	42
Queue Length 95th (ft)	94	133	85	209	57	29	169	48	116	140
Internal Link Dist (ft)		465		3507			611			497
Turn Bay Length (ft)	260		320		230	260		280	260	
Base Capacity (vph)	701	1039	688	1084	952	598	1075	1010	665	939
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.14	0.09	0.21	0.24	0.02	0.15	0.11	0.14	0.18

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	129	4	58	208	210	12	145	107	88	77	75
Future Volume (vph)	66	129	4	58	208	210	12	145	107	88	77	75
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		0%			0%			-2%			2%	
Total Lost time (s)	5.0	5.3		5.0	5.3	5.3	5.0	5.3	5.3	5.0	5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1446	1512		1421	1577	1282	1235	1564	1417	1372	1354	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1446	1512		1421	1577	1282	1235	1564	1417	1372	1354	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	72	140	4	63	226	228	13	158	116	96	84	82
RTOR Reduction (vph)	0	1	0	0	0	162	0	0	89	0	18	0
Lane Group Flow (vph)	72	143	0	63	226	66	13	158	27	96	148	0
Heavy Vehicles (%)	15%	15%	25%	17%	11%	16%	36%	13%	6%	20%	18%	19%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	7.6	23.1		7.2	22.7	22.7	1.1	18.0	18.0	9.1	26.0	
Effective Green, g (s)	7.6	23.1		7.2	22.7	22.7	1.1	18.0	18.0	9.1	26.0	
Actuated g/C Ratio	0.10	0.30		0.09	0.29	0.29	0.01	0.23	0.23	0.12	0.33	
Clearance Time (s)	5.0	5.3		5.0	5.3	5.3	5.0	5.3	5.3	5.0	5.3	
Vehicle Extension (s)	2.3	5.0		2.3	5.0	5.0	2.3	2.0	2.0	2.3	2.0	
Lane Grp Cap (vph)	140	447		131	458	373	17	360	327	160	451	
v/s Ratio Prot	c0.05	0.09		0.04	c0.14		0.01	c0.10		c0.07	0.11	
v/s Ratio Perm						0.05			0.02			
v/c Ratio	0.51	0.32		0.48	0.49	0.18	0.76	0.44	0.08	0.60	0.33	
Uniform Delay, d1	33.4	21.3		33.6	22.9	20.7	38.3	25.7	23.5	32.7	19.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.0	0.9		1.6	1.7	0.5	102.0	0.3	0.0	4.6	0.2	
Delay (s)	35.4	22.2		35.2	24.6	21.2	140.3	26.0	23.6	37.3	19.6	
Level of Service	D	C		D	C	C	F	C	C	D	B	
Approach Delay (s)		26.6			24.4			30.2			26.1	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	78.0	Sum of lost time (s)	20.6
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	341	3	14	512	11	39	1	26	2	1	14
Future Vol, veh/h	30	341	3	14	512	11	39	1	26	2	1	14
Conflicting Peds, #/hr	1	0	2	2	0	1	0	0	7	7	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	190	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	2	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	10	10	0	0	13	0	0	0	0	0	0	7
Mvmt Flow	37	416	4	17	624	13	48	1	32	2	1	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	639	0	0	422	0	0	1167	1166	427	1180	1161	632
Stage 1	-	-	-	-	-	-	493	493	-	666	666	-
Stage 2	-	-	-	-	-	-	674	673	-	514	495	-
Critical Hdwy	4.2	-	-	4.1	-	-	7.1	6.5	6.2	7.5	6.9	6.47
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.5	5.9	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.5	5.9	-
Follow-up Hdwy	2.29	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.363
Pot Cap-1 Maneuver	908	-	-	1148	-	-	172	196	632	148	173	455
Stage 1	-	-	-	-	-	-	562	550	-	420	428	-
Stage 2	-	-	-	-	-	-	448	457	-	517	520	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	908	-	-	1140	-	-	157	185	627	133	163	455
Mov Cap-2 Maneuver	-	-	-	-	-	-	157	185	-	133	163	-
Stage 1	-	-	-	-	-	-	538	527	-	403	421	-
Stage 2	-	-	-	-	-	-	424	450	-	467	498	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.2	27	16.8
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	157	576	908	-	-	1140	-	-	327
HCM Lane V/C Ratio	0.303	0.057	0.04	-	-	0.015	-	-	0.063
HCM Control Delay (s)	37.6	11.6	9.1	-	-	8.2	-	-	16.8
HCM Lane LOS	E	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	1.2	0.2	0.1	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	37	327	440	47	23	83
Future Vol, veh/h	37	327	440	47	23	83
Conflicting Peds, #/hr	3	0	0	3	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	0	10	12	2	0	18
Mvmt Flow	45	399	537	57	28	101

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	597	0	-	0	1057	568
Stage 1	-	-	-	-	568	-
Stage 2	-	-	-	-	489	-
Critical Hdwy	4.1	-	-	-	6.4	6.38
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.462
Pot Cap-1 Maneuver	989	-	-	-	251	493
Stage 1	-	-	-	-	571	-
Stage 2	-	-	-	-	621	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	989	-	-	-	235	492
Mov Cap-2 Maneuver	-	-	-	-	235	-
Stage 1	-	-	-	-	569	-
Stage 2	-	-	-	-	583	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	16
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	989	-	-	-	235	492
HCM Lane V/C Ratio	0.046	-	-	-	0.119	0.206
HCM Control Delay (s)	8.8	0	-	-	22.4	14.2
HCM Lane LOS	A	A	-	-	C	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4	0.8

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	329	7	3	452	4	2	1	2	3	1	4
Future Vol, veh/h	8	329	7	3	452	4	2	1	2	3	1	4
Conflicting Peds, #/hr	1	0	0	0	0	1	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	90	-	120	190	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	9	0	0	12	0	0	0	0	33	0	25
Mvmt Flow	9	362	8	3	497	4	2	1	2	3	1	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	502	0	0	362	0	0	887	888	362	887	885	500
Stage 1	-	-	-	-	-	-	379	379	-	506	506	-
Stage 2	-	-	-	-	-	-	508	509	-	381	379	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.43	6.5	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.43	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.43	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.797	4	3.525
Pot Cap-1 Maneuver	1073	-	-	1208	-	-	267	285	687	234	286	527
Stage 1	-	-	-	-	-	-	647	618	-	496	543	-
Stage 2	-	-	-	-	-	-	551	541	-	583	618	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1073	-	-	1208	-	-	262	282	687	230	283	526
Mov Cap-2 Maneuver	-	-	-	-	-	-	262	282	-	230	283	-
Stage 1	-	-	-	-	-	-	642	613	-	491	541	-
Stage 2	-	-	-	-	-	-	544	539	-	575	613	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.1	15.3	16.2
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	355	1073	-	-	1208	-	-	331
HCM Lane V/C Ratio	0.015	0.008	-	-	0.003	-	-	0.027
HCM Control Delay (s)	15.3	8.4	-	-	8	-	-	16.2
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.1

Intersection	
Intersection Delay, s/veh	16.2
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	44	239	28	0	6	289	39	0	87	67	17
Future Vol, veh/h	0	44	239	28	0	6	289	39	0	87	67	17
Peak Hour Factor	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	19	8	7	2	17	11	5	2	7	8	0
Mvmt Flow	0	48	263	31	0	7	318	43	0	96	74	19
Number of Lanes	0	0	1	1	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	2	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	17.3	18.5	13.1
HCM LOS	C	C	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	51%	16%	0%	2%	28%
Vol Thru, %	39%	84%	0%	87%	35%
Vol Right, %	10%	0%	100%	12%	36%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	171	283	28	334	137
LT Vol	87	44	0	6	39
Through Vol	67	239	0	289	48
RT Vol	17	0	28	39	50
Lane Flow Rate	188	311	31	367	151
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.345	0.577	0.049	0.62	0.274
Departure Headway (Hd)	6.613	6.678	5.696	6.084	6.543
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	543	544	631	595	548
Service Time	4.658	4.389	3.407	4.095	4.59
HCM Lane V/C Ratio	0.346	0.572	0.049	0.617	0.276
HCM Control Delay	13.1	18.1	8.7	18.5	12.1
HCM Lane LOS	B	C	A	C	B
HCM 95th-tile Q	1.5	3.6	0.2	4.3	1.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Traffic Vol, veh/h	0	39	48	50
Future Vol, veh/h	0	39	48	50
Peak Hour Factor	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	8	13	8
Mvmt Flow	0	43	53	55
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	12.1
HCM LOS	B

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	124	288	170	177	137	27	175	123	226	312
v/c Ratio	0.60	0.68	0.66	0.40	0.30	0.27	0.64	0.38	0.67	0.55
Control Delay	63.0	48.7	60.2	37.7	7.7	65.8	58.2	11.9	54.8	35.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.0	48.7	60.2	37.7	7.7	65.8	58.2	11.9	54.8	35.5
Queue Length 50th (ft)	83	181	113	100	0	18	116	0	143	175
Queue Length 95th (ft)	189	358	241	210	51	61	241	57	#335	365
Internal Link Dist (ft)		465		3507			611			497
Turn Bay Length (ft)	260		320		230	260		280	260	
Base Capacity (vph)	441	796	457	760	694	445	803	723	444	737
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.36	0.37	0.23	0.20	0.06	0.22	0.17	0.51	0.42

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	251	17	158	165	127	25	163	114	210	197	93
Future Volume (vph)	115	251	17	158	165	127	25	163	114	210	197	93
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		0%			0%			-2%			2%	
Total Lost time (s)	5.0	5.3		5.0	5.3	5.3	5.0	5.3	5.3	5.0	5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1525	1650		1583	1577	1293	1540	1667	1371	1538	1514	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1525	1650		1583	1577	1293	1540	1667	1371	1538	1514	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	124	270	18	170	177	137	27	175	123	226	212	100
RTOR Reduction (vph)	0	1	0	0	0	99	0	0	100	0	8	0
Lane Group Flow (vph)	124	287	0	170	177	38	27	175	23	226	304	0
Confl. Peds. (#/hr)									2	2		
Heavy Vehicles (%)	9%	5%	6%	5%	11%	15%	9%	6%	7%	7%	7%	13%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	15.0	28.3		18.2	31.5	31.5	4.4	20.9	20.9	24.2	40.7	
Effective Green, g (s)	15.0	28.3		18.2	31.5	31.5	4.4	20.9	20.9	24.2	40.7	
Actuated g/C Ratio	0.13	0.25		0.16	0.28	0.28	0.04	0.19	0.19	0.22	0.36	
Clearance Time (s)	5.0	5.3		5.0	5.3	5.3	5.0	5.3	5.3	5.0	5.3	
Vehicle Extension (s)	2.3	5.0		2.3	5.0	5.0	2.3	2.0	2.0	2.3	2.0	
Lane Grp Cap (vph)	203	416		256	442	363	60	310	255	331	549	
v/s Ratio Prot	0.08	c0.17		c0.11	c0.11		0.02	0.10		c0.15	c0.20	
v/s Ratio Perm						0.03			0.02			
v/c Ratio	0.61	0.69		0.66	0.40	0.11	0.45	0.56	0.09	0.68	0.55	
Uniform Delay, d1	45.8	38.0		44.1	32.7	29.9	52.7	41.5	37.8	40.5	28.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.3	6.0		5.4	1.2	0.3	3.1	1.4	0.1	5.0	0.7	
Delay (s)	50.1	44.0		49.6	33.9	30.2	55.8	42.9	37.8	45.4	29.2	
Level of Service	D	D		D	C	C	E	D	D	D	C	
Approach Delay (s)		45.8			38.4			42.1			36.0	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	40.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	112.2	Sum of lost time (s)	20.6
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	654	11	22	613	15	17	1	10	6	1	23
Future Vol, veh/h	17	654	11	22	613	15	17	1	10	6	1	23
Conflicting Peds, #/hr	0	0	1	1	0	0	3	0	1	1	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	190	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	2	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	5	0	0	7	7	0	0	0	0	0	13
Mvmt Flow	19	719	12	24	674	16	19	1	11	7	1	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	690	0	0	732	0	0	1509	1501	727	1499	1499	685
Stage 1	-	-	-	-	-	-	763	763	-	730	730	-
Stage 2	-	-	-	-	-	-	746	738	-	769	769	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.5	6.9	6.53
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.5	5.9	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.5	5.9	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.417
Pot Cap-1 Maneuver	914	-	-	882	-	-	100	123	427	86	104	414
Stage 1	-	-	-	-	-	-	400	416	-	384	397	-
Stage 2	-	-	-	-	-	-	409	427	-	364	380	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	911	-	-	881	-	-	89	117	426	80	99	413
Mov Cap-2 Maneuver	-	-	-	-	-	-	89	117	-	80	99	-
Stage 1	-	-	-	-	-	-	391	407	-	376	386	-
Stage 2	-	-	-	-	-	-	371	415	-	346	372	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.3	40.1	25
HCM LOS			E	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	89	344	911	-	-	881	-	-	213
HCM Lane V/C Ratio	0.21	0.035	0.021	-	-	0.027	-	-	0.155
HCM Control Delay (s)	55.9	15.8	9	-	-	9.2	-	-	25
HCM Lane LOS	F	C	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0.7	0.1	0.1	-	-	0.1	-	-	0.5

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	41	613	582	49	16	57
Future Vol, veh/h	41	613	582	49	16	57
Conflicting Peds, #/hr	2	0	0	2	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	7	8	2	0	2
Mvmt Flow	45	666	633	53	17	62

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	688	0	-	0	1416	662
Stage 1	-	-	-	-	661	-
Stage 2	-	-	-	-	755	-
Critical Hdwy	4.12	-	-	-	6.4	6.22
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.218	-	-	-	3.5	3.318
Pot Cap-1 Maneuver	906	-	-	-	153	462
Stage 1	-	-	-	-	517	-
Stage 2	-	-	-	-	468	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	905	-	-	-	140	461
Mov Cap-2 Maneuver	-	-	-	-	140	-
Stage 1	-	-	-	-	516	-
Stage 2	-	-	-	-	430	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	18.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	905	-	-	-	140	461
HCM Lane V/C Ratio	0.049	-	-	-	0.124	0.134
HCM Control Delay (s)	9.2	0	-	-	34.3	14
HCM Lane LOS	A	A	-	-	D	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.4	0.5

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	541	52	54	547	5	47	1	48	5	2	4
Future Vol, veh/h	4	541	52	54	547	5	47	1	48	5	2	4
Conflicting Peds, #/hr	7	0	0	0	0	7	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	90	-	120	190	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	75	6	4	0	9	20	0	0	2	60	50	0
Mvmt Flow	4	558	54	56	564	5	48	1	49	5	2	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	576	0	0	558	0	0	1247	1253	558	1276	1251	573
Stage 1	-	-	-	-	-	-	566	566	-	685	685	-
Stage 2	-	-	-	-	-	-	681	687	-	591	566	-
Critical Hdwy	4.85	-	-	4.1	-	-	7.1	6.5	6.22	7.7	7	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.7	6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.7	6	-
Follow-up Hdwy	2.875	-	-	2.2	-	-	3.5	4	3.318	4.04	4.45	3.3
Pot Cap-1 Maneuver	719	-	-	1023	-	-	152	174	529	109	140	523
Stage 1	-	-	-	-	-	-	513	511	-	357	383	-
Stage 2	-	-	-	-	-	-	444	450	-	406	438	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	719	-	-	1023	-	-	142	162	529	93	131	520
Mov Cap-2 Maneuver	-	-	-	-	-	-	142	162	-	93	131	-
Stage 1	-	-	-	-	-	-	510	508	-	353	360	-
Stage 2	-	-	-	-	-	-	414	423	-	365	436	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.8	33.2	32.3
HCM LOS			D	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	224	719	-	-	1023	-	-	143
HCM Lane V/C Ratio	0.442	0.006	-	-	0.054	-	-	0.079
HCM Control Delay (s)	33.2	10	-	-	8.7	-	-	32.3
HCM Lane LOS	D	B	-	-	A	-	-	D
HCM 95th %tile Q(veh)	2.1	0	-	-	0.2	-	-	0.3

Intersection	
Intersection Delay, s/veh	39.3
Intersection LOS	E

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	66	330	82	0	21	341	41	0	98	79	28
Future Vol, veh/h	0	66	330	82	0	21	341	41	0	98	79	28
Peak Hour Factor	0.92	0.95	0.95	0.95	0.92	0.95	0.95	0.95	0.92	0.95	0.95	0.95
Heavy Vehicles, %	2	6	6	5	2	0	8	0	2	6	5	4
Mvmt Flow	0	69	347	86	0	22	359	43	0	103	83	29
Number of Lanes	0	0	1	1	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	2	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	48.9	47	20.6
HCM LOS	E	E	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	48%	17%	0%	5%	23%
Vol Thru, %	39%	83%	0%	85%	35%
Vol Right, %	14%	0%	100%	10%	42%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	205	396	82	403	287
LT Vol	98	66	0	21	66
Through Vol	79	330	0	341	100
RT Vol	28	0	82	41	121
Lane Flow Rate	216	417	86	424	302
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.516	0.937	0.175	0.893	0.667
Departure Headway (Hd)	8.601	8.093	7.284	7.576	7.952
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	419	450	495	479	453
Service Time	6.681	5.793	4.984	5.641	6.027
HCM Lane V/C Ratio	0.516	0.927	0.174	0.885	0.667
HCM Control Delay	20.6	56.7	11.5	47	25.7
HCM Lane LOS	C	F	B	E	D
HCM 95th-tile Q	2.9	10.9	0.6	9.8	4.8

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Traffic Vol, veh/h	0	66	100	121
Future Vol, veh/h	0	66	100	121
Peak Hour Factor	0.92	0.95	0.95	0.95
Heavy Vehicles, %	2	3	5	2
Mvmt Flow	0	69	105	127
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	25.7
HCM LOS	D

Appendix E
Year 2020 Total Conditions
Traffic Analysis Worksheets

Queues
1: OR 213 & OR 211

01/11/2019

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	72	166	77	241	243	13	158	137	117	166
v/c Ratio	0.40	0.39	0.41	0.53	0.45	0.13	0.55	0.37	0.51	0.30
Control Delay	46.4	30.3	46.2	32.6	6.9	48.8	42.9	10.0	45.0	20.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.4	30.3	46.2	32.6	6.9	48.8	42.9	10.0	45.0	20.4
Queue Length 50th (ft)	34	67	36	102	0	6	73	0	55	45
Queue Length 95th (ft)	100	165	104	235	62	31	179	54	143	145
Internal Link Dist (ft)		465		3507			611			497
Turn Bay Length (ft)	260		320		230	260		280	260	
Base Capacity (vph)	595	999	585	1042	929	508	1033	982	565	903
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.17	0.13	0.23	0.26	0.03	0.15	0.14	0.21	0.18

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	149	4	71	222	224	12	145	126	108	77	75
Future Volume (vph)	66	149	4	71	222	224	12	145	126	108	77	75
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		0%			0%			-2%			2%	
Total Lost time (s)	5.0	5.3		5.0	5.3	5.3	5.0	5.3	5.3	5.0	5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1446	1513		1421	1577	1282	1235	1564	1417	1372	1354	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1446	1513		1421	1577	1282	1235	1564	1417	1372	1354	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	72	162	4	77	241	243	13	158	137	117	84	82
RTOR Reduction (vph)	0	1	0	0	0	176	0	0	105	0	17	0
Lane Group Flow (vph)	72	165	0	77	241	67	13	158	32	117	149	0
Heavy Vehicles (%)	15%	15%	25%	17%	11%	16%	36%	13%	6%	20%	18%	19%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	8.1	23.1		8.5	23.5	23.5	1.2	19.9	19.9	13.6	32.3	
Effective Green, g (s)	8.1	23.1		8.5	23.5	23.5	1.2	19.9	19.9	13.6	32.3	
Actuated g/C Ratio	0.09	0.27		0.10	0.27	0.27	0.01	0.23	0.23	0.16	0.38	
Clearance Time (s)	5.0	5.3		5.0	5.3	5.3	5.0	5.3	5.3	5.0	5.3	
Vehicle Extension (s)	2.3	5.0		2.3	5.0	5.0	2.3	2.0	2.0	2.3	2.0	
Lane Grp Cap (vph)	136	407		140	432	351	17	363	329	217	510	
v/s Ratio Prot	0.05	0.11		c0.05	c0.15		0.01	c0.10		c0.09	0.11	
v/s Ratio Perm						0.05			0.02			
v/c Ratio	0.53	0.41		0.55	0.56	0.19	0.76	0.44	0.10	0.54	0.29	
Uniform Delay, d1	37.0	25.7		36.8	26.6	23.8	42.1	28.1	25.8	33.2	18.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.4	1.4		3.3	2.6	0.6	102.0	0.3	0.0	1.7	0.1	
Delay (s)	39.4	27.1		40.1	29.3	24.4	144.1	28.4	25.9	34.9	18.8	
Level of Service	D	C		D	C	C	F	C	C	C	B	
Approach Delay (s)		30.8			28.6			32.2			25.5	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	85.7	Sum of lost time (s)	20.6
Intersection Capacity Utilization	48.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	400	3	14	553	18	39	1	26	11	1	14
Future Vol, veh/h	30	400	3	14	553	18	39	1	26	11	1	14
Conflicting Peds, #/hr	1	0	2	2	0	1	0	0	7	7	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	190	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	2	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	10	10	0	0	13	0	0	0	0	0	0	7
Mvmt Flow	37	488	4	17	674	22	48	1	32	13	1	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	697	0	0	493	0	0	1294	1296	499	1307	1288	686
Stage 1	-	-	-	-	-	-	565	565	-	721	721	-
Stage 2	-	-	-	-	-	-	729	731	-	586	567	-
Critical Hdwy	4.2	-	-	4.1	-	-	7.1	6.5	6.2	7.5	6.9	6.47
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.5	5.9	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.5	5.9	-
Follow-up Hdwy	2.29	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.363
Pot Cap-1 Maneuver	863	-	-	1081	-	-	141	164	576	119	143	423
Stage 1	-	-	-	-	-	-	513	511	-	389	401	-
Stage 2	-	-	-	-	-	-	417	430	-	468	479	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	863	-	-	1074	-	-	128	154	571	106	134	423
Mov Cap-2 Maneuver	-	-	-	-	-	-	128	154	-	106	134	-
Stage 1	-	-	-	-	-	-	490	488	-	372	394	-
Stage 2	-	-	-	-	-	-	393	423	-	419	458	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.2	34	29.2
HCM LOS			D	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	128	519	863	-	-	1074	-	-	180
HCM Lane V/C Ratio	0.372	0.063	0.042	-	-	0.016	-	-	0.176
HCM Control Delay (s)	48.9	12.4	9.4	-	-	8.4	-	-	29.2
HCM Lane LOS	E	B	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	1.5	0.2	0.1	-	-	0	-	-	0.6

Intersection	
Int Delay, s/veh	4.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	361	73	59	498	77	42
Future Vol, veh/h	361	73	59	498	77	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	100	75	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	10	0	0	12	0	0
Mvmt Flow	440	89	72	607	94	51

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	440	0	1191	440
Stage 1	-	-	-	-	440	-
Stage 2	-	-	-	-	751	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1131	-	209	621
Stage 1	-	-	-	-	653	-
Stage 2	-	-	-	-	470	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1131	-	196	621
Mov Cap-2 Maneuver	-	-	-	-	196	-
Stage 1	-	-	-	-	653	-
Stage 2	-	-	-	-	440	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	35.5
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	258	-	-	1131	-
HCM Lane V/C Ratio	0.562	-	-	0.064	-
HCM Control Delay (s)	35.5	-	-	8.4	-
HCM Lane LOS	E	-	-	A	-
HCM 95th %tile Q(veh)	3.2	-	-	0.2	-

Intersection	
Int Delay, s/veh	8.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	37	324	40	124	431	47	39	7	84	23	9	83
Future Vol, veh/h	37	324	40	124	431	47	39	7	84	23	9	83
Conflicting Peds, #/hr	3	0	0	0	0	3	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	100	-	-	100	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	0	10	0	0	12	2	0	0	0	0	0	18
Mvmt Flow	45	395	49	151	526	57	48	9	102	28	11	101

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	586	0	0	444	0	0	1423	1398	420	1425	1394	557
Stage 1	-	-	-	-	-	-	510	510	-	860	860	-
Stage 2	-	-	-	-	-	-	913	888	-	565	534	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.38
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.462
Pot Cap-1 Maneuver	999	-	-	1127	-	-	115	142	638	114	143	501
Stage 1	-	-	-	-	-	-	550	541	-	353	376	-
Stage 2	-	-	-	-	-	-	330	365	-	513	528	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	999	-	-	1127	-	-	74	117	638	78	118	500
Mov Cap-2 Maneuver	-	-	-	-	-	-	74	117	-	78	118	-
Stage 1	-	-	-	-	-	-	525	517	-	336	325	-
Stage 2	-	-	-	-	-	-	220	315	-	404	504	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	1.8	45.4	29.7
HCM LOS			E	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	74	475	999	-	-	1127	-	-	78	380
HCM Lane V/C Ratio	0.643	0.234	0.045	-	-	0.134	-	-	0.36	0.295
HCM Control Delay (s)	116.6	14.9	8.8	-	-	8.7	-	-	75.1	18.4
HCM Lane LOS	F	B	A	-	-	A	-	-	F	C
HCM 95th %tile Q(veh)	2.9	0.9	0.1	-	-	0.5	-	-	1.4	1.2

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	433	0	1	604	0	1
Future Vol, veh/h	433	0	1	604	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	10	0	0	12	0	0
Mvmt Flow	528	0	1	737	0	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	528	0	1267	528
Stage 1	-	-	-	-	528	-
Stage 2	-	-	-	-	739	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1049	-	188	554
Stage 1	-	-	-	-	596	-
Stage 2	-	-	-	-	476	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1049	-	188	554
Mov Cap-2 Maneuver	-	-	-	-	188	-
Stage 1	-	-	-	-	596	-
Stage 2	-	-	-	-	476	-

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

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	554	-	-	1049	-
HCM Lane V/C Ratio	0.002	-	-	0.001	-
HCM Control Delay (s)	11.5	-	-	8.4	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	411	7	3	568	4	2	1	2	3	1	4
Future Vol, veh/h	8	411	7	3	568	4	2	1	2	3	1	4
Conflicting Peds, #/hr	1	0	0	0	0	1	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	90	-	120	190	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	9	0	0	12	0	0	0	0	33	0	25
Mvmt Flow	9	452	8	3	624	4	2	1	2	3	1	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	630	0	0	452	0	0	1105	1105	452	1105	1103	627
Stage 1	-	-	-	-	-	-	469	469	-	634	634	-
Stage 2	-	-	-	-	-	-	636	636	-	471	469	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.43	6.5	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.43	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.43	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.797	4	3.525
Pot Cap-1 Maneuver	962	-	-	1119	-	-	190	213	612	164	213	444
Stage 1	-	-	-	-	-	-	579	564	-	419	476	-
Stage 2	-	-	-	-	-	-	469	475	-	519	564	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	962	-	-	1119	-	-	186	210	612	161	210	444
Mov Cap-2 Maneuver	-	-	-	-	-	-	186	210	-	161	210	-
Stage 1	-	-	-	-	-	-	574	559	-	415	474	-
Stage 2	-	-	-	-	-	-	462	473	-	511	559	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	18.8	20.1
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	266	962	-	-	1119	-	-	247
HCM Lane V/C Ratio	0.021	0.009	-	-	0.003	-	-	0.036
HCM Control Delay (s)	18.8	8.8	-	-	8.2	-	-	20.1
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

Intersection	
Intersection Delay, s/veh	27.4
Intersection LOS	D

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	72	279	42	0	6	346	39	0	106	67	17
Future Vol, veh/h	0	72	279	42	0	6	346	39	0	106	67	17
Peak Hour Factor	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	19	8	7	2	17	11	5	2	7	8	0
Mvmt Flow	0	79	307	46	0	7	380	43	0	116	74	19
Number of Lanes	0	0	1	1	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	2	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	31	34.3	16.7
HCM LOS	D	D	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	56%	21%	0%	2%	22%
Vol Thru, %	35%	79%	0%	88%	27%
Vol Right, %	9%	0%	100%	10%	51%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	190	351	42	391	177
LT Vol	106	72	0	6	39
Through Vol	67	279	0	346	48
RT Vol	17	0	42	39	90
Lane Flow Rate	209	386	46	430	195
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.443	0.797	0.082	0.822	0.401
Departure Headway (Hd)	7.64	7.438	6.423	6.883	7.42
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	470	490	560	528	484
Service Time	5.701	5.154	4.14	4.898	5.482
HCM Lane V/C Ratio	0.445	0.788	0.082	0.814	0.403
HCM Control Delay	16.7	33.5	9.7	34.3	15.4
HCM Lane LOS	C	D	A	D	C
HCM 95th-tile Q	2.2	7.4	0.3	8.1	1.9

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Traffic Vol, veh/h	0	39	48	90
Future Vol, veh/h	0	39	48	90
Peak Hour Factor	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	8	13	8
Mvmt Flow	0	43	53	99
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	15.4
HCM LOS	C

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	124	309	186	195	155	27	175	142	247	312
v/c Ratio	0.63	0.72	0.71	0.42	0.32	0.29	0.67	0.43	0.68	0.54
Control Delay	68.2	52.5	65.4	38.7	7.1	69.9	63.3	12.0	55.6	36.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.2	52.5	65.4	38.7	7.1	69.9	63.3	12.0	55.6	36.5
Queue Length 50th (ft)	91	216	136	120	0	20	128	0	168	186
Queue Length 95th (ft)	193	388	268	231	54	62	248	62	#400	377
Internal Link Dist (ft)		465		3507			611			497
Turn Bay Length (ft)	260		320		230	260		280	260	
Base Capacity (vph)	403	729	418	699	659	407	735	682	407	676
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.42	0.44	0.28	0.24	0.07	0.24	0.21	0.61	0.46

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	271	17	173	181	144	25	163	132	230	197	93
Future Volume (vph)	115	271	17	173	181	144	25	163	132	230	197	93
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		0%			0%			-2%			2%	
Total Lost time (s)	5.0	5.3		5.0	5.3	5.3	5.0	5.3	5.3	5.0	5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1525	1651		1583	1577	1293	1540	1667	1371	1538	1514	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1525	1651		1583	1577	1293	1540	1667	1371	1538	1514	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	124	291	18	186	195	155	27	175	142	247	212	100
RTOR Reduction (vph)	0	1	0	0	0	110	0	0	117	0	8	0
Lane Group Flow (vph)	124	308	0	186	195	45	27	175	25	247	304	0
Confl. Peds. (#/hr)									2	2		
Heavy Vehicles (%)	9%	5%	6%	5%	11%	15%	9%	6%	7%	7%	7%	13%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	15.3	30.6		19.7	35.0	35.0	4.5	21.2	21.2	28.2	44.9	
Effective Green, g (s)	15.3	30.6		19.7	35.0	35.0	4.5	21.2	21.2	28.2	44.9	
Actuated g/C Ratio	0.13	0.25		0.16	0.29	0.29	0.04	0.18	0.18	0.23	0.37	
Clearance Time (s)	5.0	5.3		5.0	5.3	5.3	5.0	5.3	5.3	5.0	5.3	
Vehicle Extension (s)	2.3	5.0		2.3	5.0	5.0	2.3	2.0	2.0	2.3	2.0	
Lane Grp Cap (vph)	193	419		259	458	376	57	293	241	360	565	
v/s Ratio Prot	0.08	c0.19		c0.12	c0.12		0.02	0.10		c0.16	c0.20	
v/s Ratio Perm						0.03			0.02			
v/c Ratio	0.64	0.73		0.72	0.43	0.12	0.47	0.60	0.10	0.69	0.54	
Uniform Delay, d1	49.9	41.1		47.7	34.5	31.3	56.7	45.6	41.6	42.0	29.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.9	7.9		8.2	1.3	0.3	3.6	2.2	0.1	4.7	0.5	
Delay (s)	55.8	49.0		55.9	35.9	31.6	60.3	47.8	41.6	46.7	30.1	
Level of Service	E	D		E	D	C	E	D	D	D	C	
Approach Delay (s)		51.0			41.6			46.2			37.4	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	43.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	120.3	Sum of lost time (s)	20.6
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	712	11	22	661	22	17	1	10	15	1	23
Future Vol, veh/h	17	712	11	22	661	22	17	1	10	15	1	23
Conflicting Peds, #/hr	0	0	1	1	0	0	3	0	1	1	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	190	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	2	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	5	0	0	7	7	0	0	0	0	0	13
Mvmt Flow	19	782	12	24	726	24	19	1	11	16	1	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	751	0	0	796	0	0	1630	1626	790	1620	1620	741
Stage 1	-	-	-	-	-	-	827	827	-	787	787	-
Stage 2	-	-	-	-	-	-	803	799	-	833	833	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.5	6.9	6.53
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.5	5.9	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.5	5.9	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.417
Pot Cap-1 Maneuver	868	-	-	835	-	-	82	103	393	70	87	383
Stage 1	-	-	-	-	-	-	369	389	-	355	372	-
Stage 2	-	-	-	-	-	-	380	401	-	334	352	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	866	-	-	834	-	-	73	98	392	65	83	382
Mov Cap-2 Maneuver	-	-	-	-	-	-	73	98	-	65	83	-
Stage 1	-	-	-	-	-	-	361	380	-	347	361	-
Stage 2	-	-	-	-	-	-	343	389	-	316	344	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.3	49.6	46.2
HCM LOS			E	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	73	308	866	-	-	834	-	-	129
HCM Lane V/C Ratio	0.256	0.039	0.022	-	-	0.029	-	-	0.332
HCM Control Delay (s)	70.5	17.2	9.2	-	-	9.4	-	-	46.2
HCM Lane LOS	F	C	A	-	-	A	-	-	E
HCM 95th %tile Q(veh)	0.9	0.1	0.1	-	-	0.1	-	-	1.3

Intersection	
Int Delay, s/veh	6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	641	82	56	623	75	48
Future Vol, veh/h	641	82	56	623	75	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	100	75	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	7	0	0	8	0	0
Mvmt Flow	697	89	61	677	82	52

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	697	0	1496	697
Stage 1	-	-	-	-	697	-
Stage 2	-	-	-	-	799	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	909	-	137	444
Stage 1	-	-	-	-	498	-
Stage 2	-	-	-	-	446	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	909	-	128	444
Mov Cap-2 Maneuver	-	-	-	-	128	-
Stage 1	-	-	-	-	498	-
Stage 2	-	-	-	-	416	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	70
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	177	-	-	909	-
HCM Lane V/C Ratio	0.755	-	-	0.067	-
HCM Control Delay (s)	70	-	-	9.2	-
HCM Lane LOS	F	-	-	A	-
HCM 95th %tile Q(veh)	4.9	-	-	0.2	-

Intersection	
Int Delay, s/veh	12.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	41	596	50	123	573	49	45	8	111	16	10	57
Future Vol, veh/h	41	596	50	123	573	49	45	8	111	16	10	57
Conflicting Peds, #/hr	2	0	0	0	0	2	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	100	-	-	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, %	2	7	2	2	8	2	2	2	2	0	2	2
Mvmt Flow	45	648	54	134	623	53	49	9	121	17	11	62

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	678	0	0	702	0	0	1718	1709	675	1748	1710	652
Stage 1	-	-	-	-	-	-	764	764	-	919	919	-
Stage 2	-	-	-	-	-	-	954	945	-	829	791	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.1	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.5	4.018	3.318
Pot Cap-1 Maneuver	914	-	-	895	-	-	71	91	454	68	91	468
Stage 1	-	-	-	-	-	-	396	413	-	328	350	-
Stage 2	-	-	-	-	-	-	311	340	-	368	401	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	913	-	-	895	-	-	~ 47	73	454	39	73	467
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 47	73	-	39	73	-
Stage 1	-	-	-	-	-	-	376	393	-	311	297	-
Stage 2	-	-	-	-	-	-	221	289	-	251	381	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	1.6	93.1	49.8
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	47	336	913	-	-	895	-	-	39	259
HCM Lane V/C Ratio	1.041	0.385	0.049	-	-	0.149	-	-	0.446	0.281
HCM Control Delay (s)	280.4	22.3	9.1	-	-	9.7	-	-	157.2	24.2
HCM Lane LOS	F	C	A	-	-	A	-	-	F	C
HCM 95th %tile Q(veh)	4.4	1.8	0.2	-	-	0.5	-	-	1.5	1.1

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	723	1	1	748	0	1
Future Vol, veh/h	723	1	1	748	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	7	0	0	8	0	0
Mvmt Flow	786	1	1	813	0	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	787	0	1601	786
Stage 1	-	-	-	-	786	-
Stage 2	-	-	-	-	815	-
Critical Hdwy	-	-	4.1	-	7.1	6.2
Critical Hdwy Stg 1	-	-	-	-	6.1	-
Critical Hdwy Stg 2	-	-	-	-	6.1	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	841	-	86	395
Stage 1	-	-	-	-	388	-
Stage 2	-	-	-	-	374	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	841	-	86	395
Mov Cap-2 Maneuver	-	-	-	-	86	-
Stage 1	-	-	-	-	388	-
Stage 2	-	-	-	-	374	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	14.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	395	-	-	841	-
HCM Lane V/C Ratio	0.003	-	-	0.001	-
HCM Control Delay (s)	14.1	-	-	9.3	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	635	52	54	662	5	47	1	48	5	2	4
Future Vol, veh/h	4	635	52	54	662	5	47	1	48	5	2	4
Conflicting Peds, #/hr	7	0	0	0	0	7	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	90	-	120	190	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	75	6	4	0	9	20	0	0	2	60	50	0
Mvmt Flow	4	655	54	56	682	5	48	1	49	5	2	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	695	0	0	655	0	0	1462	1469	655	1491	1466	692
Stage 1	-	-	-	-	-	-	663	663	-	803	803	-
Stage 2	-	-	-	-	-	-	799	806	-	688	663	-
Critical Hdwy	4.85	-	-	4.1	-	-	7.1	6.5	6.22	7.7	7	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.7	6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.7	6	-
Follow-up Hdwy	2.875	-	-	2.2	-	-	3.5	4	3.318	4.04	4.45	3.3
Pot Cap-1 Maneuver	640	-	-	942	-	-	108	129	466	76	101	447
Stage 1	-	-	-	-	-	-	454	462	-	303	335	-
Stage 2	-	-	-	-	-	-	382	398	-	355	393	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	640	-	-	942	-	-	100	120	466	64	94	444
Mov Cap-2 Maneuver	-	-	-	-	-	-	100	120	-	64	94	-
Stage 1	-	-	-	-	-	-	451	459	-	299	313	-
Stage 2	-	-	-	-	-	-	354	372	-	315	391	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.7	55.1	45.1
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	165	640	-	-	942	-	-	101
HCM Lane V/C Ratio	0.6	0.006	-	-	0.059	-	-	0.112
HCM Control Delay (s)	55.1	10.7	-	-	9.1	-	-	45.1
HCM Lane LOS	F	B	-	-	A	-	-	E
HCM 95th %tile Q(veh)	3.2	0	-	-	0.2	-	-	0.4

Intersection	
Intersection Delay, s/veh	82.7
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	98	377	97	0	21	399	41	0	117	79	28
Future Vol, veh/h	0	98	377	97	0	21	399	41	0	117	79	28
Peak Hour Factor	0.92	0.95	0.95	0.95	0.92	0.95	0.95	0.95	0.92	0.95	0.95	0.95
Heavy Vehicles, %	2	6	6	5	2	0	8	0	2	6	5	4
Mvmt Flow	0	103	397	102	0	22	420	43	0	123	83	29
Number of Lanes	0	0	1	1	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	2	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	115.4	100.6	26.7
HCM LOS	F	F	D

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	52%	21%	0%	5%	20%
Vol Thru, %	35%	79%	0%	87%	31%
Vol Right, %	12%	0%	100%	9%	49%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	224	475	97	461	325
LT Vol	117	98	0	21	66
Through Vol	79	377	0	399	100
RT Vol	28	0	97	41	159
Lane Flow Rate	236	500	102	485	342
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.597	1.192	0.221	1.093	0.788
Departure Headway (Hd)	9.954	8.903	8.069	8.542	9.027
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	365	410	447	427	404
Service Time	7.954	6.603	5.769	6.542	7.027
HCM Lane V/C Ratio	0.647	1.22	0.228	1.136	0.847
HCM Control Delay	26.7	136.3	13	100.6	38.3
HCM Lane LOS	D	F	B	F	E
HCM 95th-tile Q	3.7	19.1	0.8	15.8	6.8

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Traffic Vol, veh/h	0	66	100	159
Future Vol, veh/h	0	66	100	159
Peak Hour Factor	0.92	0.95	0.95	0.95
Heavy Vehicles, %	2	3	5	2
Mvmt Flow	0	69	105	167
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	38.3
HCM LOS	E

Appendix F
Signal Warrant Analysis Worksheets

KITTELSON & ASSOCIATES, INC.
610 SW Alder, Suite 700
Portland, Oregon 97205
(503) 228-5230

Project #: 23301
Project Name: Cascade Center
Analyst: ZHB
Date: 1/11/2019
File: K:\H_Projects\23\23301 - Molalla Commercial Project\excel\[Signal Warrant_OR 211 Leroy total.xls]Data Input
Intersection: OR 211/Leroy Ave
Scenario: Total Traffic

Analysis Traffic Volumes

Hour		Major Street		Minor Street	
Begin	End	EB	WB	NB	SB
12:00 AM	1:00 AM	0	0	0	0
1:00 AM		0	0	0	0
2:00 AM		0	0	0	0
3:00 AM		0	0	0	0
4:00 AM		0	0	0	0
5:00 AM		0	0	0	0
6:00 AM		287	489	3	32
7:00 AM		401	602	130	115
8:00 AM		370	455	25	50
9:00 AM		390	509	49	44
10:00 AM		452	617	85	33
11:00 AM		569	712	177	52
12:00 PM		643	680	219	59
1:00 PM		633	667	187	51
2:00 PM		629	685	150	80
3:00 PM		747	733	160	82
4:00 PM		786	728	129	73
5:00 PM		682	736	150	82
6:00 PM		697	588	131	97
7:00 PM		403	401	94	54
8:00 PM		301	315	88	30
9:00 PM		219	167	65	16
10:00 PM		0	0	0	0
11:00 PM		0	0	0	0

Warrant Summary

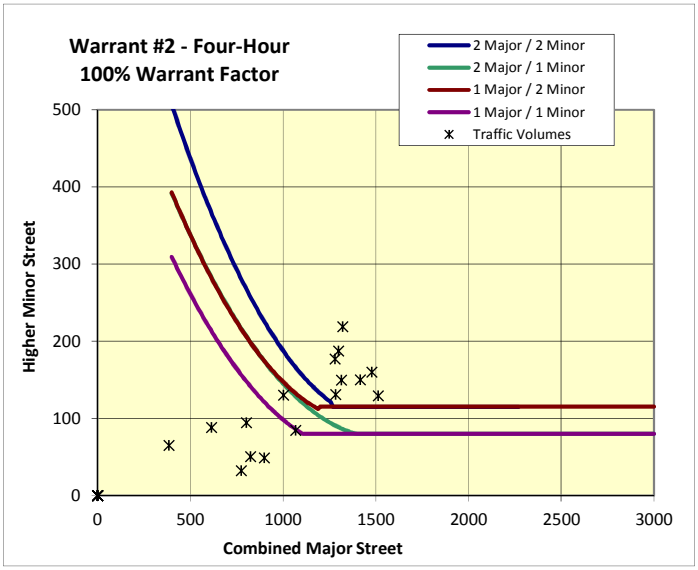
Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	Yes
#2	Four-Hour Vehicular volume	Yes	Yes
#3	Peak Hour	Yes	Yes
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

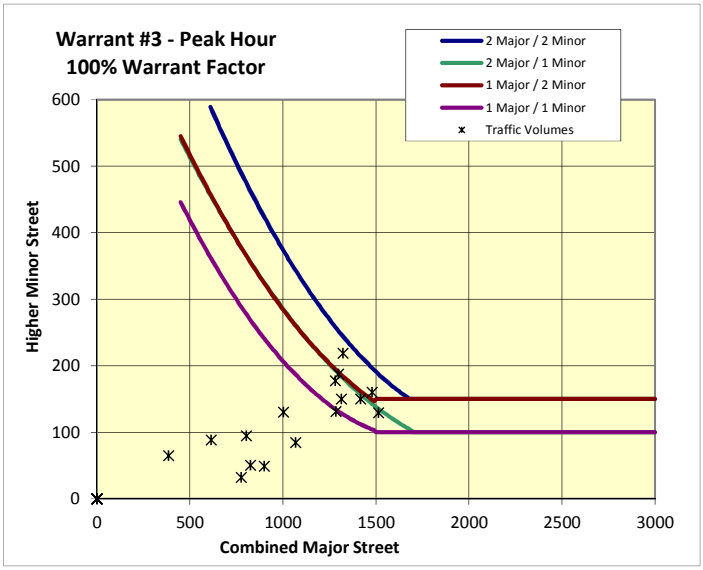
Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Minor
East-West Approach =	Major
Major Street Thru Lanes =	1
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	Yes
Warrant Factor	70%
Peak Hour or Daily Count?	Daily

Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	500	150	6	No	**Yes**
	B	750	75	11	Yes	
80%	A	400	120	9	Yes	**Yes**
	B	600	60	12	Yes	
70%	A	350	105	9	Yes	**Yes**
	B	525	53	12	Yes	
56%	A	280	84	12	Yes	**Yes**
	B	420	42	14	Yes	





KITTELSON & ASSOCIATES, INC.
610 SW Alder, Suite 700
Portland, Oregon 97205
(503) 228-5230

Project #: 23301
Project Name: Cascade Center
Analyst: ZHB
Date: 1/14/2019
File: K:\H_Projects\23\23301 - Molalla Commercial Project\excel\[Signal Warrant_OR 211 Molalla.xls]Data Input
Intersection: OR 211/Molalla Ave
Scenario: Existing Traffic (No SF), Estimated

Warrant Summary

Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	Yes
#2	Four-Hour Vehicular volume	Yes	Yes
#3	Peak Hour	Yes	Yes
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

Analysis Traffic Volumes

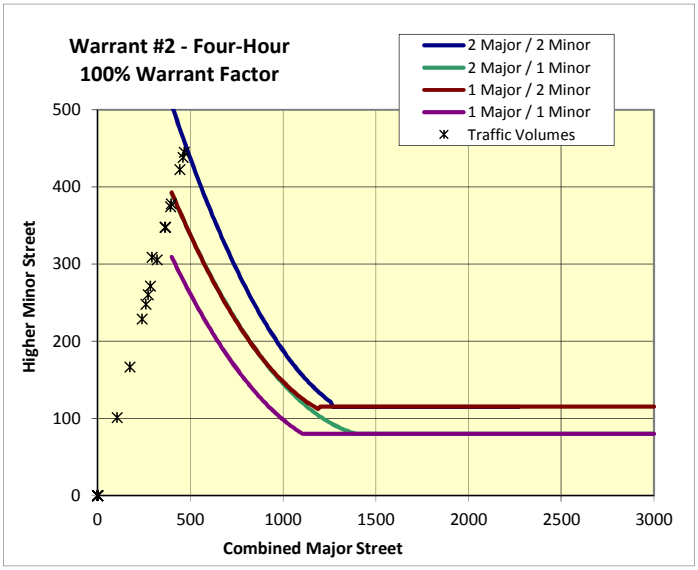
Hour		Major Street		Minor Street	
Begin	End	EB	WB	NB	SB
12:00 AM	1:00 AM	0	0	0	0
1:00 AM		0	0	0	0
2:00 AM		0	0	0	0
3:00 AM		0	0	0	0
4:00 AM		0	0	0	0
5:00 AM		0	0	0	0
6:00 AM		109	152	248	208
7:00 AM		163	131	289	309
8:00 AM		114	160	260	218
9:00 AM		119	166	271	227
10:00 AM		134	187	306	256
11:00 AM		152	213	347	291
12:00 PM		152	213	348	292
1:00 PM		152	213	348	291
2:00 PM		164	230	374	314
3:00 PM		185	259	422	354
4:00 PM		192	269	438	367
5:00 PM		195	273	445	373
6:00 PM		166	232	378	317
7:00 PM		100	140	229	192
8:00 PM		73	102	167	140
9:00 PM		44	62	101	85
10:00 PM		0	0	0	0
11:00 PM		0	0	0	0

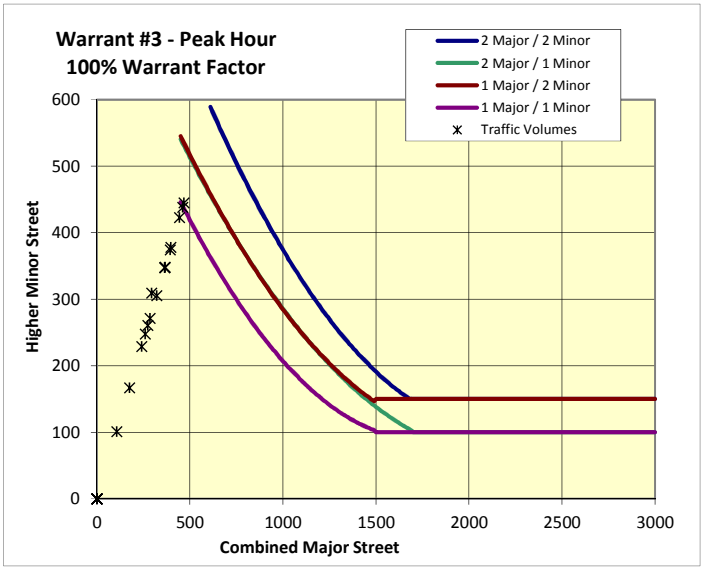
Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Minor
East-West Approach =	Major
Major Street Thru Lanes =	1
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	Yes
Warrant Factor	70%
Peak Hour or Daily Count?	Daily

Warrant #1 - Eight Hour

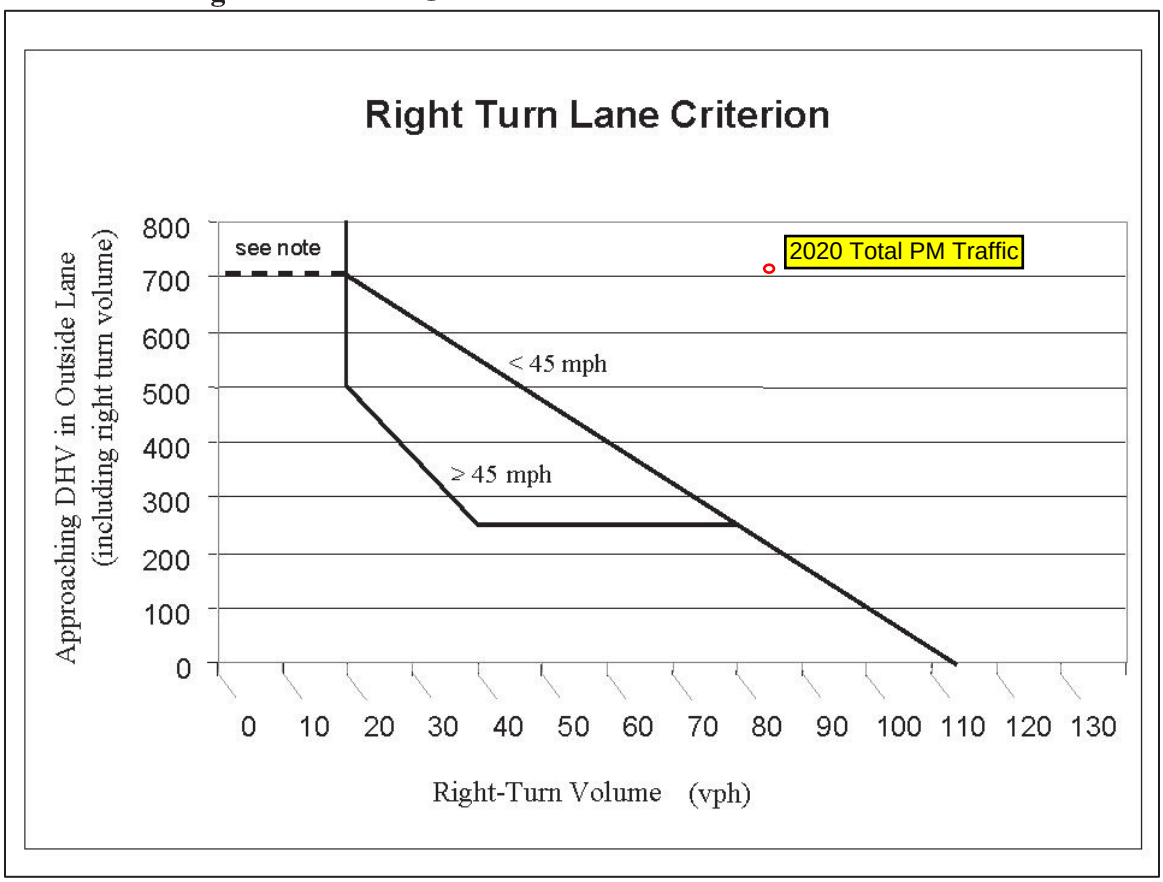
Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	500	150	0	No	**No**
	B	750	75	0	No	
80%	A	400	120	3	No	**No**
	B	600	60	0	No	
70%	A	350	105	8	Yes	**Yes**
	B	525	53	0	No	
56%	A	280	84	11	Yes	**Yes**
	B	420	42	3	No	





Appendix G
Turn Lane Criteria Analysis Worksheets

Exhibit 12-2 Right Turn Lane Criterion



Note: If there is no right turn lane, a shoulder needs to be provided. If this intersection is in a rural area and is a connection to a public street, a right turn lane is needed.

Criterion 2: Crash Experience

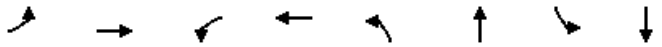
The crash experience criterion is satisfied when:

1. Adequate trial of other remedies with satisfactory observance and enforcement has failed to reduce the accident frequency; **and**
2. A history of crashes of the type susceptible to correction by a right turn lane; **and**
3. The safety benefits outweigh the associated improvements costs; **and**
4. The installation of the right turn lane minimizes impacts to the safety of vehicles, bicycles or pedestrians along the roadway.

Criterion 3: Special Cases

1. **Railroad Crossings**: If a railroad is parallel to the roadway and adversely affects right turns, a worst case scenario should be used in determining the storage requirements for the right turn lane design. The right turn lane storage length depends on the amount of time the roadway is closed, the expected number of vehicle arrivals and the location of the crossing or other obstruction. The analysis should consider all of the variables influencing the design of the right turn lane and may allow a design for conditions other than the worst case storage requirements, providing safety is not compromised.

Appendix H
Year 2020 Total Conditions with Mitigation Traffic Analysis Worksheets



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	45	444	151	583	48	111	28	112
v/c Ratio	0.10	0.43	0.27	0.58	0.20	0.29	0.12	0.33
Control Delay	5.0	6.7	6.4	8.8	17.4	7.5	16.4	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.0	6.7	6.4	8.8	17.4	7.5	16.4	8.4
Queue Length 50th (ft)	4	45	14	69	8	1	5	2
Queue Length 95th (ft)	14	95	37	143	32	29	22	29
Internal Link Dist (ft)		324		325		335		304
Turn Bay Length (ft)	100		100		100		100	
Base Capacity (vph)	674	1538	855	1508	1059	1344	1059	1162
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.29	0.18	0.39	0.05	0.08	0.03	0.10

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	324	40	124	431	47	39	7	84	23	9	83
Future Volume (vph)	37	324	40	124	431	47	39	7	84	23	9	83
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	5.0	5.0		5.0	5.0		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.86		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1661	1580		1662	1550		1662	1509		1662	1302	
Flt Permitted	0.40	1.00		0.50	1.00		0.68	1.00		0.69	1.00	
Satd. Flow (perm)	693	1580		878	1550		1198	1509		1200	1302	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	45	395	49	151	526	57	48	9	102	28	11	101
RTOR Reduction (vph)	0	4	0	0	4	0	0	86	0	0	85	0
Lane Group Flow (vph)	45	440	0	151	579	0	48	25	0	28	27	0
Confl. Peds. (#/hr)	3					3						
Heavy Vehicles (%)	0%	10%	0%	0%	12%	2%	0%	0%	0%	0%	0%	18%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	23.5	23.5		23.5	23.5		6.3	6.3		6.3	6.3	
Effective Green, g (s)	23.5	23.5		23.5	23.5		6.3	6.3		6.3	6.3	
Actuated g/C Ratio	0.60	0.60		0.60	0.60		0.16	0.16		0.16	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	414	944		525	926		192	241		192	208	
v/s Ratio Prot		0.28			c0.37			0.02			0.02	
v/s Ratio Perm	0.06			0.17			c0.04			0.02		
v/c Ratio	0.11	0.47		0.29	0.63		0.25	0.11		0.15	0.13	
Uniform Delay, d1	3.4	4.4		3.8	5.1		14.4	14.1		14.2	14.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.4		0.3	1.3		0.7	0.2		0.4	0.3	
Delay (s)	3.5	4.8		4.1	6.4		15.1	14.3		14.5	14.4	
Level of Service	A	A		A	A		B	B		B	B	
Approach Delay (s)		4.7			5.9			14.5			14.5	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	7.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	39.3	Sum of lost time (s)	9.5
Intersection Capacity Utilization	53.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	386	46	430	209	195
v/c Ratio	0.64	0.07	0.62	0.51	0.41
Control Delay	15.3	3.3	13.8	17.6	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	15.3	3.3	13.8	17.6	11.7
Queue Length 50th (ft)	59	0	63	33	19
Queue Length 95th (ft)	179	14	187	117	83
Internal Link Dist (ft)	803		299	553	291
Turn Bay Length (ft)		190			
Base Capacity (vph)	1262	1267	1437	1058	1122
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.31	0.04	0.30	0.20	0.17

Intersection Summary

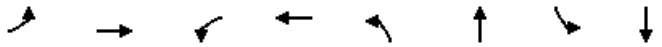
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	279	42	6	346	39	106	67	17	39	48	90
Future Volume (vph)	72	279	42	6	346	39	106	67	17	39	48	90
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.5		4.5			4.5			4.5	
Lane Util. Factor		1.00	1.00		1.00			1.00			1.00	
Frpb, ped/bikes		1.00	0.98		1.00			1.00			0.99	
Flpb, ped/bikes		1.00	1.00		1.00			1.00			1.00	
Frt		1.00	0.85		0.99			0.99			0.93	
Flt Protected		0.99	1.00		1.00			0.97			0.99	
Satd. Flow (prot)		1571	1362		1558			1576			1459	
Flt Permitted		0.86	1.00		0.99			0.78			0.90	
Satd. Flow (perm)		1361	1362		1549			1259			1324	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	79	307	46	7	380	43	116	74	19	43	53	99
RTOR Reduction (vph)	0	0	25	0	5	0	0	5	0	0	46	0
Lane Group Flow (vph)	0	386	21	0	425	0	0	204	0	0	149	0
Confl. Peds. (#/hr)	2		1	1		2	1					1
Heavy Vehicles (%)	19%	8%	7%	17%	11%	5%	7%	8%	0%	8%	13%	8%
Parking (#/hr)						2			2			2
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2		2	6			4			8		
Actuated Green, G (s)		19.0	19.0		19.0			13.7			13.7	
Effective Green, g (s)		19.0	19.0		19.0			13.7			13.7	
Actuated g/C Ratio		0.46	0.46		0.46			0.33			0.33	
Clearance Time (s)		4.5	4.5		4.5			4.5			4.5	
Vehicle Extension (s)		3.0	3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)		620	620		705			413			434	
v/s Ratio Prot												
v/s Ratio Perm		c0.28	0.02		0.27			c0.16			0.11	
v/c Ratio		0.62	0.03		0.60			0.49			0.34	
Uniform Delay, d1		8.6	6.3		8.5			11.2			10.6	
Progression Factor		1.00	1.00		1.00			1.00			1.00	
Incremental Delay, d2		2.0	0.0		1.5			0.9			0.5	
Delay (s)		10.6	6.3		10.0			12.2			11.1	
Level of Service		B	A		A			B			B	
Approach Delay (s)		10.1			10.0			12.2			11.1	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	41.7	Sum of lost time (s)	9.0
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Queues
4: Leroy Ave & OR 211

01/11/2019



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	45	702	134	676	49	130	17	73
v/c Ratio	0.13	0.71	0.42	0.69	0.23	0.36	0.08	0.23
Control Delay	4.4	10.3	8.9	9.9	23.6	9.6	22.0	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.4	10.3	8.9	9.9	23.6	9.6	22.0	10.9
Queue Length 50th (ft)	4	92	14	86	11	2	4	2
Queue Length 95th (ft)	14	205	46	194	46	45	22	35
Internal Link Dist (ft)		283		285		255		304
Turn Bay Length (ft)	100		100		100		100	
Base Capacity (vph)	504	1478	478	1462	954	1184	926	1168
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.47	0.28	0.46	0.05	0.11	0.02	0.06

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	596	50	123	573	49	45	8	111	16	10	57
Future Volume (vph)	41	596	50	123	573	49	45	8	111	16	10	57
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.86		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1629	1622		1630	1606		1630	1476		1662	1471	
Flt Permitted	0.32	1.00		0.31	1.00		0.71	1.00		0.67	1.00	
Satd. Flow (perm)	553	1622		525	1606		1217	1476		1179	1471	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	648	54	134	623	53	49	9	121	17	11	62
RTOR Reduction (vph)	0	3	0	0	3	0	0	99	0	0	51	0
Lane Group Flow (vph)	45	699	0	134	673	0	49	31	0	17	22	0
Confl. Peds. (#/hr)	2					2						1
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	2%	7%	2%	2%	8%	2%	2%	2%	2%	0%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	27.7	27.7		27.7	27.7		8.1	8.1		8.1	8.1	
Effective Green, g (s)	27.7	27.7		27.7	27.7		8.1	8.1		8.1	8.1	
Actuated g/C Ratio	0.62	0.62		0.62	0.62		0.18	0.18		0.18	0.18	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	341	1002		324	992		220	266		213	265	
v/s Ratio Prot		c0.43			0.42			0.02			0.02	
v/s Ratio Perm	0.08			0.26			c0.04			0.01		
v/c Ratio	0.13	0.70		0.41	0.68		0.22	0.12		0.08	0.08	
Uniform Delay, d1	3.6	5.7		4.4	5.6		15.7	15.4		15.3	15.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	2.1		0.9	1.9		0.5	0.2		0.2	0.1	
Delay (s)	3.7	7.9		5.2	7.5		16.2	15.5		15.4	15.4	
Level of Service	A	A		A	A		B	B		B	B	
Approach Delay (s)		7.6			7.1			15.7			15.4	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	8.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	44.8	Sum of lost time (s)	9.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	500	102	485	235	341
v/c Ratio	0.75	0.14	0.64	0.64	0.66
Control Delay	21.6	3.1	16.5	26.6	21.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	21.6	3.1	16.5	26.6	21.5
Queue Length 50th (ft)	119	0	105	61	75
Queue Length 95th (ft)	333	24	285	176	211
Internal Link Dist (ft)	803		299	553	291
Turn Bay Length (ft)		190			
Base Capacity (vph)	1097	1120	1244	714	959
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.46	0.09	0.39	0.33	0.36

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	98	377	97	21	399	41	117	79	28	66	100	159
Future Volume (vph)	98	377	97	21	399	41	117	79	28	66	100	159
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.5		4.5			4.5			4.5	
Lane Util. Factor		1.00	1.00		1.00			1.00			1.00	
Frpb, ped/bikes		1.00	0.98		1.00			1.00			0.98	
Flpb, ped/bikes		1.00	1.00		1.00			1.00			1.00	
Frt		1.00	0.85		0.99			0.98			0.93	
Flt Protected		0.99	1.00		1.00			0.97			0.99	
Satd. Flow (prot)		1634	1387		1610			1582			1543	
Flt Permitted		0.84	1.00		0.97			0.65			0.90	
Satd. Flow (perm)		1383	1387		1567			1060			1400	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	103	397	102	22	420	43	123	83	29	69	105	167
RTOR Reduction (vph)	0	0	52	0	4	0	0	6	0	0	41	0
Lane Group Flow (vph)	0	500	50	0	481	0	0	229	0	0	300	0
Confl. Peds. (#/hr)	4		1	1		4	11		4	4		11
Confl. Bikes (#/hr)									1			3
Heavy Vehicles (%)	6%	6%	5%	0%	8%	0%	6%	5%	4%	3%	5%	2%
Parking (#/hr)						2			2			2
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2		2	6			4			8		
Actuated Green, G (s)		28.0	28.0		28.0			19.8			19.8	
Effective Green, g (s)		28.0	28.0		28.0			19.8			19.8	
Actuated g/C Ratio		0.49	0.49		0.49			0.35			0.35	
Clearance Time (s)		4.5	4.5		4.5			4.5			4.5	
Vehicle Extension (s)		3.0	3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)		681	683		772			369			488	
v/s Ratio Prot												
v/s Ratio Perm		c0.36	0.04		0.31			c0.22			0.21	
v/c Ratio		0.73	0.07		0.62			0.62			0.61	
Uniform Delay, d1		11.4	7.6		10.5			15.4			15.3	
Progression Factor		1.00	1.00		1.00			1.00			1.00	
Incremental Delay, d2		4.1	0.0		1.6			3.2			2.3	
Delay (s)		15.6	7.6		12.1			18.6			17.6	
Level of Service		B	A		B			B			B	
Approach Delay (s)		14.2			12.1			18.6			17.6	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	56.8	Sum of lost time (s)	9.0
Intersection Capacity Utilization	95.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group