

Transportation Impact Analysis

Crestview Crossing

Newberg, Oregon

Final

June 2018

Transportation Impact Analysis

Crestview Crossing

Newberg, Oregon

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Section 1
Executive Summary

EXECUTIVE SUMMARY

JT Smith Companies proposes to develop a 33.13-acre property in Newberg, Oregon into a residential development consisting of up to 260 single-family homes and 48 apartment units. The development is occurring adjacent to a 4.43-acre commercial property that is not included as part of this development application. The site is located on the north side of OR 99W (Portland Road) near the intersection with Providence Drive and will include an extension of Crestview Drive to the south through the property and connecting to OR 99W to form the north leg of the OR 99W/Providence Drive intersection.

The subject property is currently occupied by farm land and one single-family home. It is bordered by residential uses to the west, north, and east and by OR 99W to the south. No direct accesses to the residential units or civic space are proposed on OR 99W or the Crestview Drive extension—these will instead be accessed via new internal local roadways and one new east-west connector that will connect to Crestview Drive north of OR 99W. Completion and occupancy of the development as described in this report is expected to occur by 2020.

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

FINDINGS

Year 2017 Existing Conditions

- All of the study intersections currently meet City of Newberg (and Oregon Department of Transportation, where applicable) mobility targets during the weekday AM and PM peak hours, with the following exceptions:
 - The Springbrook Road/OR 99W intersection currently experiences a volume-to-capacity ratio (v/c) of 0.86 during the weekday AM peak hour, which exceeds the ODOT mobility standard of 0.85. The intersection also operates at level of service (LOS) E during the weekday PM peak hour, which exceeds the City standard of LOS D under current conditions.
 - The southbound stop-controlled approach to the Vittoria Way/OR 99W intersection currently operates at LOS E during the weekday PM peak hour, which exceeds the City standard of LOS D.
- A review of historical crash data did not reveal any patterns or trends in the site vicinity that require mitigation associated with this project.
 - One fatal crash was reported at the Springbrook Road/Crestview Drive roundabout—this crash occurred when a southbound motorcyclist struck a curb and was thrown from the vehicle. The crash report lists the cause as driver error—driving too fast for conditions.
 - Based upon a 2016 analysis, the Springbrook Road/OR 99W intersection is currently within the top five percent of the highest-scoring intersections in Region 2.

Since 2016, pavement marking improvements and an additional westbound left turn lane on OR 99W were added to this intersection, and the proposed Crestview Crossing development is expected to result in a net decrease in traffic at this intersection due to the reassignment of traffic to the Crestview Drive extension.

Year 2020 Background Conditions

- A two-percent annual growth rate was applied to the existing mainline traffic volumes on OR 99W to reflect general background growth in the area before any in-process traffic was considered.
- Traffic generated by the Oregon Clinic, to be located on the west side of Providence Drive south of Providence Newberg Medical Center, was included in the background traffic volumes as in-process traffic.

Background traffic conditions with the assumed build-out of the north leg of the Providence Drive/OR 99W intersection (and no site-added traffic) were assumed as the base case against which future traffic conditions are compared.

- The proposed development will extend Crestview Drive south through the property and to the existing Providence Drive/OR 99W intersection, where it will form the north leg.
- Traffic volumes were assigned to the Crestview Drive extension based upon existing turning movement volumes at the study intersections and the Newberg Transportation System Plan.
- The background traffic condition includes rerouted traffic from the proposed Crestview Drive extension but does not include trips associated with new land uses within the proposed development.
- All of the study intersections are expected to continue operating acceptably during the weekday AM and PM peak hours under 2020 background traffic conditions with reassigned traffic, with the following exceptions:
 - The Springbrook Rd/OR 99W intersection is forecast to operate with a v/c ratio of 0.88 during the weekday PM peak hour, which exceeds the ODOT mobility standard of 0.85.
 - The weekday AM and PM peak hour v/c ratios at the Providence Drive/OR 99W intersection are forecast to be 0.89 and 0.92, respectively, which both exceed the ODOT mobility standard of 0.80.

Proposed Development Plan

- The proposed development is expected to generate approximately 4,126 weekday daily trips, of which approximately 213 (53 in, 160 out) are forecast to occur during the AM peak hour and approximately 285 (180 in, 105 out) are forecast to occur during the PM peak hour.
- A select-zone analysis of the Newberg Transportation Planning Model was used to develop a trip distribution pattern for the proposed development.

Year 2020 Total Conditions

- All of the study intersections are expected to continue operating acceptably during the weekday AM and PM peak hours under 2020 total traffic volumes, with the following exceptions:
 - The Springbrook Rd/OR 99W intersection is forecast to operate with a v/c ratio of 0.86 during the weekday PM peak hour, which exceeds the ODOT mobility standard of 0.85 but does not exceed the v/c ratio under background conditions with reassigned traffic.
 - The weekday AM and PM peak hour v/c ratios at the Providence Drive/OR 99W intersection are forecast to be 0.98 and 1.08, respectively, which both exceed the ODOT mobility standard of 0.80.
 - The new proposed Crestview Diver/East-West Connector intersection within the Crestview Crossing development is expected to operate acceptably as a single-lane roundabout.

Year 2020 Total Mitigated Conditions

- The Crestview Drive/Providence Drive/OR 99W intersection was analyzed under total traffic conditions with the following additional lane improvements:
 - Add an exclusive left turn lane on southbound Crestview Drive,
 - Add an exclusive right turn lane on southbound Crestview Drive,
 - Add an exclusive right turn lane on westbound OR 99W,
 - Restripe eastbound OR 99W to include an exclusive left turn lane, and,
 - Restripe the northbound Providence Drive approach to include an exclusive left turn lane and an exclusive right turn lane.

With these improvements, the weekday AM and PM peak hour v/c ratios at the intersection are forecast to be 0.88 and 0.89, respectively. These exceed the ODOT mobility standard of 0.80 but do not exceed the respective v/c ratios under background conditions with reassigned traffic. As such, the impact of the development has been mitigated.

95th-percentile Queuing Analysis

- All 95th-percentile queues are projected to be accommodated by the provided storage lengths under 2020 total traffic conditions, with the following exceptions:
 - The southbound right turn at Springbrook Road/OR 99W during the weekday PM peak hour.
 - The northbound left turn at Brutscher Street/OR 99W during the weekday PM peak hour.

Each of the queues noted above is expected to decrease under total traffic conditions compared with existing conditions due to reassigned traffic from Springbrook Road and OR 99W to the Crestview Drive extension.

Commercial Property Sensitivity Analysis

A planning-level analysis was prepared to account for the future development potential of the 4.43-acre commercial property adjacent to the development site. While this is NOT part of this development application, the analysis was conducted to evaluate the future effectiveness of the recommended mitigations.

- A planning-level estimate for developable commercial area was used to estimate the number of potential commercial-related site trips. The gross leasable area-to-acreage ratio was assumed at 25 percent, and the entire commercial property was assumed as shopping center land use.
- The commercial development trips were added to the residential trips of this application to arrive at a total development estimate of 6,220 weekday daily trips, of which 370 (155 in, 215 out) will occur during the AM peak hour and 440 (247 in, 193 out) will occur during the PM peak hour. The development is also expected to generate approximately 96 pass-by trips during the weekday PM peak hour—these were treated as diverted trips from OR 99W.
- The Crestview Drive/Providence Drive/OR 99W intersection and Crestview Drive/East-West Connector roundabout were analyzed assuming development of the 4.43-acre commercial property.
- The Crestview Drive/East-West Connector intersection is expected to continue operating acceptably as a single-lane roundabout.
- With the mitigation improvements associated with the residential development in place, the weekday AM and PM peak hour v/c ratios at the Crestview Drive/Providence Drive/OR 99W intersection are forecast to be 0.90 and 0.94, respectively.

Per ODOT policy guidance, when an intersection exceeds mobility targets but the v/c ratio increases by less than 0.03 as a result of development, the impacts are not considered significant. For this reason, no additional mitigation measures would be warranted as a result of additional commercial development.

RECOMMENDATIONS

Providence Drive/Crestview Drive/OR 99W Intersection

- The new north leg of the intersection, which will be an extension of Crestview Drive, should be configured as a four-lane section with one northbound lane and three southbound lanes (exclusive lanes for left-turn, through, and right-turn movements). At least 250 feet of southbound left turn storage and at least 150 feet of southbound right turn storage should be provided to accommodate the forecast 95th percentile queue lengths.
- The south leg of the intersection should be restriped to a four-lane section with one southbound lane and three northbound lanes (exclusive lanes for left-turn, through, and right-turn movements).
- Based on the forecast 95th percentile queuing analysis:
 - A westbound right turn lane should be constructed with at least 300 feet of storage.

- An eastbound left turn lane should be striped to provide at least 150 feet of storage.
- Recommended signal phasing: the intersection should be operated with permissive left turn movements on the northbound and southbound approaches and fully protected left turn movements on the eastbound and westbound approaches.

On-Site Circulation/Site Access Operations

- Driveways, landscaping, utilities, and signage within the site should be located and maintained to provide sufficient sight distance at all new internal intersections and accesses.
- Other than at the Providence Drive/Crestview Drive/OR 99W intersection, a two-lane section of Crestview Drive should be adequate to accommodate turning movements and queuing within the proposed development.

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

Section 2 Introduction

INTRODUCTION

PROJECT DESCRIPTION

JT Smith Companies proposes to develop a 33.13-acre property in Newberg, Oregon consisting of up to 260 single-family homes and 48 apartment units. The ultimate number of residential units may vary but is not anticipated to exceed the number of units analyzed in this report. The development is located adjacent to 4.43 acres of commercial property that are not included in this application but may be developed as part of a future phase.

Figure 1 displays the site vicinity, and Figure 2 illustrates the proposed site plan. The site is located on the north side of OR 99W (Portland Road) near the intersection with Providence Drive and will include an extension of Crestview Drive to the south through the property and connecting to OR 99W to form the north leg of the OR 99W/Providence Drive intersection. No direct accesses to the residential units or adjacent commercial property are proposed on OR 99W or the Crestview Drive extension—these will instead be accessed via new internal local roadways and one new east-west connector that will connect to Crestview Drive north of OR 99W. Completion and occupancy of the development as described in this report is expected to occur by 2020.

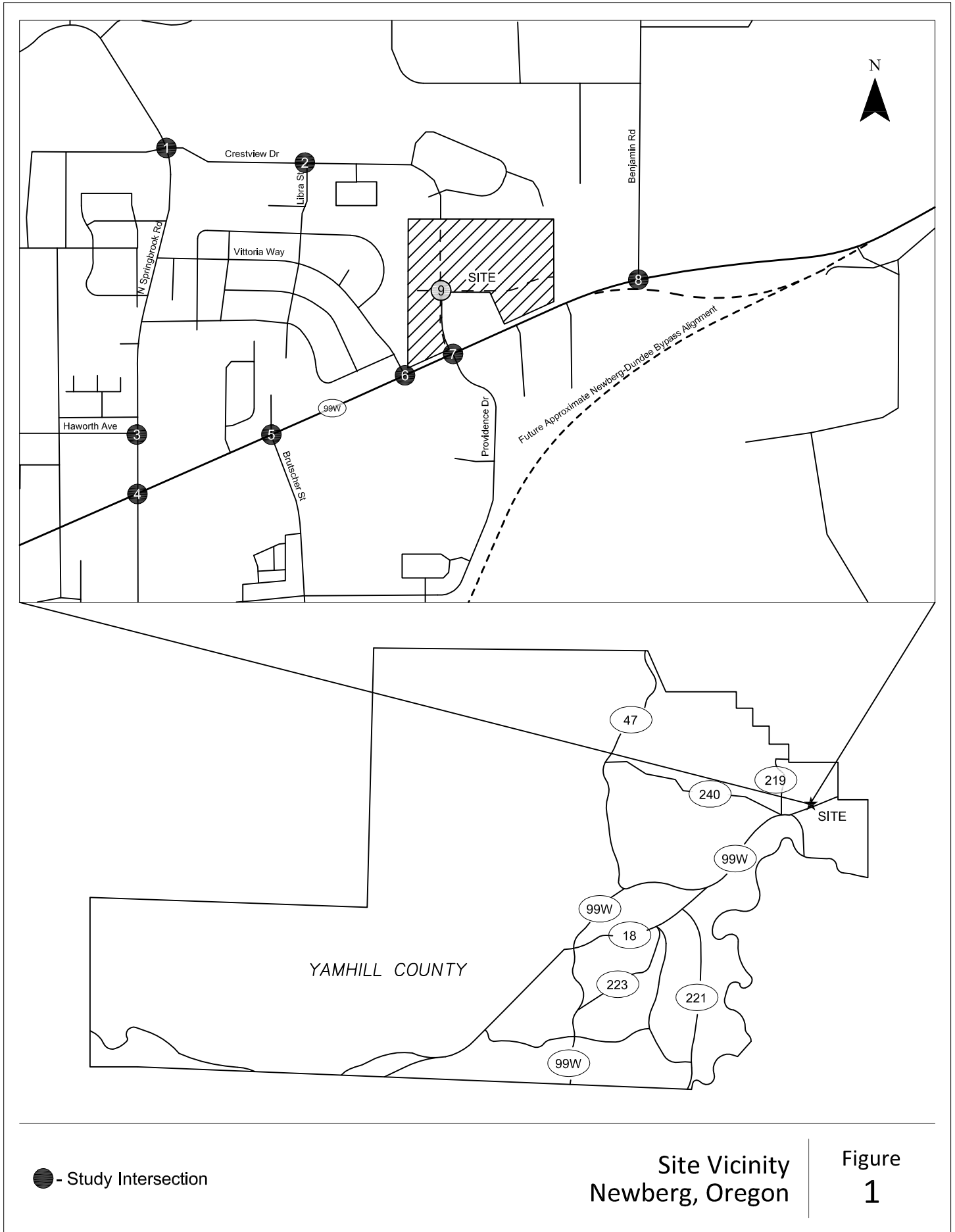
SCOPE AND ANALYSIS METHODOLOGY

This analysis determines the transportation-related impacts associated with the proposed Crestview Crossing development and was prepared in accordance with City of Newberg and Oregon Department of Transportation (ODOT) requirements for traffic impact analyses. The study intersections and scope of this project were selected based on conversations with City and ODOT staff and are documented in a scoping memorandum (dated October 19, 2017) and subsequent City and ODOT comments (*Appendix "A"*).

Study Intersections

This report includes an analysis of operations and safety at the following study intersections:

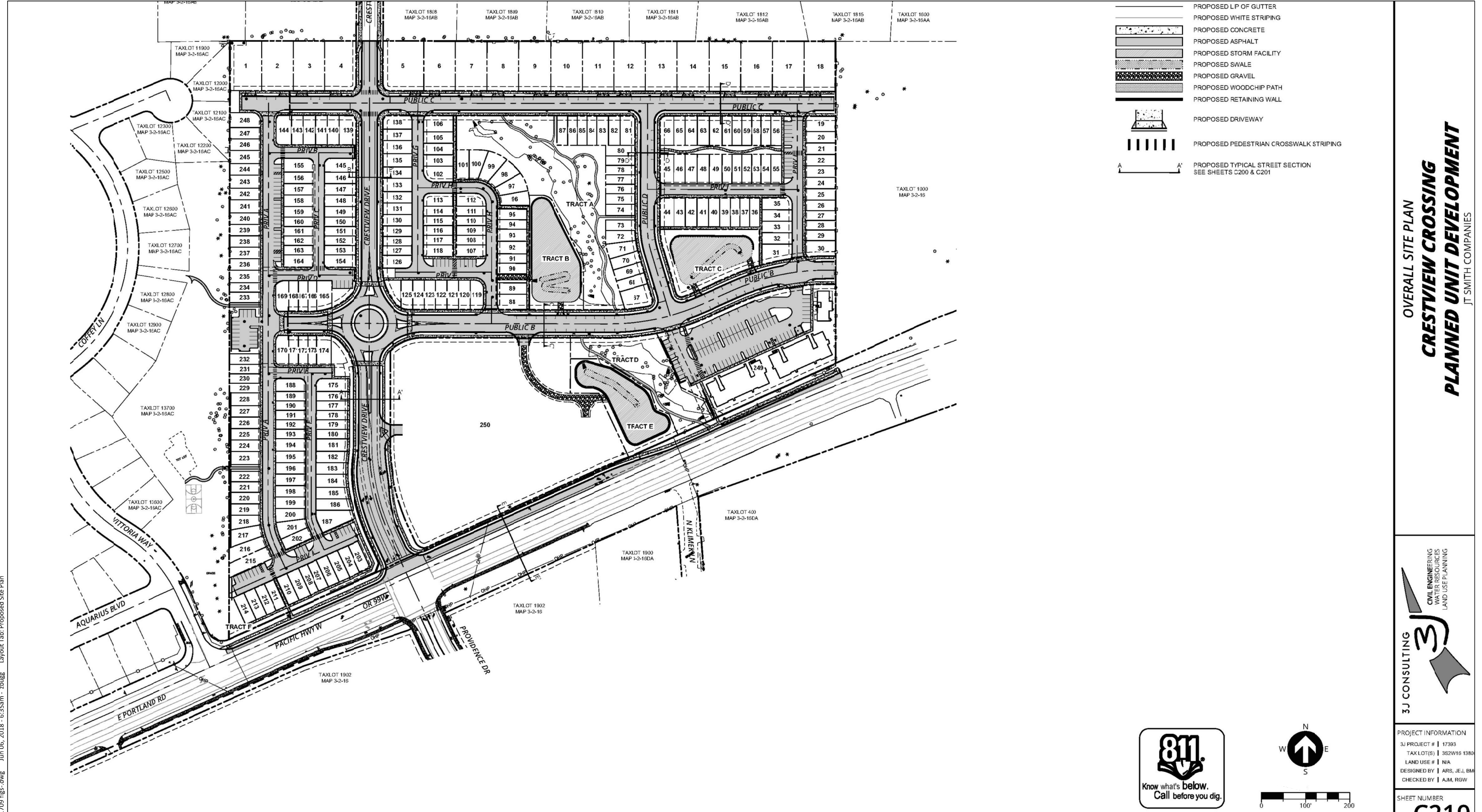
1. Springbrook Road/Crestview Drive,
2. Libra Street/Crestview Drive,
3. Springbrook Road/Haworth Avenue,
4. Springbrook Road/OR 99W,
5. Brutscher Street/OR 99W,
6. Vittoria Way/OR 99W,
7. Providence Drive/Future Crestview Drive extension/OR 99W,
8. Benjamin Road/OR 99W, and
9. Future Crestview Drive extension/Future east-west connector.



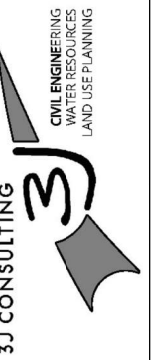
Site Vicinity
Newberg, Oregon

Figure
1

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OVERALL SITE PLAN
CRESTVIEW CROSSING
 PLANNED UNIT DEVELOPMENT
 JT SMITH COMPANIES



PROJECT INFORMATION
 3J PROJECT # | 17393
 TAX LOT(S) | 382W16 1380
 LAND USE # | N/A
 DESIGNED BY | ARS, JEL, BM
 CHECKED BY | AJM, RGW
 SHEET NUMBER
C210

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Site Plan Provided by 3J Consulting 6/5/2018

Proposed Site Plan
 Newberg, Oregon

Figure
 2

Study Scope

This report documents evaluation of the following transportation items:

- Year 2017 existing conditions analysis, including *Highway Capacity Manual 2000* (HCM 2000, Reference 1) volume-to-capacity (v/c) ratio, control delay, and 95th-percentile queuing analysis at the study intersections during the weekday AM and PM peak hours;
- A review of reported crash data from ODOT at the study intersections for the most recent five-year period available;
- Build-out Year 2020 background conditions (includes in-process traffic and regional growth but not traffic from the development), including HCM 2000 v/c ratio, control delay, and 95th-percentile queuing analysis at the study intersections during the weekday AM and PM peak hours;
- Build-out Year 2020 total conditions analysis, including HCM 2000 v/c ratio, control delay, and 95th-percentile queuing analysis at the study intersections during the weekday AM and PM peak hours; and,
- On-site traffic operations and circulation.

Analysis Methodology and Applicable Standards

All Level of Service analyses described in this report were performed in accordance with the procedures stated in the HCM 2000. The operations and queuing analyses presented in this report were completed using *Synchro 9 and SimTraffic 9* software, with the exception of the roundabout analyses, which were completed using *Highway Capacity Software (HCS) 7*. Per HCM 2000 methodology, the reported traffic operations are based upon the worst 15 minutes of each peak hour—consequently, the study intersections are expected to perform better during the rest of the day, in general.

The study intersections along OR 99W are all subject to ODOT v/c ratio mobility targets, defined by the *1999 Oregon Highway Plan*, Policy 1F. The study intersections along OR 99W are within the Newberg urban growth boundary, on a Statewide Highway, on a freight route, outside a Metropolitan Planning Organization, outside a Special Transportation Area, and not on a freeway. Thus, the mobility target for each study intersection along OR 99W is a function of the posted speed limit, as shown in Table 1.

Table 1: OR 99W Mobility Targets

Intersection	Posted Speed (mph)	Mobility Target (v/c)
OR 99W/Springbrook Road	35	0.85
OR 99W/Brutcher Street	35	0.85
OR 99W/Vittoria Way	45	0.80
OR 99W/Providence Drive	45	0.80
OR 99W/Benjamin Road	55	0.75

With the exception of OR 99W/Benjamin Road, which is outside the City limits, all study intersections are additionally subject to City of Newberg mobility standards, which require LOS D or better.

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 Crestview Crossing site in November 2017. 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 subject property is located on the north side of OR 99W (Portland Road) near the intersection with Providence Drive. The site is currently occupied by farm land and one single-family home, and it is bordered by residential uses to the west, north, and east and by OR 99W to the south.

Transportation Facilities

Existing lane configurations and traffic control devices at the study intersections are displayed in Figure 3. Table 2 summarizes the existing transportation facilities and roadways in the study area.

Table 2: Existing transportation facilities and roadways in the study area

Roadway	Functional Classification ¹	Number of Lanes	Posted Speed	Sidewalks	Bicycle Lanes	On-Street Parking
OR 99W	Major Arterial	4-5	35 mph – 55 mph ²	Partial ³	Yes	No
Springbrook Road	Minor Arterial	2-3	35 mph	Both Sides	South of Haworth Avenue	No
Crestview Drive	Major Collector	2	25 mph	Both sides east of Birdhaven Loop	East of Birdhaven Loop	No
Providence Drive	Major Collector	2	25 mph	Partial ⁴	Yes	No
Brutscher Street	Major Collector	2-3	25 mph	Both Sides south of OR 99W	South of Fred Meyer entrance	No
Haworth Avenue	Major Collector	2	25 mph	Both Sides	No	Yes
Vittoria Way	Minor Collector	2	25 mph	Partial ⁵	No	Yes
Libra Street	Local Street	2	25 mph	Both Sides	No	Yes
Benjamin Road	Local Street	2	45 mph	No	No	No

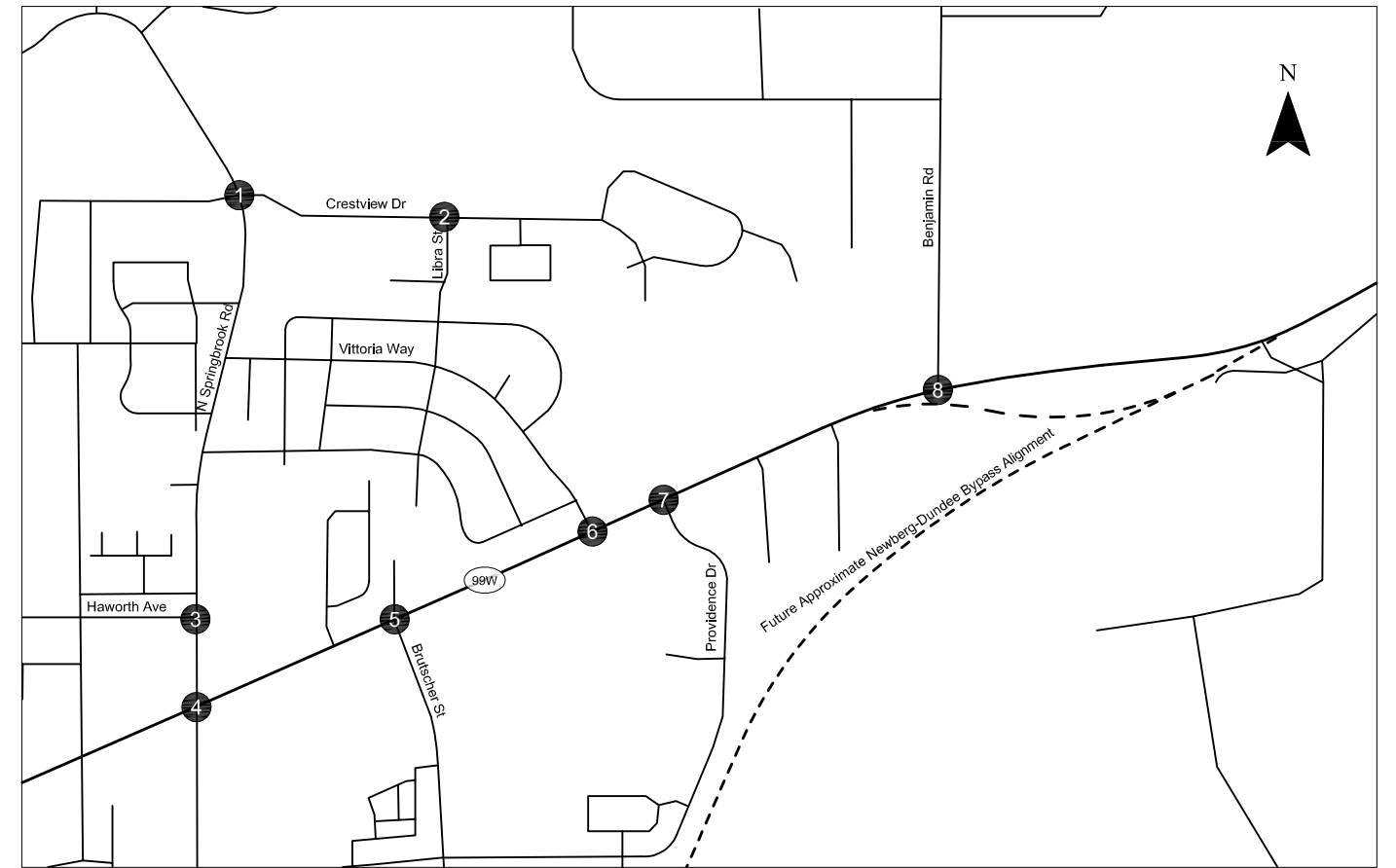
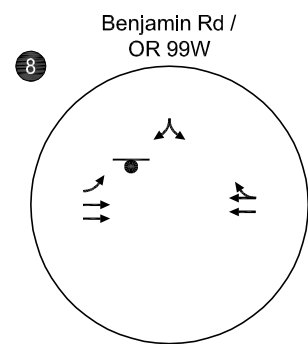
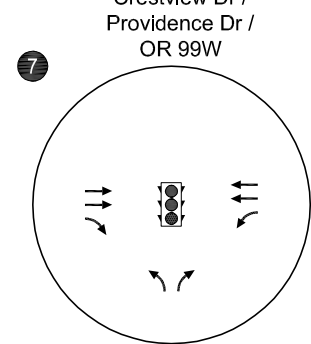
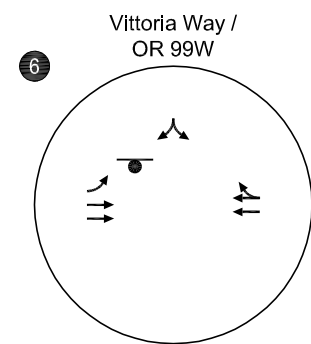
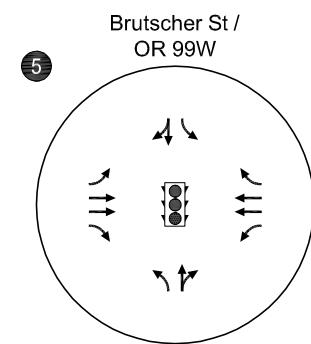
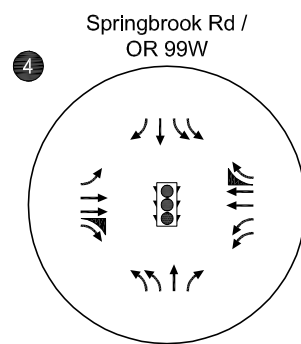
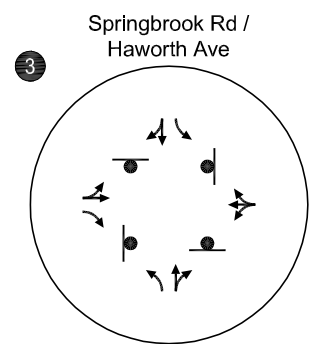
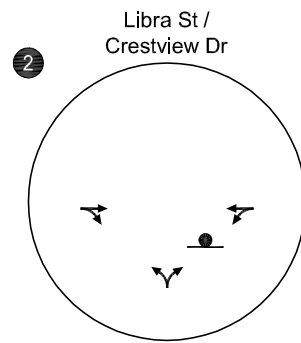
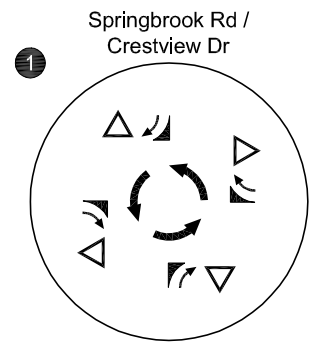
¹City of Newberg Transportation System Plan (TSP, Reference 2)

²Posted speed is 35 mph at and west of Brutscher Street, 45 mph from east of Brutscher Street to east of Providence Drive, and 55 mph at and east of Benjamin Road

³Sidewalks are provided on both sides of OR 99W throughout the study area except on the north side from 250 feet east of Brutscher Street to the east end of the study area and on the south side from 400 feet east of Providence Drive to the east end of the study area

⁴The sidewalk on the east side of Providence Drive ends approximately 270 feet south of OR 99W.

⁵No sidewalk is provided on the east side of Vittoria Way south of Aquarius Boulevard.



- STOP SIGN
- TRAFFIC SIGNAL
- ROUNDABOUT
- YIELD

Existing Lane Configurations
and Traffic Control Devices
Newberg, Oregon

Figure
3

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Roadway Facilities

The proposed Crestview Crossing development site is bordered to the south by OR 99W, which is maintained by ODOT and is classified a Major Arterial in the Newberg TSP. Crestview Drive, which is classified a Major Collector, will be extended south through the proposed development site and will connect to OR 99W to form the fourth leg of the existing OR 99W/Providence Drive intersection. The Crestview Drive extension will consist of one travel lane in either direction, except where turn lanes are needed. As shown in Figure 2, several new local streets will be constructed to serve the development, and one east-west connector roadway will intersect the Crestview Drive at a roundabout approximately 500 feet north of OR 99W.

Pedestrian and Bicycle Facilities

There are currently no sidewalks provided within the proposed site frontage along OR 99W, but sidewalks and bicycle lanes are provided on both sides of Crestview Drive and Providence Drive north and south of the proposed site. While paved shoulders are provided along both sides of OR 99W within the site vicinity, OR 99W is a high-speed roadway with no separated bicycle facilities.

TRANSIT FACILITIES

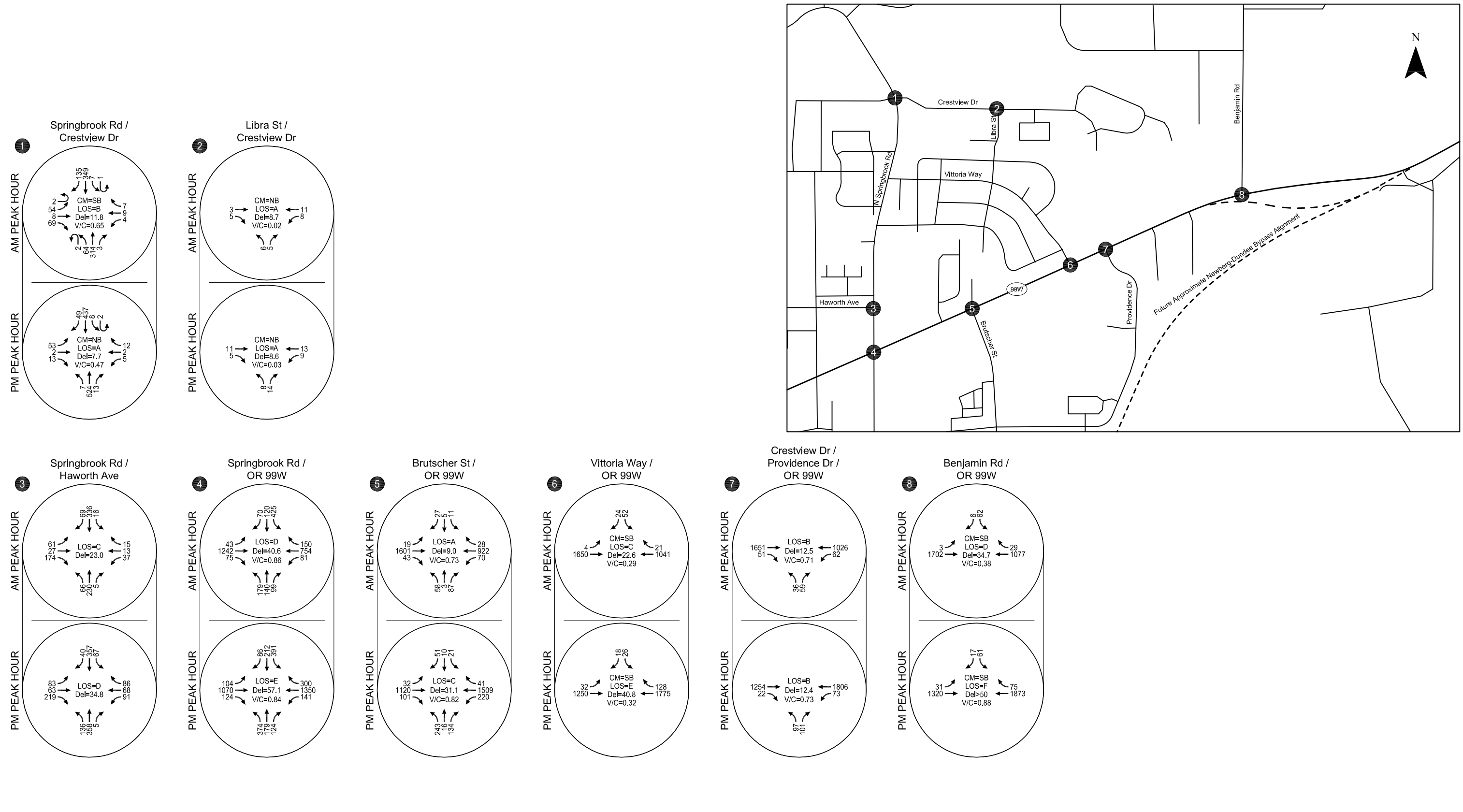
Transit service in the site vicinity is provided by Yamhill County Transit Area (YCTA, Reference 3). Route 7: Newberg Providence connects Providence Newberg Medical Center, which is approximately 0.15 mile south of the proposed development, to the Newberg Central Business District. Service is provided on weekdays at approximately one-hour intervals from approximately 7:15 AM to 6:15 PM.

TRAFFIC VOLUMES AND PEAK HOUR OPERATIONS

Turning movement counts were conducted at the Libra Street/Crestview Drive and Springbrook Road/Haworth Avenue intersections in November 2017 when school was in session. Counts were conducted at all other existing study intersections in September 2017 when school was in session—per scoping discussions with ODOT staff, the study intersections along OR 99W are heavily influenced by both seasonal traffic and school traffic, with the peak travel period occurring in September. Therefore, no seasonal count adjustment along OR 99W is required.

All counts used in this analysis were conducted on a typical midweek day during the morning (6:00 to 9:00 AM) and afternoon (3:00 to 6:00 PM) peak periods. The analysis time periods are based on a corridor-wide peak hour along OR 99W and individual intersection peak hours at the remaining study intersections. Figure 4 provides a summary of the year 2017 turning-movement counts.

Appendix “B” contains the traffic count worksheets used in this study.



CM = CRITICAL MOVEMENT (UNSIGNALIZED)
 LOS = INTERSECTION 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
 Newberg, Oregon

Figure
 4

Saturation Flow Rate Calibration

ODOT requires a base saturation flow rate of 1,750 vehicles per hour per lane outside the Portland metro area. Based on field observation and video data, vehicles exhibited driving behavior typical of urban areas. Thus, a saturation flow-rate study was prepared to calibrate the analysis to real-world observations. Using video data, the base saturation flow rate was calibrated to 1,800 vehicles per hour for the following two movements:

- Westbound OR 99W at Springbrook Road, and
- Westbound OR 99W at Providence Drive.

All analysis for these movements assumes the calibrated base saturation flow rates. *Appendix "C" contains the saturation flow study worksheets for these movements.*

Level of Service Analysis

Figure 4 also displays the existing levels of service at each of the study intersections during the weekday AM and PM peak hours. As shown in the figure, each of the study intersections currently meets ODOT and City mobility standards, with the following exceptions:

- The volume-to-capacity ratio of the Springbrook Road/OR 99W intersection is 0.86 during the weekday AM peak hour, which exceeds the ODOT mobility standard of 0.85. The weekday PM peak hour level of service of this intersection (LOS E) does not meet the City standard of LOS D.
- The weekday PM peak hour level of service of the Vittoria Way approach to the intersection with OR 99W (LOS E) does not meet the City standard of LOS D.

Appendix "C" contains the existing conditions Level of Service worksheets.

Traffic Safety

ODOT-reported crash data was reviewed for the most recent five-year period, from January 1, 2011 to December 31, 2015. Table 3 summarizes the reported crash data at the study intersections.

Table 3: ODOT-Reported Crash Data (January 1, 2011 to December 31, 2015)

Intersection	Crash Severity			Crash Type						Crash Rate ²
	Fatal	Injury	PDO ¹	Rear End	Turning	Sideswipe	Angle	Other	Total	
Springbrook Rd / Crestview Dr	1	0	1	1	0	0	0	1	2	0.10
Libra St / Crestview Dr	0	0	0	0	0	0	0	0	0	0.00
Springbrook Rd / Haworth Ave	0	2	5	1	2	0	3	1	7	0.24
Springbrook Rd / OR 99W	0	27	41	53	9	2	2	2	68	0.84
Brutscher St / OR 99W	0	13	7	15	4	0	0	1	20	0.31
Vittoria Way / OR 99W	0	2	2	2	2	0	0	0	4	0.07
Providence Dr / OR 99W	0	2	9	11	0	0	0	0	11	0.18
Benjamin Rd / OR 99W	0	3	1	0	4	0	0	0	4	0.06

¹Property Damage Only

²Per million entering vehicles

As shown in the table, one fatal crash was reported at the Springbrook Road/Crestview Drive roundabout—this crash occurred in 2013 when a southbound motorcyclist struck a curb and was thrown from the vehicle. The crash report lists the cause as driver error—driving too fast for conditions.

ODOT maintains a ranking of intersections with potential safety problems known as the Safety Priority Index System (SPIS). Based upon a 2016 analysis, the Springbrook Road/OR 99W intersection is currently within the top 5 percent of the highest-scoring intersections in Region 2. Pavement marking improvements and an additional westbound left turn lane on OR 99W have been added to this intersection since 2016.

Additionally, ODOT has identified basic signing and marking improvements for the Springbrook Road/Haworth Avenue intersection to improve stop sign visibility.

No other crash trends or safety deficiencies were identified at the study intersections.

Appendix “D” 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 Crestview Crossing development is expected to be fully built and occupied, year 2020. The impact of traffic generated by the proposed Crestview Crossing development during the weekday AM and PM peak hours was examined as follows:

- The Oregon Clinic was identified as an in-process development by City of Newberg and included in the background traffic volumes;
- Year 2020 background traffic volumes at the study intersections were developed by applying a two-percent annual growth rate to the existing mainline volumes along OR 99W and then adding the in-process trips;
- Some traffic was reassigned based upon the new network link created by the Crestview Drive extension;
- Site trip distribution patterns were identified based upon a select zone analysis of the Newberg Model;
- Site-generated trips were estimated for build-out of the site and assigned to the study intersections based upon the assumed trip distribution pattern;
- Year 2020 total traffic volumes at the study intersections were developed by adding the site-generated trips to the 2020 background traffic volumes, accounting for reassigned traffic due to the Crestview Drive extension; and
- On-site circulation issues and site-access operations were evaluated.

YEAR 2020 BACKGROUND TRAFFIC CONDITIONS

The year 2020 background traffic analysis identifies how the study area's transportation system will operate without the proposed Crestview Crossing development. 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.

Planned Developments and Transportation Improvements

The City of Newberg identified one in-process development within the site vicinity: the Oregon Clinic, to be located on the west side of Providence Drive south of Providence Newberg Medical Center.

In-process trips are summarized in a graphic in Appendix "E".

The following two planned transportation improvements were identified, neither of which will be completed prior to development of the proposed Crestview Crossing:

- The aforementioned Crestview Drive extension, which will be incorporated into site development and is described later in this report under Proposed Development Plan; and

- The Newberg-Dundee Bypass, which will intersect OR 99W approximately 0.5 miles east of the proposed development site and is not expected to be completed until after the proposed Crestview Crossing development is fully built and occupied (2020).

Background Growth

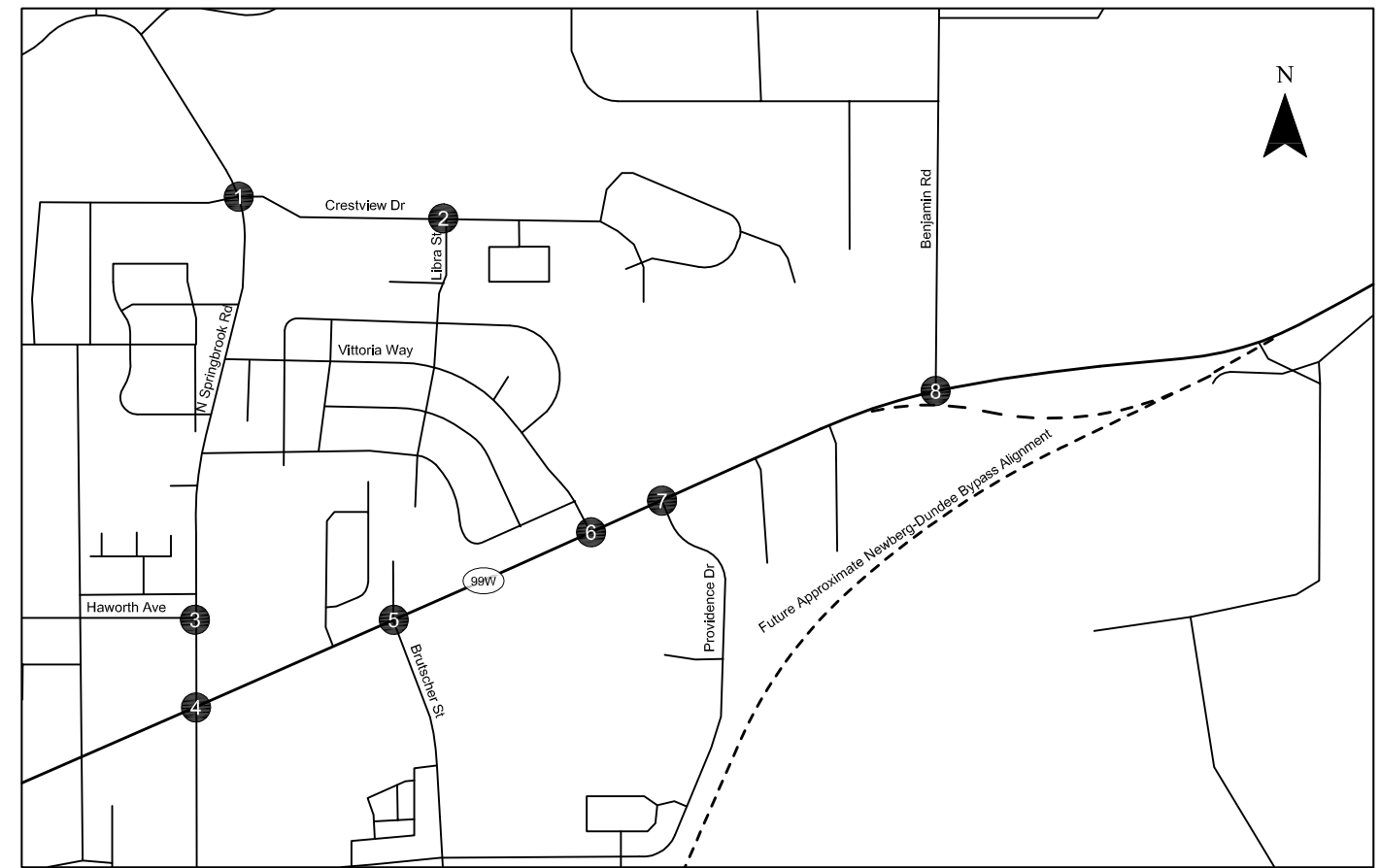
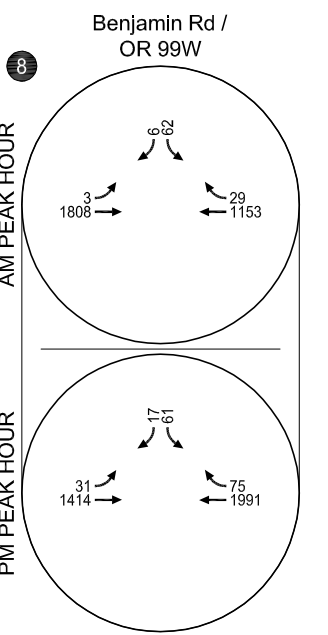
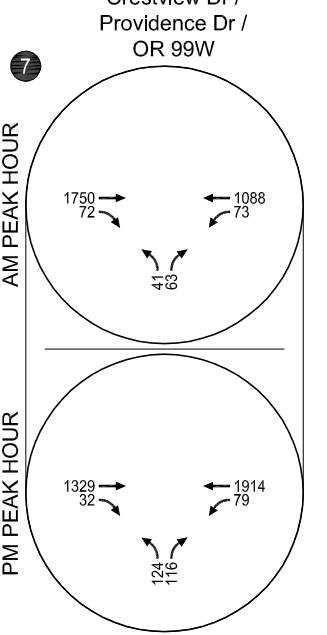
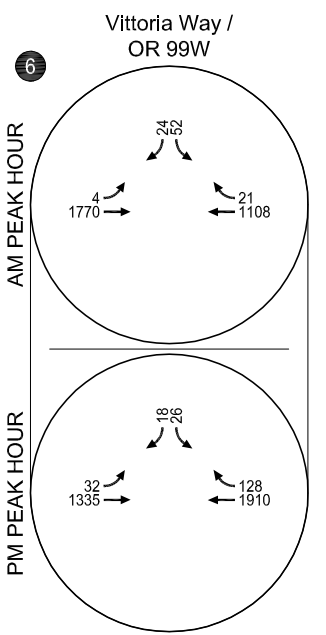
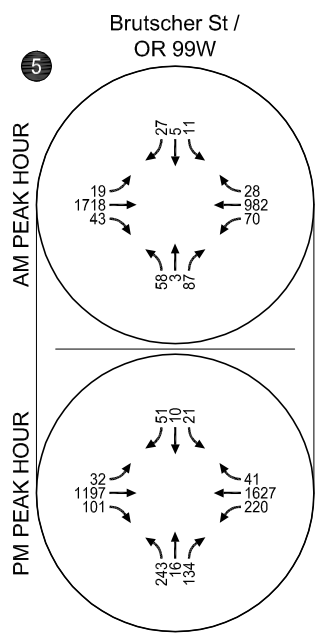
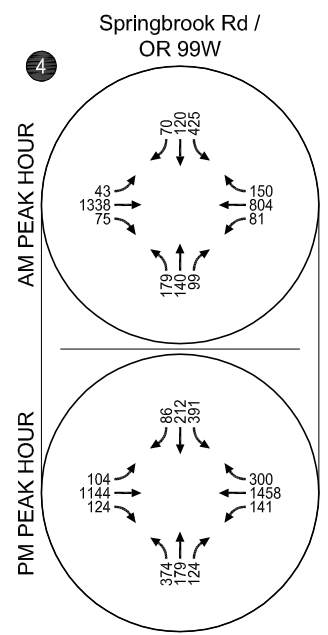
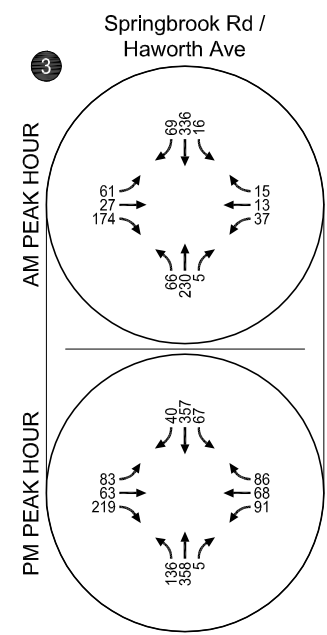
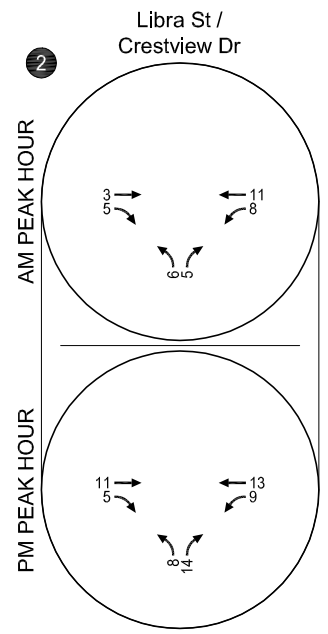
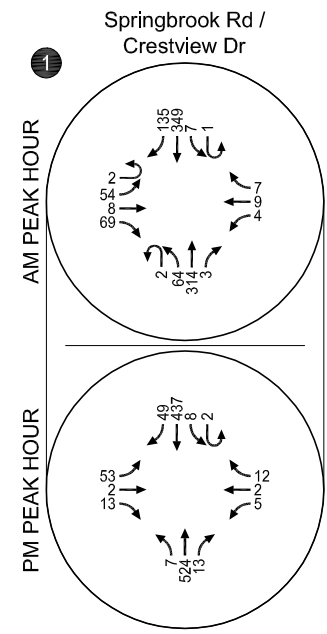
To account for general area growth, a two-percent annual growth rate was applied to the existing mainline volumes along OR 99W at the study intersections.

Figure 5 displays the 2020 background traffic volumes at the study intersections during the weekday AM and PM peak hours, which include general area growth and in-process trips identified previously.

Crestview Drive Extension

The Crestview Drive extension is contained within the City's Transportation System Plan and can be considered a regional system improvement independent of the land uses contained within the Crestview Crossing development. The construction of the Crestview Drive extension is expected to cause some traffic to shift from Springbrook Road and OR 99W. For this analysis, traffic volumes were reassigned to the new street system based on existing turning movement demand at the intersections of Springbrook Road/Crestview Drive, Springbrook Road/Haworth Avenue, and Springbrook Road/OR 99W. The City's Transportation System Plan was also consulted for consistency in assumptions. Figure 6 displays the estimated reassigned traffic volumes.

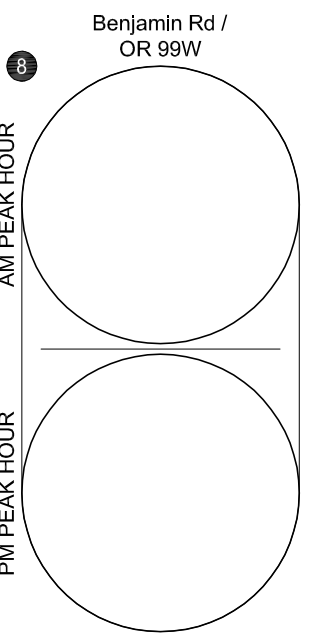
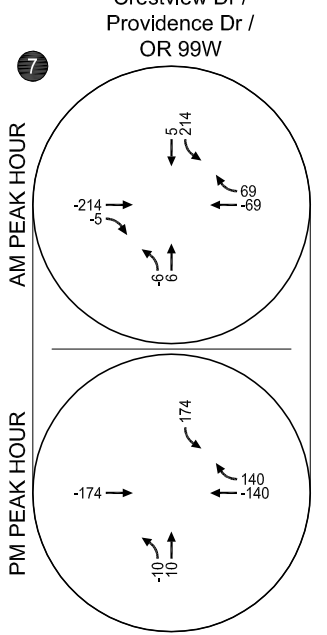
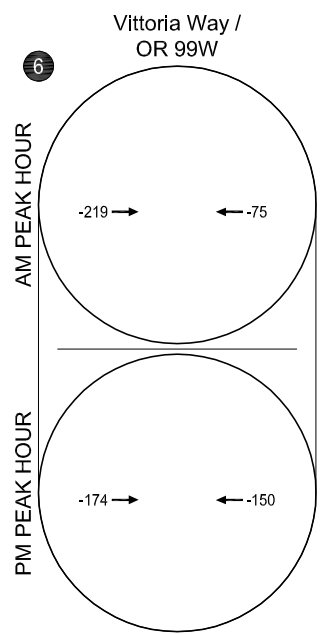
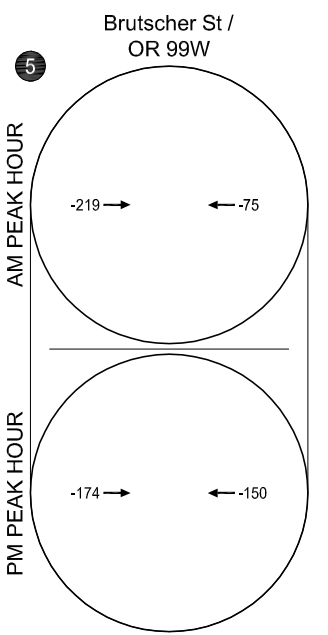
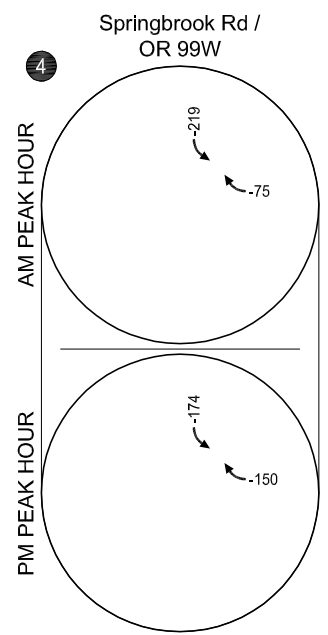
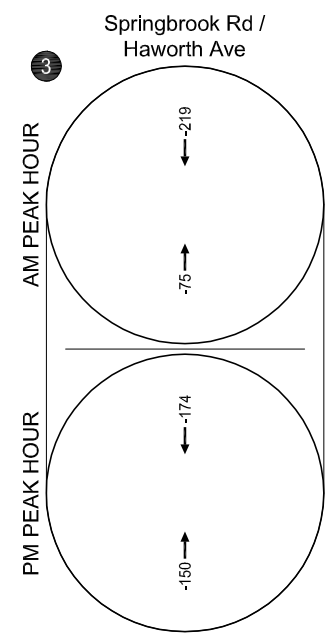
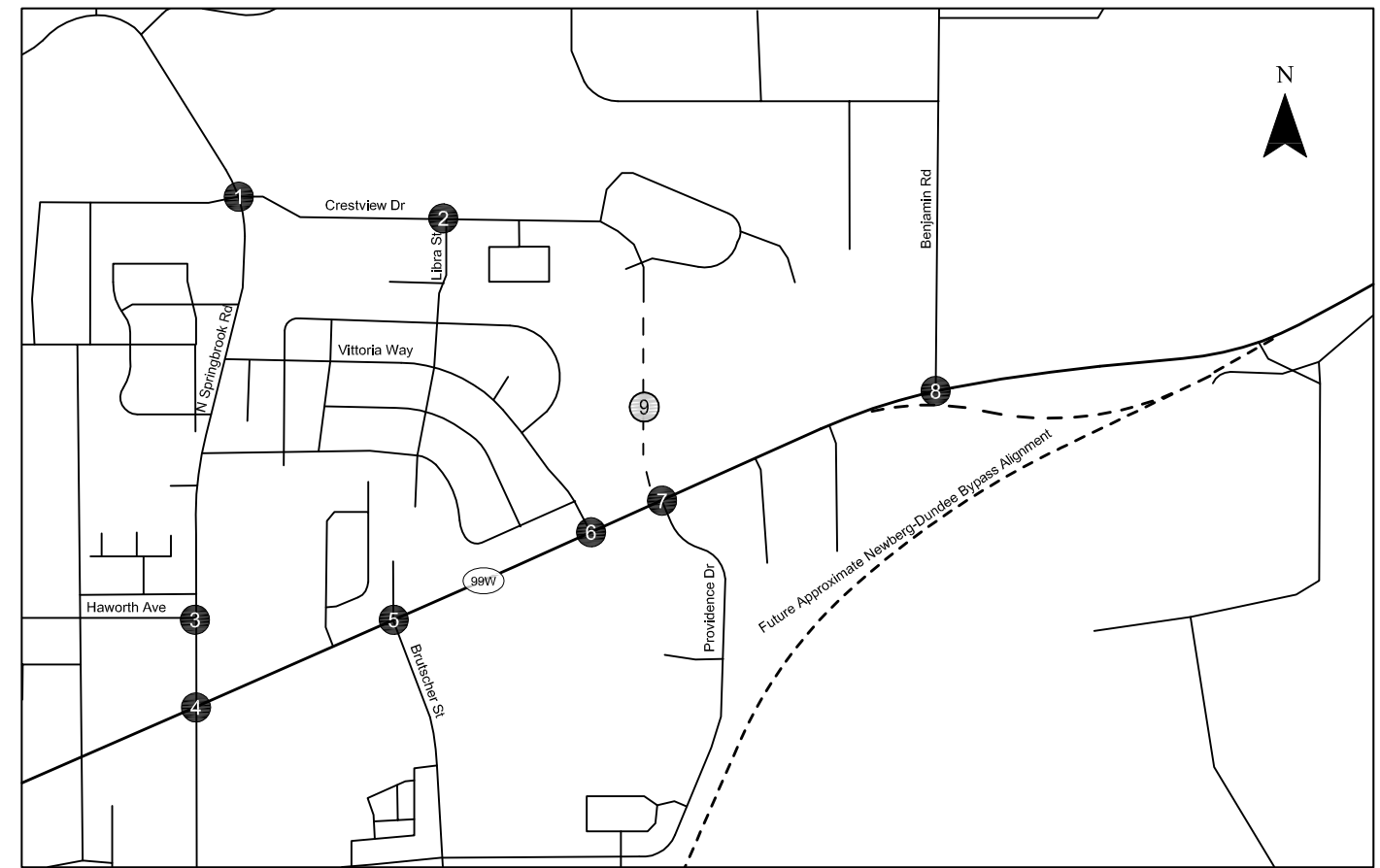
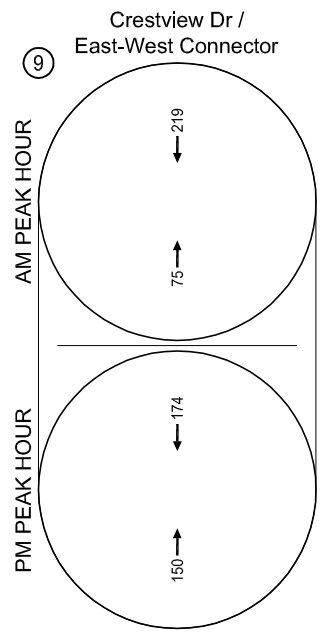
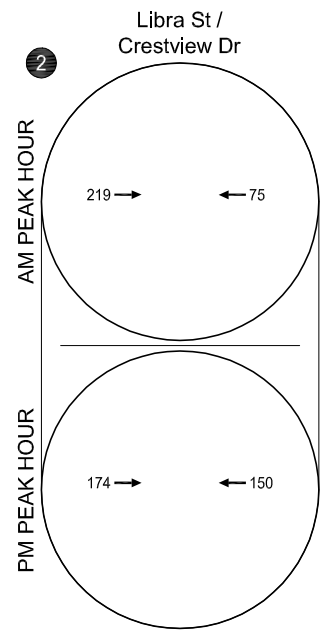
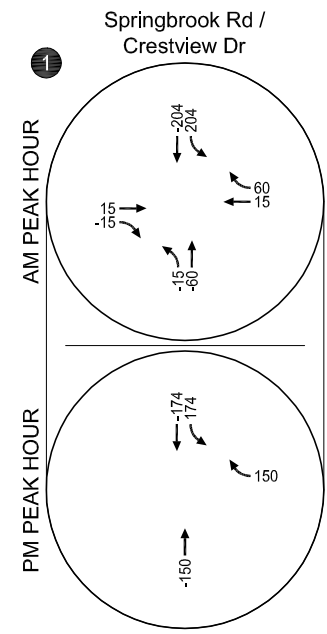
The reassigned traffic volumes shown in Figure 6 were added to the background traffic volumes in Figure 5 to arrive at the 2020 background traffic conditions, shown in Figure 7. Based on concurrence from ODOT transportation planning staff, this scenario serves as the base case against which future traffic conditions are prepared. The background condition for the Crestview Drive extension assumes a two-lane cross section, including the new north leg of the Providence Drive/OR 99W intersection. Any potential turn lane additions at the Crestview Drive/Providence Drive/OR 99W intersection will be considered mitigation measures associated with the Crestview Crossing development and are described under 2020 total traffic conditions. The assumed lane configurations for this scenario are displayed in Figure 8.



Year 2020 Background Traffic Volumes
Weekday AM and PM Peak Hours
Newberg, Oregon

Figure
5

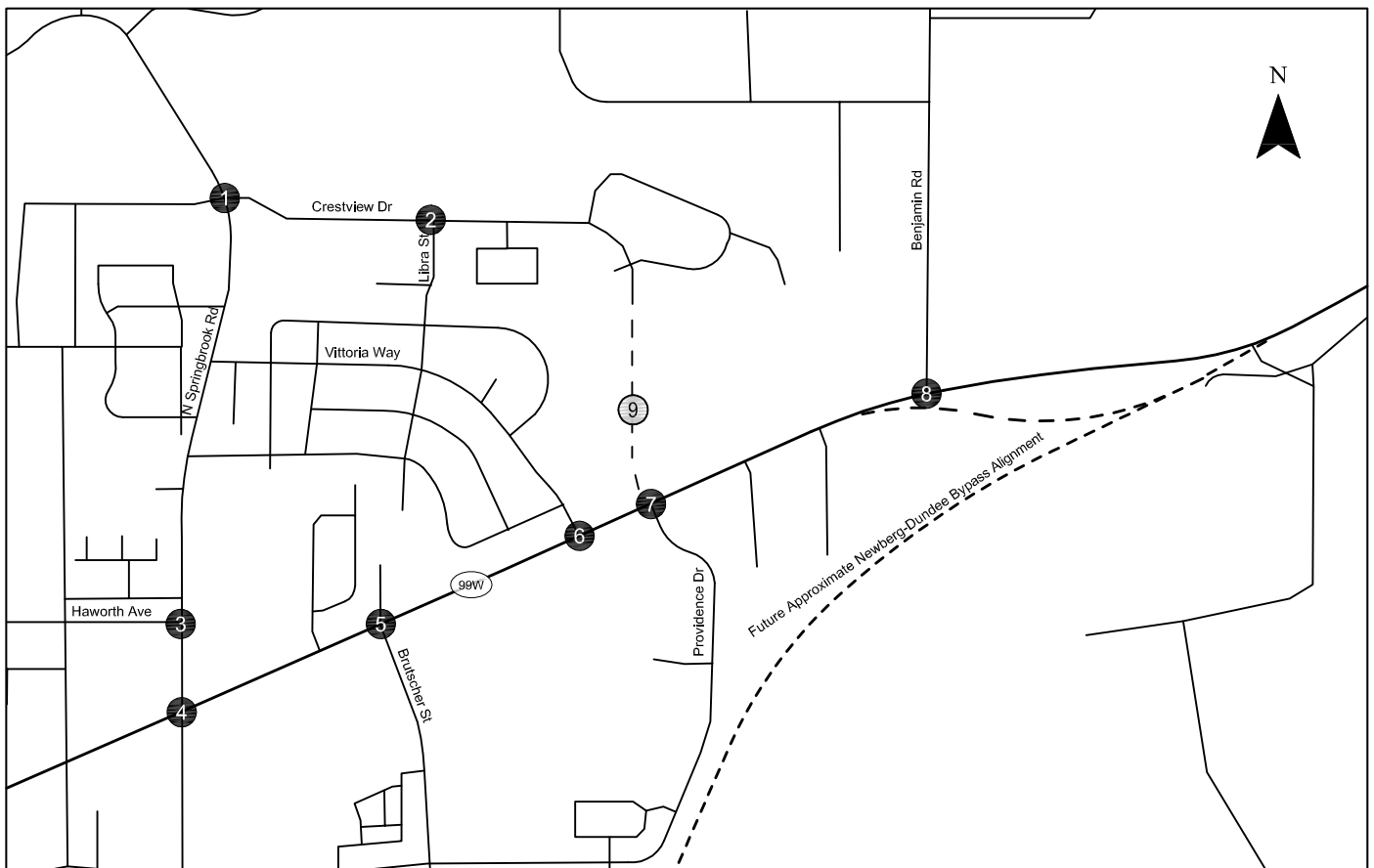
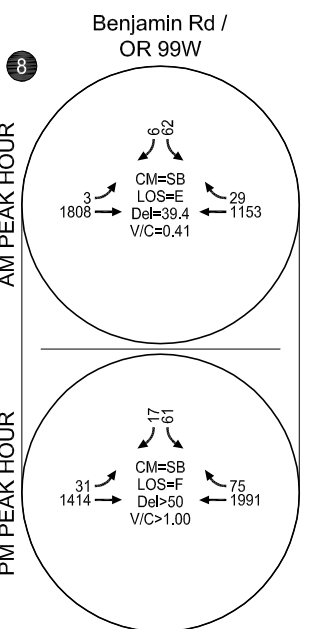
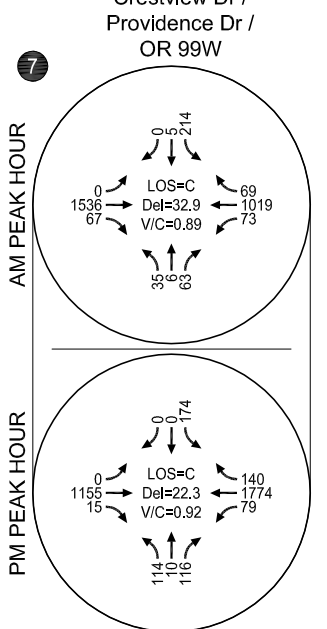
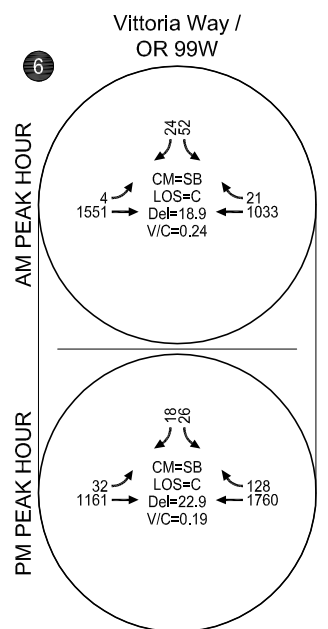
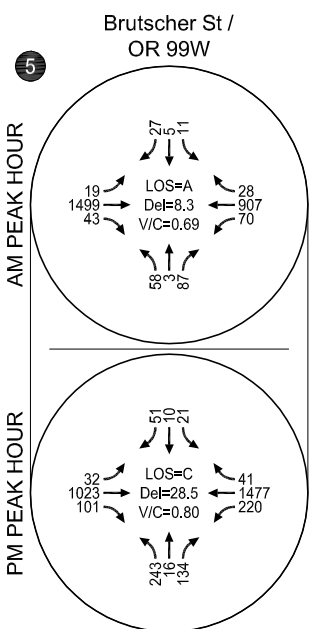
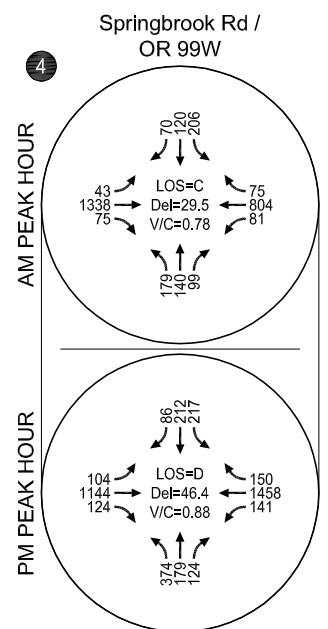
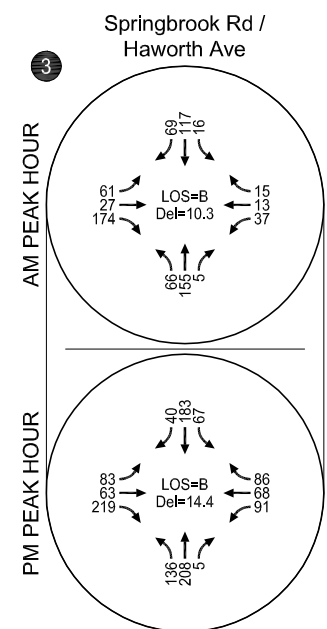
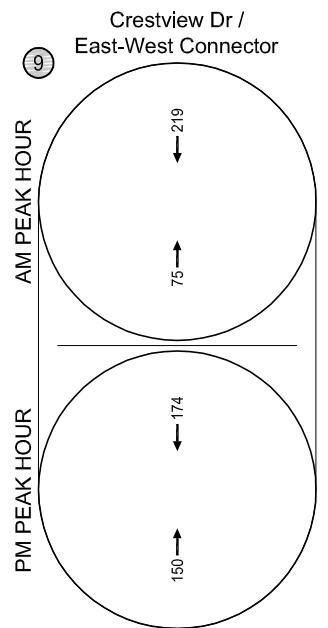
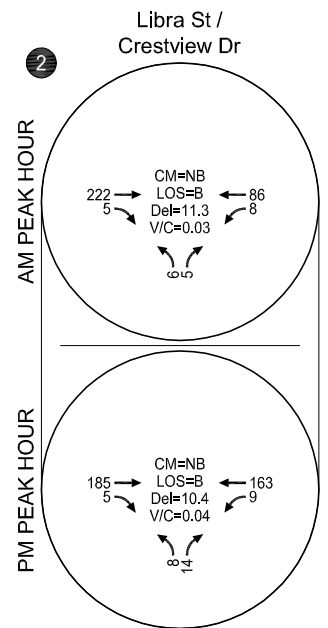
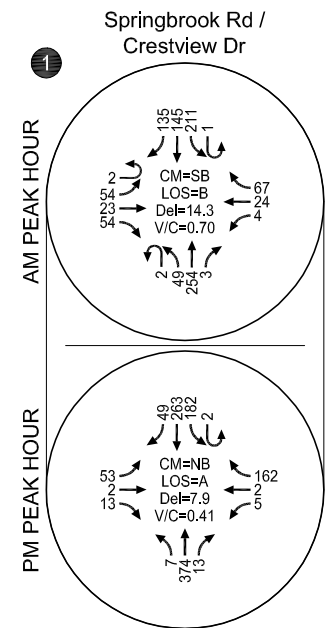
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Reassigned Traffic Volumes
Weekday AM and PM Peak Hours
Newberg, Oregon

Figure
6

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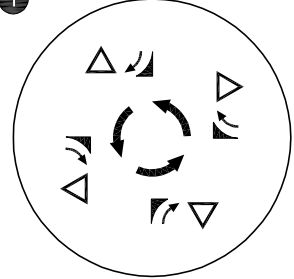
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 LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/
 CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
 Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/
 CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
 V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

Year 2020 Background Traffic Conditions with Reassigned Traffic
 Weekday AM and PM Peak Hours
 Newberg, Oregon

Figure
 7

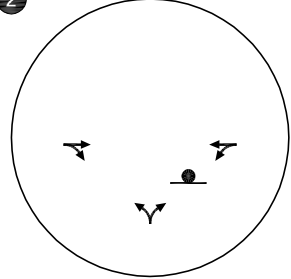
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1 Springbrook Rd / Crestview Dr



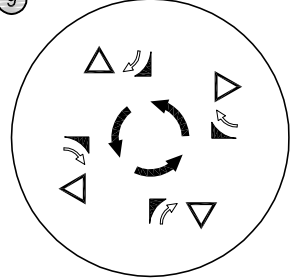
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Libra St / Crestview Dr



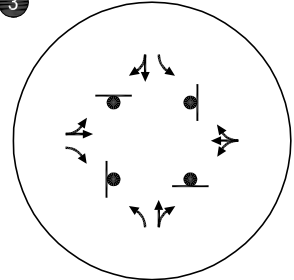
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Crestview Dr / East-West Connector



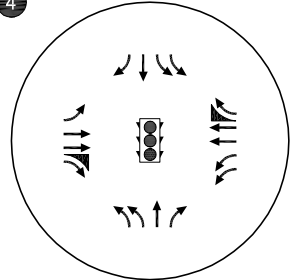
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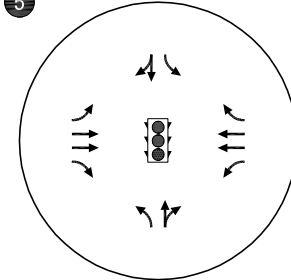
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Springbrook Rd / OR 99W



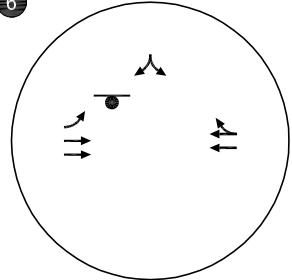
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Brutscher St / OR 99W



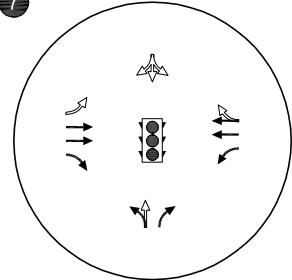
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Vittoria Way / OR 99W



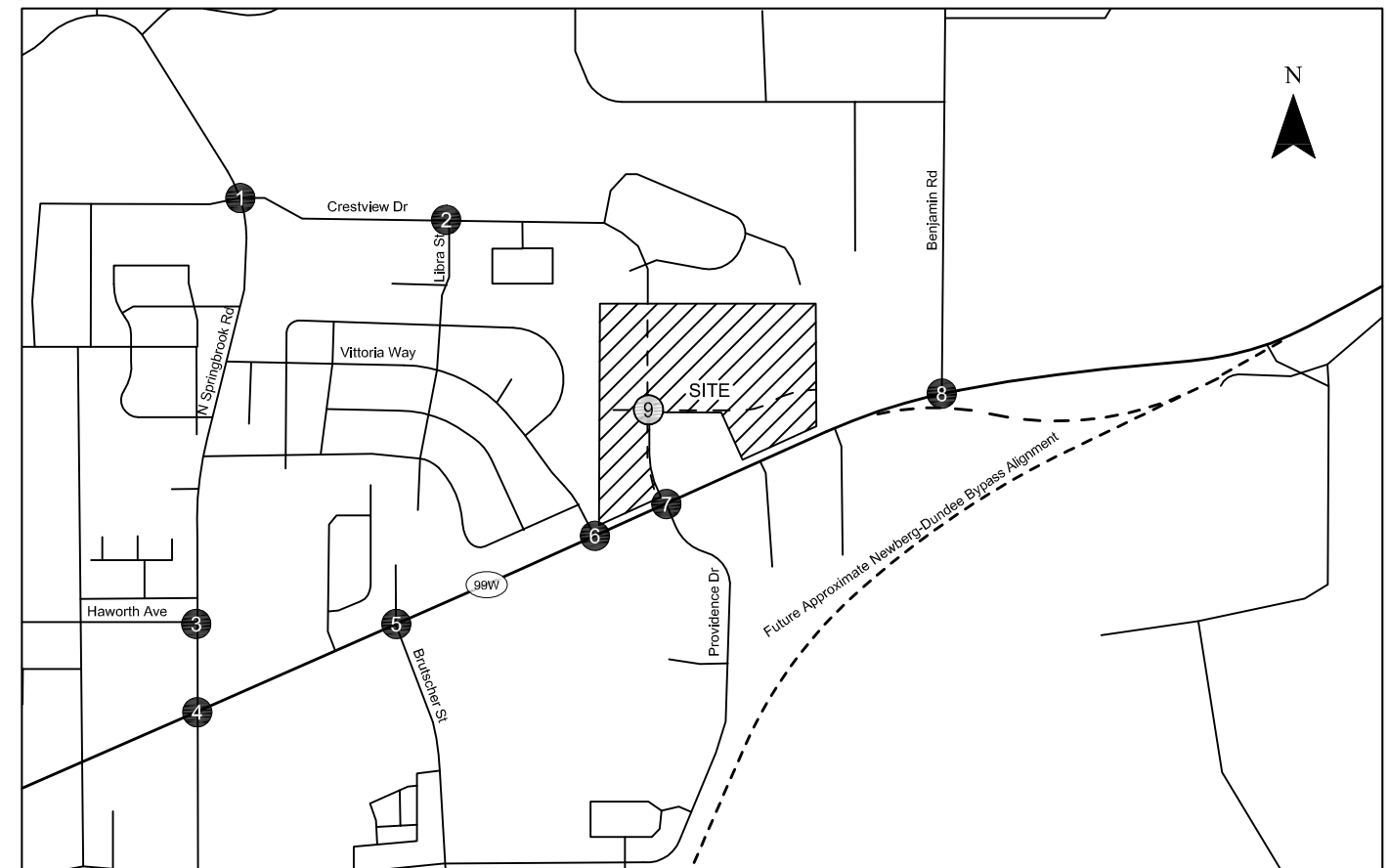
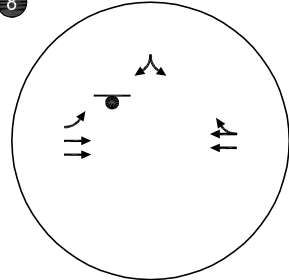
7







Crestview Dr / Providence Dr / OR 99W



8

Benjamin Rd / OR 99W



-  - STOP SIGN
-  - TRAFFIC SIGNAL
-  - ROUNDABOUT
-  - YIELD
-  - EXISTING
-  - PROPOSED

Assumed Lane Configurations and Traffic Control Devices Newberg, Oregon

Figure 8

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Level of Service Analysis

Figure 7 also shows the corresponding level of service analysis—each of the study intersections is expected to continue meeting ODOT and City mobility standards, with the following exceptions:

- The Springbrook Rd/OR 99W intersection is forecast to operate with a v/c ratio of 0.88 during the weekday PM peak hour, which exceeds the ODOT mobility standard of 0.85.
- The weekday AM and PM peak hour v/c ratios at the Providence Drive/OR 99W intersection are forecast to be 0.89 and 0.92, respectively, which both exceed the ODOT mobility standard of 0.80.

Appendix “F” contains the year 2020 background with reassigned traffic Level of Service worksheets.

PROPOSED DEVELOPMENT PLAN

Per the site plan displayed in Figure 2, the Crestview Crossing development includes 248 single-family homes and 48 apartment units. However, given the potential for fluctuation in the final number of units, up to 260 single-family homes were analyzed in this report to provide a conservative analysis of the impacts. The site development will also include an extension of Crestview Drive to the south through the development and connecting to OR 99W to form the north leg of the OR 99W/Providence Drive intersection. Full-build out and occupancy of the phase of the development included in this report is expected to occur in 2020. A future development phase may include an additional 4.43 acres of commercial space adjacent to the development site but is not included in this application.

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 4). Table 4 summarizes the anticipated number of trips that will be generated by the proposed Crestview Crossing development.

Table 4: Proposed Trip Generation

Land Use	ITE Code	Size		Weekday Trips	Weekday AM Peak Hour			Weekday PM Peak Hour		
					Total	In	Out	Total	In	Out
Single-Family Detached Housing	210	260	units	2,504	189	47	142	254	160	94
Apartment	220	48	units	1,622	24	6	18	31	20	11
Total				4,126	213	53	160	285	180	105

As shown in Table 4, the proposed development is expected to generate approximately 4,126 weekday daily trips, of which 213 (53 in, 160 out) will occur during the AM peak hour and 285 (180 in, 105 out) will occur during the PM peak hour.

Site Trip Distribution/Trip Assignment

The site-generated trips were distributed onto the study area roadway system according to a select zone analysis of TAZ 117, which includes the proposed development site, from the Newberg Transportation Planning Model, provided by ODOT. This model was reviewed and adjusted based on field-observed turning movement patterns. The traffic generated by the proposed Crestview Crossing development is expected to follow the following trip distribution pattern:

- 15 percent to the east along OR 99W;
- 10 percent to the south along Providence Drive;
- 10 percent to the south along Brutscher Street;
- 35 percent to the west along OR 99W to Springbrook Road; and
- 30 percent to the north along the Crestview Drive extension to Springbrook Road.

Trips were then distributed at the Springbrook Road/Crestview Drive and Springbrook Road/OR 99W intersections based upon existing turning movement counts. Figure 9 illustrates the estimated trip distribution pattern for the proposed development.

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 9. Figure 9 illustrates the site-generated trips that are expected to use the roadway system during the weekday AM and PM peak hours.

Appendix "G" contains the select zone analysis results received from ODOT.

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 Crestview Crossing development. The weekday AM and PM peak hour site-generated traffic volumes (shown in Figure 9) were added to the year 2020 background traffic volumes with reassigned traffic (shown in Figure 7) to arrive at the total traffic volumes shown in Figure 10.

Level of Service Analysis

The weekday AM and PM peak hour turning-movement volumes shown in Figure 10 were used to conduct an operational analysis at each study intersection to determine the year 2020 total traffic levels of service. The assumed lane configurations at the Crestview Drive/Providence Drive/OR 99W and Crestview Drive/East-West Connector intersections are displayed in Figure 8. The results of the total traffic analysis shown in Figure 10 indicate that all of the study intersections and site access points are forecast to meet ODOT and City mobility standards under 2020 total traffic conditions during the weekday AM and PM peak hours, with the following exceptions:

- The Springbrook Rd/OR 99W intersection is forecast to operate with a v/c ratio of 0.86 during the weekday PM peak hour, which exceeds the ODOT mobility standard of 0.85 but does not exceed the v/c ratio under background conditions with reassigned traffic.
- The weekday AM and PM peak hour v/c ratios at the Crestview Drive/Providence Drive/OR 99W intersection are forecast to be 0.98 and 1.08, respectively. These both exceed the ODOT mobility standard of 0.80.

Appendix "H" contains the year 2020 total traffic Level of Service worksheets.

Mitigation at Crestview Drive/Providence Drive/OR 99W

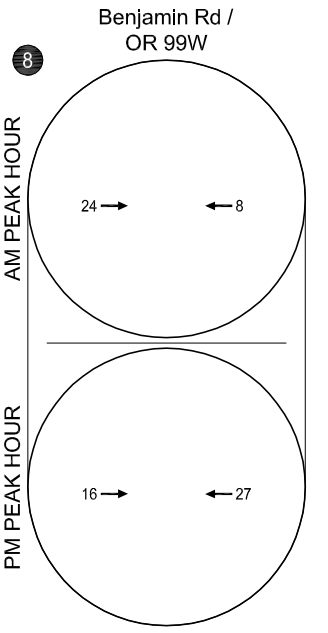
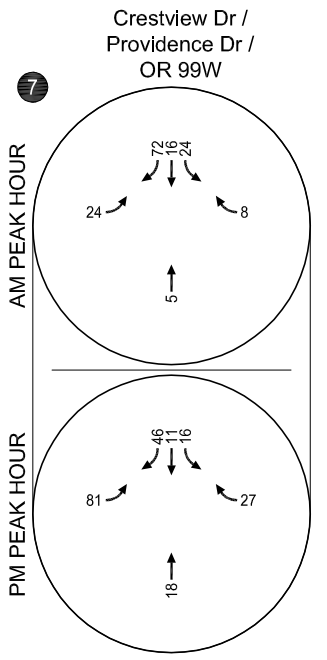
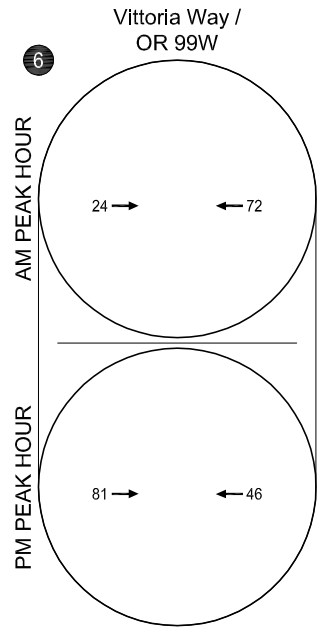
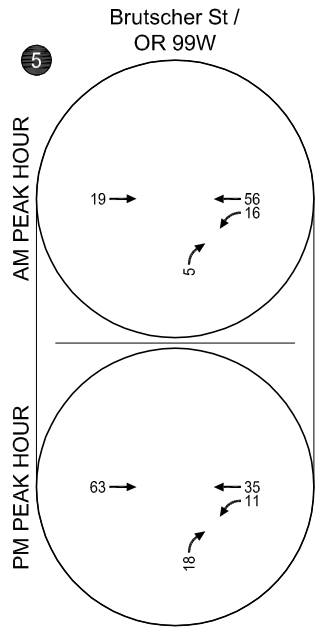
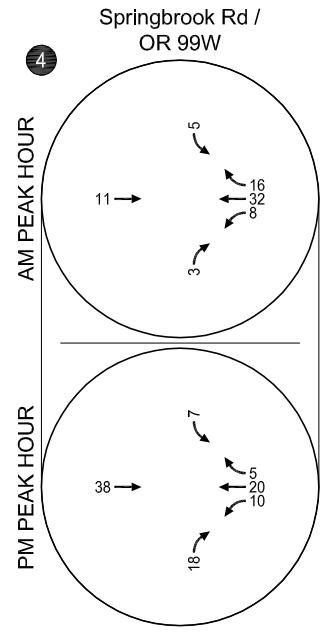
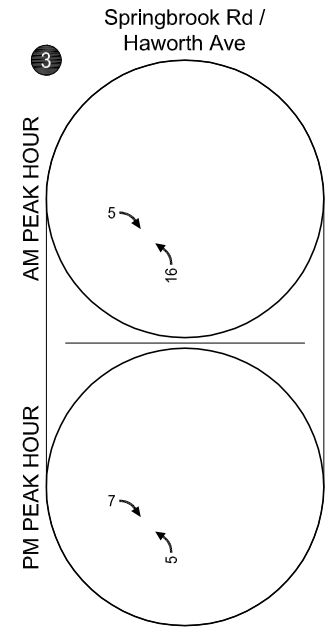
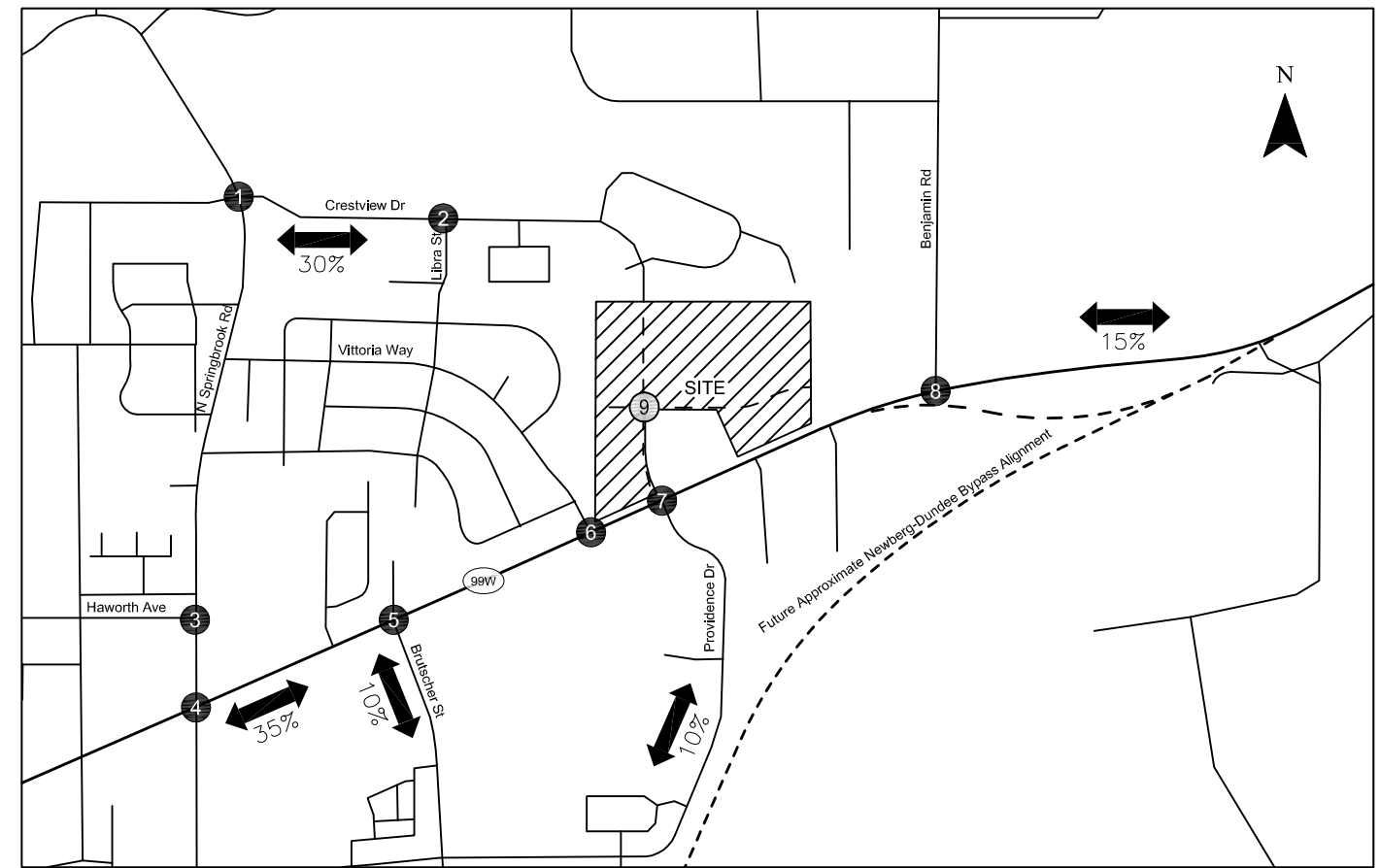
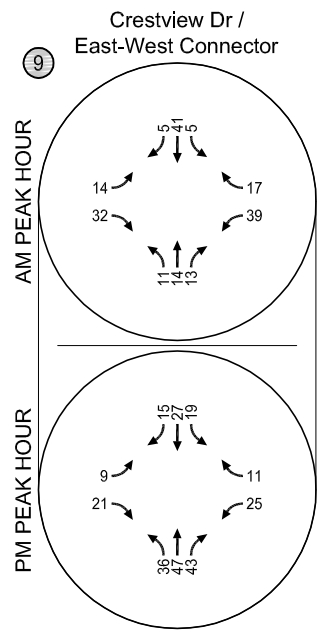
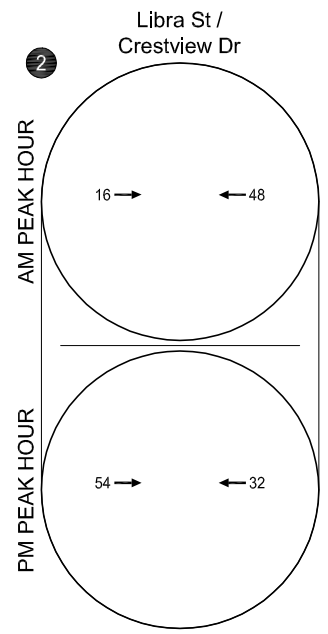
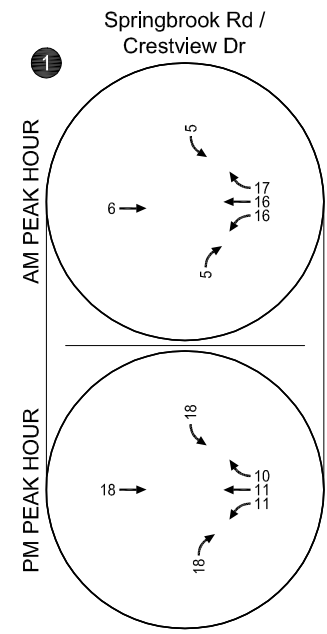
In conjunction with site development, JT Smith Companies proposes to add lanes to the Crestview Drive/Providence Drive/OR 99W intersection, shown in Figure 11 and described below:

- Add an exclusive left turn lane on southbound Crestview Drive,
- Add an exclusive right turn lane on southbound Crestview Drive,
- Add an exclusive right turn lane on westbound OR 99W, and,
- Restripe the northbound Providence Drive approach to include an exclusive left turn lane and an exclusive right turn lane.

These improvements are considered to be above and beyond the geometry needed to construct the Crestview Drive extension.

As shown in Figure 11, with these mitigation measures in place, the weekday AM and PM peak hour v/c ratios at the intersection are forecast to be 0.88 and 0.89, respectively. These both exceed the ODOT mobility standard of 0.80 but do not exceed the respective v/c ratios for background conditions with reassigned traffic.

Appendix "I" contains the year 2020 total traffic with mitigation Level of Service worksheets.

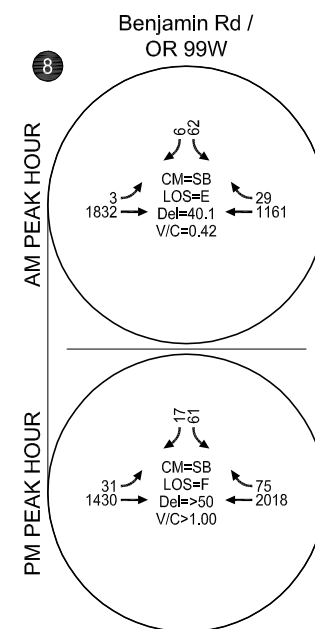
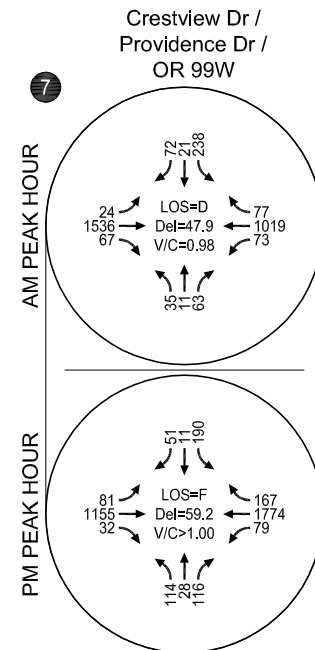
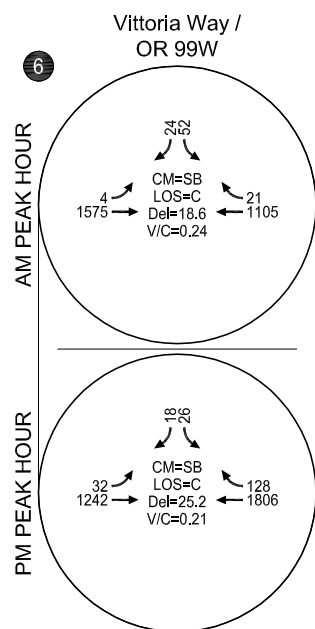
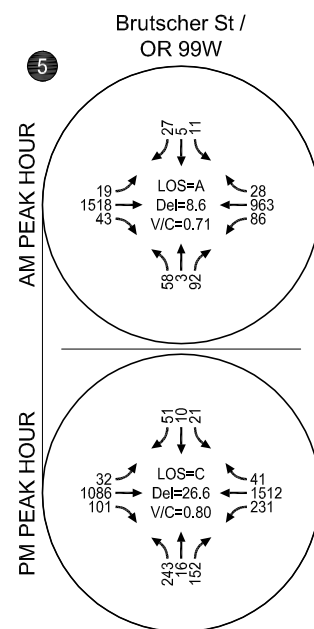
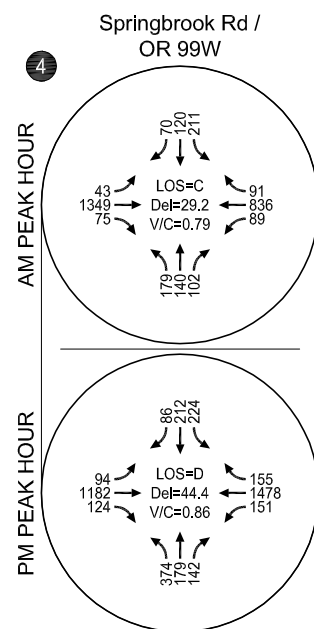
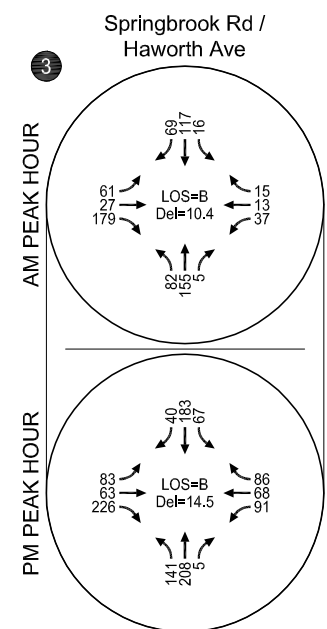
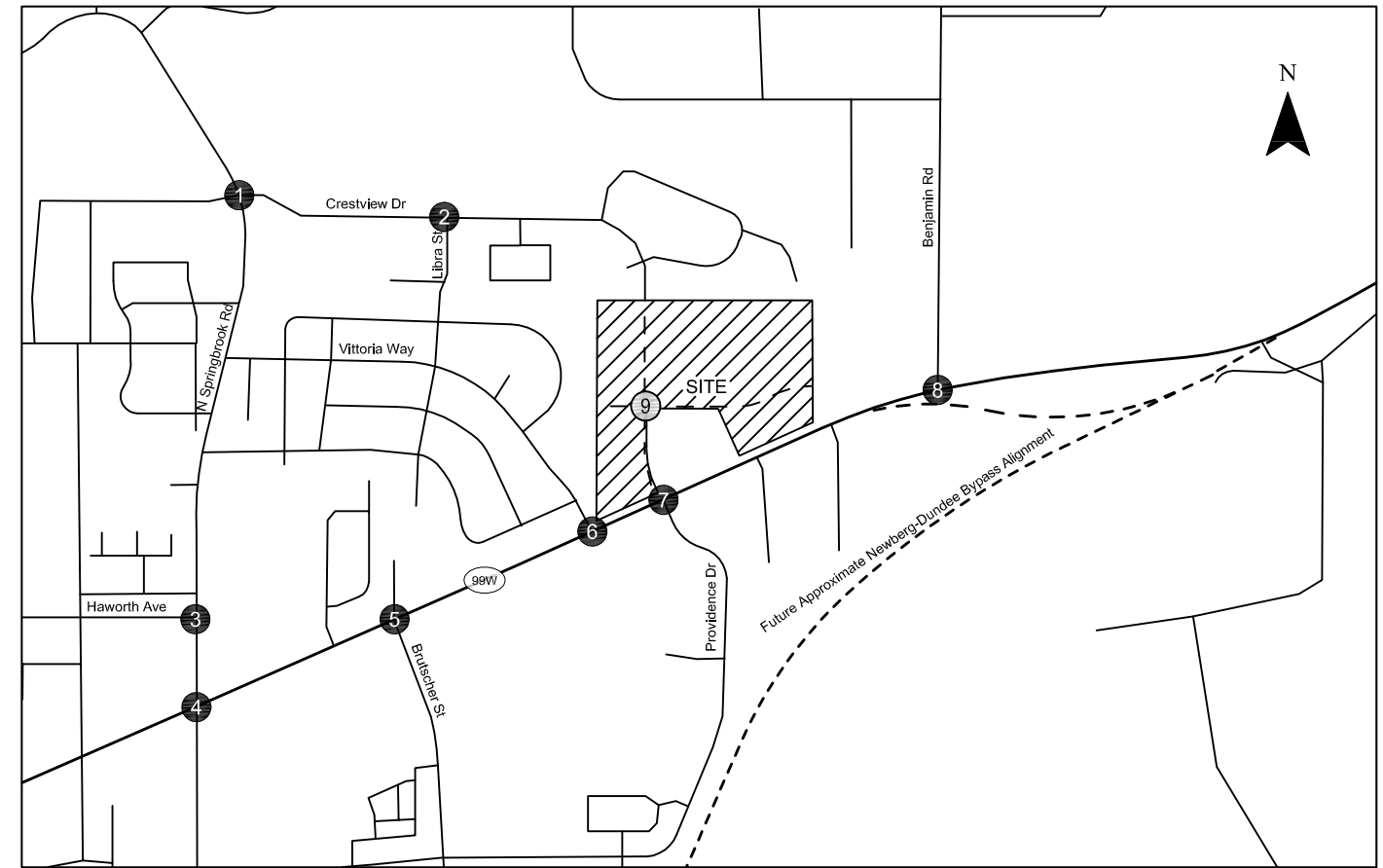
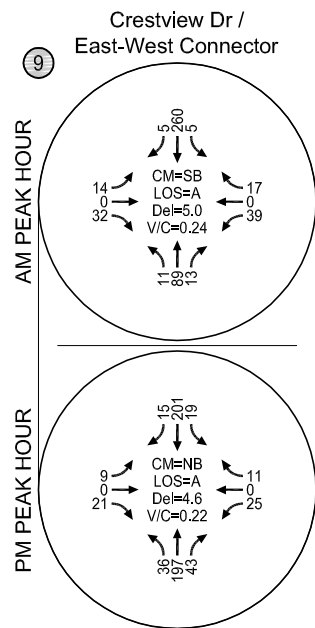
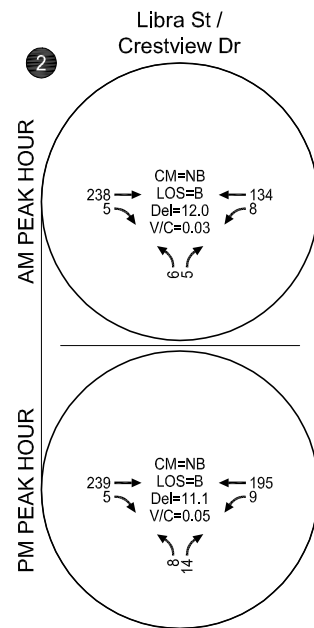
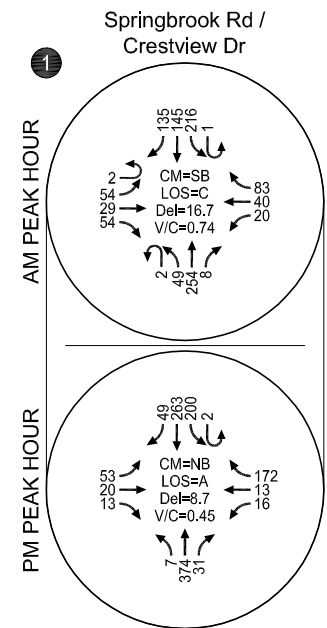


	TOTAL	IN	OUT
AM	213	53	160
PM	285	180	105

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

Figure
9

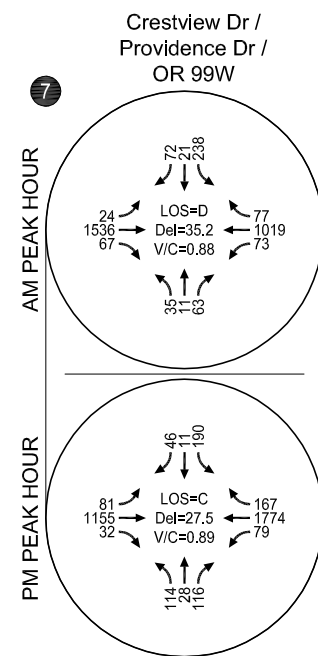
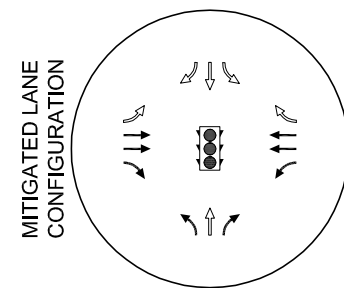
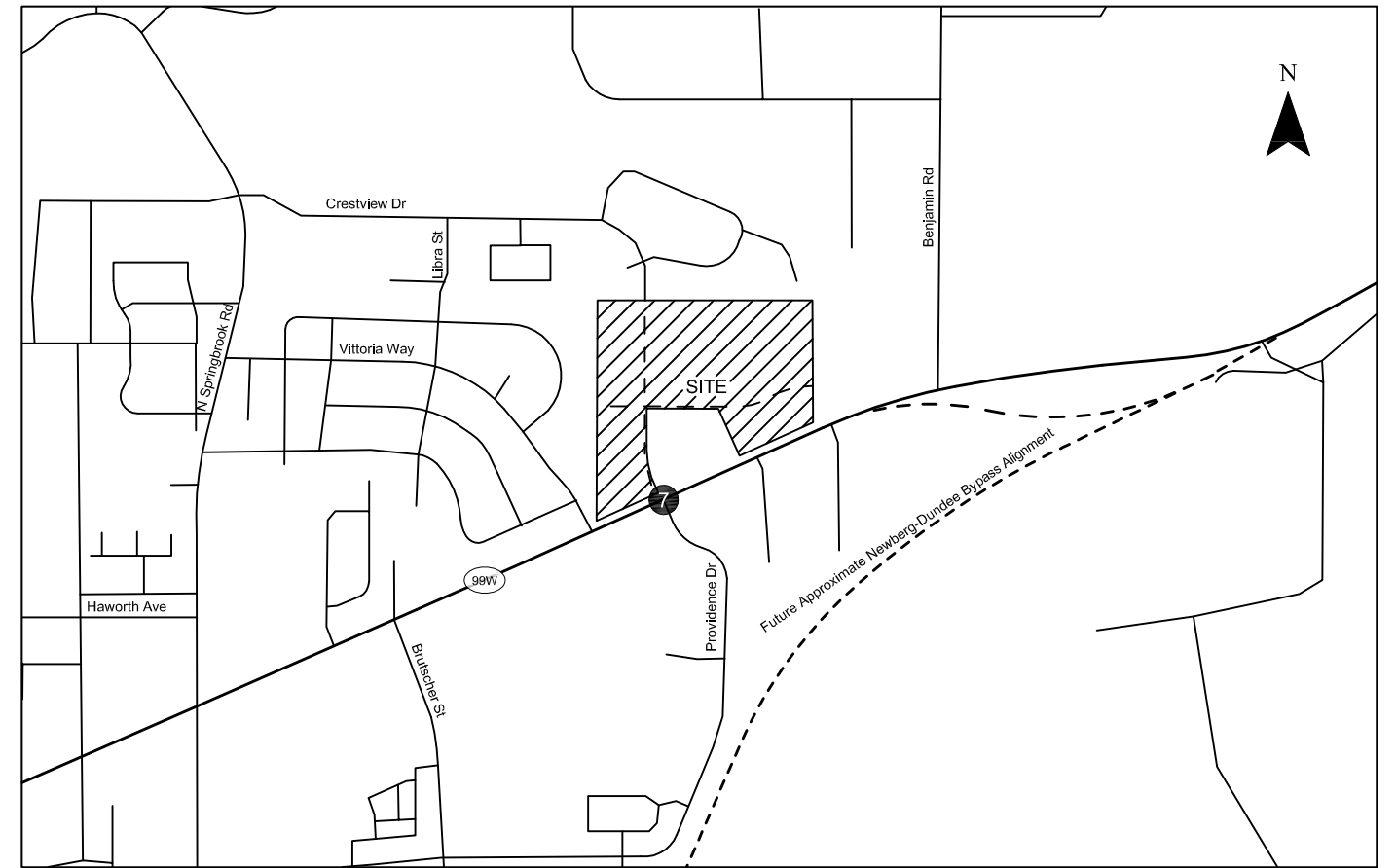
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CM = CRITICAL MOVEMENT (UNSIGNALIZED)
 LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)
 CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
 Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)
 CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
 V/C =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

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

Figure
10



CM = CRITICAL MOVEMENT (UNSIGNALIZED)
 LOS = INTERSECTION 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

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

Figure
 11

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95th-percentile Queuing Analysis

95th-percentile queues at the study intersections were reviewed to assess whether adequate storage would be provided at turn lanes and between intersections. *SimTraffic* was used to estimate the 95th-percentile queues at the signalized intersections along OR 99W (reflecting an average of five simulation runs), HCS was used to estimate the 95th-percentile queues at the roundabouts, and Synchro was used to estimate 95th-percentile queues elsewhere. Table 5 lists the estimated 95th-percentile queue for each movement at the study intersections. Reported queues are rounded to the nearest vehicle length (approximately 25 feet).

Table 5: Summary of 95th-percentile Queues

Intersection	Movement	Storage (ft)	95th-percentile Queue (ft)						Adequate Storage Provided?
			Existing		2020 Background with Reassigned Traffic		2020 Total Mitigated		
			AM	PM	AM	PM	AM	PM	
1: Springbrook Rd/ Crestview Dr	EB	N/A	25	<25	25	<25	25	<25	Yes
	WB	N/A	<25	<25	25	25	25	25	Yes
	NB	N/A	100	100	100	50	100	50	Yes
	SB	N/A	200	75	150	50	175	50	Yes
2: Libra St/ Crestview Dr	EB	N/A	<25	<25	<25	<25	<25	<25	Yes
	WB	N/A	<25	<25	<25	<25	<25	<25	Yes
	NB	N/A	<25	<25	<25	<25	<25	<25	Yes
3: Springbrook Rd/ Haworth Ave	EB L/T	N/A	25	50	25	25	25	25	Yes
	EB R	100	50	75	25	50	25	50	Yes
	WB	N/A	25	125	25	75	25	75	Yes
	NB L	90	25	50	25	25	25	25	Yes
	NB T/R	N/A	75	225	25	25	25	25	Yes
	SB L	90	<25	25	<25	25	<25	25	Yes
	SB T/R	N/A	250	300	50	50	50	50	Yes
4: Springbrook Rd/ OR 99W	EB L	350	150	375	125	275	150	250	Yes
	EB T	N/A	450	475	225	400	450	425	Yes
	EB R	350	150	75	75	125	125	150	Yes
	WB L	450	75	250	75	375	100	450	Yes
	WB T	N/A	225	550	150	850	150	650	Yes
	WB R	450	<25	350	<25	525	<25	425	Yes
	NB L	320	125	400	175	300	175	225	Yes
	NB T	N/A	175	1900	175	225	175	275	Yes
	NB R	320	100	250	100	100	100	125	Yes
	SB L	170	225	250	175	225	175	225	Yes
	SB T	N/A	350	475	250	375	175	375	Yes
	SB R	130	100	175	125	175	100	175	No

Table 5: Summary of 95th-percentile Queues (continued)

Intersection	Movement	Storage (ft)	95th-percentile Queue (ft)						Adequate Storage Provided?
			Existing		2020 Background with Reassigned Traffic		2020 Total Mitigated		
			AM	PM	AM	PM	AM	PM	
5: Brutscher St/ OR 99W	EB L	260	50	100	25	50	25	100	Yes
	EB T	N/A	125	375	150	325	175	350	Yes
	EB R	200	25	225	25	200	50	175	Yes
	WB L	350	100	450	100	450	150	375	Yes
	WB T	N/A	125	1375	75	1300	50	525	Yes
	WB R	80	25	50	25	75	25	75	Yes
	NB L	220	125	300	100	300	125	275	No
	NB T/R	N/A	100	475	100	450	100	275	Yes
	SB L	50	25	50	25	50	25	25	Yes
	SB T/R	N/A	50	75	50	100	75	50	Yes
6: Vittoria Way/ OR 99W	EB L	100	<25	<25	<25	<25	<25	<25	Yes
	EB T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
	WB T/R	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
	SB	N/A	25	25	25	25	25	25	Yes
7: Crestview Dr/ Providence Dr/ OR 99W	EB L	150	N/A	N/A	<25	200	75	125	Yes
	EB T	N/A	225	225	400	200	450	150	Yes
	EB R	100	75	50	125	25	100	50	Yes
	WB L	230	125	200	100	175	125	200	Yes
	WB T	N/A	75	1175	150	775	225	550	Yes
	WB R	300	N/A	N/A	N/A	NA	50	275	Yes
	NB L	160	75	175	75	175	75	175	Yes
	NB T	N/A	N/A	N/A	N/A	N/A	25	100	Yes
	NB R	160	75	100	75	125	75	100	Yes
	SB L	250	N/A	N/A	N/A	N/A	225	250	Yes
	SB T	N/A	N/A	N/A	275	250	225	225	Yes
SB R	150	N/A	N/A	N/A	N/A	75	75	Yes	
8: Benjamin Rd/ OR 99W	EB L	250	N/A	N/A	N/A	N/A	N/A	N/A	Yes
	EB T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
	WB T/R	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
	SB	N/A	50	125	75	150	50	150	Yes
9: Crestview Dr/ East-West Connector	EB	N/A	N/A	N/A	N/A	N/A	<25	<25	Yes
	WB	N/A	N/A	N/A	N/A	N/A	<25	<25	Yes
	NB	N/A	N/A	N/A	N/A	N/A	<25	25	Yes
	SB	N/A	N/A	N/A	N/A	N/A	25	25	Yes

The table indicates the following 95th-percentile queues are projected to exceed the provided storage lengths under 2020 total traffic conditions with the proposed mitigation measures:

- The southbound right turn at Springbrook Road/OR 99W during the weekday PM peak hour.
- The northbound left turn at Brutscher Street/OR 99W during the weekday PM peak hour.

Each of the queues noted above is expected to decrease compared with existing conditions due to reassigned traffic from Springbrook Road and OR 99W to the Crestview Drive extension. Consequently, no additional mitigation measures are recommended to accommodate the 95th-percentile queues at the study intersections the proposed development thus adds no further degradation to the system.

Appendix "J" contains the SimTraffic queuing worksheets.

On-Site Circulation/Site-Access Operations

Internal circulation was evaluated to ensure that the site provides sufficient on-site circulation for pedestrian movements and internal traffic. Figure 2 illustrates the proposed development plan. The following activities are recommended to ensure adequate safety and operation at the internal intersections and roadways:

- All local streets within the development should have two travel lanes.
- Other than at the Providence Drive/Crestview Drive/OR 99W intersection, a two-lane section of Crestview Drive should be adequate to accommodate turning movements and queuing within the proposed development.
- Shrubbery and landscaping near the internal intersections and site access points should be maintained to ensure adequate sight distance.

COMMERCIAL DEVELOPMENT SENSITIVITY ANALYSIS

As noted previously, approximately 4.43 acres adjacent to the proposed site could be developed in the future as commercial property. This commercial property is not included in this land use application but could be constructed at an undetermined time as part of a separate land use application. We investigated the potential impacts of developing the 4.43 acres of commercial property for the following reasons:

- To estimate the additional mitigations, if any, needed to meet ODOT policy, and
- To consider compatibility between these additional mitigations and the proposed lane geometry and mitigations on roadways and at intersections within and around the site, including the Crestview Drive/Providence Drive/OR 99W intersection and proposed Crestview Drive/East-West Connector roundabout.

A build-out year of 2020 was assumed for this analysis for simplicity. Assuming a later background year would result in marginally different background traffic volumes because traffic on OR 99W could either increase (if more in process developments are approved) or decrease (as a result of completion of the Newberg-Dundee Bypass).

Table 6 displays the trip generation for the commercial traffic (in addition to the residential), assuming 25 percent of the 4.43 acres becomes leasable floor space and that all of the property is developed as shopping center.

Table 6: Trip Generation Including Phase II

Land Use	ITE Code	Size		Daily Trips	Weekday AM Peak Hour			Weekday PM Peak Hour		
					Total	In	Out	Total	In	Out
Single-Family Detached Housing	210	260	Units	2,504	189	47	142	254	160	94
<i>Less Internal Trips</i>				226	9	2	7	28	18	10
Apartment	220	48	Units	1,622	24	6	18	31	20	11
<i>Less Internal Trips</i>				146	1	0	1	3	2	1
Shopping Center	820	48,243*	ft ²	3,662	176	109	67	317	152	165
<i>Less Internal Trips</i>				330	9	5	4	35	17	18
<i>Less Pass-by Trips</i>				866	0	0	0	96	48	48
Total Gross Trips				7,788	389	162	227	602	332	270
<i>Less Internal Trips</i>				702	19	7	12	66	37	29
<i>Less Pass-by Trips</i>				866	0	0	0	96	48	48
Total Net New Trips				6,220	370	155	215	440	247	193

*Assumes a gross leasable area to acreage ratio of 0.25.

As shown, if the commercial property is developed, then the total development is estimated to generate 6,220 weekday daily trips, of which 370 (155 in, 215 out) will occur during the AM peak hour and 440 (247 in, 193 out) will occur during the PM peak hour. The development is also expected to generate approximately 96 pass-by trips during the weekday PM peak hour—to conservatively estimate the impacts to the Crestview Drive/Providence Drive/OR 99W intersection, all of the pass-by trips were treated as diverted from OR 99W.

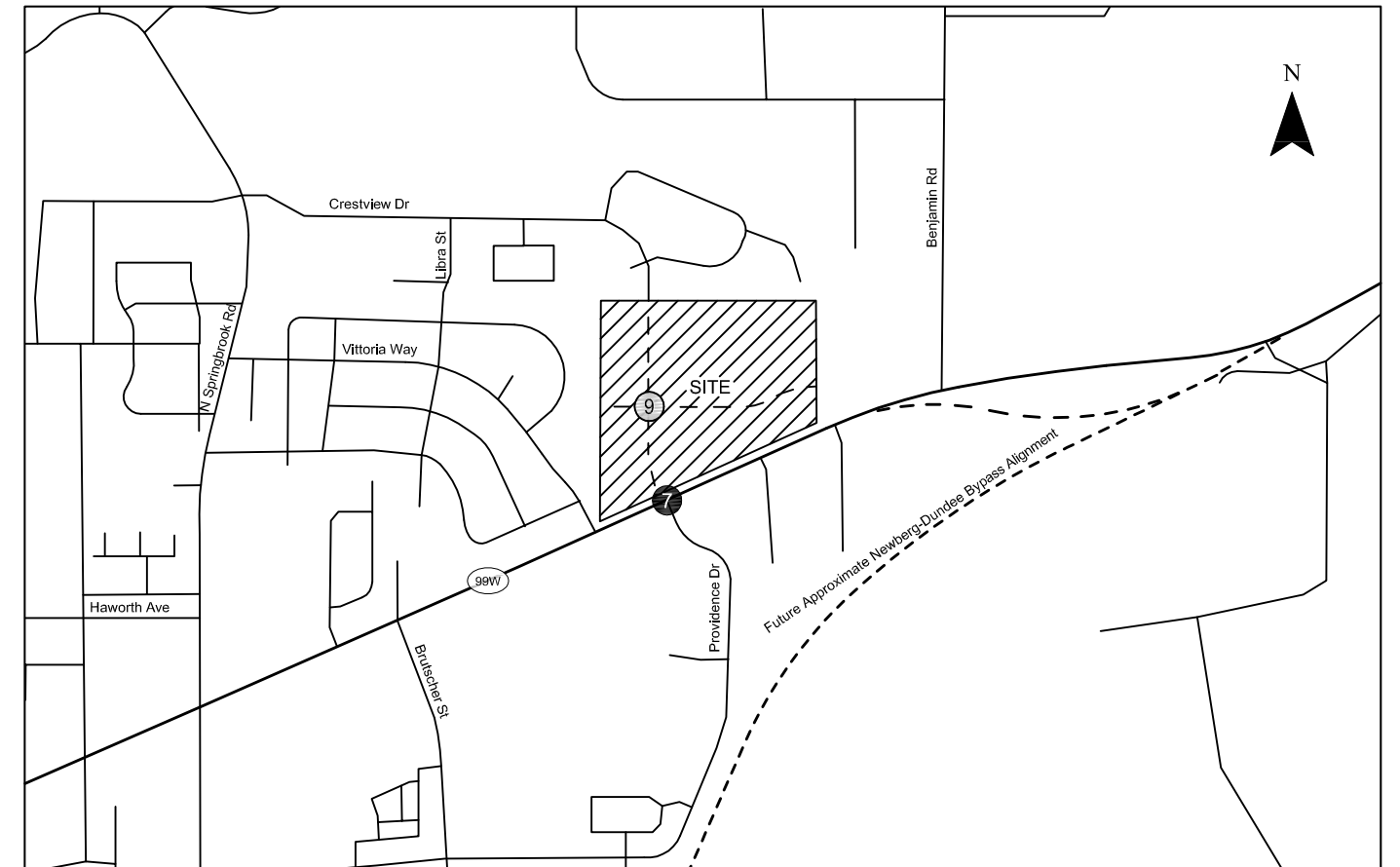
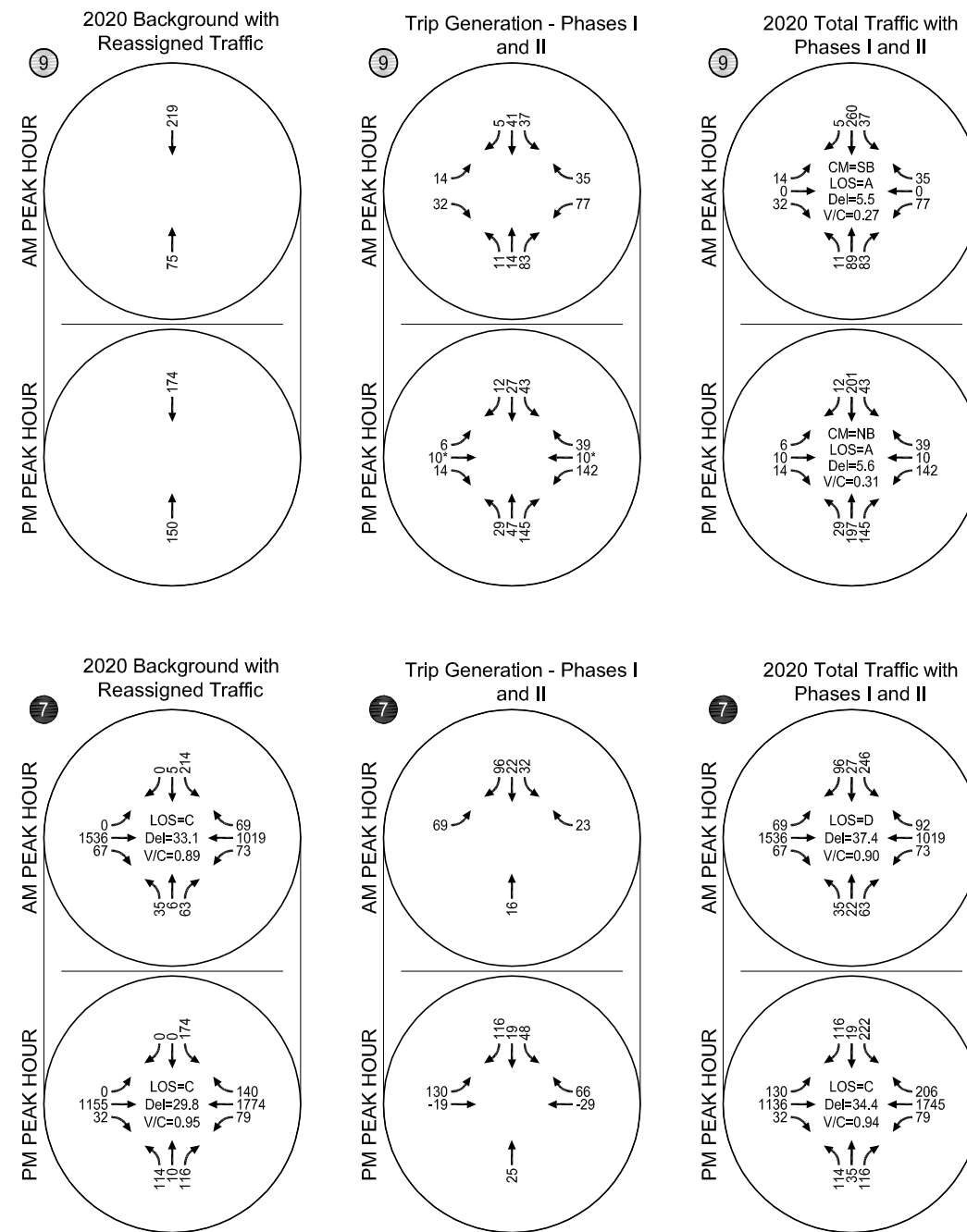
Figure 12 shows the trip generation and total traffic conditions at the Crestview Drive/Providence Drive/OR 99W intersection and Crestview Drive/East-West Connector Roundabout. As shown, the Crestview Drive/East-West Connector Roundabout is expected to continue operating acceptably as a single-lane roundabout. With the mitigation improvements associated with the residential development in place, the weekday AM and PM peak hour v/c ratios at the Crestview Drive/Providence Drive/OR 99W intersection are forecast to be 0.90 and 0.94, respectively. ODOT defines no significant impact as a v/c ratio of 0.03 above the background condition—therefore, assuming the same background conditions, no additional mitigations would be required.

Table 7 displays the estimated resulting 95th-percentile queues at the Crestview Drive/Providence Drive/OR 99W intersection from *SimTraffic*.

Table 7: Summary of 95th-percentile Queues Including Phase II

Intersection	Movement	Storage (ft)	95th-percentile Queue (ft)	
			2020 Phase II	
			AM	PM
7: Crestview Dr/ Providence Dr/ OR 99W	EB L	150	125	150
	EB T	N/A	475	250
	EB R	100	125	25
	WB L	230	125	250
	WB T	N/A	250	975
	WB R	300	100	300
	NB L	160	75	150
	NB T	N/A	50	75
	NB R	160	75	100
	SB L	250	250	250
	SB T	N/A	300	350
	SB R	150	100	125

Appendix "K" contains the Phase II Sensitivity Analysis Level of Service worksheets.



*Estimated retail-residential internal trips
Negative values indicate retail pass-by trips.

CM = CRITICAL MOVEMENT (UNSIGNALIZED)
 LOS = INTERSECTION 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 - Phase II Sensitivity Analysis
 Weekday AM and PM Peak Hours
 Newberg, Oregon

Figure
 12

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Section 5
Conclusions and Recommendations

CONCLUSIONS AND RECOMMENDATIONS

The results of the traffic impact analysis indicate that the proposed Crestview Crossing development can be constructed while maintaining acceptable levels of service and safety on the surrounding transportation system, provided the appropriate mitigations are in place. The findings of this analysis and our recommendations are discussed below.

Year 2017 Existing Conditions

- All of the study intersections currently meet City of Newberg (and Oregon Department of Transportation, where applicable) mobility targets during the weekday AM and PM peak hours, with the following exceptions:
 - The Springbrook Road/OR 99W intersection currently experiences a volume-to-capacity ratio (v/c) of 0.86 during the weekday AM peak hour, which exceeds the ODOT mobility standard of 0.85. The intersection also operates at level of service (LOS) E during the weekday PM peak hour, which exceeds the City standard of LOS D under current conditions.
 - The southbound stop-controlled approach to the Vittoria Way/OR 99W intersection currently operates at LOS E during the weekday PM peak hour, which exceeds the City standard of LOS D.
- A review of historical crash data did not reveal any patterns or trends in the site vicinity that require mitigation associated with this project.
 - One fatal crash was reported at the Springbrook Road/Crestview Drive roundabout—this crash occurred when a southbound motorcyclist struck a curb and was thrown from the vehicle. The crash report lists the cause as driver error—driving too fast for conditions.
 - Based upon a 2016 analysis, the Springbrook Road/OR 99W intersection is currently within the top five percent of the highest-scoring intersections in Region 2.

Since 2016, pavement marking improvements and an additional westbound left turn lane on OR 99W were added to this intersection, and the proposed Crestview Crossing development is expected to result in a net decrease in traffic at this intersection due to the reassignment of traffic to the Crestview Drive extension.

Year 2020 Background Conditions

- A two-percent annual growth rate was applied to the existing mainline traffic volumes on OR 99W to reflect general background growth in the area before any in-process traffic was considered.
- Traffic generated by the Oregon Clinic, to be located on the west side of Providence Drive south of Providence Newberg Medical Center, was included in the background traffic volumes as in-process traffic.

Background traffic conditions with the assumed build-out of the north leg of the Providence Drive/OR 99W intersection (and no site-added traffic) were assumed as the base case against which future traffic conditions are compared.

- The proposed development will extend Crestview Drive south through the property and to the existing Providence Drive/OR 99W intersection, where it will form the north leg.
- Traffic volumes were assigned to the Crestview Drive extension based upon existing turning movement volumes at the study intersections and the Newberg Transportation System Plan.
- The background traffic condition includes rerouted traffic from the proposed Crestview Drive extension but does not include trips associated with new land uses within the proposed development.
- All of the study intersections are expected to continue operating acceptably during the weekday AM and PM peak hours under 2020 background traffic conditions with reassigned traffic, with the following exceptions:
 - The Springbrook Rd/OR 99W intersection is forecast to operate with a v/c ratio of 0.88 during the weekday PM peak hour, which exceeds the ODOT mobility standard of 0.85.
 - The weekday AM and PM peak hour v/c ratios at the Providence Dr/OR 99W intersection are forecast to be 0.89 and 0.92, respectively, which both exceed the ODOT mobility standard of 0.80.

Proposed Development Plan

- The proposed development is expected to generate approximately 4,126 weekday daily trips, of which approximately 213 (53 in, 160 out) are forecast to occur during the AM peak hour and approximately 285 (180 in, 105 out) are forecast to occur during the PM peak hour.
- A select-zone analysis of the Newberg Transportation Planning Model was used to develop a trip distribution pattern for the proposed development.

Year 2020 Total Conditions

- All of the study intersections are expected to continue operating acceptably during the weekday AM and PM peak hours under 2020 total traffic volumes, with the following exceptions:
 - The Springbrook Rd/OR 99W intersection is forecast to operate with a v/c ratio of 0.86 during the weekday PM peak hour, which exceeds the ODOT mobility standard of 0.85 but does not exceed the v/c ratio under background conditions with reassigned traffic.
 - The weekday AM and PM peak hour v/c ratios at the Providence Drive/OR 99W intersection are forecast to be 0.98 and 1.08, respectively, which both exceed the ODOT mobility standard of 0.80.
 - The new proposed Crestview Diver/East-West Connector intersection within the Crestview Crossing development is expected to operate acceptably as a single-lane roundabout.

Year 2020 Total Mitigated Conditions

- The Crestview Drive/Providence Drive/OR 99W intersection was analyzed under total traffic conditions with the following additional lane improvements:

- Add an exclusive left turn lane on southbound Crestview Drive,
- Add an exclusive right turn lane on southbound Crestview Drive,
- Add an exclusive right turn lane on westbound OR 99W,
- Restripe eastbound OR 99W to include an exclusive left turn lane, and,
- Restripe the northbound Providence Drive approach to include an exclusive left turn lane and an exclusive right turn lane.

With these improvements, the weekday AM and PM peak hour v/c ratios at the intersection are forecast to be 0.88 and 0.89, respectively. These exceed the ODOT mobility standard of 0.80 but do not exceed the respective v/c ratios under background conditions with reassigned traffic. As such, the impact of the development has been mitigated.

95th-percentile Queuing Analysis

- All 95th-percentile queues are projected to be accommodated by the provided storage lengths under 2020 total traffic conditions, with the following exceptions:
 - The southbound right turn at Springbrook Road/OR 99W during the weekday PM peak hour.
 - The northbound left turn at Brutscher Street/OR 99W during the weekday PM peak hour.

Each of the queues noted above is expected to decrease under total traffic conditions compared with existing conditions due to reassigned traffic from Springbrook Road and OR 99W to the Crestview Drive extension.

Commercial Property Sensitivity Analysis

A planning-level analysis was prepared to account for the future development potential of the 4.43-acre commercial property adjacent to the development site. While this is NOT part of this development application, the analysis was conducted to evaluate the future effectiveness of the recommended mitigations.

- The gross leasable area-to-acreage ratio was assumed at 25 percent, and the entire commercial property was assumed as shopping center land use.
- The total development (including residential and commercial) is estimated to generate 6,220 weekday daily trips, of which 370 (155 in, 215 out) will occur during the AM peak hour and 440 (247 in, 193 out) will occur during the PM peak hour. The development is also expected to generate approximately 96 pass-by trips during the weekday PM peak hour—these were treated as diverted trips from OR 99W.
- The Crestview Drive/Providence Drive/OR 99W intersection and Crestview Drive/East-West Connector roundabout were analyzed assuming development of the 4.43-acre commercial property.
- The Crestview Drive/East-West Connector intersection is expected to continue operating acceptably as a single-lane roundabout.

- With the mitigation improvements associated with the residential development in place, the weekday AM and PM peak hour v/c ratios at the Crestview Drive/Providence Drive/OR 99W intersection are forecast to be 0.90 and 0.94, respectively. ODOT defines no significant impact as a v/c ratio of 0.03 above the background condition—therefore, assuming the same background conditions, no additional mitigations would be required.

RECOMMENDATIONS

Providence Drive/Crestview Drive/OR 99W Intersection

- The new north leg of the intersection, which will be an extension of Crestview Drive, should be configured as a four-lane section with one northbound lane and three southbound lanes (exclusive lanes for left-turn, through, and right-turn movements). At least 250 feet of southbound left turn storage and at least 150 feet of southbound right turn storage should be provided to accommodate the forecast 95th percentile queue lengths.
- The south leg of the intersection should be restriped to a four-lane section with one southbound lane and three northbound lanes (exclusive lanes for left-turn, through, and right-turn movements).
- Based on the forecast 95th percentile queuing analysis:
 - A westbound right turn lane should be constructed with at least 300 feet of storage.
 - An eastbound left turn lane should be striped to provide at least 150 feet of storage.
- Recommended signal phasing: the intersection should be operated with permissive left turn movements on the northbound and southbound approaches and fully protected left turn movements on the eastbound and westbound approaches.

On-Site Circulation/Site Access Operations

- Driveways, landscaping, utilities, and signage within the site should be located and maintained to provide sufficient sight distance at all new internal intersections and accesses.
- Other than at the Providence Drive/Crestview Drive/OR 99W intersection, a two-lane section of Crestview Drive should be adequate to accommodate turning movements and queuing within the proposed development.

Section 6
References

REFERENCES

1. Transportation Research Board of the National Academies. *Highway Capacity Manual 2000*. 2000.
2. City of Newberg, Oregon. *Transportation System Plan*. 2016.
3. Yamhill County Transit Area. "Routes and Schedules." 2017. <<http://www.yctransitarea.org/index.php/routes-and-schedules/>>. Accessed 12-21-2017.
4. Institute of Transportation Engineers. *Trip Generation: 10th Edition*. 2017.

Appendix A
Scoping Memorandum



KITTELSON & ASSOCIATES, INC.

TRANSPORTATION ENGINEERING / PLANNING

610 SW Alder Street, Suite 700, Portland, OR 97205 P 503.228.5230 F 503.273.8169

SCOPING MEMORANDUM

Date: October 19, 2017

Project #: 21709

To: Steve Olson, City of Newberg
Gerry Juster and Keith Blair, ODOT

From: Zachary Bugg, PhD; Diego Arguea, PE; and Matt Hughart, AICP

Project: Crestview Crossing

Subject: Traffic Impact Analysis Scoping Memorandum

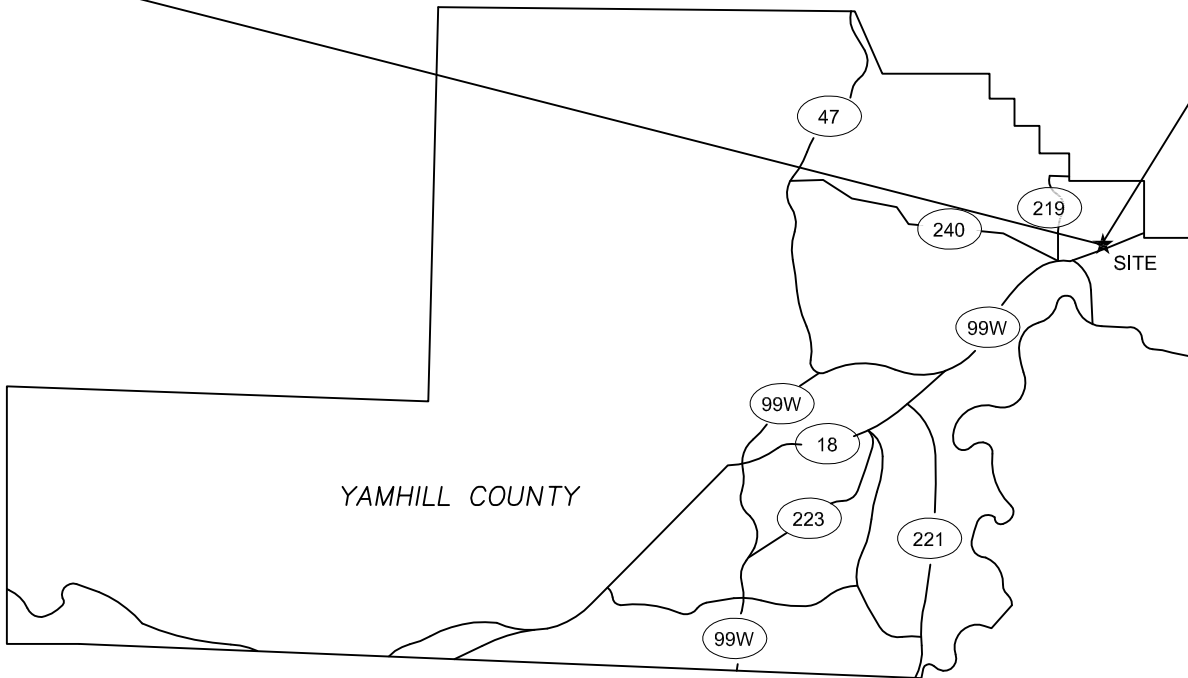
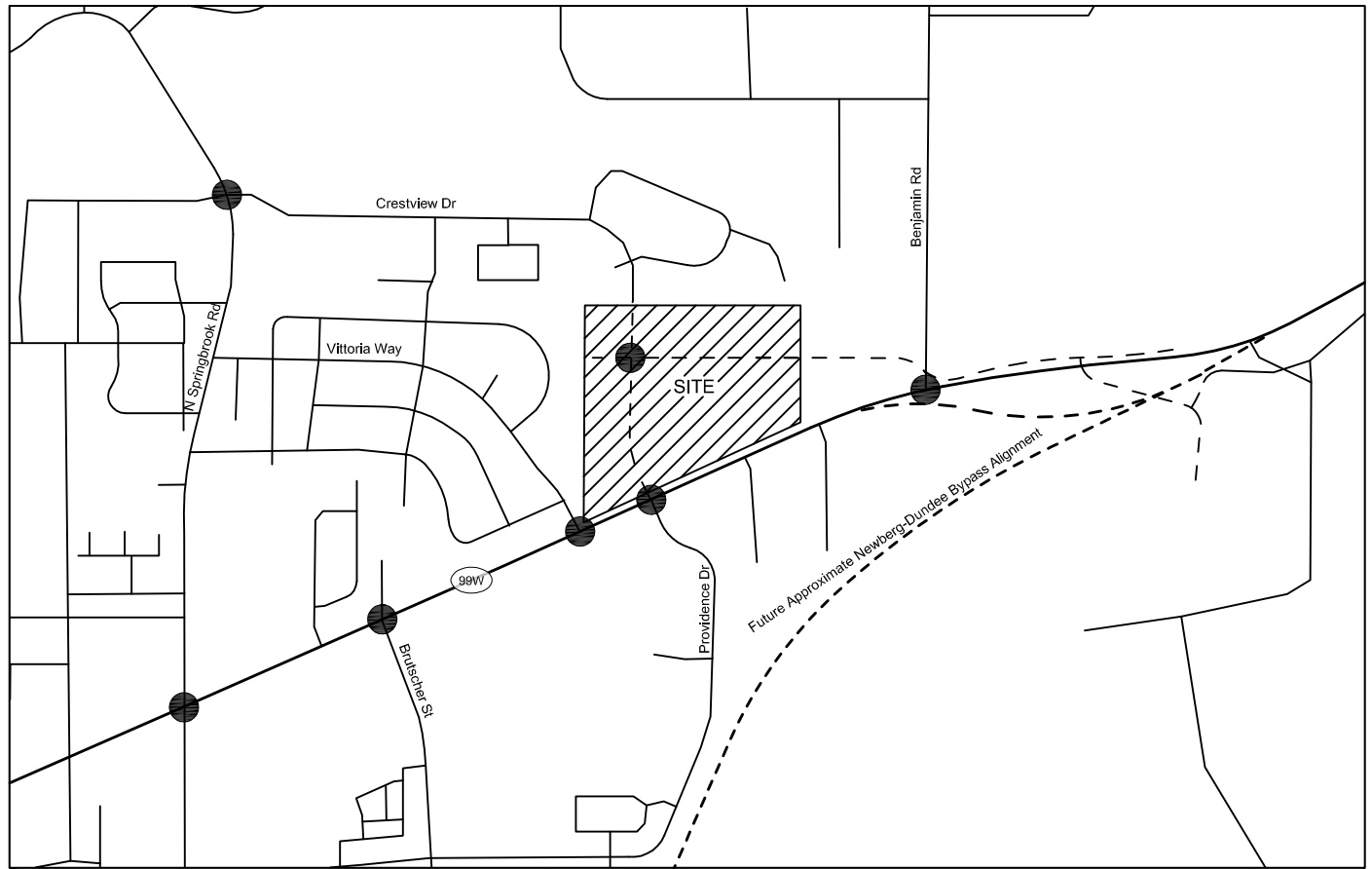
This memorandum represents a scoping needs assessment for preparing the Traffic Impact Analysis (TIA) associated with the proposed development located at the northeast corner of the OR 99W/ Providence Drive intersection in Newberg, Oregon. The assumptions for scoping the TIA are based on a review of a conceptual site plan, a preapplication meeting and discussions between City of Newberg staff and the Applicant, and our working knowledge of the transportation policies of City of Newberg and the Oregon Department of Transportation (ODOT).

Proposed Development

The Applicant, JT Smith Companies, is in the process of preparing an application to develop a 33.13-acre mixed-use development on the subject property. The site is currently occupied by farm land and one single family home. The site is bordered by OR 99W to the south and by residential uses to the west, north, and east.

Figure 1 displays a site vicinity map, and Figure 2 displays the proposed site plan. Per the current site plan, the development will include 249 single-family homes, 48 apartment units, 4.43 acres of commercial property, and 1.17 acres of civic space. As shown, the site development includes an extension of Crestview Drive to the south through the proposed development, connecting to OR 99W to form the north leg of the OR 99W/Providence Drive intersection.

Per ODOT and City of Newberg criteria, a TIA is needed as part of the design review application for the development. This memorandum presents the proposed methodology to prepare the TIA and reflects the outcome of conversations with City and ODOT staff.



● - Study Intersection

Site Vicinity
Newberg, Oregon

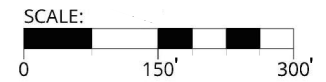
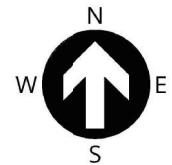
Figure
1



SITE STATISTICS	
PROPERTY:	3216AC 13800 & 321601100
JURISDICTION:	CITY OF NEWBERG
GROSS SIZE:	33.13 ACRES
EXISTING ZONING:	
R-1:	4.31 ACRES
R-2:	6.58 ACRES
C-2:	22.24 ACRES
PROPOSED ZONING:	R-1 & R-3
R-1:	5.73 ACRES
R-3:	23.00 ACRES
C-2:	4.40 ACRES

SITE NOTE

SITE MAP HAS BEEN PREPARED USING DATA FROM EXISTING TAX MAPS AND METRO'S RLS GIS DATA. THIS MAP HAS BEEN PREPARED FOR ILLUSTRATIVE PURPOSES ONLY. ALL BOUNDARY AND DIMENSIONAL INFORMATION SHOULD BE VERIFIED BY A PROFESSIONAL LAND SURVEYOR.



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Site Plan Provided by 3J Consulting 8/14/2017

Proposed Site Plan
Newberg, Oregon

Figure
2

Trip Generation

Preliminary trip generation estimates for the proposed development were prepared based on the Institute of Transportation Engineers’ (ITE) *Trip Generation Manual*, 9th Edition (Reference 1) for weekday daily, AM peak hour, and PM peak hour time periods. The trip generation is based on the residential and commercial mix, with an assumed use of the civic space for a community center. Internal and pass-by trips were estimated based on rates identified in the *Trip Generation Handbook*, 2nd Edition (Institute of Transportation Engineers, 2004)¹. The trip generation is summarized below in Table 1.

Table 1. Preliminary Trip Generation Estimate

Land Use	ITE Code	Size	Daily Trips	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
Single-Family Detached Housing	210	249 units	2,370	187	47	140	249	157	92
<i>Less Internal Trips (13% Daily, 8% AM, 12% PM)</i>			308	15	4	11	30	19	11
Apartment	220	48 units	320	24	5	19	30	20	10
<i>Less Internal Trips (13% Daily, 8% AM, 12% PM)</i>			42	2	0	2	4	2	2
Shopping Center	820	48,243 ft ² *	2,060	46	29	17	179	86	93
<i>Less Internal Trips (13% Daily, 8% AM, 12% PM)</i>			268	4	2	2	21	10	11
<i>Less Pass-by Trips (34% Daily, AM, PM)</i>			610	14	7	7	54	27	27
Recreational Community Center	495	12,741 ft ² *	292	26	17	9	35	17	18
<i>Less Internal Trips (13% Daily, 8% AM, 12% PM)</i>			38	2	1	1	4	2	2
Total Gross Trips			5,042	283	98	185	493	280	213
<i>Less Internal Trips</i>			<i>656</i>	<i>23</i>	<i>7</i>	<i>16</i>	<i>59</i>	<i>33</i>	<i>26</i>
<i>Less Pass-by Trips</i>			<i>610</i>	<i>14</i>	<i>7</i>	<i>7</i>	<i>54</i>	<i>27</i>	<i>27</i>
Total Net New Trips			3,776	246	84	162	380	220	160

*Assumes gross floor area/acreage = 0.25

As shown in Table 1, the proposed development is estimated to generate a potential of up to 246 weekday AM peak hour trips and 380 weekday PM peak hour trips.

To provide a high estimate that would result in a more conservative analysis, the trip generation in Table 1 reflects the commercial property as a general Shopping Center—no further details about the development of this property are known at this time. Also, the trip generation assumes that the civic space will function as a community area, and thus has been estimated to operate as a Recreational Community Center for trip generation estimate purposes. Should the civic space only be available as a private amenity to the residential community (such as a community pool/fitness center), then all trips associated with this land use will be internal to the development, and thus the total net new trips will

¹ The ITE Trip Generation Handbook does not include trip internalization rates for the weekday AM peak hour time period. The weekday midday peak hour trip internalization rates were applied as the best available data.

be lower than what is shown in Table 1. The final TIA will document all assumptions and reflect the revised trip generation accordingly.

The internalization calculations and assumptions are included in Attachment “A” to this memorandum.

Trip Distribution and Assignment

The study area is contained within the Newberg Transportation Planning Model. A select-zone analysis will be used to develop a trip distribution pattern for the proposed site (TAZ 117). Please provide two select zone analyses, one with the Crestview Road connection and one without the Crestview Road connection through the proposed site.

Study Area and Intersections

Based on the estimated trip generation and assignment patterns, the following intersections and accesses are proposed for analysis:

- OR 99W/Springbrook Road
- OR 99W/Brutscher Street
- OR 99W/Vittoria Way
- OR 99W/Providence Drive/Crestview Drive
- OR 99W/Benjamin Road
- Crestview Drive/Site Access
- Springbrook Road/Crestview Drive

Additionally, all accesses to the commercial property and civic property will be analyzed.

Time Periods for Analysis

Existing and estimated build-out year 2020 conditions at the identified study intersections will be analyzed using Synchro/SimTraffic Version 9 software. Turning movement counts at the study intersections will be collected during the morning (6 – 9 AM) and afternoon (3 – 6 PM) periods on a typical mid-week day when school is in session. Additionally, a 16-hour count (6 AM – 10 PM) will be performed at the OR 99W/Providence Drive intersection in support of a potential modified signal design and complete safety analysis.

Based on conversations with ODOT staff, the site is located in an area influenced by both seasonal traffic and school traffic, with the peak travel period occurring in September. Therefore, the counts will be performed between September 12, 2017 and September 21, 2017 per ODOT direction, and no seasonal volume adjustment will be required.

In-process Developments

A two percent annual growth rate will be applied to the existing mainline traffic volumes on OR 99W to generate future background traffic volumes before any trips associated with approved in-process developments are added to the background traffic volumes. We request that City of Newberg and/or ODOT confirm the two percent annual growth rate and provide any other developments to be included as in-process.

Network Traffic Reassignment

The proposed development will result in a major network connection via the southward extension of Crestview Drive to OR 99W. The methodology for reassigning existing traffic to this new connection will be based upon a combination of the Transportation System Plan and the results of the select-zone analysis applying the Newberg Transportation Planning Model.

Queuing Analysis

An analysis of average and 95th-percentile queues will be prepared based on *SimTraffic* microsimulation. The analysis will be based on five simulation runs per intersection and analysis scenario.

Crash Analysis

The most recent five years of reported crash data at the study intersections will be requested from ODOT and reviewed in detail. The ODOT Statewide Priority Index System (SPIS) will also be reviewed to identify any sites where safety issues may encourage further investigation.

Signal Timing

We will obtain the latest signal timing and phasing information for the three signalized study intersections from ODOT:

- OR 99W/Springbrook Road
- OR 99W/Brutscher Street
- OR 99W/Providence Drive

Next Steps

We trust this memorandum provides adequate documentation of the proposed land use action, methodology, and specific study intersections and analysis periods to address in the TIA. We formally request that City of Newberg and ODOT Region 2 provide written confirmation and/or questions

regarding the proposed methodology and project TIA assumptions as soon as possible so that we may proceed with our analysis. If you have any questions, please give us a call at (503) 228-5230.

REFERENCES

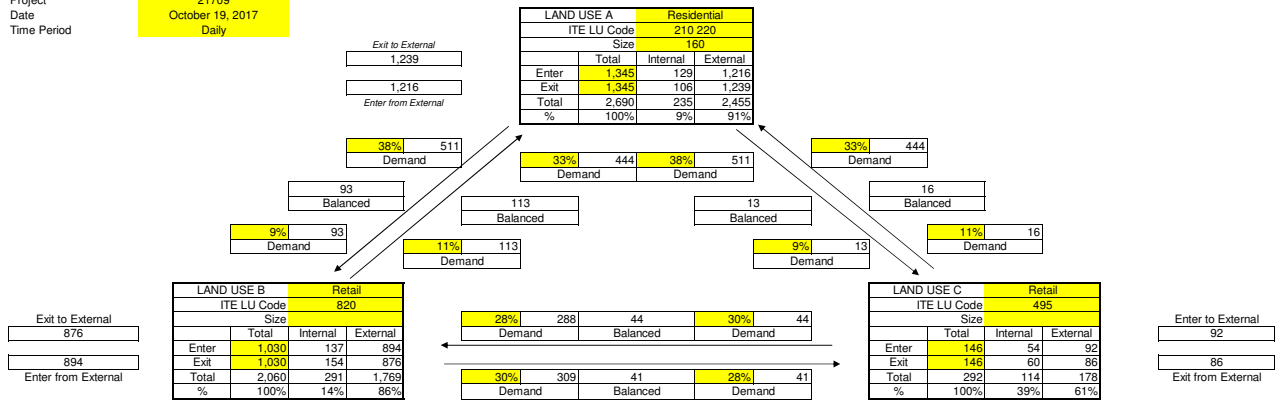
1. Institute of Transportation Engineers. *Trip Generation Manual, 9th Edition*. 2012.
2. Institute of Transportation Engineers. *Trip Generation Handbook, 2nd Edition*. 2004.

ATTACHMENT A

Trip Generation Internalization Calculations

Analyst
Project
Date
Time Period

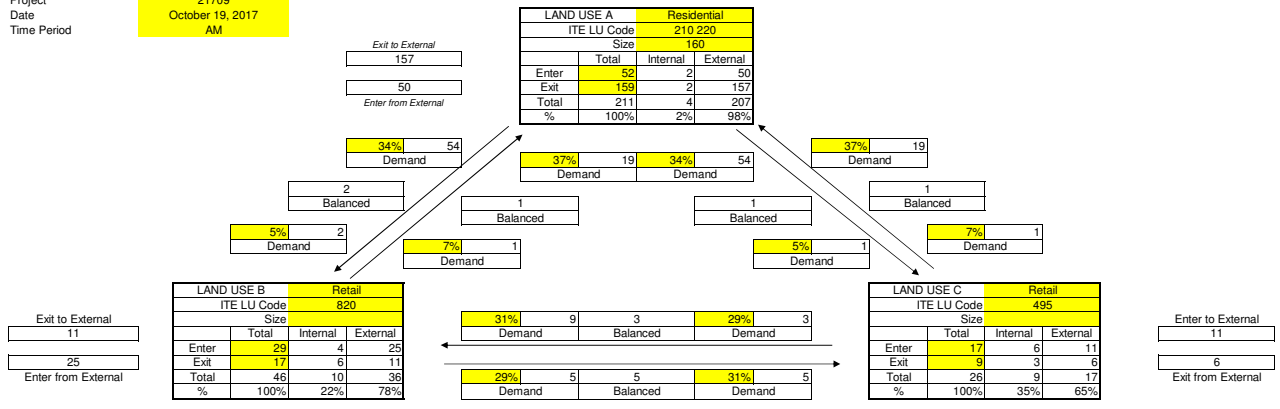
ZHB
21709
October 19, 2017
Daily



NET EXTERNAL TRIPS FOR MULTI-USE DEVELOPMENT				
	LAND USE A	LAND USE B	LAND USE C	TOTAL
Enter	1,216	894	92	2,201
Exit	1,239	876	86	2,201
Total	2,455	1,769	178	4,402
Single-Use Trip Gen Est.	2,690	2,060	292	5,042
				INTERNAL CAPTURE 13%

Analyst
Project
Date
Time Period

ZHB
21709
October 19, 2017
AM

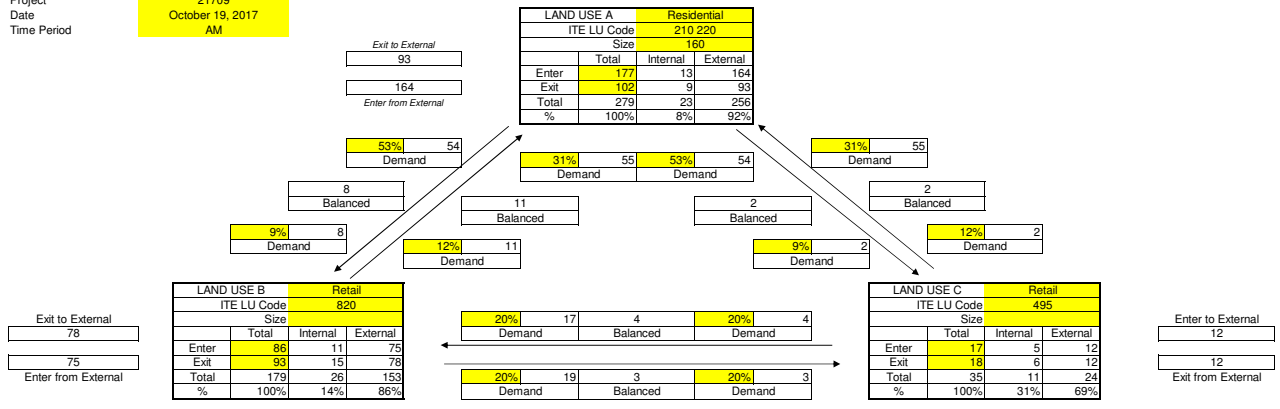


NET EXTERNAL TRIPS FOR MULTI-USE DEVELOPMENT				
	LAND USE A	LAND USE B	LAND USE C	TOTAL
Enter	50	25	11	86
Exit	157	11	6	173
Total	207	36	17	260
Single-Use Trip Gen Est.	211	46	26	283

INTERNAL CAPTURE 8%

Analyst
Project
Date
Time Period

ZHB
21709
October 19, 2017
AM

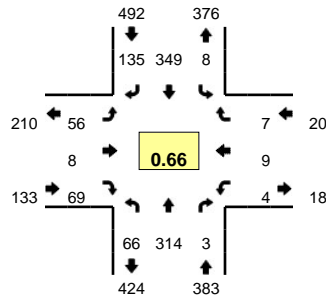


NET EXTERNAL TRIPS FOR MULTI-USE DEVELOPMENT				
	LAND USE A	LAND USE B	LAND USE C	TOTAL
Enter	164	75	12	250
Exit	93	78	12	183
Total	256	153	24	434
Single-Use Trip Gen Est.	279	179	35	493
				INTERNAL CAPTURE
				12%

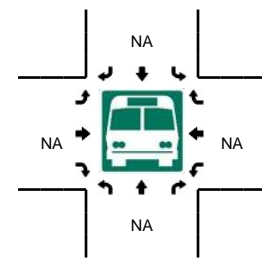
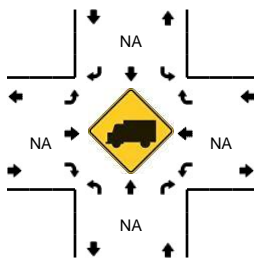
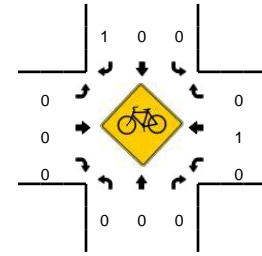
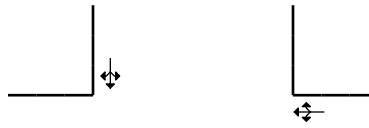
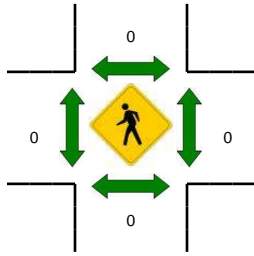
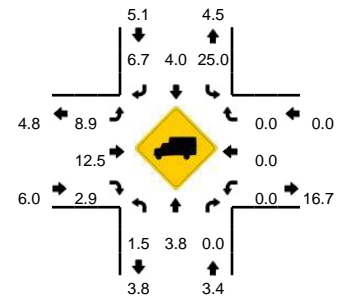
Appendix B
Turning Movement Counts

LOCATION: Springbrook Rd -- Crestview Dr
CITY/STATE: Newberg, OR

QC JOB #: 14505611
DATE: Thu, Sep 14 2017



Peak-Hour: 7:05 AM -- 8:05 AM
Peak 15-Min: 7:20 AM -- 7:35 AM

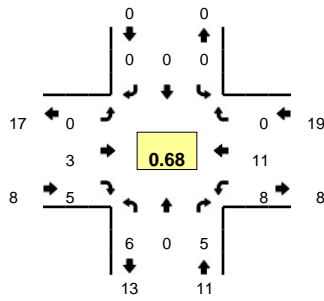


5-Min Count Period Beginning At	Springbrook Rd (Northbound)				Springbrook Rd (Southbound)				Crestview Dr (Eastbound)				Crestview Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:35 AM	0	9	0	0	0	19	2	0	0	0	1	0	0	0	0	0	31	
6:40 AM	1	10	0	0	0	22	5	0	1	0	3	0	0	0	1	0	43	
6:45 AM	0	20	0	0	0	35	5	0	0	0	1	0	0	0	0	0	61	
6:50 AM	0	10	0	0	1	30	12	0	1	0	0	0	0	2	1	0	57	
6:55 AM	0	23	0	0	1	22	9	0	1	1	0	0	0	1	1	0	59	485
7:00 AM	1	13	0	0	1	27	4	0	2	0	0	0	0	1	1	2	52	511
7:05 AM	6	21	1	1	1	23	11	1	3	0	0	0	0	1	0	0	69	558
7:10 AM	5	15	0	0	0	37	14	0	1	0	3	0	0	0	1	1	77	596
7:15 AM	14	16	0	0	1	26	23	0	9	2	6	1	0	0	0	0	98	660
7:20 AM	15	37	1	0	1	26	28	0	7	2	14	0	0	2	0	0	133	758
7:25 AM	10	30	0	0	0	29	26	0	7	3	21	0	0	5	1	0	132	851
7:30 AM	5	39	0	0	0	31	15	0	14	0	19	1	0	0	0	0	124	936
7:35 AM	1	25	1	1	1	30	8	0	8	1	2	0	0	0	1	0	79	984
7:40 AM	1	24	0	0	1	39	1	0	1	0	0	0	0	0	0	0	67	1008
7:45 AM	0	25	0	0	0	28	0	0	1	0	0	0	0	0	1	0	55	1002
7:50 AM	2	23	0	0	0	28	3	0	1	0	2	0	2	1	2	0	64	1009
7:55 AM	5	30	0	0	0	23	5	0	2	0	2	0	0	0	0	0	67	1017
8:00 AM	0	29	0	0	2	29	1	0	0	0	0	0	0	1	0	1	63	1028
8:05 AM	1	24	0	0	0	35	0	0	2	0	1	0	0	0	0	3	66	1025
8:10 AM	0	38	1	0	0	25	4	0	0	0	0	0	0	2	1	4	75	1023
8:15 AM	1	18	0	2	0	28	2	0	0	0	2	0	0	0	0	1	54	979
8:20 AM	2	17	0	0	0	39	1	0	1	0	0	0	2	0	1	0	63	909
8:25 AM	0	8	1	0	0	28	3	0	3	0	1	0	0	0	0	0	44	821
8:30 AM	0	25	0	0	0	22	0	0	2	0	0	0	0	0	0	0	49	746
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	120	424	4	0	4	344	276	0	112	20	216	4	0	28	4	0	1556	
Heavy Trucks	0	12	0	0	0	16	16	0	4	4	8	0	0	0	0	0	60	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

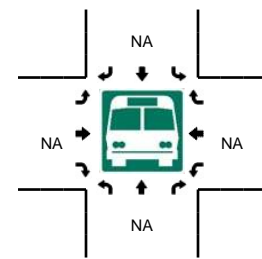
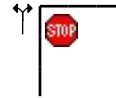
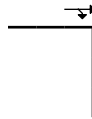
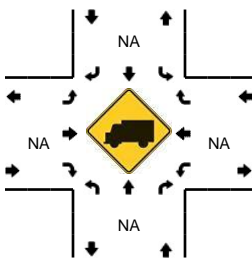
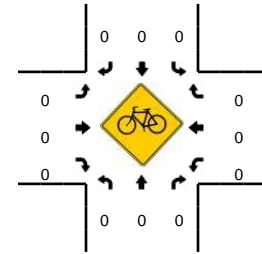
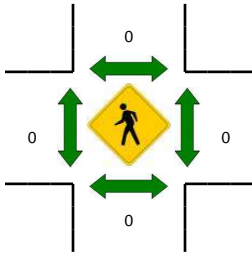
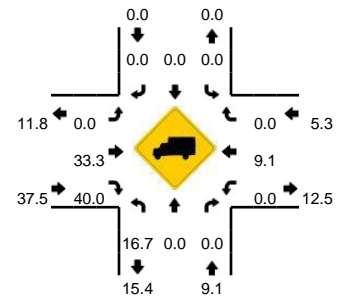
Comments:

LOCATION: N Libra St -- Crestview Dr
CITY/STATE: Newberg, OR

QC JOB #: 14566406
DATE: Wed, Nov 15 2017



Peak-Hour: 8:00 AM -- 9:00 AM
Peak 15-Min: 8:10 AM -- 8:25 AM

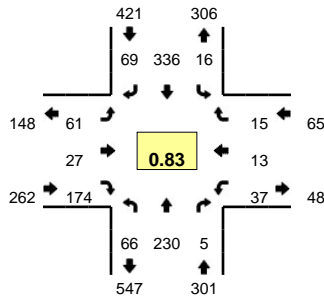


5-Min Count Period Beginning At	N Libra St (Northbound)				N Libra St (Southbound)				Crestview Dr (Eastbound)				Crestview Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	2	0	0	0	0	0	0	0	0	0	1	0	0	3	0	0	6	
7:05 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	3	
7:10 AM	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
7:15 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	3	
7:20 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	
7:25 AM	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	4	
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	3	
7:35 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2	
7:40 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	3	
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	4	
7:50 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
7:55 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	33
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	28
8:05 AM	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	3	28
8:10 AM	4	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	7	33
8:15 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	3	33
8:20 AM	1	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	4	36
8:25 AM	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	2	34
8:30 AM	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	3	34
8:35 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	3	35
8:40 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	33
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	31
8:50 AM	0	0	2	0	0	0	0	0	0	0	1	0	1	1	0	0	5	35
8:55 AM	1	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	4	38
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	20	0	4	0	0	0	0	0	0	4	4	0	4	20	0	0	56	
Heavy Trucks	4	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	8	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

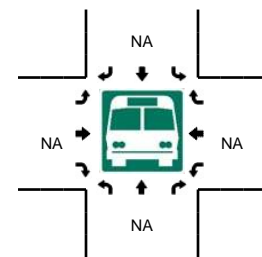
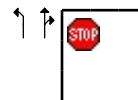
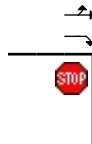
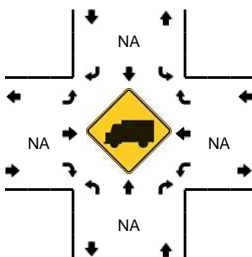
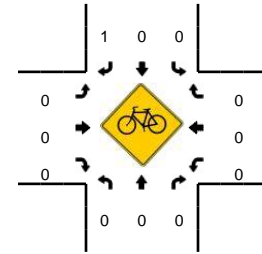
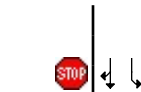
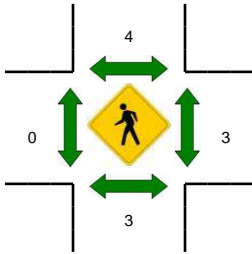
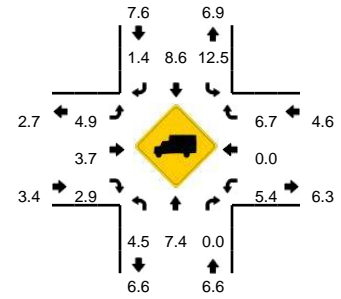
Comments:

LOCATION: N Springbrook Rd -- Haworth Ave
CITY/STATE: Newberg, OR

QC JOB #: 14566404
DATE: Wed, Nov 15 2017



Peak-Hour: 8:00 AM -- 9:00 AM
Peak 15-Min: 8:20 AM -- 8:35 AM

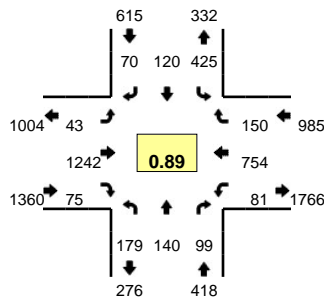


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	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	3	28	0	0	1	17	7	0	15	1	21	0	2	1	0	0	96	
7:05 AM	5	21	0	0	0	24	7	0	10	1	15	0	1	0	0	0	84	
7:10 AM	5	17	0	0	1	26	5	0	4	1	19	0	2	1	2	0	83	
7:15 AM	3	18	0	0	0	30	5	0	11	0	23	0	0	0	0	0	90	
7:20 AM	6	20	1	0	0	24	4	0	8	1	17	0	2	2	1	0	86	
7:25 AM	6	13	0	0	1	26	4	0	7	3	16	0	1	0	0	0	77	
7:30 AM	3	17	0	0	1	22	6	0	10	1	13	0	4	1	2	0	80	
7:35 AM	6	24	0	0	0	31	5	0	5	0	13	0	0	0	1	0	85	
7:40 AM	1	19	2	0	3	24	9	0	6	0	10	0	4	1	1	0	80	
7:45 AM	2	12	0	0	0	19	4	0	5	0	6	0	2	1	2	0	53	
7:50 AM	8	23	0	0	3	16	10	0	9	1	14	0	2	0	0	0	86	
7:55 AM	3	10	1	0	0	28	5	0	0	4	8	0	1	0	0	0	60	960
8:00 AM	5	17	0	0	1	19	5	0	5	0	11	0	3	0	3	0	69	933
8:05 AM	4	24	1	0	1	19	7	0	4	1	11	0	3	0	3	0	78	927
8:10 AM	2	24	0	0	1	23	7	0	5	3	15	0	4	1	1	0	86	930
8:15 AM	6	28	0	0	2	26	3	0	9	4	11	0	0	1	0	0	90	930
8:20 AM	5	28	0	0	1	42	5	0	3	3	11	0	5	2	0	0	105	949
8:25 AM	6	17	0	0	2	36	10	0	9	2	18	0	0	0	0	0	100	972
8:30 AM	9	13	0	0	3	35	11	0	7	3	21	0	4	3	1	0	110	1002
8:35 AM	6	17	0	0	0	40	5	0	2	2	22	0	3	1	1	0	99	1016
8:40 AM	5	14	1	0	1	30	5	0	1	3	19	0	5	1	2	0	87	1023
8:45 AM	7	17	1	0	2	16	6	0	9	2	13	0	4	0	1	0	78	1048
8:50 AM	6	16	0	0	1	18	2	0	1	1	8	0	4	1	1	0	59	1021
8:55 AM	5	15	2	0	1	32	3	0	6	3	14	0	2	3	2	0	88	1049
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	232	0	0	24	452	104	0	76	32	200	0	36	20	4	0	1260	
Heavy Trucks	4	8	0	0	4	36	4	0	0	4	8	0	0	0	0	0	68	
Pedestrians		8				4				0				4			16	
Bicycles	0	0	0		0	0	1		0	0	0		0	0	0		1	
Railroad																		
Stopped Buses																		

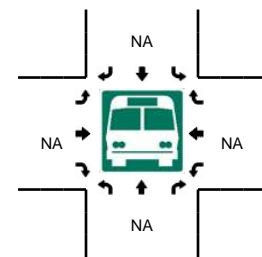
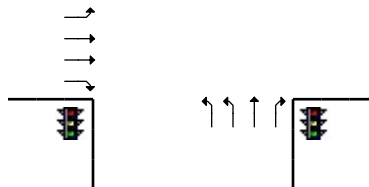
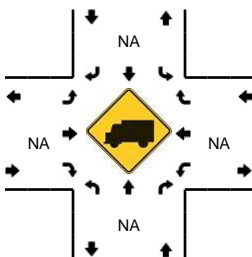
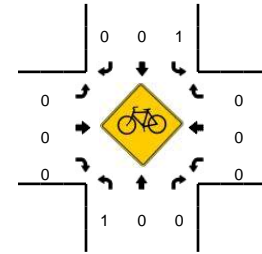
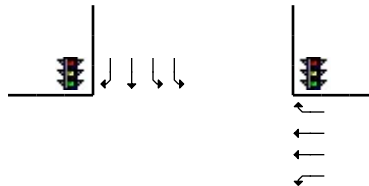
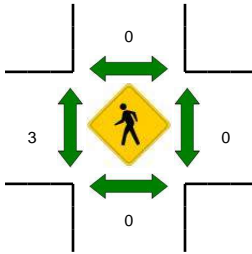
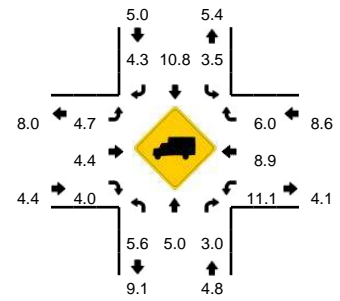
Comments:

LOCATION: N Springbrook Rd -- OR 99W
CITY/STATE: Newberg, OR

QC JOB #: 14505601
DATE: Thu, Sep 14 2017



Peak-Hour: 6:55 AM -- 7:55 AM
Peak 15-Min: 7:20 AM -- 7:35 AM

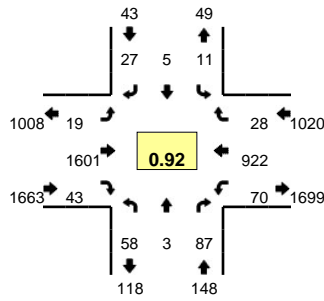


5-Min Count Period Beginning At	N Springbrook Rd (Northbound)				N Springbrook Rd (Southbound)				OR 99W (Eastbound)				OR 99W (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:25 AM	5	2	7	0	27	11	3	0	0	104	3	0	2	32	4	0	200	
6:30 AM	9	4	6	0	27	7	3	0	1	141	6	0	3	39	5	0	251	
6:35 AM	12	4	11	0	43	8	1	0	0	109	3	0	5	50	4	1	251	
6:40 AM	7	5	10	0	26	6	1	0	2	136	2	0	3	42	4	0	244	
6:45 AM	5	7	9	0	23	7	4	0	3	119	0	0	0	63	9	0	249	
6:50 AM	7	9	9	0	44	4	6	0	1	111	1	0	5	52	6	0	255	
6:55 AM	5	9	7	0	36	2	4	0	4	101	5	0	6	49	14	0	242	2665
7:00 AM	6	10	6	0	33	7	9	0	4	112	2	0	4	49	19	0	261	2739
7:05 AM	8	12	7	0	17	10	6	0	3	85	3	0	8	60	12	0	231	2795
7:10 AM	13	16	7	0	42	8	5	0	3	114	5	1	7	51	6	0	278	2858
7:15 AM	14	18	9	0	33	8	9	0	1	103	2	0	7	44	13	0	261	2952
7:20 AM	18	12	7	0	41	13	7	0	3	114	3	0	6	54	11	0	289	3012
7:25 AM	18	17	15	0	31	15	5	0	1	104	15	0	5	87	21	0	334	3146
7:30 AM	20	8	11	0	48	13	7	0	5	108	6	0	5	80	15	0	326	3221
7:35 AM	20	12	11	0	33	17	6	0	6	84	9	0	8	68	10	0	284	3254
7:40 AM	19	9	8	0	48	6	2	0	2	116	12	0	8	65	9	0	304	3314
7:45 AM	18	11	6	0	25	12	5	0	10	90	6	0	9	78	11	0	281	3346
7:50 AM	20	6	5	0	38	9	5	0	0	111	7	0	8	69	9	0	287	3378
7:55 AM	10	16	11	0	17	7	6	0	3	92	11	0	16	74	14	0	277	3413
8:00 AM	13	9	9	0	35	11	9	0	0	65	10	2	10	79	14	0	266	3418
8:05 AM	17	11	9	0	28	5	11	0	3	105	8	0	4	68	11	0	280	3467
8:10 AM	23	27	14	0	22	14	8	0	3	67	8	0	9	82	17	0	294	3483
8:15 AM	25	15	11	0	29	10	5	0	2	97	1	0	4	57	7	0	263	3485
8:20 AM	11	4	8	0	34	20	4	0	5	83	6	0	8	62	8	0	253	3449
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	224	148	132	0	480	164	76	0	36	1304	96	0	64	884	188	0	3796	
Heavy Trucks	16	4	0		12	20	4		4	60	8		0	80	8		216	
Pedestrians		0				0				4				0			4	
Bicycles	1	0	0		1	0	0		0	0	0		0	0	0		2	
Railroad																		
Stopped Buses																		

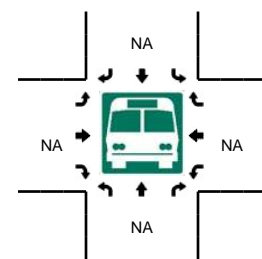
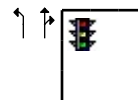
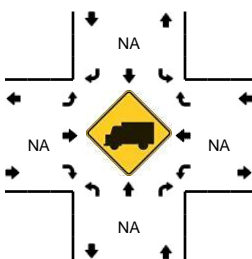
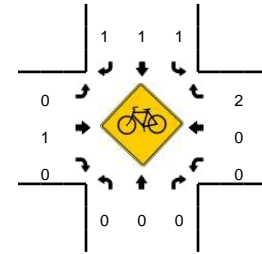
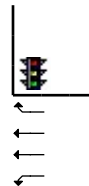
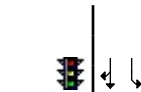
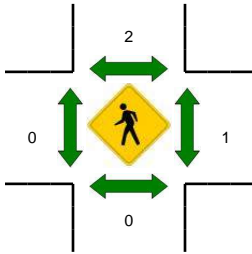
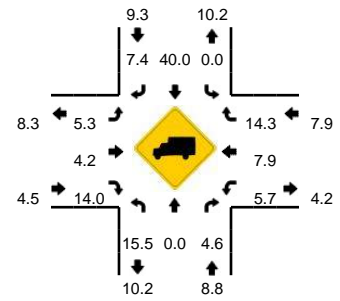
Comments:

LOCATION: Brutscher St -- OR 99W
CITY/STATE: Newberg, OR

QC JOB #: 14505603
DATE: Thu, Sep 14 2017



Peak-Hour: 6:55 AM -- 7:55 AM
Peak 15-Min: 7:25 AM -- 7:40 AM

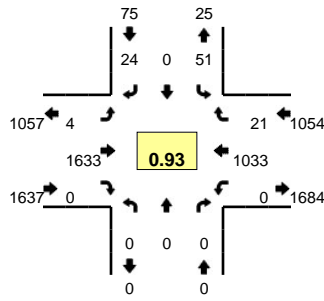


5-Min Count Period Beginning At	Brutscher St (Northbound)				Brutscher St (Southbound)				OR 99W (Eastbound)				OR 99W (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:25 AM	0	0	4	0	0	0	6	0	0	139	1	0	4	36	3	0	193	
6:30 AM	2	0	10	0	0	0	2	0	1	154	3	0	3	50	0	0	225	
6:35 AM	1	0	4	0	1	0	1	0	0	173	1	0	3	48	2	0	234	
6:40 AM	2	1	10	0	1	2	0	0	4	133	1	0	6	51	0	0	211	
6:45 AM	2	1	9	0	2	0	1	0	1	170	1	0	2	66	4	0	259	
6:50 AM	1	2	14	0	4	0	3	0	1	140	5	0	11	59	3	0	243	
6:55 AM	3	0	4	0	1	1	2	0	1	148	3	0	5	73	1	0	242	2513
7:00 AM	3	0	5	0	2	0	1	0	0	126	2	0	7	55	4	0	205	2547
7:05 AM	4	0	12	0	2	0	1	0	1	117	2	0	3	73	2	0	217	2604
7:10 AM	4	0	4	0	1	0	3	0	2	132	1	0	6	64	3	0	220	2643
7:15 AM	4	0	11	0	0	0	3	0	1	158	2	0	10	62	2	0	253	2717
7:20 AM	8	0	3	0	1	1	1	0	1	124	6	0	2	71	1	0	219	2721
7:25 AM	7	0	11	0	0	0	2	0	2	145	7	1	3	94	3	0	275	2803
7:30 AM	6	1	6	0	1	0	2	0	3	128	4	0	9	92	0	0	252	2830
7:35 AM	3	1	6	0	1	2	2	0	0	144	2	0	3	81	6	0	251	2847
7:40 AM	2	0	15	0	1	0	9	0	3	131	6	0	9	65	3	0	244	2880
7:45 AM	7	1	7	0	1	0	1	0	0	137	4	0	3	98	1	0	260	2881
7:50 AM	7	0	3	0	0	1	0	0	4	111	4	0	10	94	2	0	236	2874
7:55 AM	10	2	10	0	4	0	2	0	1	122	5	1	5	78	1	0	241	2873
8:00 AM	10	1	11	0	1	0	2	0	1	83	14	0	9	80	2	0	214	2882
8:05 AM	8	0	6	0	0	1	3	0	1	106	1	0	1	90	4	0	221	2886
8:10 AM	16	2	6	0	0	1	1	0	2	100	5	1	4	80	2	0	220	2886
8:15 AM	6	0	5	0	2	1	2	0	3	93	5	1	15	69	0	0	202	2835
8:20 AM	7	1	9	0	2	0	1	0	1	114	7	1	8	60	0	0	211	2827
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	64	8	92	0	8	8	24	0	20	1668	52	4	60	1068	36	0	3112	
Heavy Trucks	16	0	0		0	0	0		0	40	4		0	92	0		152	
Pedestrians	0				4				0	0			0	4			8	
Bicycles	0	0	0		1	0	0		0	1	0		0	0	1		3	
Railroad																		
Stopped Buses																		

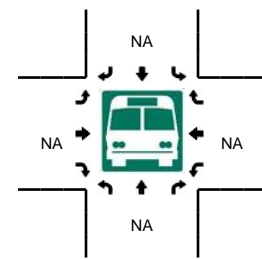
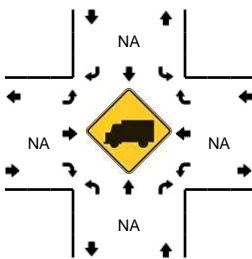
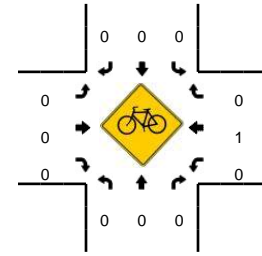
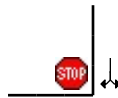
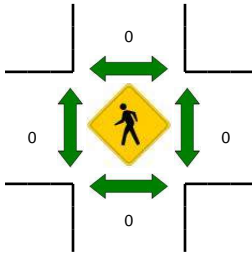
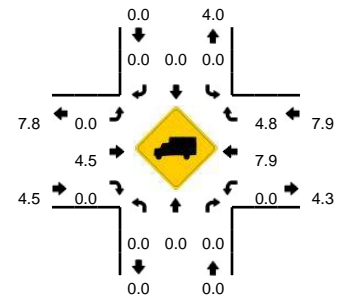
Comments:

LOCATION: Vittoria Way -- OR 99W
CITY/STATE: Newberg, OR

QC JOB #: 14505605
DATE: Thu, Sep 14 2017



Peak-Hour: 6:55 AM -- 7:55 AM
Peak 15-Min: 7:25 AM -- 7:40 AM

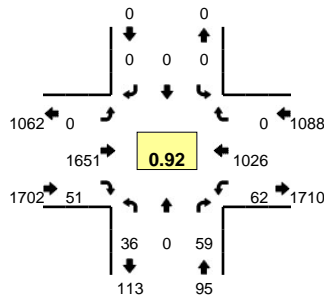


5-Min Count Period Beginning At	Vittoria Way (Northbound)				Vittoria Way (Southbound)				OR 99W (Eastbound)				OR 99W (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:25 AM	0	0	0	0	10	0	0	0	0	155	0	0	0	39	3	0	207	
6:30 AM	0	0	0	0	7	0	2	0	0	141	0	0	0	54	1	0	205	
6:35 AM	0	0	0	0	3	0	2	0	0	182	0	0	0	60	1	0	248	
6:40 AM	0	0	0	0	4	0	1	0	0	126	0	0	0	63	0	0	194	
6:45 AM	0	0	0	0	1	0	3	0	1	180	0	0	0	69	0	0	254	
6:50 AM	0	0	0	0	4	0	3	0	0	131	0	0	0	65	0	0	203	
6:55 AM	0	0	0	0	7	0	1	0	0	156	0	0	0	89	1	0	254	2446
7:00 AM	0	0	0	0	3	0	0	0	0	123	0	0	0	66	2	0	194	2477
7:05 AM	0	0	0	0	6	0	2	0	0	142	0	0	0	76	1	0	227	2532
7:10 AM	0	0	0	0	5	0	3	0	0	125	0	0	0	78	2	0	213	2590
7:15 AM	0	0	0	0	5	0	1	0	1	165	0	0	0	66	0	0	238	2633
7:20 AM	0	0	0	0	6	0	1	0	1	131	0	0	0	72	2	0	213	2650
7:25 AM	0	0	0	0	5	0	3	0	1	133	0	0	0	106	4	0	252	2695
7:30 AM	0	0	0	0	3	0	2	0	0	130	0	0	0	95	2	0	232	2722
7:35 AM	0	0	0	0	3	0	2	0	1	153	0	0	0	97	4	0	260	2734
7:40 AM	0	0	0	0	3	0	1	0	0	130	0	0	0	72	1	0	207	2747
7:45 AM	0	0	0	0	2	0	2	0	0	147	0	0	0	113	1	0	265	2758
7:50 AM	0	0	0	0	3	0	6	0	0	98	0	0	0	103	1	0	211	2766
7:55 AM	0	0	0	0	2	0	1	0	0	124	0	0	0	90	3	0	220	2732
8:00 AM	0	0	0	0	2	0	3	0	3	91	0	0	0	89	1	0	189	2727
8:05 AM	0	0	0	0	1	0	0	0	0	99	0	0	0	80	1	0	181	2681
8:10 AM	0	0	0	0	1	0	0	0	2	95	0	0	0	97	0	0	195	2663
8:15 AM	0	0	0	0	4	0	1	0	1	95	0	0	0	80	2	0	183	2608
8:20 AM	0	0	0	0	1	0	0	0	4	113	0	0	0	81	1	0	200	2595
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	44	0	28	0	8	1664	0	0	0	1192	40	0	2976	
Heavy Trucks	0	0	0	0	0	0	0	0	0	48	0	0	0	104	0	0	152	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
Railroad																		
Stopped Buses																		

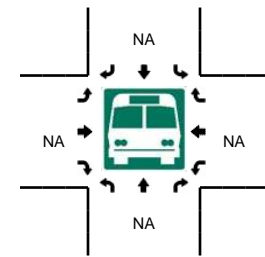
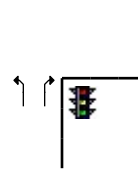
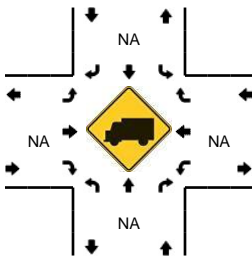
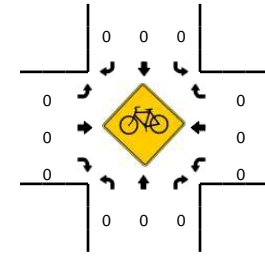
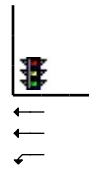
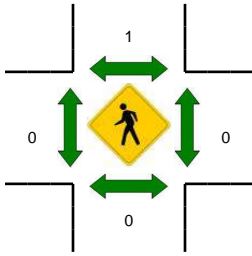
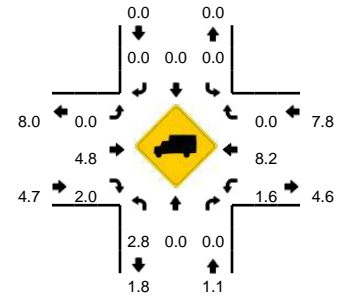
Comments:

LOCATION: Providence Dr -- OR 99W
CITY/STATE: Newberg, OR

QC JOB #: 14505607
DATE: Thu, Sep 14 2017



Peak-Hour: 6:55 AM -- 7:55 AM
Peak 15-Min: 7:25 AM -- 7:40 AM

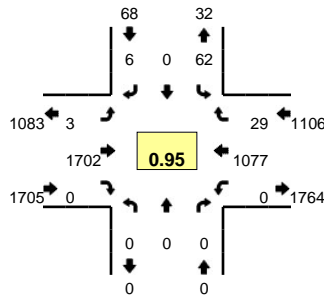


5-Min Count Period Beginning At	Providence Dr (Northbound)				Providence Dr (Southbound)				OR 99W (Eastbound)				OR 99W (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:25 AM	1	0	2	0	0	0	0	0	0	167	3	0	4	42	0	0	219	
6:30 AM	0	0	6	0	0	0	0	0	0	149	3	0	3	53	0	0	214	
6:35 AM	0	0	3	0	0	0	0	0	0	184	6	0	6	64	0	0	263	
6:40 AM	1	0	5	0	0	0	0	0	0	132	2	0	6	60	0	0	206	
6:45 AM	0	0	1	0	0	0	0	0	0	174	6	0	2	69	0	0	252	
6:50 AM	2	0	3	0	0	0	0	0	0	130	4	0	4	63	0	0	206	
6:55 AM	2	0	4	0	0	0	0	0	0	146	4	0	14	86	0	0	256	2501
7:00 AM	1	0	2	0	0	0	0	0	0	132	3	0	6	68	0	0	212	2556
7:05 AM	0	0	3	0	0	0	0	0	0	143	5	0	4	77	0	0	232	2619
7:10 AM	3	0	9	0	0	0	0	0	0	131	2	0	3	80	0	0	228	2677
7:15 AM	2	0	3	0	0	0	0	0	0	164	2	0	3	62	0	0	236	2711
7:20 AM	2	0	10	0	0	0	0	0	0	128	6	0	4	74	0	0	224	2748
7:25 AM	4	0	2	0	0	0	0	0	0	141	4	0	6	106	0	0	263	2792
7:30 AM	6	0	8	0	0	0	0	0	0	126	3	0	7	93	0	0	243	2821
7:35 AM	4	0	6	0	0	0	0	0	0	163	4	0	5	97	0	0	279	2837
7:40 AM	5	0	7	0	0	0	0	0	0	130	6	0	4	71	0	0	223	2854
7:45 AM	4	0	2	0	0	0	0	0	0	150	5	0	6	116	0	0	283	2885
7:50 AM	3	0	3	0	0	0	0	0	0	97	7	0	0	96	0	0	206	2885
7:55 AM	2	0	2	0	0	0	0	0	0	111	14	0	6	98	0	0	233	2862
8:00 AM	1	0	3	0	0	0	0	0	0	81	1	0	5	82	0	0	173	2823
8:05 AM	8	0	3	0	0	0	0	0	0	93	7	0	4	75	0	0	190	2781
8:10 AM	1	0	3	0	0	0	0	0	0	92	5	0	4	96	0	0	201	2754
8:15 AM	2	0	0	0	0	0	0	0	0	91	10	0	3	76	0	0	182	2700
8:20 AM	3	0	1	0	0	0	0	0	0	102	8	0	6	80	0	0	200	2676
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	64	0	0	0	0	0	0	1720	44	0	72	1184	0	0	3140	
Heavy Trucks	0	0	0	0	0	0	0	0	0	52	0	0	4	96	0	0	152	
Pedestrians	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	4	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

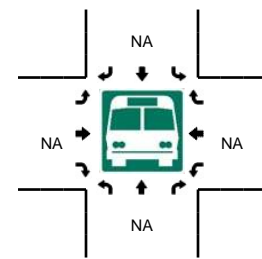
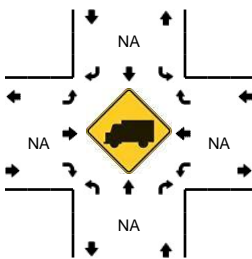
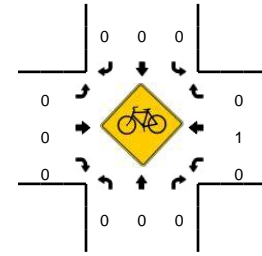
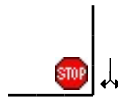
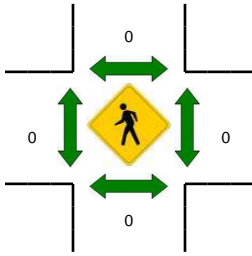
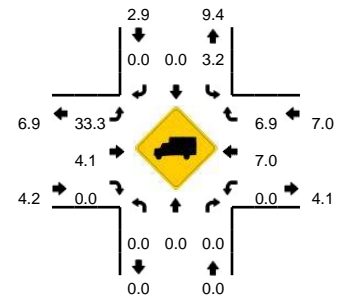
Comments:

LOCATION: NE Benjamin Rd -- OR 99W
CITY/STATE: Newberg, OR

QC JOB #: 14505609
DATE: Thu, Sep 14 2017



Peak-Hour: 6:55 AM -- 7:55 AM
Peak 15-Min: 7:20 AM -- 7:35 AM

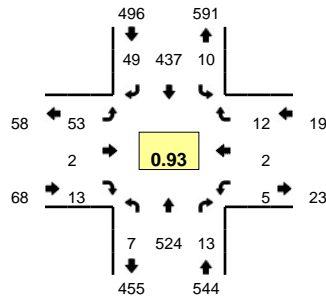


5-Min Count Period Beginning At	NE Benjamin Rd (Northbound)				NE Benjamin Rd (Southbound)				OR 99W (Eastbound)				OR 99W (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:25 AM	0	0	0	0	3	0	2	0	1	155	0	0	0	47	0	0	208	
6:30 AM	0	0	0	0	2	0	0	0	0	160	0	0	0	49	0	0	211	
6:35 AM	0	0	0	0	4	0	0	0	0	180	0	0	0	71	0	0	255	
6:40 AM	0	0	0	0	7	0	0	0	0	156	0	0	0	70	1	0	234	
6:45 AM	0	0	0	0	6	0	0	0	0	170	0	0	0	74	3	0	253	
6:50 AM	0	0	0	0	3	0	1	0	0	141	0	0	0	73	3	0	221	
6:55 AM	0	0	0	0	4	0	1	0	0	127	0	0	0	95	2	0	229	2520
7:00 AM	0	0	0	0	7	0	1	0	0	154	0	0	0	72	2	0	236	2601
7:05 AM	0	0	0	0	7	0	0	0	0	139	0	0	0	77	2	0	225	2650
7:10 AM	0	0	0	0	10	0	0	0	0	145	0	0	0	85	1	0	241	2722
7:15 AM	0	0	0	0	10	0	1	0	1	149	0	0	0	60	1	0	222	2742
7:20 AM	0	0	0	0	1	0	0	0	0	158	0	0	0	95	1	0	255	2790
7:25 AM	0	0	0	0	2	0	0	0	1	126	0	0	0	107	7	0	243	2825
7:30 AM	0	0	0	0	8	0	0	0	0	150	0	0	0	101	1	0	260	2874
7:35 AM	0	0	0	0	3	0	1	0	0	153	0	0	0	86	6	0	249	2868
7:40 AM	0	0	0	0	3	0	1	0	0	152	0	0	0	76	3	0	235	2869
7:45 AM	0	0	0	0	5	0	1	0	1	136	0	0	0	116	2	0	261	2877
7:50 AM	0	0	0	0	2	0	0	0	0	113	0	0	0	107	1	0	223	2879
7:55 AM	0	0	0	0	5	0	0	0	0	106	0	0	0	99	5	0	215	2865
8:00 AM	0	0	0	0	6	0	0	0	0	105	0	0	0	82	4	0	197	2826
8:05 AM	0	0	0	0	1	0	1	0	0	103	0	0	0	82	8	0	195	2796
8:10 AM	0	0	0	0	5	0	1	0	1	81	0	0	0	93	1	0	182	2737
8:15 AM	0	0	0	0	4	0	1	0	0	106	0	0	0	78	4	0	193	2708
8:20 AM	0	0	0	0	1	0	1	0	0	94	0	0	0	93	1	0	190	2643
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	44	0	0	0	4	1736	0	0	0	1212	36	0	3032	
Heavy Trucks	0	0	0	0	0	0	0	0	0	56	0	0	0	80	8	0	144	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
Railroad																		
Stopped Buses																		

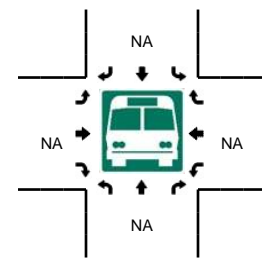
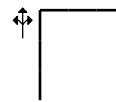
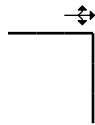
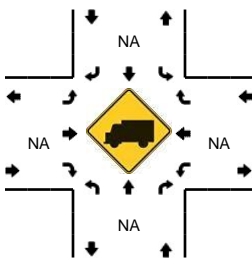
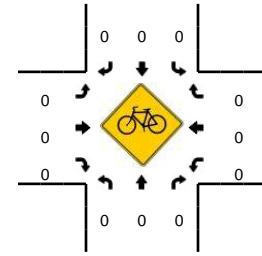
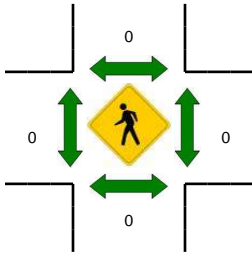
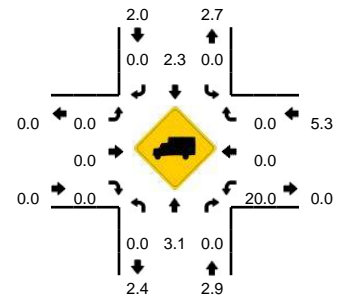
Comments:

LOCATION: Springbrook Rd -- Crestview Dr
CITY/STATE: Newberg, OR

QC JOB #: 14505612
DATE: Thu, Sep 14 2017



Peak-Hour: 4:40 PM -- 5:40 PM
Peak 15-Min: 4:40 PM -- 4:55 PM

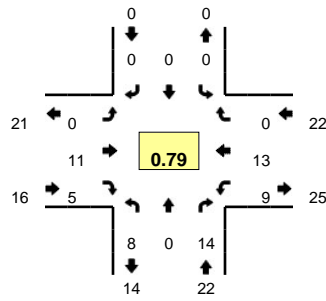


5-Min Count Period Beginning At	Springbrook Rd (Northbound)				Springbrook Rd (Southbound)				Crestview Dr (Eastbound)				Crestview Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	27	0	0	0	40	0	1	4	1	0	0	0	0	0	0	73	913
4:05 PM	1	31	0	0	1	55	3	0	2	0	0	0	1	0	1	0	95	925
4:10 PM	0	34	1	0	1	41	2	0	2	0	1	0	0	0	1	0	83	933
4:15 PM	2	26	2	0	1	35	2	0	0	0	0	0	1	0	1	0	70	923
4:20 PM	1	47	0	0	0	27	3	0	2	0	2	0	0	0	1	0	83	930
4:25 PM	1	36	1	0	0	32	6	0	1	0	0	0	0	0	0	0	77	939
4:30 PM	1	39	0	0	0	32	1	0	2	0	2	0	2	0	2	0	81	942
4:35 PM	1	31	3	0	0	38	4	0	3	0	0	0	2	0	0	0	82	922
4:40 PM	0	39	1	0	0	56	2	1	0	0	0	0	1	0	2	0	102	953
4:45 PM	2	47	1	0	2	40	4	0	2	0	0	0	0	0	2	0	100	986
4:50 PM	0	46	0	0	1	44	8	0	0	0	2	0	0	0	0	0	101	1017
4:55 PM	1	46	3	0	0	30	12	0	6	0	1	0	0	0	1	0	100	1047
5:00 PM	0	44	1	0	0	25	3	0	15	0	3	0	2	0	1	0	94	1068
5:05 PM	2	46	0	0	0	30	6	0	8	0	3	0	1	0	1	0	97	1070
5:10 PM	1	44	2	0	0	37	1	0	8	0	1	0	0	0	1	0	95	1082
5:15 PM	1	46	1	0	0	30	1	0	4	0	0	0	0	2	0	0	85	1097
5:20 PM	0	43	0	0	1	47	4	0	3	0	0	0	0	0	2	0	100	1114
5:25 PM	0	45	1	0	2	29	2	0	1	0	1	0	0	0	0	0	81	1118
5:30 PM	0	31	2	0	0	40	3	1	3	2	2	0	0	0	2	0	86	1123
5:35 PM	0	47	1	0	2	29	3	0	3	0	0	0	1	0	0	0	86	1127
5:40 PM	1	41	0	0	0	33	0	0	1	1	0	0	1	0	0	0	78	1103
5:45 PM	1	29	1	0	1	41	1	0	7	0	0	0	1	0	2	0	84	1087
5:50 PM	3	34	0	0	1	34	2	0	4	0	0	0	2	1	0	0	81	1067
5:55 PM	1	27	0	0	0	37	0	0	0	0	0	0	0	0	0	0	65	1032
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	8	528	8	0	12	560	56	4	8	0	8	0	4	0	16	0	1212	
Heavy Trucks	0	12	0	0	0	8	0	0	0	0	0	0	0	0	0	0	20	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

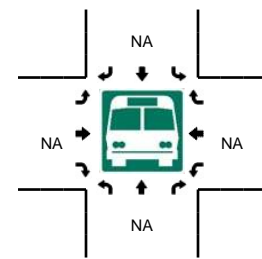
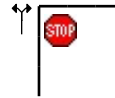
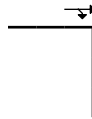
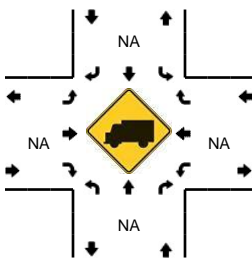
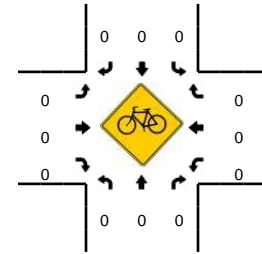
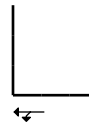
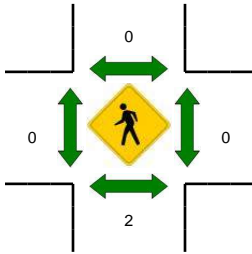
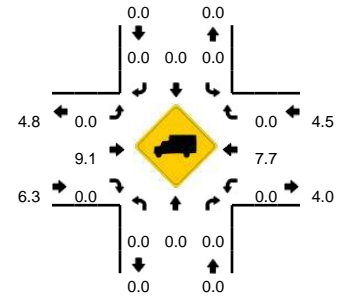
Comments:

LOCATION: N Libra St -- Crestview Dr
CITY/STATE: Newberg, OR

QC JOB #: 14566407
DATE: Wed, Nov 15 2017



Peak-Hour: 3:40 PM -- 4:40 PM
Peak 15-Min: 4:25 PM -- 4:40 PM

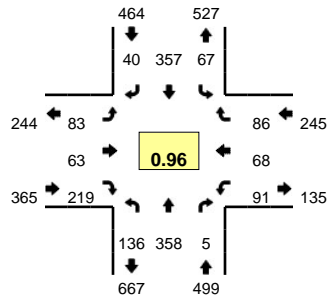


5-Min Count Period Beginning At	N Libra St (Northbound)				N Libra St (Southbound)				Crestview Dr (Eastbound)				Crestview Dr (Westbound)				Total	Hourly Totals	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
3:10 PM	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	3	
3:15 PM	0	0	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	4	
3:20 PM	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
3:25 PM	0	0	0	1	0	0	0	0	0	0	0	1	0	1	1	0	0	4	
3:30 PM	0	0	2	0	0	0	0	0	0	0	1	0	0	0	1	0	0	4	
3:35 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2	
3:40 PM	0	0	1	0	0	0	0	0	0	0	0	1	0	1	1	0	0	4	
3:45 PM	0	0	1	0	0	0	0	0	0	0	2	1	0	0	1	0	0	5	
3:50 PM	0	0	2	0	0	0	0	0	0	0	1	0	0	0	2	0	0	5	
3:55 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	2	1	0	0	5	47
4:00 PM	2	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	4	49
4:05 PM	0	0	0	0	0	0	0	0	0	0	3	0	0	1	1	0	0	5	48
4:10 PM	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	47
4:15 PM	0	0	3	0	0	0	0	0	0	0	1	0	0	1	0	0	0	5	48
4:20 PM	1	0	2	0	0	0	0	0	0	0	2	0	0	1	0	0	0	6	51
4:25 PM	0	0	1	0	0	0	0	0	0	0	1	0	0	0	2	0	0	4	51
4:30 PM	2	0	0	0	0	0	0	0	0	0	1	1	0	1	3	0	0	8	55
4:35 PM	2	0	1	0	0	0	0	0	0	0	0	1	0	2	1	0	0	7	60
4:40 PM	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3	59
4:45 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	56
4:50 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	53
4:55 PM	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	51
5:00 PM	0	0	3	0	0	0	0	0	0	0	3	0	0	0	0	0	0	6	53
5:05 PM	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	50
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	0	8	0	0	0	0	0	0	8	8	0	12	24	0	0	76		
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Railroad																			
Stopped Buses																			

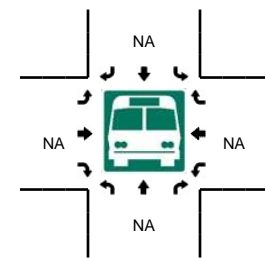
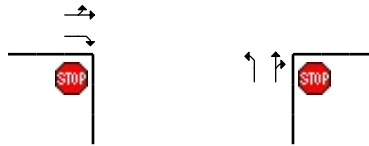
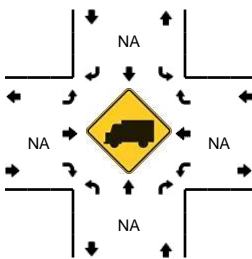
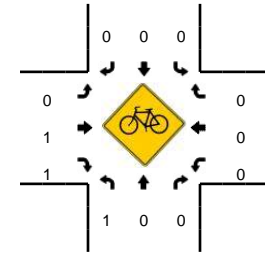
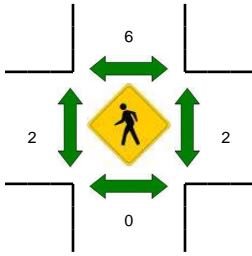
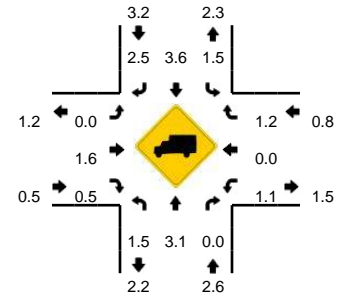
Comments:

LOCATION: N Springbrook Rd -- Haworth Ave
CITY/STATE: Newberg, OR

QC JOB #: 14566405
DATE: Wed, Nov 15 2017



Peak-Hour: 4:20 PM -- 5:20 PM
Peak 15-Min: 4:50 PM -- 5:05 PM

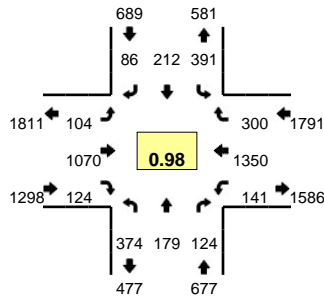


5-Min Count Period Beginning At	N Springbrook Rd (Northbound)				N Springbrook Rd (Southbound)				Haworth Ave (Eastbound)				Haworth Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:50 PM	8	18	1	0	5	30	3	0	5	5	10	0	9	4	7	0	105	
3:55 PM	10	24	0	0	3	28	5	0	10	1	18	0	10	7	4	0	120	1317
4:00 PM	11	21	3	0	2	21	3	0	7	4	11	0	7	2	1	0	93	1309
4:05 PM	14	24	1	0	9	33	5	0	7	5	18	0	7	4	3	0	130	1328
4:10 PM	11	22	2	0	6	31	5	0	7	4	13	0	11	10	5	0	127	1340
4:15 PM	12	25	0	0	6	29	3	0	8	5	11	0	11	7	7	0	124	1359
4:20 PM	8	33	0	0	9	28	5	0	4	9	12	0	6	6	7	0	127	1360
4:25 PM	13	22	1	0	3	33	3	0	5	4	12	0	10	4	1	0	111	1367
4:30 PM	14	30	0	0	4	23	5	0	12	3	18	0	6	8	6	0	129	1380
4:35 PM	12	31	0	0	5	30	4	0	10	4	16	0	9	3	5	0	129	1402
4:40 PM	9	33	2	0	5	28	6	0	5	7	27	0	4	6	10	0	142	1424
4:45 PM	14	22	1	0	3	28	2	0	8	2	18	0	8	7	8	0	121	1458
4:50 PM	12	26	1	0	2	31	5	0	6	4	23	0	12	9	8	0	139	1492
4:55 PM	6	23	0	0	9	34	3	0	9	5	17	0	5	7	7	0	125	1497
5:00 PM	13	29	0	0	6	29	2	0	9	7	23	0	8	8	10	0	144	1548
5:05 PM	13	36	0	0	6	27	0	0	3	4	16	0	6	3	8	0	122	1540
5:10 PM	13	31	0	0	8	31	2	0	6	10	14	0	11	3	6	0	135	1548
5:15 PM	9	42	0	0	7	35	3	0	6	4	23	0	6	4	10	0	149	1573
5:20 PM	19	26	2	0	2	27	3	0	3	5	16	0	10	6	6	0	125	1571
5:25 PM	8	24	0	0	1	29	4	0	7	5	12	0	10	5	6	0	111	1571
5:30 PM	14	20	2	0	3	23	3	0	6	5	7	0	5	7	7	0	102	1544
5:35 PM	18	31	1	0	3	21	3	0	7	5	18	0	4	4	5	0	120	1535
5:40 PM	10	36	2	0	2	16	5	0	3	6	15	0	11	7	5	0	118	1511
5:45 PM	11	24	0	0	2	17	1	0	1	6	5	0	14	3	4	0	88	1478
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	124	312	4	0	68	376	40	0	96	64	252	0	100	96	100	0	1632	
Heavy Trucks	0	16	0	0	0	4	0	0	0	4	4	0	0	0	0	0	28	
Pedestrians		0				8				0				0			8	
Bicycles		0				0				0	1			0			1	
Railroad																		
Stopped Buses																		

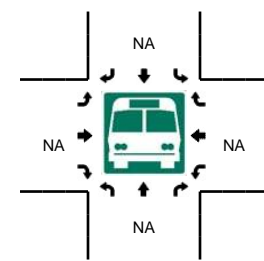
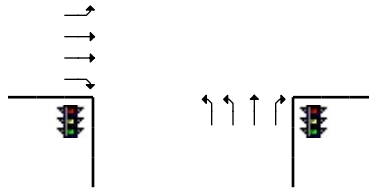
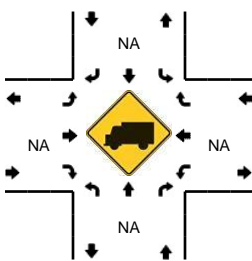
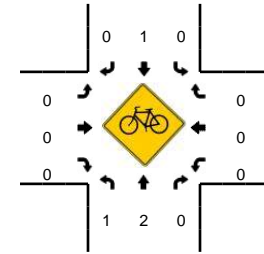
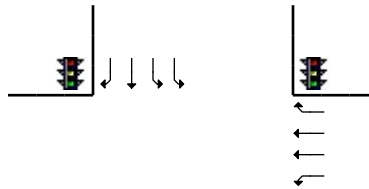
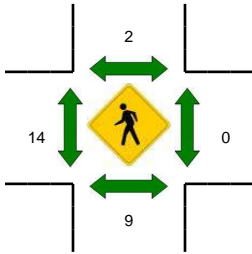
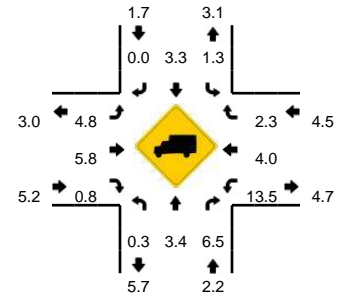
Comments:

LOCATION: N Springbrook Rd -- OR 99W
CITY/STATE: Newberg, OR

QC JOB #: 14505602
DATE: Thu, Sep 14 2017



Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:20 PM -- 5:35 PM

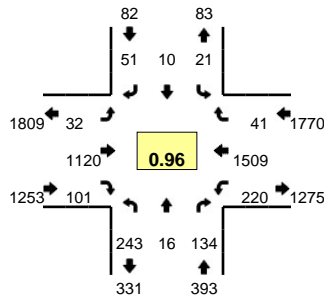


5-Min Count Period Beginning At	N Springbrook Rd (Northbound)				N Springbrook Rd (Southbound)				OR 99W (Eastbound)				OR 99W (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	30	10	12	0	29	9	5	0	12	90	11	0	16	105	20	0	349	4050
4:05 PM	31	12	9	0	20	16	9	0	7	103	12	0	15	114	22	0	370	4104
4:10 PM	25	14	16	0	33	11	7	0	3	90	5	1	8	111	23	0	347	4133
4:15 PM	34	14	10	0	31	10	6	0	7	99	14	1	12	129	21	0	388	4191
4:20 PM	33	18	15	0	28	15	16	0	7	91	10	0	16	115	24	0	388	4241
4:25 PM	27	18	14	0	31	17	8	0	11	93	8	0	17	99	29	0	372	4270
4:30 PM	42	14	13	0	36	8	8	0	12	96	10	0	17	118	15	0	389	4304
4:35 PM	29	13	7	0	27	15	7	0	8	81	5	1	15	133	20	0	361	4307
4:40 PM	33	12	11	0	15	14	12	0	6	93	11	0	15	137	16	0	375	4338
4:45 PM	28	12	12	0	31	20	9	0	10	98	13	0	12	108	28	0	381	4368
4:50 PM	31	15	10	0	24	11	5	0	11	91	16	0	14	123	25	0	376	4432
4:55 PM	35	18	7	0	26	27	6	0	3	89	9	0	11	96	35	0	362	4458
5:00 PM	40	17	16	1	45	16	9	0	8	86	10	0	11	97	23	0	379	4488
5:05 PM	32	16	10	0	38	17	7	0	7	81	5	0	11	85	22	0	331	4449
5:10 PM	32	17	10	0	27	21	4	0	12	84	11	2	21	103	28	0	372	4474
5:15 PM	26	8	7	0	33	14	5	0	5	104	9	0	9	119	26	0	365	4451
5:20 PM	33	12	10	0	29	9	9	0	9	101	9	0	12	140	21	0	394	4457
5:25 PM	31	14	9	0	29	13	6	0	7	73	11	0	9	138	28	0	368	4453
5:30 PM	20	19	12	0	35	32	6	0	12	90	9	0	9	110	24	1	379	4443
5:35 PM	35	17	8	0	43	18	8	0	7	93	14	0	8	118	16	0	385	4467
5:40 PM	30	14	13	0	31	14	12	0	11	80	8	0	13	113	24	0	363	4455
5:45 PM	36	12	11	0	21	12	10	0	9	81	9	1	14	121	21	1	359	4433
5:50 PM	27	16	5	0	26	15	7	0	11	104	14	0	11	136	19	0	391	4448
5:55 PM	28	13	6	0	25	12	10	0	9	102	15	0	11	120	17	0	368	4454
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	336	180	124	0	372	216	84	0	112	1056	116	0	120	1552	292	4	4564	
Heavy Trucks	0	8	8		8	4	0		4	44	0		16	64	0		156	
Pedestrians		4				0				0				0			4	
Bicycles	0	1	0		0	0	0		0	0	0		0	0	0		1	
Railroad																		
Stopped Buses																		

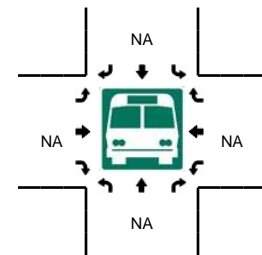
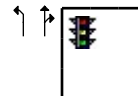
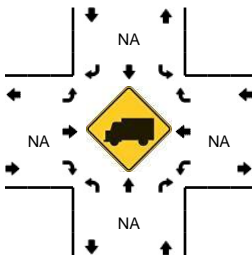
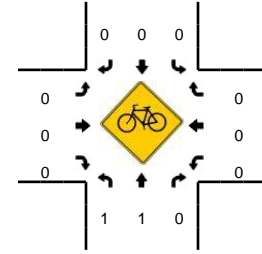
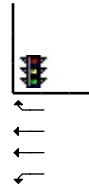
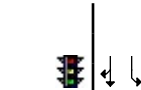
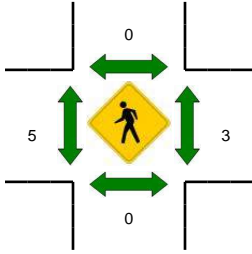
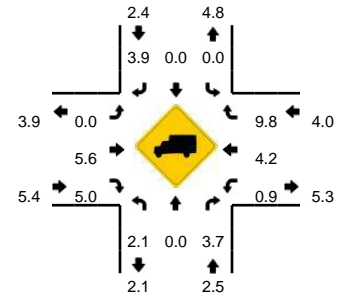
Comments:

LOCATION: Brutscher St -- OR 99W
CITY/STATE: Newberg, OR

QC JOB #: 14505604
DATE: Thu, Sep 14 2017



Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:30 PM -- 5:45 PM

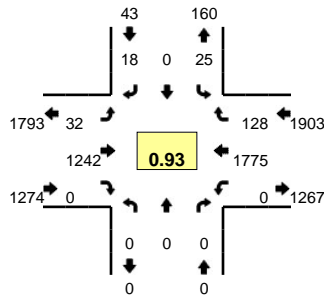


5-Min Count Period Beginning At	Brutscher St (Northbound)				Brutscher St (Southbound)				OR 99W (Eastbound)				OR 99W (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	10	1	15	0	1	4	10	0	0	87	5	1	30	121	3	0	288	3289
4:05 PM	16	4	5	0	0	1	6	0	3	88	7	1	20	120	7	0	278	3283
4:10 PM	25	3	7	0	4	2	5	0	2	91	13	1	16	123	5	0	297	3335
4:15 PM	23	2	5	0	1	1	5	0	1	80	7	1	20	135	3	0	284	3307
4:20 PM	17	2	7	0	1	1	6	0	3	118	7	0	17	138	5	0	322	3368
4:25 PM	24	3	9	0	2	1	3	0	1	101	13	2	12	112	5	0	288	3385
4:30 PM	13	2	10	0	1	1	6	0	1	96	11	1	21	151	5	1	320	3433
4:35 PM	17	1	13	0	0	2	9	0	2	77	11	0	18	135	4	0	289	3462
4:40 PM	13	4	8	0	2	1	4	0	0	78	5	0	18	150	0	0	283	3500
4:45 PM	21	1	7	0	1	1	6	0	3	78	12	0	22	117	4	0	273	3469
4:50 PM	29	5	12	0	1	2	5	0	2	81	10	0	22	118	1	0	288	3501
4:55 PM	22	0	11	0	1	0	6	0	2	118	9	0	13	127	4	0	313	3523
5:00 PM	23	0	12	0	1	1	2	0	3	82	7	0	21	112	6	0	270	3505
5:05 PM	23	2	13	0	5	0	7	0	2	102	5	0	19	99	4	0	281	3508
5:10 PM	19	0	19	0	1	1	6	0	0	92	9	1	21	142	0	0	311	3522
5:15 PM	14	1	15	0	1	0	1	0	3	98	9	0	15	130	4	0	291	3529
5:20 PM	17	1	8	0	4	0	4	0	0	83	7	1	15	124	2	0	266	3473
5:25 PM	19	3	5	0	3	0	2	0	2	94	9	1	18	132	4	0	292	3477
5:30 PM	14	0	9	0	2	0	3	0	2	98	10	2	22	132	1	0	295	3452
5:35 PM	21	1	9	0	0	2	6	0	5	94	7	1	20	139	6	0	311	3474
5:40 PM	21	2	14	0	1	3	3	0	2	100	7	0	12	137	5	0	307	3498
5:45 PM	16	2	12	0	2	3	4	0	0	70	12	0	16	142	4	0	283	3508
5:50 PM	15	1	15	0	0	0	5	0	1	77	9	0	29	124	2	0	278	3498
5:55 PM	26	0	15	0	0	2	5	0	2	86	10	0	7	101	3	0	257	3442
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	224	12	128	0	12	20	48	0	36	1168	96	12	216	1632	48	0	3652	
Heavy Trucks	4	0	0		0	0	4		0	72	4		0	64	8		156	
Pedestrians		0				0				4				0			4	
Bicycles	1	0	0		0	0	0		0	0	0		0	0	0		1	
Railroad																		
Stopped Buses																		

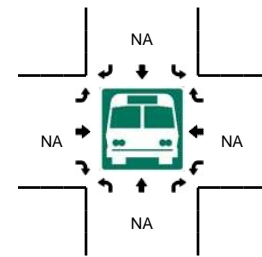
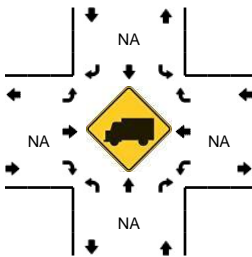
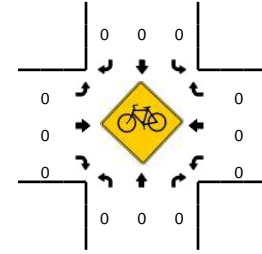
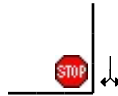
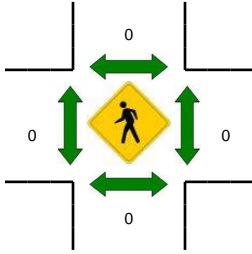
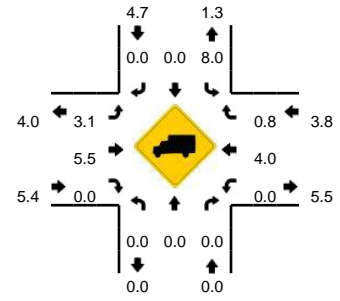
Comments:

LOCATION: Vittoria Way -- OR 99W
CITY/STATE: Newberg, OR

QC JOB #: 14505606
DATE: Thu, Sep 14 2017



Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:30 PM -- 5:45 PM

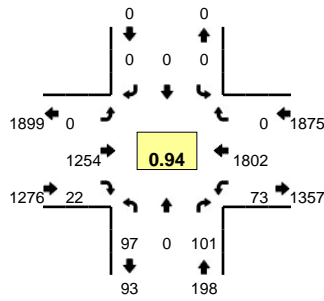


5-Min Count Period Beginning At	Vittoria Way (Northbound)				Vittoria Way (Southbound)				OR 99W (Eastbound)				OR 99W (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	1	0	1	0	2	98	0	0	0	133	5	0	240	2850
4:05 PM	0	0	0	0	0	0	2	0	1	95	0	0	0	140	10	0	248	2876
4:10 PM	0	0	0	0	2	0	2	0	1	103	0	0	0	167	5	0	280	2938
4:15 PM	0	0	0	0	2	0	2	0	1	76	0	0	0	154	3	0	238	2917
4:20 PM	0	0	0	0	1	0	2	0	3	107	0	0	0	144	10	0	267	2937
4:25 PM	0	0	0	0	1	0	0	0	0	117	0	0	0	139	6	0	263	2976
4:30 PM	0	0	0	0	0	0	1	0	2	115	0	0	0	172	11	0	301	3061
4:35 PM	0	0	0	0	2	0	1	0	1	87	0	0	0	147	12	0	250	3071
4:40 PM	0	0	0	0	1	0	0	0	1	91	0	0	0	156	14	0	263	3111
4:45 PM	0	0	0	0	0	0	3	0	0	88	0	0	0	157	10	0	258	3127
4:50 PM	0	0	0	0	2	0	0	0	2	88	0	0	0	148	11	0	251	3134
4:55 PM	0	0	0	0	1	0	1	0	1	107	0	0	0	139	8	0	257	3116
5:00 PM	0	0	0	0	3	0	0	0	1	101	0	0	0	129	15	0	249	3125
5:05 PM	0	0	0	0	0	0	3	0	3	116	0	0	0	134	9	0	265	3142
5:10 PM	0	0	0	0	1	0	0	0	8	112	0	0	0	158	13	0	292	3154
5:15 PM	0	0	0	0	3	0	0	0	4	112	0	0	0	142	10	0	271	3187
5:20 PM	0	0	0	0	4	0	3	0	5	96	0	0	0	146	7	0	261	3181
5:25 PM	0	0	0	0	5	0	2	0	2	84	0	0	0	148	9	0	250	3168
5:30 PM	0	0	0	0	1	0	1	0	2	105	0	0	0	158	14	0	281	3148
5:35 PM	0	0	0	0	3	0	3	0	1	88	0	0	0	176	8	0	279	3177
5:40 PM	0	0	0	0	2	0	2	0	3	145	0	0	0	140	14	0	306	3220
5:45 PM	0	0	0	0	3	0	1	0	1	82	0	0	0	161	7	0	255	3217
5:50 PM	0	0	0	0	1	0	3	0	1	88	0	0	0	151	5	0	249	3215
5:55 PM	0	0	0	0	1	0	0	0	2	94	0	0	0	123	6	0	226	3184
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	24	0	24	0	24	1352	0	0	0	1896	144	0	3464	
Heavy Trucks	0	0	0	0	0	0	0	0	0	72	0	0	0	76	0	0	148	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

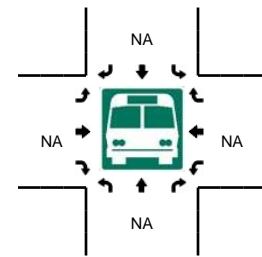
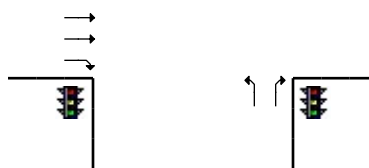
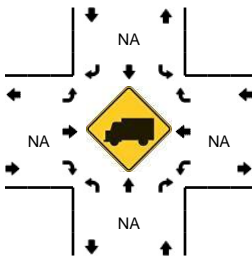
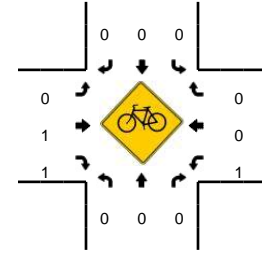
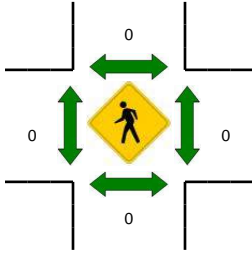
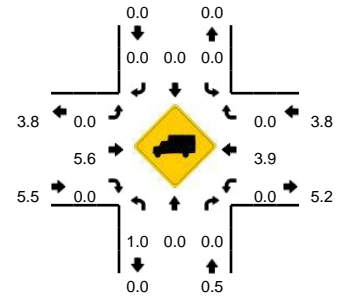
Comments:

LOCATION: Providence Dr -- OR 99W
CITY/STATE: Newberg, OR

QC JOB #: 14505608
DATE: Thu, Sep 14 2017



Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:05 PM -- 5:20 PM

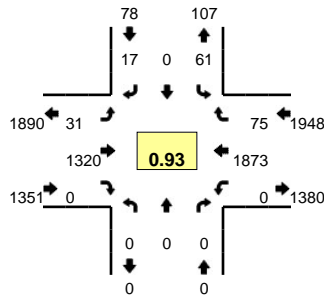


5-Min Count Period Beginning At	Providence Dr (Northbound)				Providence Dr (Southbound)				OR 99W (Eastbound)				OR 99W (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	8	0	2	0	0	0	0	0	0	98	6	0	6	133	0	0	253	2940
4:05 PM	10	0	5	0	0	0	0	0	0	93	4	0	7	137	0	0	256	2965
4:10 PM	22	0	11	0	0	0	0	0	0	101	5	0	7	149	0	0	295	3032
4:15 PM	6	0	5	0	0	0	0	0	0	77	2	0	7	157	0	0	254	3028
4:20 PM	7	0	5	0	0	0	0	0	0	106	0	0	8	140	0	0	266	3033
4:25 PM	7	0	5	0	0	0	0	0	0	117	0	0	2	142	0	0	273	3076
4:30 PM	9	0	9	0	0	0	0	0	0	115	1	0	5	169	0	0	308	3155
4:35 PM	10	0	10	0	0	0	0	0	0	91	2	0	5	154	0	0	272	3173
4:40 PM	11	0	8	0	0	0	0	0	0	92	2	0	6	151	0	0	270	3223
4:45 PM	11	0	4	0	0	0	0	0	0	87	1	0	4	156	0	0	263	3238
4:50 PM	8	0	4	0	0	0	0	0	0	85	2	0	2	153	0	0	254	3242
4:55 PM	6	0	9	0	0	0	0	0	0	105	1	0	7	139	0	0	267	3231
5:00 PM	9	0	4	0	0	0	0	0	0	99	2	0	3	138	0	2	257	3235
5:05 PM	11	0	14	0	0	0	0	0	0	117	1	0	6	132	0	0	281	3260
5:10 PM	5	0	11	0	0	0	0	0	0	121	3	0	9	165	0	0	314	3279
5:15 PM	12	0	16	0	0	0	0	0	0	116	2	0	8	140	0	0	294	3319
5:20 PM	9	0	9	0	0	0	0	0	0	94	4	0	6	142	0	0	264	3317
5:25 PM	6	0	11	0	0	0	0	0	0	93	2	0	6	154	0	0	272	3316
5:30 PM	11	0	2	0	0	0	0	0	0	100	0	0	7	161	0	0	281	3289
5:35 PM	6	0	7	0	0	0	0	0	0	91	1	0	8	173	0	0	286	3303
5:40 PM	3	0	10	0	0	0	0	0	0	146	3	0	5	149	0	0	316	3349
5:45 PM	1	0	2	0	0	0	0	0	0	86	1	0	4	170	0	0	264	3350
5:50 PM	9	0	5	0	0	0	0	0	0	90	1	0	0	146	0	0	251	3347
5:55 PM	5	0	6	0	0	0	0	0	0	91	3	0	7	121	0	0	233	3313
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	112	0	164	0	0	0	0	0	0	1416	24	0	92	1748	0	0	3556	
Heavy Trucks	0	0	0	0	0	0	0	0	0	108	0	0	0	68	0	0	176	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	2	
Railroad																		
Stopped Buses																		

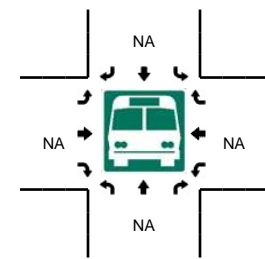
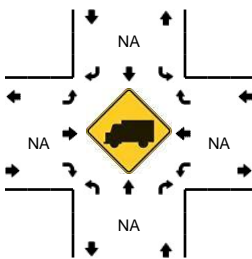
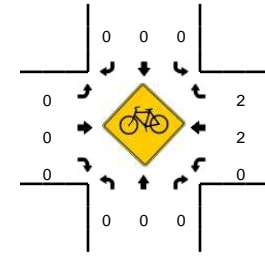
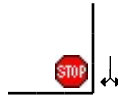
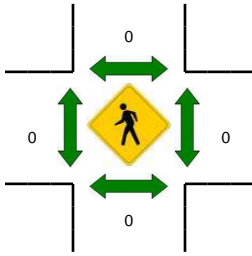
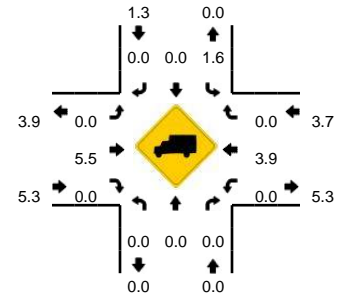
Comments:

LOCATION: NE Benjamin Rd -- OR 99W
CITY/STATE: Newberg, OR

QC JOB #: 14505610
DATE: Thu, Sep 14 2017



Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:10 PM -- 5:25 PM



5-Min Count Period Beginning At	NE Benjamin Rd (Northbound)				NE Benjamin Rd (Southbound)				OR 99W (Eastbound)				OR 99W (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	0	0	1	0	2	105	0	0	0	137	4	0	249	2869
4:05 PM	0	0	0	0	8	0	1	0	1	103	0	0	0	150	11	0	274	2932
4:10 PM	0	0	0	0	3	0	1	0	2	114	0	0	0	151	2	0	273	2975
4:15 PM	0	0	0	0	2	0	1	0	1	82	0	0	0	168	8	0	262	3002
4:20 PM	0	0	0	0	3	0	1	0	1	105	0	0	0	128	7	0	245	2982
4:25 PM	0	0	0	0	1	0	0	0	2	100	0	0	0	160	6	0	269	3025
4:30 PM	0	0	0	0	3	0	0	0	2	126	0	0	0	166	5	0	302	3086
4:35 PM	0	0	0	0	3	0	3	0	0	110	0	0	0	155	6	0	277	3114
4:40 PM	0	0	0	0	5	0	0	0	0	108	0	0	0	164	4	0	281	3171
4:45 PM	0	0	0	0	3	0	1	0	1	92	0	0	0	186	4	0	287	3222
4:50 PM	0	0	0	0	5	0	1	0	3	85	0	0	0	139	1	0	234	3220
4:55 PM	0	0	0	0	5	0	0	0	1	105	0	0	0	131	7	0	249	3202
5:00 PM	0	0	0	0	3	0	6	0	4	106	0	0	0	139	5	0	263	3216
5:05 PM	0	0	0	0	3	0	0	0	3	124	0	0	0	133	4	0	267	3209
5:10 PM	0	0	0	0	6	0	0	0	1	128	0	0	0	178	7	0	320	3256
5:15 PM	0	0	0	0	2	0	1	0	3	137	0	0	0	153	10	0	306	3300
5:20 PM	0	0	0	0	4	0	0	0	6	104	0	0	0	164	8	0	286	3341
5:25 PM	0	0	0	0	5	0	4	0	2	96	0	0	0	168	5	0	280	3352
5:30 PM	0	0	0	0	7	0	2	0	0	97	0	0	0	150	10	0	266	3316
5:35 PM	0	0	0	0	7	0	1	1	3	102	0	0	0	172	8	0	294	3333
5:40 PM	0	0	0	0	10	0	1	0	4	144	0	0	0	160	6	0	325	3377
5:45 PM	0	0	0	0	1	0	2	0	3	78	0	0	0	165	5	0	254	3344
5:50 PM	0	0	0	0	3	0	2	0	1	105	0	0	0	140	3	0	254	3364
5:55 PM	0	0	0	0	1	0	3	0	2	100	0	0	0	133	7	0	246	3361
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	48	0	4	0	40	1476	0	0	0	1980	100	0	3648	
Heavy Trucks	0	0	0	0	0	0	0	0	0	80	0	0	0	84	0	0	164	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	
Railroad																		
Stopped Buses																		

Comments:

Appendix C
Year 2017 Existing Conditions
Level of Service Worksheets

HCS 2010 Roundabouts Report

General Information					Site Information				
Analyst	ZHB				Intersection	Springbrook/Crestview			
Agency or Co.	KAI				E/W Street Name	Crestview Dr			
Date Performed	10/21/2017				N/S Street Name	Springbrook Rd			
Analysis Year	2017				Analysis Time Period (hrs)	0.25			
Time Period	Existing AM				Peak Hour Factor	0.66			
Project Description	Crestview Crossing				Jurisdiction				

Volume Adjustments and Site Characteristics																
Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	2	54	8	69	0	4	9	7	2	64	314	3	1	7	349	135
Percent Heavy Vehicles, %	9	9	13	3	0	0	0	0	2	2	4	0	25	25	4	7
Flow Rate (v _{pce}), pc/h	3	89	14	108	0	6	14	11	3	99	495	5	2	13	550	219
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment													
Approach	EB			WB			NB			SB			
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	
Critical Headway (s)		4.9734			4.9734			4.9734			4.9734		
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087		

Flow Computations, Capacity and v/c Ratios												
Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v _e), pc/h		214			31			602			784	
Entry Volume veh/h		202			31			581			746	
Circulating Flow (v _c), pc/h		574			691			121			125	
Exiting Flow (v _{ex}), pc/h		32			335			597			667	
Capacity (c _{pce}), pc/h		769			682			1220			1215	
Capacity (c), veh/h		724			682			1177			1155	
v/c Ratio (x)		0.28			0.05			0.49			0.65	

Delay and Level of Service												
Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		8.3			5.8			8.5			11.8	
Lane LOS		A			A			A			B	
95% Queue, veh		1.1			0.1			2.8			5.0	
Approach Delay, s/veh		8.3			5.8			8.5			11.8	
Approach LOS		A			A			A			B	
Intersection Delay, s/veh LOS	10.0						A					

HCM Unsignalized Intersection Capacity Analysis

2: Libra St & Crestview Dr

01/12/2018






















Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↶			↷	↶	↷
Traffic Volume (veh/h)	3	5	8	11	6	5
Future Volume (Veh/h)	3	5	8	11	6	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	2%	
Peak Hour Factor	0.68	0.68	0.68	0.68	0.68	0.68
Hourly flow rate (vph)	4	7	12	16	9	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			11		48	8
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			11		48	8
tC, single (s)			4.1		6.6	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.7	3.3
p0 queue free %			99		99	99
cM capacity (veh/h)			1621		919	1081
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	11	28	16			
Volume Left	0	12	9			
Volume Right	7	0	7			
cSH	1700	1621	983			
Volume to Capacity	0.01	0.01	0.02			
Queue Length 95th (ft)	0	1	1			
Control Delay (s)	0.0	3.1	8.7			
Lane LOS		A	A			
Approach Delay (s)	0.0	3.1	8.7			
Approach LOS		A	A			
Intersection Summary						
Average Delay			4.1			
Intersection Capacity Utilization			17.7%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Springbrook Rd & Haworth Ave/Shopping Center

01/12/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	61	27	174	37	13	15	66	230	5	16	336	69
Future Volume (vph)	61	27	174	37	13	15	66	230	5	16	336	69
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	73	33	210	45	16	18	80	277	6	19	405	83
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1	SB 2					
Volume Total (vph)	106	210	79	80	283	19	488					
Volume Left (vph)	73	0	45	80	0	19	0					
Volume Right (vph)	0	210	18	0	6	0	83					
Hadj (s)	0.42	-0.65	0.05	0.58	0.10	0.72	0.01					
Departure Headway (s)	7.7	6.6	7.8	7.3	6.8	7.2	6.5					
Degree Utilization, x	0.23	0.38	0.17	0.16	0.53	0.04	0.88					
Capacity (veh/h)	448	519	423	471	501	480	547					
Control Delay (s)	11.7	12.4	12.4	10.5	16.1	9.3	38.3					
Approach Delay (s)	12.2		12.4	14.9		37.2						
Approach LOS	B		B	B		E						
Intersection Summary												
Delay			23.0									
Level of Service			C									
Intersection Capacity Utilization			48.1%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

4: Springbrook Rd & OR 99W

01/12/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	1242	75	81	754	150	179	140	99	425	120	70
Future Volume (vph)	43	1242	75	81	754	150	179	140	99	425	120	70
Ideal Flow (vphpl)	1750	1750	1750	1750	1800	1750	1750	1750	1750	1750	1750	1750
Grade (%)		0%			0%			3%			0%	
Total Lost time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	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	1.00	1.00	1.00	1.00
Fr _t	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fl _t Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1583	3197	1430	2906	3138	1403	2997	1642	1423	3101	1577	1408
Fl _t Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1583	3197	1430	2906	3138	1403	2997	1642	1423	3101	1577	1408
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	48	1396	84	91	847	169	201	157	111	478	135	79
RTOR Reduction (vph)	0	0	45	0	0	88	0	0	96	0	0	69
Lane Group Flow (vph)	48	1396	39	91	847	81	201	157	15	478	135	10
Confl. Peds. (#/hr)							3					3
Heavy Vehicles (%)	5%	4%	4%	11%	9%	6%	6%	5%	3%	4%	11%	4%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	7.2	55.2	55.2	9.3	57.3	57.3	24.1	16.0	16.0	23.0	14.9	14.9
Effective Green, g (s)	7.2	55.2	55.2	9.3	57.3	57.3	24.1	16.0	16.0	23.0	14.9	14.9
Actuated g/C Ratio	0.06	0.46	0.46	0.08	0.48	0.48	0.20	0.13	0.13	0.19	0.12	0.12
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.3	4.2	4.2	2.3	4.0	4.0	2.3	2.3	2.3	2.3	2.3	2.3
Lane Grp Cap (vph)	94	1470	657	225	1498	669	601	218	189	594	195	174
v/s Ratio Prot	0.03	c0.44		0.03	c0.27		0.07	c0.10		c0.15	0.09	
v/s Ratio Perm			0.03			0.06			0.01			0.01
v/c Ratio	0.51	0.95	0.06	0.40	0.57	0.12	0.33	0.72	0.08	0.80	0.69	0.06
Uniform Delay, d1	54.7	31.1	18.0	52.7	22.4	17.4	41.1	49.9	45.5	46.4	50.4	46.3
Progression Factor	1.00	1.00	1.00	0.95	0.87	1.38	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.9	14.2	0.2	0.6	1.5	0.3	0.2	10.1	0.1	7.5	8.9	0.1
Delay (s)	57.5	45.3	18.2	50.8	21.0	24.3	41.3	59.9	45.6	53.9	59.3	46.4
Level of Service	E	D	B	D	C	C	D	E	D	D	E	D
Approach Delay (s)		44.2			23.9			48.5			54.1	
Approach LOS		D			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			40.6				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			16.5		
Intersection Capacity Utilization			70.4%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Brutscher St & OR 99W

01/12/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	1601	43	70	922	28	58	3	87	11	5	27
Future Volume (vph)	19	1601	43	70	922	28	58	3	87	11	5	27
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		2%			0%			0%			-2%	
Total Lost time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	0.99		1.00	0.99	
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	1.00	0.85	1.00	1.00	0.85	1.00	0.85		1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1567	3165	1265	1568	3079	1273	1433	1408		1678	1361	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.73	1.00		0.56	1.00	
Satd. Flow (perm)	1567	3165	1265	1568	3079	1273	1109	1408		991	1361	
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)	21	1740	47	76	1002	30	63	3	95	12	5	29
RTOR Reduction (vph)	0	0	13	0	0	7	0	86	0	0	26	0
Lane Group Flow (vph)	21	1740	34	76	1002	23	63	12	0	12	8	0
Confl. Peds. (#/hr)	2					2			1	1		
Confl. Bikes (#/hr)			1									1
Heavy Vehicles (%)	5%	4%	14%	6%	8%	14%	16%	0%	5%	0%	40%	7%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4				8
Permitted Phases			2			6	4			8		
Actuated Green, G (s)	3.2	86.6	86.6	9.2	92.6	92.6	11.7	11.7		11.7	11.7	
Effective Green, g (s)	3.2	86.6	86.6	9.2	92.6	92.6	11.7	11.7		11.7	11.7	
Actuated g/C Ratio	0.03	0.72	0.72	0.08	0.77	0.77	0.10	0.10		0.10	0.10	
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.3	4.8	4.8	2.3	4.8	4.8	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	41	2284	912	120	2375	982	108	137		96	132	
v/s Ratio Prot	0.01	c0.55		c0.05	0.33			0.01			0.01	
v/s Ratio Perm			0.03			0.02	c0.06			0.01		
v/c Ratio	0.51	0.76	0.04	0.63	0.42	0.02	0.58	0.09		0.12	0.06	
Uniform Delay, d1	57.6	10.3	4.8	53.8	4.6	3.2	51.8	49.3		49.5	49.2	
Progression Factor	1.29	0.22	0.06	0.96	0.95	0.89	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.1	1.2	0.0	8.1	0.5	0.0	6.5	0.2		0.4	0.1	
Delay (s)	77.7	3.5	0.3	59.9	4.9	2.9	58.3	49.5		49.9	49.3	
Level of Service	E	A	A	E	A	A	E	D		D	D	
Approach Delay (s)		4.3			8.6			53.0			49.5	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

6: OR 99W & Vittoria Way

06/05/2018



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↕↕	↕↕		↵	
Traffic Volume (veh/h)	4	1650	1041	21	52	24
Future Volume (Veh/h)	4	1650	1041	21	52	24
Sign Control		Free	Free		Stop	
Grade		-2%	2%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	4	1774	1119	23	56	26
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage (veh)		2	2			
Upstream signal (ft)			521			
pX, platoon unblocked	0.93				0.93	0.93
vC, conflicting volume	1142				2026	571
vC1, stage 1 conf vol					1130	
vC2, stage 2 conf vol					895	
vCu, unblocked vol	996				1949	380
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	99				76	96
cM capacity (veh/h)	652				231	578
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	4	887	887	746	396	82
Volume Left	4	0	0	0	0	56
Volume Right	0	0	0	0	23	26
cSH	652	1700	1700	1700	1700	286
Volume to Capacity	0.01	0.52	0.52	0.44	0.23	0.29
Queue Length 95th (ft)	0	0	0	0	0	29
Control Delay (s)	10.6	0.0	0.0	0.0	0.0	22.6
Lane LOS	B					C
Approach Delay (s)	0.0			0.0		22.6
Approach LOS						C
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			60.9%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

7: Providence Dr & OR 99W

01/12/2018

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↓	↑↑	↓	↓
Traffic Volume (vph)	1651	51	62	1026	36	59
Future Volume (vph)	1651	51	62	1026	36	59
Ideal Flow (vphpl)	1750	1750	1750	1800	1750	1750
Grade (%)	-3%			2%	3%	
Total Lost time (s)	6.0	6.0	4.5	4.5	4.5	4.5
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Fr _t	1.00	0.85	1.00	1.00	1.00	0.85
Fl _t Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3214	1480	1614	3135	1590	1465
Fl _t Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3214	1480	1614	3135	1590	1465
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1795	55	67	1115	39	64
RTOR Reduction (vph)	0	6	0	0	0	60
Lane Group Flow (vph)	1795	49	67	1115	39	4
Heavy Vehicles (%)	5%	2%	2%	8%	3%	0%
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	87.1	87.1	9.8	102.9	8.1	8.1
Effective Green, g (s)	87.1	87.1	9.8	102.9	8.1	8.1
Actuated g/C Ratio	0.73	0.73	0.08	0.86	0.07	0.07
Clearance Time (s)	6.0	6.0	4.5	4.5	4.5	4.5
Vehicle Extension (s)	5.0	5.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	2332	1074	131	2688	107	98
v/s Ratio Prot	c0.56		c0.04	0.36	c0.02	
v/s Ratio Perm		0.03				0.00
v/c Ratio	0.77	0.05	0.51	0.41	0.36	0.04
Uniform Delay, d ₁	10.2	4.7	52.8	1.9	53.5	52.3
Progression Factor	1.30	0.61	1.00	1.00	1.00	1.00
Incremental Delay, d ₂	1.8	0.1	4.4	0.5	2.9	0.3
Delay (s)	15.1	2.9	57.2	2.4	56.4	52.6
Level of Service	B	A	E	A	E	D
Approach Delay (s)	14.7			5.5	54.0	
Approach LOS	B			A	D	
Intersection Summary						
HCM 2000 Control Delay			12.5		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.71			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	15.0
Intersection Capacity Utilization			67.6%		ICU Level of Service	C
Analysis Period (min)			15			

c Critical Lane Group

Intersection

Int Delay, s/veh 0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↖↗		↖	
Traffic Vol, veh/h	3	1702	1077	29	62	6
Future Vol, veh/h	3	1702	1077	29	62	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	250	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	-2	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	33	4	7	7	3	0
Mvmt Flow	3	1792	1134	31	65	6

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1164	0	582
Stage 1	-	-	1149
Stage 2	-	-	902
Critical Hdwy	4.76	-	6.7
Critical Hdwy Stg 1	-	-	5.46
Critical Hdwy Stg 2	-	-	5.46
Follow-up Hdwy	2.53	-	3.3
Pot Cap-1 Maneuver	447	-	477
Stage 1	-	-	298
Stage 2	-	-	391
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	447	-	477
Mov Cap-2 Maneuver	-	-	181
Stage 1	-	-	298
Stage 2	-	-	388

Approach	EB	WB	SB
HCM Control Delay, s	0	0	34.7
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	447	-	-	-	191
HCM Lane V/C Ratio	0.007	-	-	-	0.375
HCM Control Delay (s)	13.1	-	-	-	34.7
HCM Lane LOS	B	-	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	1.6

Notes

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

HCS 2010 Roundabouts Report

General Information					Site Information				
Analyst	ZHB				Intersection	Springbrook/Crestview			
Agency or Co.	KAI				E/W Street Name	Crestview Dr			
Date Performed	10/21/2017				N/S Street Name	Springbrook Rd			
Analysis Year	2017				Analysis Time Period (hrs)	0.25			
Time Period	Existing PM				Peak Hour Factor	0.93			
Project Description	Crestview Crossing				Jurisdiction				

Volume Adjustments and Site Characteristics																
Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	53	2	13	0	5	2	12	0	7	524	13	2	8	437	49
Percent Heavy Vehicles, %	0	0	0	0	20	20	0	0	0	0	3	0	0	0	2	0
Flow Rate (v _{pce}), pc/h	0	57	2	14	0	6	2	13	0	8	580	14	2	9	479	53
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment													
Approach	EB			WB			NB			SB			
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	
Critical Headway (s)		4.9734			4.9734			4.9734			4.9734		
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087		

Flow Computations, Capacity and v/c Ratios												
Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v _e), pc/h		73			21			602			543	
Entry Volume veh/h		73			20			585			534	
Circulating Flow (v _c), pc/h		496			647			70			16	
Exiting Flow (v _{ex}), pc/h		25			63			652			499	
Capacity (c _{pce}), pc/h		832			714			1285			1358	
Capacity (c), veh/h		832			680			1249			1334	
v/c Ratio (x)		0.09			0.03			0.47			0.40	

Delay and Level of Service												
Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		5.2			5.6			7.7			6.5	
Lane LOS		A			A			A			A	
95% Queue, veh		0.3			0.1			2.6			2.0	
Approach Delay, s/veh		5.2			5.6			7.7			6.5	
Approach LOS		A			A			A			A	
Intersection Delay, s/veh LOS	7.0						A					

HCM Unsignalized Intersection Capacity Analysis

2: Libra St & Crestview Dr

12/21/2017



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↶			↷	↶	↷
Traffic Volume (veh/h)	11	5	9	13	8	14
Future Volume (Veh/h)	11	5	9	13	8	14
Sign Control	Free			Free	Stop	
Grade	0%			0%	2%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	14	6	11	16	10	18
Pedestrians						2
Lane Width (ft)						12.0
Walking Speed (ft/s)						3.5
Percent Blockage						0
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			22		57	19
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			22		57	19
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		99	98
cM capacity (veh/h)			1604		947	1063




















Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	20	27	28
Volume Left	0	11	10
Volume Right	6	0	18
cSH	1700	1604	1018
Volume to Capacity	0.01	0.01	0.03
Queue Length 95th (ft)	0	1	2
Control Delay (s)	0.0	3.0	8.6
Lane LOS		A	A
Approach Delay (s)	0.0	3.0	8.6
Approach LOS			A

Intersection Summary			
Average Delay		4.3	
Intersection Capacity Utilization	17.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis

3: Springbrook Rd & Haworth Ave/Shopping Center

12/21/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	83	63	219	91	68	86	136	358	5	67	357	40
Future Volume (vph)	83	63	219	91	68	86	136	358	5	67	357	40
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	86	66	228	95	71	90	142	373	5	70	372	42
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1	SB 2					
Volume Total (vph)	152	228	256	142	378	70	414					
Volume Left (vph)	86	0	95	142	0	70	0					
Volume Right (vph)	0	228	90	0	5	0	42					
Hadj (s)	0.30	-0.68	-0.12	0.53	0.04	0.53	0.00					
Departure Headway (s)	9.0	8.0	8.6	8.8	8.3	8.8	8.2					
Degree Utilization, x	0.38	0.51	0.61	0.35	0.87	0.17	0.95					
Capacity (veh/h)	379	428	395	398	426	399	426					
Control Delay (s)	16.3	17.9	24.4	15.2	44.9	12.4	58.4					
Approach Delay (s)	17.3		24.4	36.8		51.8						
Approach LOS	C		C	E		F						






























Intersection Summary

Delay	34.8
Level of Service	D
Intersection Capacity Utilization	59.5%
ICU Level of Service	B
Analysis Period (min)	15

HCM Signalized Intersection Capacity Analysis

4: Springbrook Rd & OR 99W

12/21/2017
























												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 		 	 		 			 		
Traffic Volume (vph)	104	1070	124	141	1350	300	374	179	124	391	212	86
Future Volume (vph)	104	1070	124	141	1350	300	374	179	124	391	212	86
Ideal Flow (vphpl)	1750	1750	1750	1750	1800	1750	1750	1750	1750	1750	1750	1750
Grade (%)		0%			0%			3%			0%	
Total Lost time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr t	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fl t Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1583	3137	1440	2854	3288	1423	3177	1674	1361	3193	1699	1438
Fl t Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1583	3137	1440	2854	3288	1423	3177	1674	1361	3193	1699	1438
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	106	1092	127	144	1378	306	382	183	127	399	216	88
RTOR Reduction (vph)	0	0	56	0	0	138	0	0	111	0	0	76
Lane Group Flow (vph)	106	1092	71	144	1378	168	382	183	16	399	216	12
Confl. Peds. (#/hr)	2		9	9		2	14					14
Confl. Bikes (#/hr)									2			1
Heavy Vehicles (%)	5%	6%	1%	13%	4%	2%	0%	3%	6%	1%	3%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	12.5	77.8	77.8	11.7	77.0	77.0	15.1	17.7	17.7	16.3	18.9	18.9
Effective Green, g (s)	12.5	77.8	77.8	11.7	77.0	77.0	15.1	17.7	17.7	16.3	18.9	18.9
Actuated g/C Ratio	0.09	0.56	0.56	0.08	0.55	0.55	0.11	0.13	0.13	0.12	0.13	0.13
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.3	4.2	4.2	2.3	4.0	4.0	2.3	2.3	2.3	2.3	2.3	2.3
Lane Grp Cap (vph)	141	1743	800	238	1808	782	342	211	172	371	229	194
v/s Ratio Prot	c0.07	0.35		0.05	c0.42		0.12	0.11		c0.12	c0.13	
v/s Ratio Perm			0.05			0.12			0.01			0.01
v/c Ratio	0.75	0.63	0.09	0.61	0.76	0.22	1.12	0.87	0.09	1.08	0.94	0.06
Uniform Delay, d1	62.2	21.2	14.5	61.9	24.4	16.1	62.5	60.0	54.1	61.9	60.0	52.8
Progression Factor	1.00	1.00	1.00	0.96	1.16	3.14	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	18.7	1.7	0.2	2.2	2.0	0.4	84.1	28.6	0.1	68.3	43.5	0.1
Delay (s)	80.9	22.9	14.7	61.6	30.2	50.9	146.5	88.6	54.2	130.2	103.5	52.9
Level of Service	F	C	B	E	C	D	F	F	D	F	F	D
Approach Delay (s)		26.8			36.2			114.3			112.3	
Approach LOS		C			D			F			F	
Intersection Summary												
HCM 2000 Control Delay			57.1				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			16.5		
Intersection Capacity Utilization			87.6%				ICU Level of Service			E		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

5: Brutscher St & OR 99W

12/21/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	1120	101	220	1509	41	243	16	134	21	10	51
Future Volume (vph)	32	1120	101	220	1509	41	243	16	134	21	10	51
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		2%			0%			0%			-2%	
Total Lost time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	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	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87		1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1646	3105	1402	1646	3197	1352	1620	1442		1674	1471	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.72	1.00		0.52	1.00	
Satd. Flow (perm)	1646	3105	1402	1646	3197	1352	1221	1442		911	1471	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	33	1167	105	229	1572	43	253	17	140	22	10	53
RTOR Reduction (vph)	0	0	40	0	0	13	0	110	0	0	42	0
Lane Group Flow (vph)	33	1167	65	229	1572	30	253	47	0	22	21	0
Confl. Peds. (#/hr)							5		3	3		5
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	6%	5%	1%	4%	10%	2%	0%	4%	0%	0%	4%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4				8
Permitted Phases			2			6	4			8		
Actuated Green, G (s)	5.4	74.9	74.9	22.3	91.8	91.8	30.3	30.3		30.3	30.3	
Effective Green, g (s)	5.4	74.9	74.9	22.3	91.8	91.8	30.3	30.3		30.3	30.3	
Actuated g/C Ratio	0.04	0.54	0.54	0.16	0.66	0.66	0.22	0.22		0.22	0.22	
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.3	4.8	4.8	2.3	4.8	4.8	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	63	1661	750	262	2096	886	264	312		197	318	
v/s Ratio Prot	0.02	c0.38		c0.14	c0.49			0.03				0.01
v/s Ratio Perm			0.05			0.02	c0.21			0.02		
v/c Ratio	0.52	0.70	0.09	0.87	0.75	0.03	0.96	0.15		0.11	0.07	
Uniform Delay, d1	66.0	24.3	15.9	57.5	16.3	8.5	54.2	44.4		44.0	43.6	
Progression Factor	0.81	1.07	1.81	0.95	0.80	0.29	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.4	1.7	0.2	19.9	1.8	0.1	43.5	0.2		0.2	0.1	
Delay (s)	57.2	27.7	28.8	74.5	14.9	2.5	97.7	44.6		44.2	43.7	
Level of Service	E	C	C	E	B	A	F	D		D	D	
Approach Delay (s)		28.6			22.0			77.4			43.8	
Approach LOS		C			C			E			D	

Intersection Summary

HCM 2000 Control Delay	31.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

6: OR 99W & Vittoria Way

06/05/2018



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	32	1250	1775	128	26	18
Future Volume (Veh/h)	32	1250	1775	128	26	18
Sign Control		Free	Free		Stop	
Grade		-2%	2%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	34	1344	1909	138	28	19
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage (veh)		2	2			
Upstream signal (ft)			522			
pX, platoon unblocked	0.72				0.72	0.72
vC, conflicting volume	2047				2718	1024
vC1, stage 1 conf vol					1978	
vC2, stage 2 conf vol					740	
vCu, unblocked vol	1672				2607	246
tC, single (s)	4.2				7.0	6.9
tC, 2 stage (s)					6.0	
tF (s)	2.2				3.6	3.3
p0 queue free %	87				71	97
cM capacity (veh/h)	269				98	546
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	34	672	672	1273	774	47
Volume Left	34	0	0	0	0	28
Volume Right	0	0	0	0	138	19
cSH	269	1700	1700	1700	1700	146
Volume to Capacity	0.13	0.40	0.40	0.75	0.46	0.32
Queue Length 95th (ft)	11	0	0	0	0	32
Control Delay (s)	20.3	0.0	0.0	0.0	0.0	40.8
Lane LOS	C					E
Approach Delay (s)	0.5			0.0		40.8
Approach LOS						E
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			67.7%		ICU Level of Service	C
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
 7: Providence Dr & OR 99W

12/21/2017

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↓	↑↑	↓	↓
Traffic Volume (vph)	1254	22	73	1806	97	101
Future Volume (vph)	1254	22	73	1806	97	101
Ideal Flow (vphpl)	1750	1750	1750	1800	1750	1750
Grade (%)	-3%			2%	3%	
Total Lost time (s)	6.0	6.0	4.5	4.5	4.5	4.5
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.98	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3184	1479	1646	3256	1621	1465
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3184	1479	1646	3256	1621	1465
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	1334	23	78	1921	103	107
RTOR Reduction (vph)	0	3	0	0	0	95
Lane Group Flow (vph)	1334	20	78	1921	103	12
Confl. Bikes (#/hr)		1				
Heavy Vehicles (%)	6%	0%	0%	4%	1%	0%
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	96.9	96.9	12.9	115.8	15.2	15.2
Effective Green, g (s)	96.9	96.9	12.9	115.8	15.2	15.2
Actuated g/C Ratio	0.69	0.69	0.09	0.83	0.11	0.11
Clearance Time (s)	6.0	6.0	4.5	4.5	4.5	4.5
Vehicle Extension (s)	5.0	5.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	2203	1023	151	2693	175	159
v/s Ratio Prot	0.42		0.05	c0.59	c0.06	
v/s Ratio Perm		0.01				0.01
v/c Ratio	0.61	0.02	0.52	0.71	0.59	0.07
Uniform Delay, d1	11.4	6.7	60.6	5.1	59.4	56.1
Progression Factor	0.79	1.03	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	0.0	3.9	1.6	5.9	0.3
Delay (s)	10.0	7.0	64.5	6.7	65.3	56.3
Level of Service	B	A	E	A	E	E
Approach Delay (s)	10.0			9.0	60.7	
Approach LOS	A			A	E	
Intersection Summary						
HCM 2000 Control Delay			12.4		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.73			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	15.0
Intersection Capacity Utilization			66.0%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Intersection

Int Delay, s/veh 3.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↖		↖	
Traffic Vol, veh/h	31	1320	1873	75	61	17
Future Vol, veh/h	31	1320	1873	75	61	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	250	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	-2	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	5	4	0	2	0
Mvmt Flow	33	1419	2014	81	66	18

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	2095	0	2830
Stage 1	-	-	2054
Stage 2	-	-	776
Critical Hdwy	4.1	-	6.44
Critical Hdwy Stg 1	-	-	5.44
Critical Hdwy Stg 2	-	-	5.44
Follow-up Hdwy	2.2	-	3.52
Pot Cap-1 Maneuver	267	-	~ 19
Stage 1	-	-	106
Stage 2	-	-	452
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	267	-	~ 17
Mov Cap-2 Maneuver	-	-	81
Stage 1	-	-	106
Stage 2	-	-	396

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	142
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	267	-	-	-	95
HCM Lane V/C Ratio	0.125	-	-	-	0.883
HCM Control Delay (s)	20.4	-	-	-	142
HCM Lane LOS	C	-	-	-	F
HCM 95th %tile Q(veh)	0.4	-	-	-	5

Notes

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

Appendix D
ODOT Crash Data

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Libra St & Crestview Dr
January 1, 2011 through December 31, 2015

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
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YEAR:

TOTAL

FINAL TOTAL

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CONTINUOUS SYSTEM CRASH LISTING

091 PACIFIC HIGHWAY WEST

OR 99W & Springbrook Rd
January 1, 2011 through December 31, 2015

SER#	UNLOC?	E D P R S W A U C O L G H R D C S L K	DATE	COUNTY	RD#	FC	CONN #	CMT/MLG	FIRST STREET	RD CHAR	INT-TYP	INT-REL	OFFRD	WTHR	CRASH TYP	SPCL USE	MOVE	A S	P R T C	I N J	G E	L I C N S	P E D	L O C	E R R O R	A C T N	E V E N T	C A U S E	
																													MILEPNT
00868	N	N	N	N	10/02/2012	YAMHILL	1	14		INTER	CROSS	N	N	CLR	S-1STOP	01	NONE	0	STRGHT									07	
					Tue	5P	NEWBERG	MN	0	PACIFIC HY 99W	SW				TRF SIGNAL	N	DRY	REAR									00		
							NEWBERG UA	22.05		SPRINGBROOK RD	06	2		N	DAY	INJ	PSNGR	CAR		01	DRVR	NONE	44	M	OR-Y		043	000	07
No		45	18	23.12	-122	56	48.94	009100100S00																					

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
 CONTINUOUS SYSTEM CRASH LISTING

091 PACIFIC HIGHWAY WEST

OR 99W & Springbrook Rd
 January 1, 2011 through December 31, 2015

SER#	UNLOC?	S D P R S W	E A U C O DATE	COUNTY	RD# FC	CONN #	INT-TYP	INT-REL	OFFRD	WTHR	CRASH TYP	SPCL USE	MOVE	A S	PED	ACTN	EVENT	CAUSE	
INVEST	ELGHR	DAY/TIME	CITY	MILEPNT	SECOND STREET	DIRECT	(#LANES)	TRAFCNTL	RNDBT	SURF	COLL TYP	OWNER	FROM	INJ	LOC	ERROR			
UNLOC?	D C S L K	LAT/LONG	URBAN AREA	LR	INTERSECTION SEQ#	LOCTN			DRVWY	LIGHT	SVRTY	V#	VEH TYPE	TO	P#	TYPE	SVRTY	E X RES	
00460	N N N	06/04/2013	YAMHILL	1 14		INTER	CROSS	N	N CLR	S-1STOP	01	NONE	0	STRGHT				07	
CITY		Tue 7A	NEWBERG	MN 0	PACIFIC HY 99W	SW		TRF SIGNAL	N DRY	REAR		PRVTE	SW NE				000	00	
			NEWBERG UA	22.05	SPRINGBROOK RD	06	0		N DAY	INJ		PSNGR CAR		01	DRVR	NONE	62 M	OR-Y	026
No	45 18 23.12	-122 56 48.94		009100100S00	1													OR<25	
												02	NONE	0	STOP				011
												PRVTE	SW NE					000	00
												PSNGR CAR		01	DRVR	INJC	44 M	OR-Y	000
																		OR<25	
00545	N N N	06/26/2013	YAMHILL	1 14		INTER	CROSS	N	N CLR	S-1STOP	01	NONE	0	STRGHT				07	
NONE		Wed 9A	NEWBERG	MN 0	PACIFIC HY 99W	SW		TRF SIGNAL	N DRY	REAR		PRVTE	SW NE				000	00	
			NEWBERG UA	22.05	SPRINGBROOK RD	06	0		N DAY	PDO		PSNGR CAR		01	DRVR	NONE	00 F	UNK	026
No	45 18 23.12	-122 56 48.94		009100100S00	1													UNK	000
												02	NONE	0	STOP				011
												PRVTE	SW NE					000	00
												PSNGR CAR		01	DRVR	NONE	46 F	OR-Y	000
																		OR<25	
00688	N N N	08/06/2013	YAMHILL	1 14		INTER	CROSS	N	N UNK	S-1STOP	01	NONE		STRGHT				07	
NONE		Tue 3P	NEWBERG	MN 0	PACIFIC HY 99W	SW		TRF SIGNAL	N UNK	REAR		PRVTE	SW NE				000	00	
			NEWBERG UA	22.05	SPRINGBROOK RD	06	0		N DAY	PDO		PSNGR CAR		01	DRVR	NONE	18 M	OR-Y	026
No	45 18 23.12	-122 56 48.94		009100100S00	1													OR<25	000
												02	NONE	0	STOP				011
												PRVTE	SW NE					000	00
												PSNGR CAR		01	DRVR	NONE	51 M	OR-Y	000
																		OR<25	
01203	N N N	12/31/2013	YAMHILL	1 14		INTER	CROSS	N	N CLR	S-1STOP	01	NONE	0	STRGHT				07	
NO RPT		Tue 5P	NEWBERG	MN 0	PACIFIC HY 99W	SW		TRF SIGNAL	N DRY	REAR		PRVTE	SW NE				000	00	
			NEWBERG UA	22.05	SPRINGBROOK RD	06	2		N DUSK	INJ		PSNGR CAR		01	DRVR	NONE	41 F	OR-Y	026
No	45 18 23.12	-122 56 48.94		009100100S00	1													OR<25	000
												02	NONE	0	STOP				011
												PRVTE	SW NE					000	00
												PSNGR CAR		01	DRVR	INJC	61 F	OR-Y	000
																		OR<25	
														02	PSNG	INJC	59 M		000
																		OR<25	
00391	N N N	04/12/2014	YAMHILL	1 14		INTER	CROSS	N	N CLR	S-1STOP	01	NONE		STRGHT				07	
NONE		Sat 10A	NEWBERG	MN 0	PACIFIC HY 99W	SW		TRF SIGNAL	N DRY	REAR		PRVTE	SW NE				000	00	
			NEWBERG UA	22.05	SPRINGBROOK RD	06	0		N DAY	INJ		PSNGR CAR		01	DRVR	INJC	26 F	OR-Y	026
No	45 18 23.12	-122 56 48.94		009100100S00	1													OR<25	000
																		OR<25	000
																		OR<25	000
												02	NONE	0	STOP				011
												PRVTE	SW NE					000	00
												PSNGR CAR		01	DRVR	INJC	27 F	OR-Y	000
																		OR<25	

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CONTINUOUS SYSTEM CRASH LISTING

091 PACIFIC HIGHWAY WEST

OR 99W & Springbrook Rd
January 1, 2011 through December 31, 2015

SER#	UNLOC?	D C S L K	D A T E	C O U N T Y	R D #	F C	C O N N #	F I R S T S T R E E T	R D C H A R	I N T - T Y P	I N T - R E L	O F F R D	W T H R	C R A S H T Y P	S P C L U S E	M O V E	A S	P E D	E R R O R	A C T N	E V E N T	C A U S E			
INVEST	E L G H R	D A Y / T I M E	C I T Y	M I L E P N T	S E C O N D S T R E E T	D I R E C T	(# L A N E S)	T R A F - C N T L	R N D B T	S U R F	C O L L T Y P	O W N E R	F R O M	P R T C	I N J	G E	L I C N S	L O C	E R R O R	A C T N	E V E N T	C A U S E			
NO RPT	D C S L K	L A T / L O N G	U R B A N A R E A	L R S	I N T E R S E C T I O N S E Q #	L O C T N																			
00821	N N N		09/21/2012	YAMHILL	1	14			INTER	CROSS	N		N RAIN	O-1 L-TURN	01	NONE	0	STRGHT				04			
			Fri 6A	NEWBERG	MN	0	PACIFIC HY 99W		CN	L-GRN-SIG		N WET	TURN		PRVTE	NE SW					000	00			
				NEWBERG UA	22.05		SPRINGBROOK RD	02		2		N DAY	PDO		PSNGR CAR			01	DRVR	NONE	00	F UNK	020	000	04
No	45	18	23.12	-122 56 48.94	009100100S00																				

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CONTINUOUS SYSTEM CRASH LISTING

091 PACIFIC HIGHWAY WEST

OR 99W & Brutscher St
January 1, 2011 through December 31, 2015

SER#	UNLOC?	S D P R S W E A U C O L G H R	DATE	COUNTY	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	SPCL USE TRLR QTY OWNER V#	MOVE FROM TO	PRTC P#	INJ SVRTY	A S G E X RES	LICNS LOC	PED ERROR	ACTN EVENT	CAUSE	
													02 NONE 0 STOP PRVTE NE SW PSNGR CAR							011 000	00 00	
00441		N N N	05/08/2015	YAMHILL	1 14		INTER	3-LEG	N		N CLR	S-1STOP	01 NONE 0 STRGHT UNKN NE SW UNKNOWN							000 000	29 00 29	
																				026 000	00 00 00	
No		45 18 28.53	-122 56 31.38	NEWBERG UA	21.80	PACIFIC HY 99W	06	0			N DAY	PDO									000	00
													02 NONE 0 STOP PRVTE NE SW PSNGR CAR							011 000	00 00	
																					000	00
00661		N N N	08/18/2011	YAMHILL	1 14		INTER	3-LEG	N		N CLR	S-1STOP	01 NONE 0 STRGHT PRVTE E W PSNGR CAR							000 000	013 00 32	
																					000	00
No		45 18 28.53	-122 56 31.38	NEWBERG UA	21.80	PACIFIC HY 99W	06	0			N DAY	INJ									052,026 000	00 00 32
													02 NONE 0 STOP PRVTE E W PSNGR CAR							011 000	013 00 00	
																					000	00
01018		N N N	11/09/2012	YAMHILL	1 14		INTER	CROSS	N		N CLD	ANGL-STP	01 NONE 0 TURN-L PRVTE SE SW PSNGR CAR							000 000	092 00 32,27	
																					000	00
No		45 18 28.53	-122 56 31.38	NEWBERG UA	21.80	PACIFIC HY 99W	05	0			N DUSK	PDO									052,016 038	00 00 32,27
													02 NONE 0 STOP PRVTE NE SW PSNGR CAR							011 000	092 00 00	
																					000	00
00469		N N N N	06/11/2012	YAMHILL	1 14		INTER	3-LEG	N		N CLR	S-1STOP	01 NONE 0 STRGHT PRVTE SW NE PSNGR CAR							000 000	27 00 27	
																					000	00
No		45 18 28.53	-122 56 31.38	NEWBERG UA	21.80	PACIFIC HY 99W	06	0			N DAY	INJ									026 000	00 00 27
													02 NONE 0 STOP PRVTE SW NE PSNGR CAR							011 000	00 00 00	
																					000	00
																					000	00

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
 CONTINUOUS SYSTEM CRASH LISTING

091 PACIFIC HIGHWAY WEST

OR 99W & Providence Dr
 January 1, 2011 through December 31, 2015

SER#	UNLOC?	E D C S L K	A U C O	DATE	COUNTY	RD#	FC	CONN #	INT-TYP	INT-REL	OFFRD	WTHR	CRASH TYP	SPCL USE	MOVE	PRTC	INJ	A S	G E	LICNS	PED	ERROR	ACTN	EVENT	CAUSE	
INVEST				DAY/TIME	CITY	MILEPNT		FIRST STREET	RD CHAR	(MEDIAN)	RNDT	SURF	COLL TYP	TRLR QTY	FROM											
UNLOC?				LAT/LONG	URBAN AREA	LR		INTERSECTION SEQ#	DIRECT	LEGS	TRAF-	DRVWY	SVR	VEH	TYPE	P#	TYPE	SVR	E X	RES	LOC					
00144	N N N			02/12/2015	YAMHILL	1	14		INTER	3-LEG	N	N CLR	S-1STOP	01 NONE	0	STRGHT									29	
NONE				Thu 4P	NEWBERG	MN	0	PROVIDENCE DR	NE		UNKNOWN	N DRY	REAR	UNKN	NE SW										00	
					NEWBERG UA	21.45		PACIFIC HY 99W	06	0		N DUSK	PDO	PSNGR	CAR	01	DRVR	NONE	00	M	UNK		026	000	29	
No		45	18	36.29	-122 56 7.21	009100100S00		1																		
														02 NONE	0	STOP										
														PRVTE	NE SW									011	00	
														PSNGR	CAR	01	DRVR	NONE	24	F	OR-Y		000	000	00	
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OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CONTINUOUS SYSTEM CRASH LISTING

091 PACIFIC HIGHWAY WEST

OR 99W & Benjamin Rd
January 1, 2011 through December 31, 2015

SER#	UNLOC?	S D P R S W	E A U C O DATE	COUNTY CITY	RD# FC	CONN #	INT-TYP	INT-REL	OFFRD WTHR	CRASH TYP	SPCL USE	MOVE	PRTC INJ	A S	G E LICNS	PED	ACTN EVENT	CAUSE
INVEST	D C S L K		DAY/TIME	URBAN AREA	MILEPNT	FIRST STREET	RD CHAR	(MEDIAN)	RNDBT SURF	COLL TYP	TRLR QTY	FROM	P#	E X RES	LOC	ERROR		
UNLOC?	D C S L K		LAT/LONG		LR	INTERSECTION SEQ#	DIRECT	LEGS	TRAF-	DRVWY LIGHT	OWNER	TO	TYPE	SVRTY				
00620	N N N		08/08/2011	YAMHILL	1 02		INTER	3-LEG	N	N CLR	01 NONE	0	01	27 M	OR-Y	028	000	02
NONE			Mon 4P		MN 0		CN	STOP SIGN	N DRY	TURN	PRVTE	N E					000	00
					21.08		01	0	N DAY	PDO	PSNGR CAR				OR<25		000	02
No	45 18 43.08	-122 55 42.80			009100100S00													
											02 NONE	0	01	66 M	OR-Y	000	000	00
											PRVTE	E W					000	00
											PSNGR CAR				OR<25		000	00
00579	N N N N N		07/09/2012	YAMHILL	1 02		INTER	3-LEG	N	N CLR	01 NONE	0	01	51 F	OR-Y	028	000	02
STATE			Mon 5P		MN 0		CN	STOP SIGN	N DRY	TURN	PRVTE	N E					015	00
					21.08		01	0	N DAY	INJ	PSNGR CAR				OR<25		000	02
No	45 18 43.08	-122 55 42.80			009100100S00													
											02 NONE	0	01	38 M	OR-Y	000	000	00
											PRVTE	E W					000	00
											PSNGR CAR				OR<25		000	00
00318	N N N		03/28/2014	YAMHILL	1 02		INTER	3-LEG	N	N RAIN	01 NONE	0	01	66 F	OR-Y	028	000	02
NO RPT			Fri 3P		MN 0		CN	STOP SIGN	N WET	TURN	PRVTE	N E					000	00
					21.08		01	0	N DAY	INJ	PSNGR CAR				OR<25		000	02
No	45 18 43.08	-122 55 42.80			009100100S00													
																	000	00
											02 NONE	0	01	56 M	OR-Y	000	000	00
											PRVTE	E W					000	00
											PSNGR CAR				OR<25		000	00
00675	N N N N N		06/23/2014	YAMHILL	1 02		INTER	3-LEG	N	N CLD	01 NONE	0	01	43 M	OR-Y	028	000	02
CITY			Mon 3P		MN 0		CN	STOP SIGN	N DRY	TURN	PRVTE	N W					000	00
					21.08		03	0	N DAY	INJ	PSNGR CAR				OR<25		000	02
No	45 18 43.08	-122 55 42.80			009100100S00													
											02 NONE	0	01	24 F	OR-Y	000	000	00
											PRVTE	E W					000	00
											PSNGR CAR				OR<25		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
055	SPRAY	BLINDED BY WATER SPRAY

ACTION CODE TRANSLATION LIST

ACTION CODE	SHORT DESCRIPTION	LONG DESCRIPTION
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

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)
040	THRU MED	DRIVING THROUGH SAFETY ZONE OR OVER ISLAND
041	F/ST BUS	FAILED TO STOP FOR SCHOOL BUS

ERROR CODE TRANSLATION LIST

ERROR CODE	SHORT DESCRIPTION	FULL DESCRIPTION
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	PNGR 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	JACKKNIFE	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
058	OTH SIGN	OTHER SIGN, INCLUDING STREET SIGNS
059	HYDRANT	HYDRANT

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
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
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

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
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

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	COUPLER
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

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

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 CONVEYANCE
5	PTOW	PEDESTRIAN TOWING OR TRAILERING AN OBJECT
6	BIKE	PEDALCYCLIST
7	BTOW	PEDALCYCLIST TOWING OR TRAILERING AN OBJECT
8	PRKD	OCCUPANT OF A PARKED MOTOR VEHICLE
9	UNK	UNKNOWN TYPE OF NON-MOTORIST

PEDESTRIAN 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

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

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

095	BUS STPSGN	BUS STOP SIGN AND RED LIGHTS
099	UNKNOWN	UNKNOWN OR NOT DEFINITE

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

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 E
In-Process Developments

Traffic Impact Analysis

Newberg Ambulatory Surgical Center

Newberg, Oregon

March 9, 2017

completed with
Anderson Dabrowski Architects, LLC
Portland, Oregon

Prepared by:
Associated Transportation Engineering & Planning, Inc.
Salem, Oregon
March 6, 2017
ATEP 17-346



Traffic Impact Analysis Newberg Ambulatory Surgical Center

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Traffic Impact Analysis

Newberg Ambulatory Surgical Center

Newberg, Oregon



Introduction:

The Oregon Clinic intends to develop a 17,510 sq. ft. Ambulatory Surgery Center on 3 acres of tax lot 2001 of tax map 3S2W16 in Newberg, Oregon. The site is west of Providence Drive and south of the Providence Hospital in Newberg. The facility will be developed with access to Providence Dr.

The Newberg Ambulatory Surgical Center will use the Newberg transportation system and add traffic to the roadways. This analysis will consider the traffic impacts at the intersection of 1) Providence Dr at Hwy 99W, 2) Hayes St at Werth Blvd. 3) Hayes St at Brutscher St and 4) Site Access at Providence Dr. Brutscher St at Fernwood Rd was closed while this study was conducted, diverting traffic to other intersections. Crash data was provided by the ODOT Crash Data Unit for the most recent 5 years.



Figure 1 - Vicinity Map

Summary of Findings:

The Newberg Ambulatory Surgical Center will generate an estimated 633 trips each day. 42 of those trips will be in the AM Peak hour and 62 trips will be in the PM Peak hour. The performance metrics at the studied intersections are shown in the following table upon opening in 2017.

	AM Peak hour		PM Peak hour	
	LOS	v/c	LOS	v/c
Hwy 99W at Providence Dr	A	0.661	B	0.721
Hayes at Werth	A		A	
Hayes at Brutscher	A		A	
Site Access at Providence Dr	A	0.012	B	0.067

Crash data from ODOT Crash Data Unit identifies 9 crashes at the studied intersections in the last 5 years. None were fatal crashes, 4 were injury crashes and 5 were property damage only crashes.

History and Existing Conditions:

The site has been vacant in the recent past and was is adjacent to the Providence Medical Center. The site is zoned Residential/Specific Plan (R R/SP). Traffic from the planned ambulatory surgery center will travel north or south on Providence Dr to access the transportation system. The intersection of Providence

Dr at Hwy 99 W is signal controlled, the intersections of Hayes at Brutscher are roundabouts, and the site access is two way stop controlled.

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Hwy 99W at Providence Dr	Signalized	HCM 6th Edition	NWB Right	0.652	5.0	A
3	Brutscher St at Hayes St	Roundabout	HCM 6th Edition	NB Thru		3.8	A
4	Hayes at Werth	Roundabout	HCM 6th Edition	EB Thru		3.2	A

Existing AM Peak Hour Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Hwy 99W at Providence Dr	Signalized	HCM 6th Edition	SWB Left	0.714	10.7	B
3	Brutscher St at Hayes St	Roundabout	HCM 6th Edition	SB Right		4.6	A
4	Hayes at Werth	Roundabout	HCM 6th Edition	WB Thru		3.5	A

Existing PM Peak Hour Summary

Figure 2 - Existing Traffic Conditions

Traffic Conditions when Newberg Surgical Center is Complete:

Newberg Ambulatory Surgical Center will add 42 trips to the AM Peak hour traffic and 62 trips to the PM Peak hour traffic. This study will assume that 60% of the traffic will travel north of the site then toward Newberg, 30% north on Providence Dr then toward Sherwood and 10% to the south of the site. The study assumed that traffic volumes will increase linearly 1% per year to estimate the 2017 and 2032 performance metrics.

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Hwy 99W at Providence Dr	Signalized	HCM 6th Edition	NWB Right	0.661	5.4	A
3	Brutscher St at Hayes St	Roundabout	HCM 6th Edition	NB Thru		3.8	A
4	Hayes at Werth	Roundabout	HCM 6th Edition	EB Thru		3.2	A
5	Site Access at Providence Dr.	Two-way stop	HCM 6th Edition	EB Left	0.012	9.3	A

2017 AM Peak Hour Summary with Newberg Surgical Center

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Hwy 99W at Providence Dr	Signalized	HCM 6th Edition	SWB Left	0.731	12.0	B
3	Brutsher St at Hayes St	Roundabout	HCM 6th Edition	SB Right		4.6	A
4	Hayes at Werth	Roundabout	HCM 6th Edition	WB Thru		3.5	A
5	Site Access at Providence Dr.	Two-way stop	HCM 6th Edition	EB Left	0.067	10.1	B

2017 PM Peak Hour Summary with Newberg Surgical Center

Figure 3 – 2017 Traffic Conditions with Newberg Surgical Center

It is anticipated traffic will continue to increase at a rate of 1% / year. The following tables estimate the performance metrics and traffic volumes in the intersections in 15 years (2032) for planning purposes.

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Hwy 99W at Providence Dr	Signalized	HCM 6th Edition	NWB Right	0.758	7.7	A
3	Brutsher St at Hayes St	Roundabout	HCM 6th Edition	NB Thru		4.0	A
4	Hayes at Werth	Roundabout	HCM 6th Edition	EB Thru		3.3	A
5	Site Access at Providence Dr.	Two-way stop	HCM 6th Edition	EB Left	0.012	9.4	A

2032 AM Peak Hour Summary with Newberg Surgical Center

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Hwy 99W at Providence Dr	Signalized	HCM 6th Edition	SWB Left	0.839	17.6	B
3	Brutsher St at Hayes St	Roundabout	HCM 6th Edition	SB Right		5.0	A
4	Hayes at Werth	Roundabout	HCM 6th Edition	WB Thru		3.6	A
5	Site Access at Providence Dr.	Two-way stop	HCM 6th Edition	EB Left	0.069	10.3	B

2032 PM Peak Hour Summary with Newberg Surgical Center

Figure 4 – 2032 Traffic Conditions with Newberg Surgical Center

Crash Data:

The ODOT Crash Data Unit provided information about reported crashes at the shown intersections for the past 5 years.

Intersection	Fatal	Injury	Property Damage	Total Crashes
Hwy 99W at Providence Dr	0	3	5	8
Hayes at Werth	0	0	0	0
Hayes at Brutscher	0	1	0	1

Figure 5 – Reported Crashes at Studied Intersections in 2010-2014

Summary:

The development of the planned Newberg Ambulatory Surgical Center in Newberg will add traffic to the transportation system. This study finds there is and will continue to be adequate capacity at the studied intersections when it is completed. Crash data does not indicate significant safety problems at the intersections.

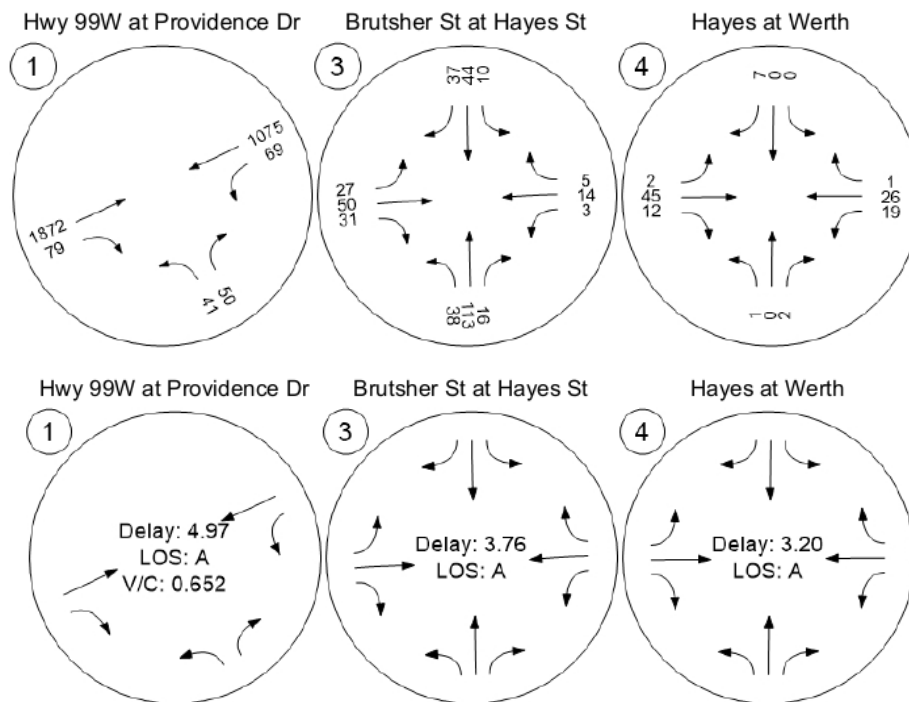


Figure 6 - Existing AM Peak hour Counts and Performance Metrics

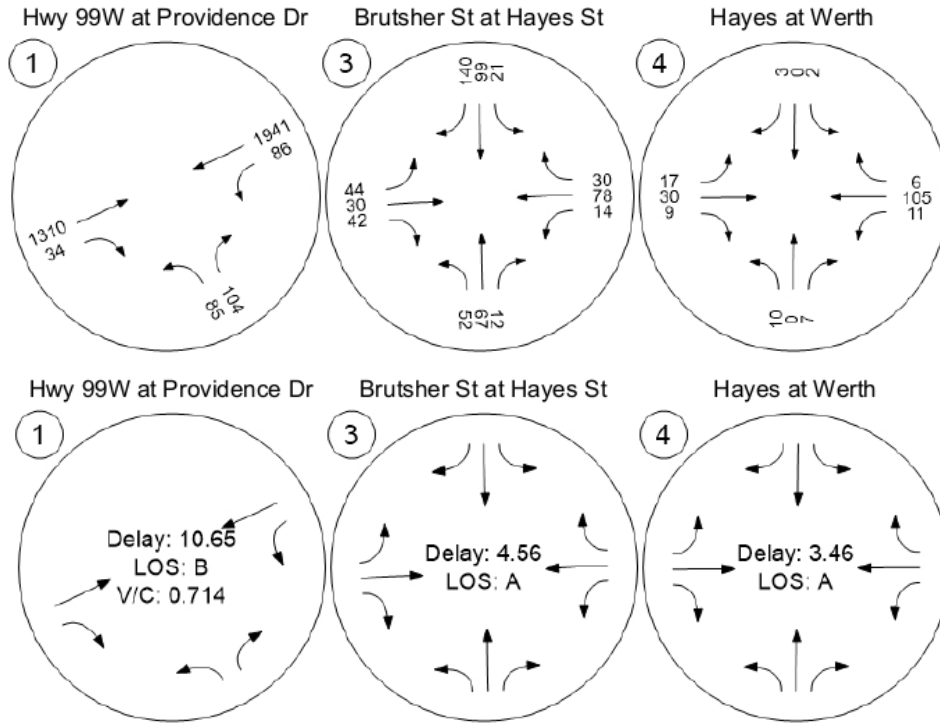


Figure 7 - Existing PM Peak hour Counts and Performance Metrics

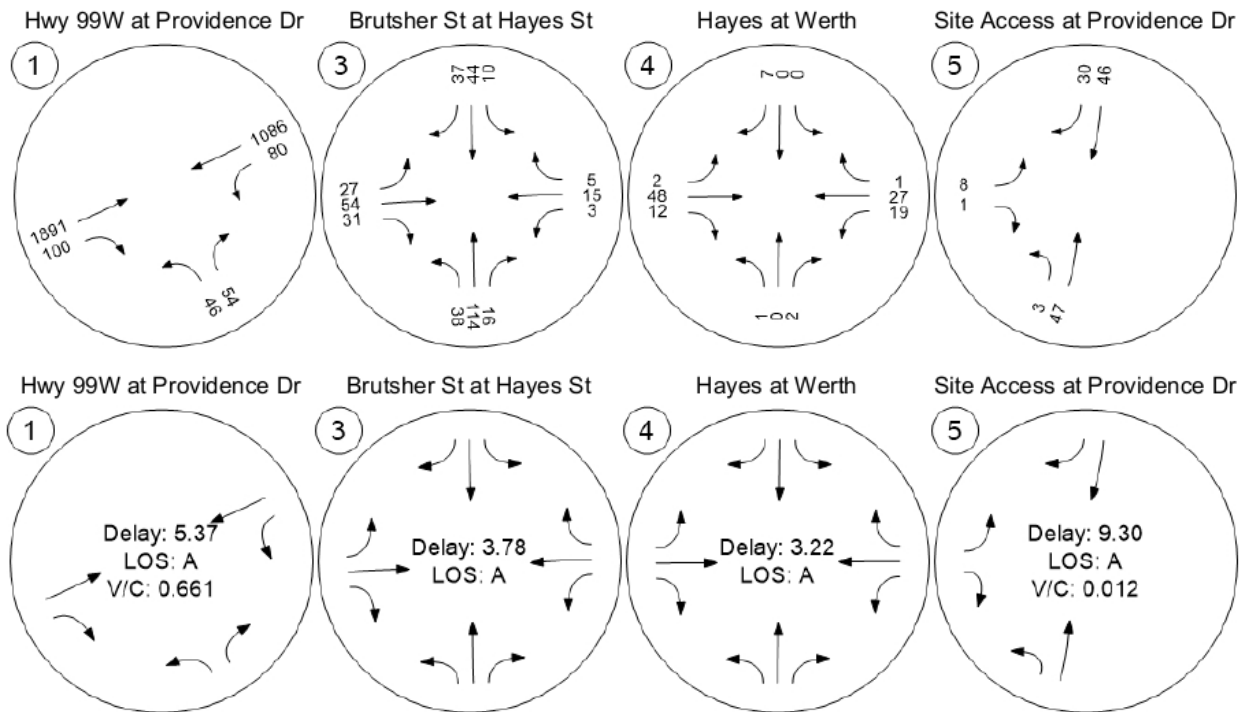


Figure 8 - 2017 AM Counts and Performance Metrics with Newberg Surgical Center

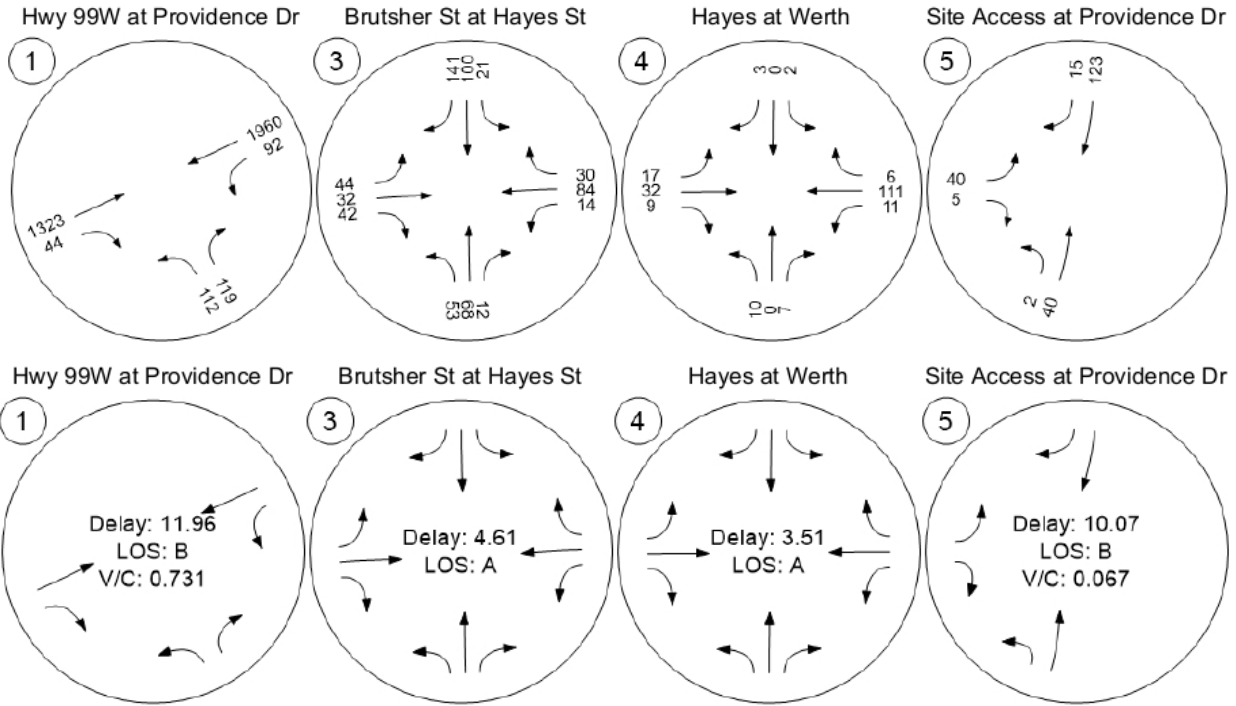


Figure 9 - 2017 PM Counts and Performance Metrics with Newberg Surgical Center

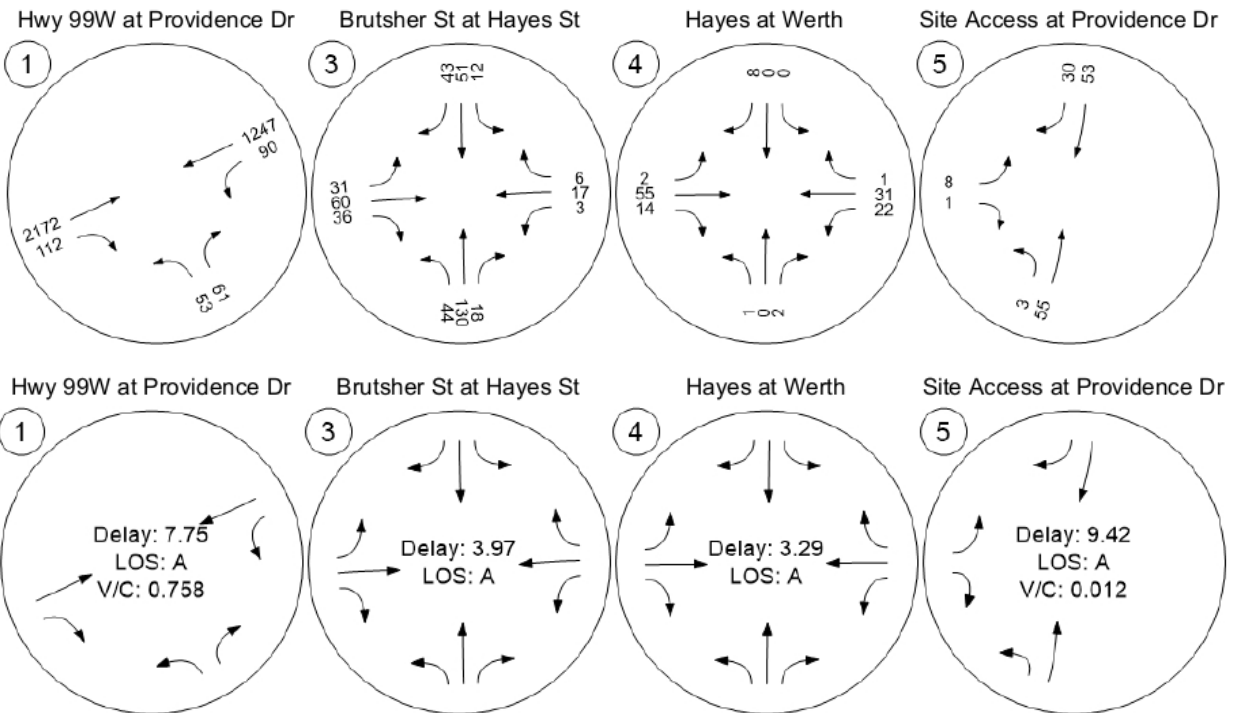


Figure 10 - 2032 AM Counts and Performance Metrics with Newberg Surgical Center

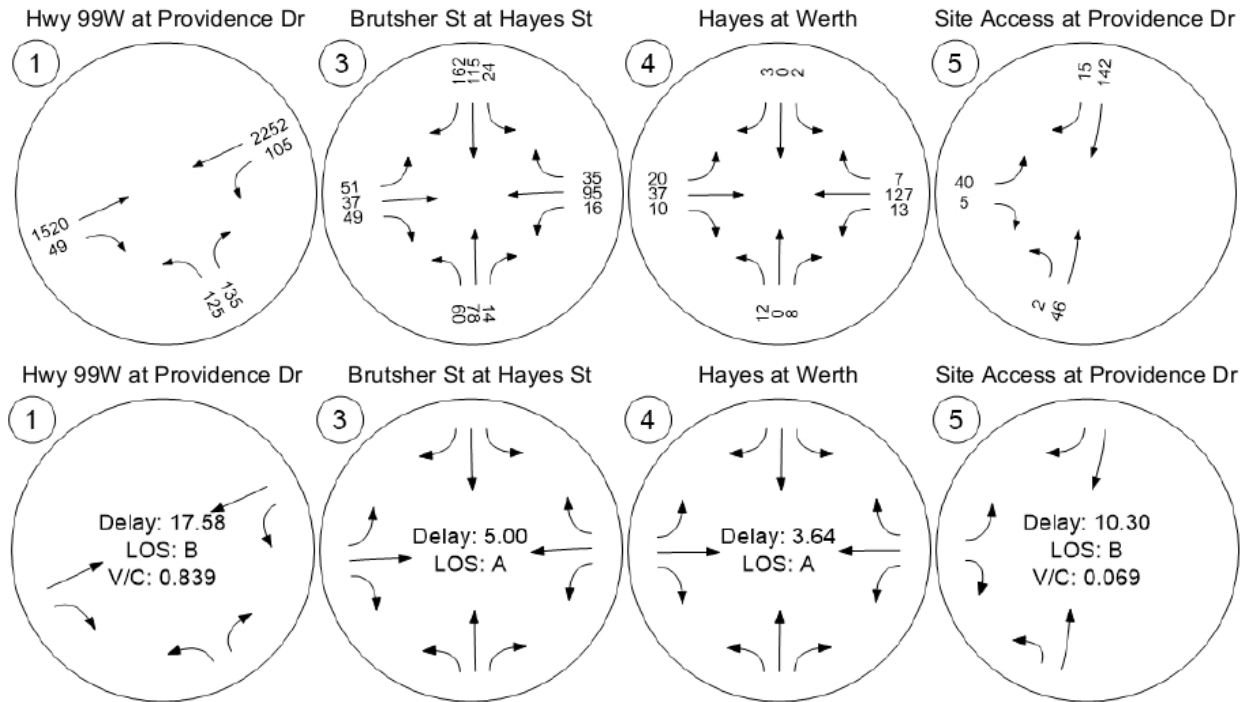
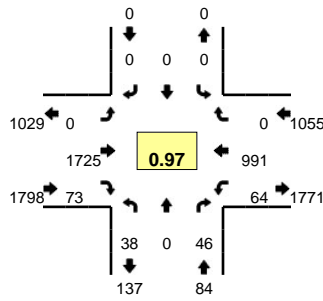


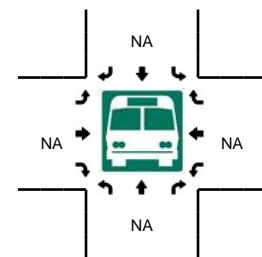
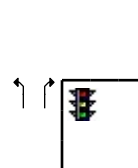
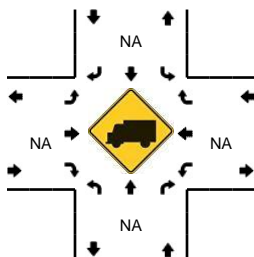
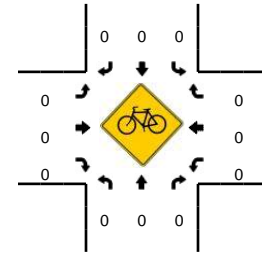
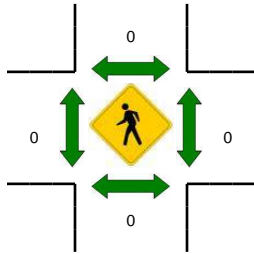
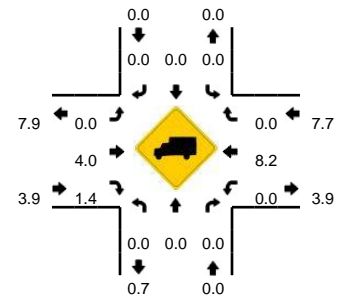
Figure 11 - 2032 PM Counts and Performance Metrics with Newberg Surgical Center

LOCATION: Providence Dr -- OR-99W
CITY/STATE: Newberg, OR

QC JOB #: 14233601
DATE: Tue, Feb 21 2017



Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

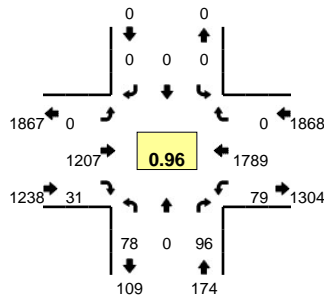


5-Min Count Period Beginning At	Providence Dr (Northbound)				Providence Dr (Southbound)				OR-99W (Eastbound)				OR-99W (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	1	0	0	0	0	0	0	171	5	0	5	68	0	0	250	
7:05 AM	1	0	4	0	0	0	0	0	0	169	6	0	4	73	0	0	257	
7:10 AM	3	0	3	0	0	0	0	0	0	132	3	0	3	88	0	0	232	
7:15 AM	1	0	1	0	0	0	0	0	0	143	2	0	10	74	0	0	231	
7:20 AM	3	0	4	0	0	0	0	0	0	176	6	0	4	77	0	0	270	
7:25 AM	4	0	8	0	0	0	0	0	0	128	3	0	3	79	0	0	225	
7:30 AM	7	0	7	0	0	0	0	0	0	141	6	0	4	87	0	0	252	
7:35 AM	1	0	6	0	0	0	0	0	0	146	7	0	10	77	0	0	247	
7:40 AM	4	0	1	0	0	0	0	0	0	134	7	0	2	70	0	0	218	
7:45 AM	6	0	5	0	0	0	0	0	0	135	4	0	7	100	0	0	257	
7:50 AM	4	0	5	0	0	0	0	0	0	129	11	0	6	96	0	0	251	
7:55 AM	4	0	1	0	0	0	0	0	0	121	13	0	6	102	0	0	247	2937
8:00 AM	3	0	7	0	0	0	0	0	0	119	5	0	4	83	0	0	221	2908
8:05 AM	1	0	4	0	0	0	0	0	0	102	4	0	7	77	0	0	195	2846
8:10 AM	4	0	3	0	0	0	0	0	0	97	4	0	3	79	0	0	190	2804
8:15 AM	6	0	2	0	0	0	0	0	0	109	7	0	2	68	0	0	194	2767
8:20 AM	4	0	5	0	0	0	0	0	0	113	7	0	9	75	0	0	213	2710
8:25 AM	4	0	5	0	0	0	0	0	0	120	1	0	2	69	0	0	201	2686
8:30 AM	2	0	4	0	0	0	0	0	0	105	4	0	5	69	0	0	189	2623
8:35 AM	5	0	3	0	0	0	0	0	0	114	6	0	3	87	0	0	218	2594
8:40 AM	7	0	3	0	0	0	0	0	0	75	4	0	4	59	0	0	152	2528
8:45 AM	11	0	6	0	0	0	0	0	0	113	5	0	6	51	0	0	192	2463
8:50 AM	9	0	2	0	0	0	0	0	0	91	4	0	3	89	0	0	198	2410
8:55 AM	7	0	0	0	0	0	0	0	0	100	5	0	3	56	0	0	171	2334
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	0	0	0	0	0	1540	112	0	76	1192	0	0	3020	
Heavy Trucks	0	0	0	0	0	0	0	0	0	48	4	0	0	84	0	0	136	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

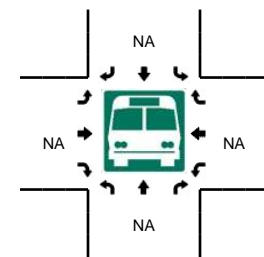
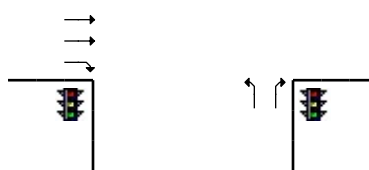
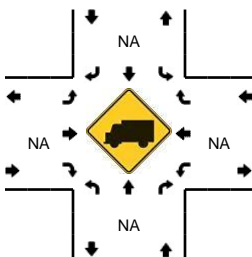
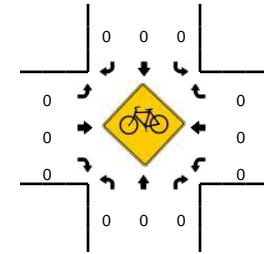
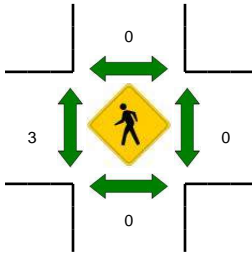
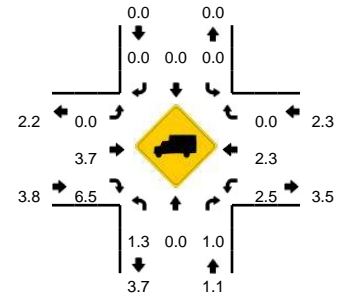
Comments:

LOCATION: Providence Dr -- OR-99W
CITY/STATE: Newberg, OR

QC JOB #: 14233602
DATE: Tue, Feb 21 2017



Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 4:40 PM -- 4:55 PM

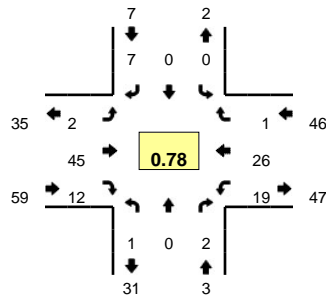


5-Min Count Period Beginning At	Providence Dr (Northbound)				Providence Dr (Southbound)				OR-99W (Eastbound)				OR-99W (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	4	0	4	0	0	0	0	0	0	88	0	0	7	149	0	1	253	
4:05 PM	12	0	9	0	0	0	0	0	0	91	2	0	4	145	0	0	263	
4:10 PM	6	0	8	0	0	0	0	0	0	100	3	0	11	166	0	0	294	
4:15 PM	8	0	4	0	0	0	0	0	0	92	3	0	6	146	0	0	259	
4:20 PM	9	0	6	0	0	0	0	0	0	81	4	0	7	151	0	0	258	
4:25 PM	9	0	5	0	0	0	0	0	0	97	4	0	2	114	0	0	231	
4:30 PM	5	0	6	0	0	0	0	0	0	82	5	0	2	167	0	0	267	
4:35 PM	16	0	15	0	0	0	0	0	0	86	4	0	2	133	0	0	256	
4:40 PM	1	0	7	0	0	0	0	0	0	106	3	0	8	179	0	1	305	
4:45 PM	5	0	8	0	0	0	0	0	0	90	2	0	7	147	0	0	259	
4:50 PM	6	0	10	0	0	0	0	0	0	111	4	0	6	156	0	0	293	
4:55 PM	3	0	9	0	0	0	0	0	0	105	1	0	8	151	0	0	277	3215
5:00 PM	4	0	9	0	0	0	0	0	0	82	2	0	10	138	0	0	245	3207
5:05 PM	13	0	9	0	0	0	0	0	0	121	1	0	11	120	0	0	275	3219
5:10 PM	5	0	6	0	0	0	0	0	0	123	3	0	9	132	0	0	278	3203
5:15 PM	7	0	10	0	0	0	0	0	0	96	3	0	3	146	0	0	265	3209
5:20 PM	7	0	6	0	0	0	0	0	0	94	2	0	9	167	0	0	285	3236
5:25 PM	6	0	1	0	0	0	0	0	0	111	1	0	3	153	0	0	275	3280
5:30 PM	6	0	6	0	0	0	0	0	0	98	1	0	7	140	0	0	258	3271
5:35 PM	5	0	4	0	0	0	0	0	0	84	2	0	5	151	0	1	252	3267
5:40 PM	7	0	5	0	0	0	0	0	0	101	3	0	10	149	0	0	275	3237
5:45 PM	8	0	5	0	0	0	0	0	0	86	0	0	4	142	0	0	245	3223
5:50 PM	2	0	4	0	0	0	0	0	0	84	3	0	8	147	0	0	248	3178
5:55 PM	1	0	3	0	0	0	0	0	0	108	3	0	1	145	0	0	261	3162
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	48	0	100	0	0	0	0	0	0	1228	36	0	84	1928	0	4	3428	
Heavy Trucks	0	0	0	0	0	0	0	0	0	48	4	0	4	56	0	0	112	
Pedestrians	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

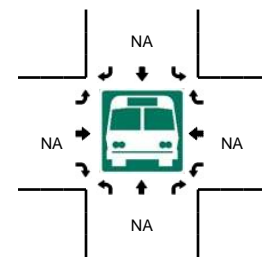
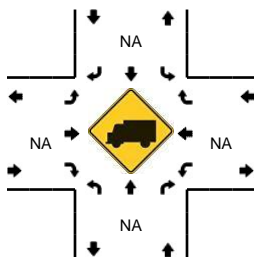
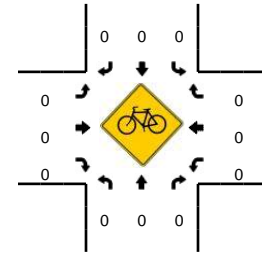
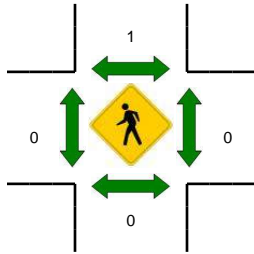
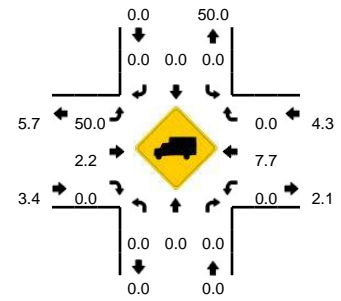
Comments:

LOCATION: Werth Blvd -- Hayes St
CITY/STATE: Newberg, OR

QC JOB #: 14233603
DATE: Tue, Feb 21 2017



Peak-Hour: 8:00 AM -- 9:00 AM
Peak 15-Min: 8:45 AM -- 9:00 AM

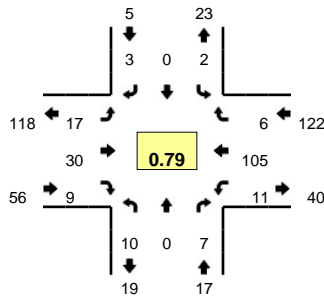


5-Min Count Period Beginning At	Werth Blvd (Northbound)				Werth Blvd (Southbound)				Hayes St (Eastbound)				Hayes St (Westbound)				Total	Hourly Totals	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
7:00 AM	0	0	1	0	0	0	0	0	0	1	2	0	0	1	2	0	0	5	
7:05 AM	0	0	1	0	1	0	0	0	1	4	1	0	0	0	1	0	0	9	
7:10 AM	0	0	0	0	0	1	0	0	0	4	0	0	0	0	3	0	0	8	
7:15 AM	0	0	1	0	1	0	0	0	0	4	1	0	0	1	1	0	0	9	
7:20 AM	0	0	0	0	0	0	0	0	0	8	0	0	0	0	3	0	0	11	
7:25 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	
7:30 AM	0	0	0	0	1	0	0	0	0	7	0	0	0	1	0	0	0	9	
7:35 AM	0	0	0	0	0	0	0	0	0	3	0	0	0	0	2	0	0	5	
7:40 AM	0	0	0	0	0	0	0	0	0	4	2	1	0	0	3	0	0	10	
7:45 AM	0	0	0	0	0	0	0	0	0	10	1	0	0	0	1	0	0	12	
7:50 AM	0	0	0	0	0	0	0	0	0	6	1	0	0	0	0	0	0	7	
7:55 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2	0	0	4	91
8:00 AM	0	0	0	0	0	0	0	0	0	8	0	0	0	0	3	0	0	11	97
8:05 AM	0	0	0	0	0	0	0	0	0	4	1	0	0	0	1	0	0	6	94
8:10 AM	1	0	0	0	0	0	0	0	0	1	1	0	0	3	1	0	0	7	93
8:15 AM	0	0	0	0	0	0	0	0	0	3	0	0	0	4	1	1	0	9	93
8:20 AM	0	0	0	0	0	0	0	0	0	1	1	0	0	3	3	0	0	8	90
8:25 AM	0	0	0	0	0	0	1	0	0	5	0	0	0	1	1	0	0	8	96
8:30 AM	0	0	0	0	0	0	1	0	0	6	1	0	0	1	3	0	0	12	99
8:35 AM	0	0	0	0	0	0	2	0	0	3	2	0	0	1	5	0	0	13	107
8:40 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	2	1	0	0	4	101
8:45 AM	0	0	0	0	0	0	1	0	0	6	1	0	0	1	2	0	0	11	100
8:50 AM	0	0	1	0	0	0	1	0	1	5	2	0	0	0	4	0	0	14	107
8:55 AM	0	0	1	0	0	0	1	0	0	3	2	1	0	3	1	0	0	12	115
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	8	0	0	0	12	0	4	56	20	4	16	28	0	0	148		
Heavy Trucks	0	0	0	0	0	0	0	0	4	0	0	0	0	4	0	0	8		
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Railroad																			
Stopped Buses																			

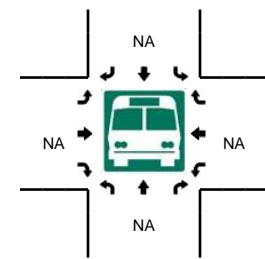
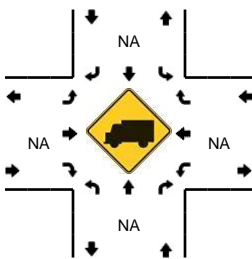
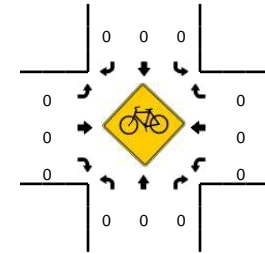
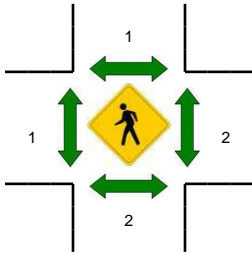
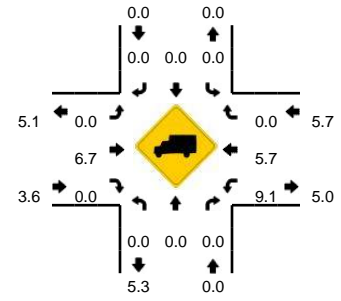
Comments:

LOCATION: Werth Blvd -- Hayes St
CITY/STATE: Newberg, OR

QC JOB #: 14233604
DATE: Tue, Feb 21 2017



Peak-Hour: 4:10 PM -- 5:10 PM
Peak 15-Min: 4:55 PM -- 5:10 PM

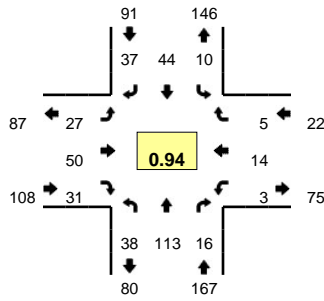


5-Min Count Period Beginning At	Werth Blvd (Northbound)				Werth Blvd (Southbound)				Hayes St (Eastbound)				Hayes St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	2	0	1	0	0	0	0	0	1	2	0	0	1	9	1	0	17	
4:05 PM	1	0	1	0	0	0	0	0	2	2	2	0	0	8	0	0	16	
4:10 PM	0	0	0	0	0	0	0	0	2	2	2	0	0	8	2	0	16	
4:15 PM	0	0	0	0	0	0	1	0	2	2	2	0	1	9	1	0	18	
4:20 PM	1	0	0	0	0	0	0	0	2	1	0	0	0	11	0	0	15	
4:25 PM	0	0	2	0	0	0	1	0	6	3	2	0	2	5	1	0	22	
4:30 PM	2	0	2	0	0	0	0	0	0	1	0	0	2	4	1	0	12	
4:35 PM	1	0	1	0	0	0	0	0	1	2	0	0	0	10	0	1	16	
4:40 PM	0	0	0	0	0	0	0	0	0	4	0	0	0	6	0	0	10	
4:45 PM	2	0	1	0	0	0	0	0	0	3	2	0	1	12	0	0	21	
4:50 PM	0	0	0	0	0	0	1	0	1	2	0	0	1	2	0	0	7	
4:55 PM	0	0	0	0	0	0	0	0	0	4	0	0	1	14	0	0	19	189
5:00 PM	2	0	0	0	0	0	0	0	1	2	0	0	1	12	1	0	19	191
5:05 PM	2	0	1	0	2	0	0	0	2	4	1	0	1	12	0	0	25	200
5:10 PM	0	0	1	0	0	0	0	0	0	3	0	0	1	7	1	0	13	197
5:15 PM	0	0	1	0	0	0	1	0	0	5	1	0	0	5	0	0	13	192
5:20 PM	3	0	1	0	1	0	0	0	1	2	0	0	1	9	0	0	18	195
5:25 PM	0	0	0	0	1	0	1	0	0	3	0	0	2	8	0	0	15	188
5:30 PM	0	0	1	0	0	0	0	0	0	2	1	0	0	5	0	0	9	185
5:35 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	8	0	0	9	178
5:40 PM	0	0	1	0	0	0	3	0	1	4	2	0	0	8	1	0	20	188
5:45 PM	1	0	0	0	1	0	0	0	0	2	0	0	0	5	0	0	9	176
5:50 PM	2	0	0	0	0	0	0	0	0	1	2	0	0	2	0	0	7	176
5:55 PM	0	0	0	0	0	0	0	0	0	4	1	0	0	4	0	0	9	166
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	0	4	0	8	0	0	0	12	40	4	0	12	152	4	0	252	
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

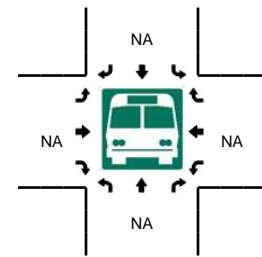
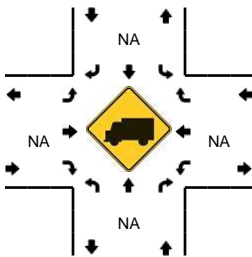
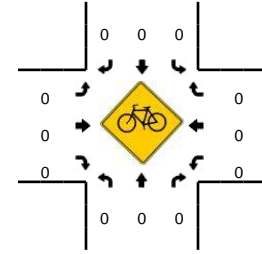
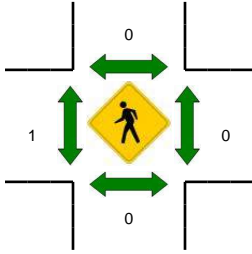
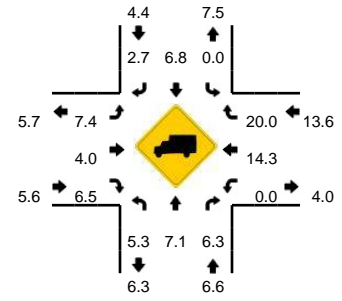
Comments:

LOCATION: Brutscher St -- Hayes St
CITY/STATE: Newberg, OR

QC JOB #: 14233605
DATE: Tue, Feb 21 2017



Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:35 AM -- 7:50 AM

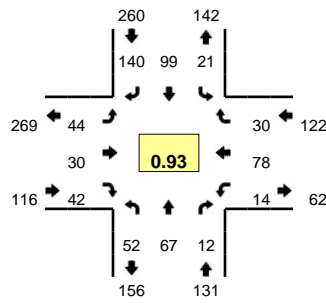


5-Min Count Period Beginning At	Brutscher St (Northbound)				Brutscher St (Southbound)				Hayes St (Eastbound)				Hayes St (Westbound)				Total	Hourly Totals	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
7:00 AM	3	4	0	0	0	1	2	0	4	1	0	0	1	0	2	0	18		
7:05 AM	4	5	1	0	0	1	0	0	0	5	1	0	0	1	0	0	18		
7:10 AM	3	6	1	0	0	3	1	0	0	4	1	0	0	0	2	1	0	22	
7:15 AM	6	14	2	0	1	1	4	0	3	3	2	0	0	1	0	0	37		
7:20 AM	3	14	2	0	1	1	1	1	1	5	0	0	1	0	2	0	32		
7:25 AM	4	12	0	1	0	2	1	0	1	3	2	0	0	2	0	0	28		
7:30 AM	3	6	1	0	3	5	1	0	3	6	4	0	0	1	0	0	33		
7:35 AM	0	10	0	0	0	1	6	0	2	3	5	0	0	2	0	0	29		
7:40 AM	4	7	1	0	1	5	3	0	2	6	2	0	2	2	1	0	36		
7:45 AM	3	8	3	0	1	4	5	0	3	7	4	0	0	0	0	0	38		
7:50 AM	2	4	1	0	1	4	3	0	4	6	1	0	0	1	0	0	27		
7:55 AM	3	8	3	0	0	4	2	0	2	2	1	0	0	1	0	0	26	344	
8:00 AM	1	4	1	1	1	6	3	0	1	4	4	0	0	2	1	0	29	355	
8:05 AM	6	13	0	0	0	3	4	0	5	5	4	0	0	1	0	0	41	378	
8:10 AM	1	13	2	0	0	8	4	0	0	0	2	0	0	1	1	0	32	388	
8:15 AM	4	8	3	0	0	4	3	1	1	0	2	0	0	1	1	0	28	379	
8:20 AM	5	9	1	0	0	6	2	0	2	2	2	0	0	0	2	0	31	378	
8:25 AM	2	6	0	0	1	10	0	1	5	5	2	0	1	1	0	0	34	384	
8:30 AM	4	6	3	0	0	4	1	0	3	3	2	0	0	2	2	0	30	381	
8:35 AM	3	6	1	0	1	4	3	0	2	3	2	0	1	2	3	0	31	383	
8:40 AM	1	3	1	0	0	6	4	0	1	3	3	0	0	2	1	0	25	372	
8:45 AM	3	5	1	0	2	5	0	0	2	5	3	0	0	1	2	0	29	363	
8:50 AM	2	1	0	0	3	8	4	0	3	3	5	0	1	2	3	0	35	371	
8:55 AM	6	7	0	0	4	6	1	0	1	2	7	0	0	1	1	0	36	381	
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	100	16	0	8	40	56	0	28	64	44	0	8	16	4	0	412		
Heavy Trucks	0	4	0	0	0	0	0	0	4	4	4	0	0	0	0	0	16		
Pedestrians		0				0				4				0			4		
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0		
Railroad																			
Stopped Buses																			

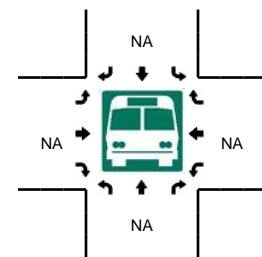
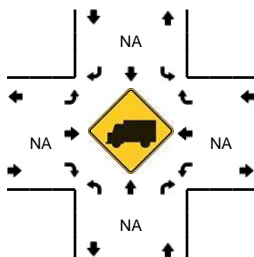
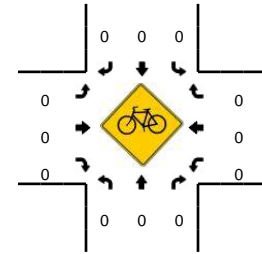
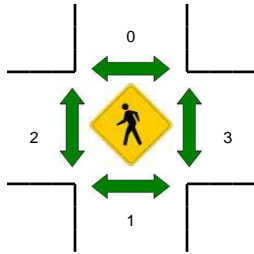
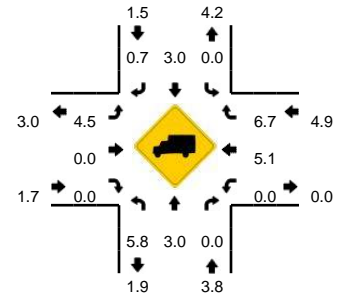
Comments:

LOCATION: Brutscher St -- Hayes St
CITY/STATE: Newberg, OR

QC JOB #: 14233606
DATE: Tue, Feb 21 2017



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



5-Min Count Period Beginning At	Brutscher St (Northbound)				Brutscher St (Southbound)				Hayes St (Eastbound)				Hayes St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	4	3	0	0	2	10	7	0	2	2	3	0	3	7	4	0	47	
4:05 PM	8	7	1	0	0	4	12	1	2	4	4	0	0	9	1	0	53	
4:10 PM	5	4	1	0	4	10	5	0	3	3	1	0	0	5	4	0	45	
4:15 PM	4	5	1	0	4	5	10	0	3	2	2	0	1	5	0	0	42	
4:20 PM	3	4	1	0	5	6	13	0	4	2	2	0	2	9	4	0	55	
4:25 PM	2	8	0	0	7	9	10	0	2	2	1	0	0	4	3	0	48	
4:30 PM	5	7	1	0	0	12	16	0	7	0	2	0	0	4	2	0	56	
4:35 PM	5	5	0	0	2	5	11	0	4	1	2	0	2	9	3	0	49	
4:40 PM	4	7	2	0	1	4	7	0	3	3	4	0	0	6	1	0	42	
4:45 PM	8	5	0	0	0	15	11	0	6	4	1	0	2	7	3	0	62	
4:50 PM	8	5	0	1	1	5	16	0	2	2	5	0	1	3	3	0	52	
4:55 PM	5	3	2	0	0	5	13	0	3	1	4	0	1	7	1	0	45	596
5:00 PM	1	9	3	0	2	6	6	0	2	3	4	0	1	14	3	0	54	603
5:05 PM	4	3	1	0	2	8	19	0	4	4	9	0	1	7	3	0	65	615
5:10 PM	3	4	0	0	0	13	8	0	4	4	5	0	3	5	2	0	51	621
5:15 PM	3	7	2	0	0	11	10	1	3	4	3	0	1	3	2	0	50	629
5:20 PM	0	4	1	0	1	5	14	0	3	2	2	0	1	12	0	0	45	619
5:25 PM	8	6	0	0	1	4	9	0	1	1	6	0	1	9	1	0	47	618
5:30 PM	2	2	0	0	1	9	11	0	4	2	2	0	1	3	2	0	39	601
5:35 PM	6	6	0	0	1	12	10	1	4	1	4	0	0	6	1	0	52	604
5:40 PM	0	4	2	0	0	6	12	0	4	4	1	0	1	13	0	0	47	609
5:45 PM	0	10	0	0	0	15	10	0	2	2	4	1	1	3	2	0	50	597
5:50 PM	5	9	0	0	1	8	7	0	0	3	7	0	1	3	0	0	44	589
5:55 PM	7	10	1	0	1	4	6	0	0	2	3	0	2	2	0	0	38	582
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	32	64	16	0	16	108	132	0	40	44	72	0	20	104	32	0	680	
Heavy Trucks	0	4	0	0	0	4	0	0	4	0	0	0	0	0	0	0	12	
Pedestrians		0				0				4				0			4	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																		
Stopped Buses																		

Comments:

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
 CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Providence Dr & 99W Pacific Highway (091)
 January 1, 2010 through December 31, 2014

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
YEAR: 2014														
REAR-END	0	0	2	2	0	0	0	2	0	2	0	2	0	0
2014 TOTAL	0	0	2	2	0	0	0	2	0	2	0	2	0	0
YEAR: 2013														
REAR-END	0	0	1	1	0	0	0	1	0	1	0	1	0	0
2013 TOTAL	0	0	1	1	0	0	0	1	0	1	0	1	0	0
YEAR: 2012														
REAR-END	0	2	1	3	0	3	0	2	1	3	0	3	0	0
2012 TOTAL	0	2	1	3	0	3	0	2	1	3	0	3	0	0
YEAR: 2011														
REAR-END	0	0	1	1	0	0	0	0	1	1	0	1	0	0
2011 TOTAL	0	0	1	1	0	0	0	0	1	1	0	1	0	0
YEAR: 2010														
REAR-END	0	1	0	1	0	2	0	1	0	1	0	1	0	0
2010 TOTAL	0	1	0	1	0	2	0	1	0	1	0	1	0	0
FINAL TOTAL	0	3	5	8	0	5	0	6	2	8	0	8	0	0

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
 CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Hayes St & Brutscher St
 January 1, 2010 through December 31, 2014

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
YEAR: 2013														
NON-COLLISION	0	1	0	1	0	1	0	1	0	0	1	1	0	0
2013 TOTAL	0	1	0	1	0	1	0	1	0	0	1	1	0	0
FINAL TOTAL	0	1	0	1	0	1	0	1	0	0	1	1	0	0

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

17-346 Newberg Surg. Ctr TIA

Vistro File: J:\...\17-346 Newberg Ambulatory Surgery
 TIA.vistro

Scenario 1 AM Existing 17-346

Report File: J:\...\17-346 Existing AM.pdf

3/2/2017

Intersection Analysis Summary


ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Hwy 99W at Providence Dr	Signalized	HCM 6th Edition	NWB Right	0.652	5.0	A
3	Brutsher St at Hayes St	Roundabout	HCM 6th Edition	NB Thru		3.8	A
4	Hayes at Werth	Roundabout	HCM 6th Edition	EB Thru		3.2	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report
Intersection 1: Hwy 99W at Providence Dr**

Control Type:	Signalized	Delay (sec / veh):	5.0
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.652

Intersection Setup

Name	Hwy 99W		Hwy 99W		Providence Dr	
Approach	Northeastbound		Southwestbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	1	0
Pocket Length [ft]	100.00	75.00	100.00	100.00	150.00	100.00
Speed [mph]	45.00		45.00		25.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	Hwy 99W		Hwy 99W		Providence Dr	
Base Volume Input [veh/h]	1725	73	64	991	38	46
Base Volume Adjustment Factor	1.0850	1.0850	1.0850	1.0850	1.0850	1.0850
Heavy Vehicles Percentage [%]	4.50	4.50	4.50	4.50	4.50	4.50
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1872	79	69	1075	41	50
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	482	20	18	277	11	13
Total Analysis Volume [veh/h]	1930	81	71	1108	42	52
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal group	8	0	0	4	5	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	5	0	0	5	5	0
Maximum Green [s]	30	0	0	30	30	0
Amber [s]	3.0	0.0	0.0	3.0	3.0	0.0
All red [s]	1.0	0.0	0.0	1.0	1.0	0.0
Split [s]	19	0	0	19	101	0
Vehicle Extension [s]	3.0	0.0	0.0	3.0	3.0	0.0
Walk [s]	5	0	0	5	5	0
Pedestrian Clearance [s]	10	0	0	10	10	0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	0.0	2.0	2.0	0.0
Minimum Recall	No			No	No	
Maximum Recall	No			No	No	
Pedestrian Recall	No			No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
C, Cycle Length [s]	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	106	106	106	106	6	6
g / C, Green / Cycle	0.88	0.88	0.88	0.88	0.05	0.05
(v / s)_i Volume / Saturation Flow Rate	0.61	0.06	0.35	0.35	0.03	0.04
s, saturation flow rate [veh/h]	3140	1402	203	3140	1571	1402
c, Capacity [veh/h]	2765	1234	195	2765	83	74
d1, Uniform Delay [s]	2.22	0.91	10.29	1.32	55.27	55.86
k, delay calibration	0.50	0.50	0.50	0.50	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.49	0.10	5.16	0.43	4.72	11.46
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.70	0.07	0.36	0.40	0.51	0.70
d, Delay for Lane Group [s/veh]	3.71	1.01	15.45	1.76	59.99	67.32
Lane Group LOS	A	A	B	A	E	E
Critical Lane Group	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	1.61	0.07	1.11	0.52	1.36	1.80
50th-Percentile Queue Length [ft]	40.21	1.77	27.64	13.03	33.90	44.91
95th-Percentile Queue Length [veh]	2.90	0.13	1.99	0.94	2.44	3.23
95th-Percentile Queue Length [ft]	72.38	3.18	49.75	23.46	61.02	80.84

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	3.71	1.01	15.45	1.76	59.99	67.32
Movement LOS	A	A	B	A	E	E
d_A, Approach Delay [s/veh]	3.60		2.58		64.04	
Approach LOS	A		A		E	
d_I, Intersection Delay [s/veh]	4.97					
Intersection LOS	A					
Intersection V/C	0.652					

Other Modes

g_Walk,mi, Effective Walk Time [s]	9.0	9.0	9.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	51.34	51.34	51.34
I_p,int, Pedestrian LOS Score for Intersection	3.299	3.240	2.123
Crosswalk LOS	C	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	0	0
d_b, Bicycle Delay [s]	60.00	60.00	60.00
I_b,int, Bicycle LOS Score for Intersection	5.791	5.105	4.132
Bicycle LOS	F	F	D

Sequence

Ring 1	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



**Intersection Level Of Service Report
Intersection 3: Brutsher St at Hayes St**

Control Type: Roundabout
 Analysis Method: HCM 6th Edition
 Analysis Period: 15 minutes

Delay (sec / veh): 3.8
 Level Of Service: A

Intersection Setup

Name	Brutsher St			Brutsher St			Hayes St			Hayes St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Brutsher St			Brutsher St			Hayes St			Hayes St		
Base Volume Input [veh/h]	38	113	16	10	44	37	27	50	31	3	14	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	38	113	16	10	44	37	27	50	31	3	14	5
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	10	30	4	3	12	10	7	13	8	1	4	1
Total Analysis Volume [veh/h]	40	120	17	11	47	39	29	53	33	3	15	5
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	94			59			62			192		
Exiting Flow Rate [veh/h]	65			56			51			151		
Demand Flow Rate [veh/h]	38	113	16	10	44	37	27	50	31	3	14	5
Adjusted Demand Flow Rate [veh/h]	40	120	17	11	47	39	29	53	33	3	15	5

Lanes

Override Calculated Critical Headway	No			No			No			No		
User-Defined Critical Headway [s]	4.00			4.00			4.00			4.00		
Override Calculated Follow-Up Time	No			No			No			No		
User-Defined Follow-Up Time [s]	3.00			3.00			3.00			3.00		
A (intercept)	1380.00			1380.00			1380.00			1380.00		
B (coefficient)	0.00102			0.00102			0.00102			0.00102		
HV Adjustment Factor	0.98			0.98			0.98			0.98		
Entry Flow Rate [veh/h]	180			99			117			24		
Capacity of Entry and Bypass Lanes [veh/h]	1254			1300			1296			1135		
Pedestrian Impedance	1.00			1.00			1.00			1.00		
Capacity per Entry Lane [veh/h]	1234			1280			1276			1117		
X, volume / capacity	0.14			0.08			0.09			0.02		

Movement, Approach, & Intersection Results

Lane LOS	A			A			A			A		
95th-Percentile Queue Length [veh]	0.50			0.25			0.30			0.06		
95th-Percentile Queue Length [ft]	12.52			6.14			7.42			1.58		
Approach Delay [s/veh]	4.12			3.42			3.55			3.39		
Approach LOS	A			A			A			A		
Intersection Delay [s/veh]	3.76											
Intersection LOS	A											

**Intersection Level Of Service Report
Intersection 4: Hayes at Werth**

Control Type: Roundabout
 Analysis Method: HCM 6th Edition
 Analysis Period: 15 minutes

Delay (sec / veh): 3.2
 Level Of Service: A

Intersection Setup

Name	Werth			Werth			Hayes St			Providence Dr		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Werth			Werth			Hayes St			Providence Dr		
Base Volume Input [veh/h]	1	0	2	0	0	7	2	45	12	19	26	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	0	2	0	0	7	2	45	12	19	26	1
Peak Hour Factor	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	1	0	0	2	1	14	4	6	8	0
Total Analysis Volume [veh/h]	1	0	3	0	0	9	3	58	15	24	33	1
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	64			61			25			4		
Exiting Flow Rate [veh/h]	61			36			25			3		
Demand Flow Rate [veh/h]	1	0	2	0	0	7	2	45	12	19	26	1
Adjusted Demand Flow Rate [veh/h]	1	0	3	0	0	9	3	58	15	24	33	1

Lanes

Overwrite Calculated Critical Headway	No			No			No			No		
User-Defined Critical Headway [s]	4.00			4.00			4.00			4.00		
Overwrite Calculated Follow-Up Time	No			No			No			No		
User-Defined Follow-Up Time [s]	3.00			3.00			3.00			3.00		
A (intercept)	1380.00			1380.00			1380.00			1380.00		
B (coefficient)	0.00102			0.00102			0.00102			0.00102		
HV Adjustment Factor	0.95			0.95			0.95			0.95		
Entry Flow Rate [veh/h]	5			10			81			62		
Capacity of Entry and Bypass Lanes [veh/h]	1293			1297			1345			1375		
Pedestrian Impedance	1.00			1.00			1.00			1.00		
Capacity per Entry Lane [veh/h]	1227			1231			1276			1304		
X, volume / capacity	0.00			0.01			0.06			0.04		

Movement, Approach, & Intersection Results

Lane LOS	A			A			A			A		
95th-Percentile Queue Length [veh]	0.01			0.02			0.19			0.14		
95th-Percentile Queue Length [ft]	0.25			0.55			4.74			3.49		
Approach Delay [s/veh]	2.96			2.98			3.30			3.11		
Approach LOS	A			A			A			A		
Intersection Delay [s/veh]	3.20											
Intersection LOS	A											

17-346 Newberg Surg. Ctr TIA

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3/2/2017

Turning Movement Volume: Summary

ID	Intersection Name	Northeastbound		Southwestbound		Northwestbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
1	Hwy 99W at Providence Dr	1872	79	69	1075	41	50	3186

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
3	Brutsher St at Hayes St	38	113	16	10	44	37	27	50	31	3	14	5	388

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4	Hayes at Werth	1	0	2	0	0	7	2	45	12	19	26	1	115

17-346 Newberg Surg. Ctr TIA

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Scenario 1 AM Existing 17-346

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3/2/2017

Turning Movement Volume: Detail

ID	Intersection Name	Volume Type	Northeastbound		Southwestbound		Northwestbound		Total Volume
			Thru	Right	Left	Thru	Left	Right	
1	Hwy 99W at Providence Dr	Final Base	1872	79	69	1075	41	50	3186
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	1872	79	69	1075	41	50	3186

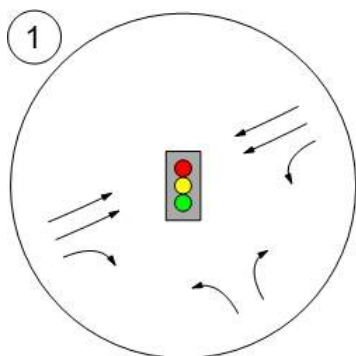
ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
3	Brutsher St at Hayes St	Final Base	38	113	16	10	44	37	27	50	31	3	14	5	388
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	38	113	16	10	44	37	27	50	31	3	14	5	388

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4	Hayes at Werth	Final Base	1	0	2	0	0	7	2	45	12	19	26	1	115
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	1	0	2	0	0	7	2	45	12	19	26	1	115

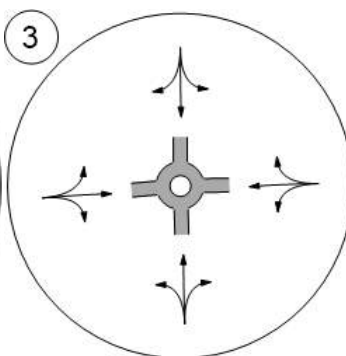
Report Figure 1: Lane Configuration and Traffic Control



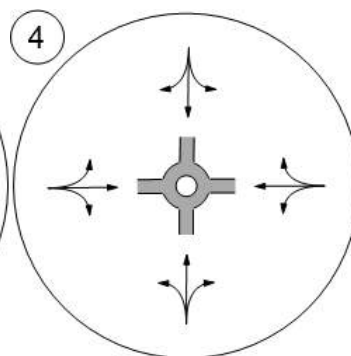
Hwy 99W at Providence Dr



Brutsher St at Hayes St



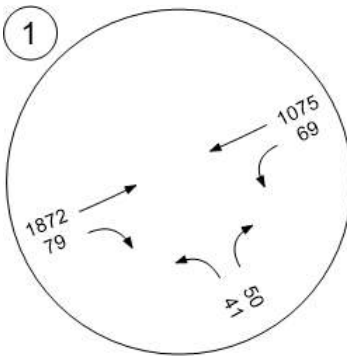
Hayes at Werth



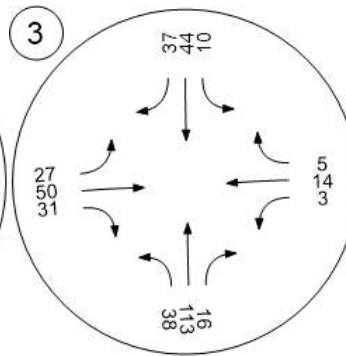
Report Figure 2a: Traffic Volume - Base Volume



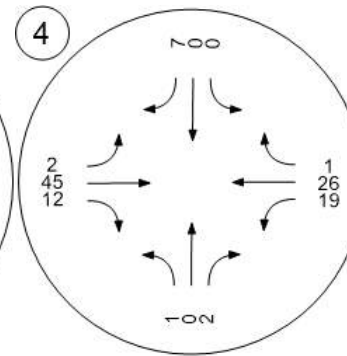
Hwy 99W at Providence Dr



Brutsher St at Hayes St



Hayes at Werth



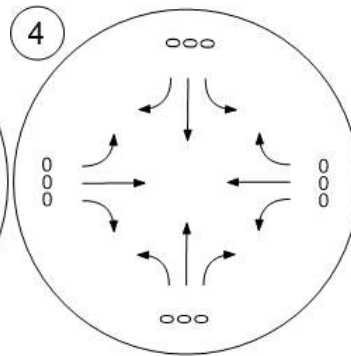
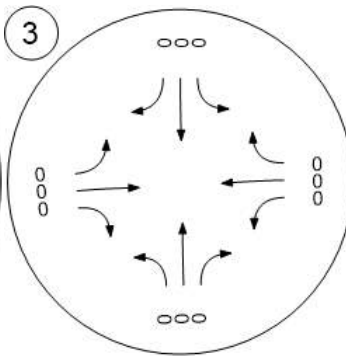
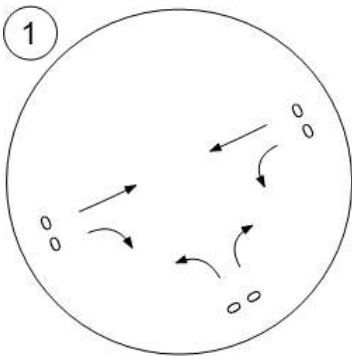
Report Figure 2c: Traffic Volume - Net New Site Trips



Hwy 99W at Providence Dr

Brutsher St at Hayes St

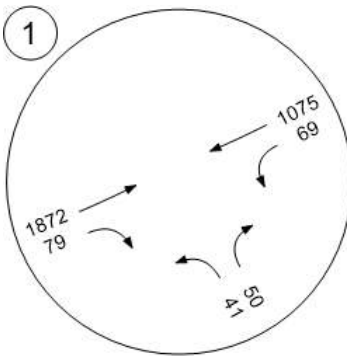
Hayes at Werth



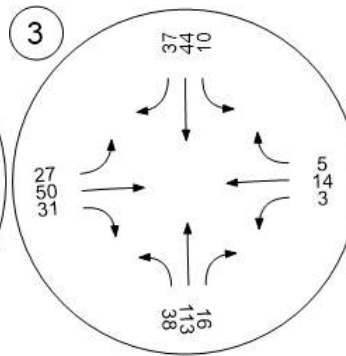
Report Figure 2e: Traffic Volume - Future Total Volume



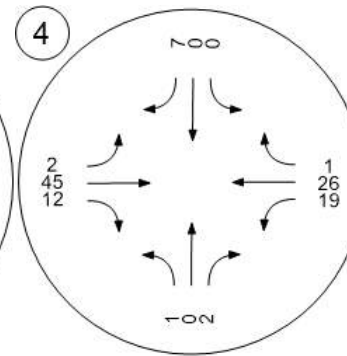
Hwy 99W at Providence Dr



Brutsher St at Hayes St



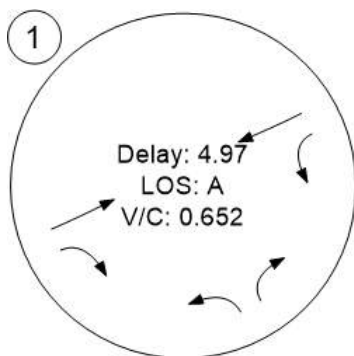
Hayes at Werth



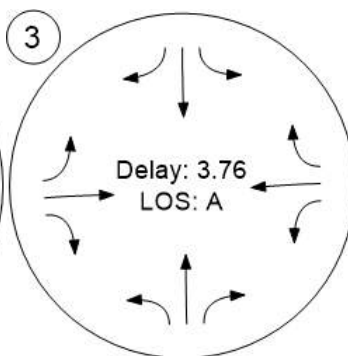
Report Figure 3: Traffic Conditions



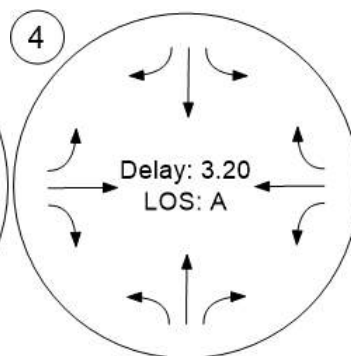
Hwy 99W at Providence Dr



Brutsher St at Hayes St



Hayes at Werth



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Scenario 2 PM Existing 17-346

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3/6/2017

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Hwy 99W at Providence Dr	Signalized	HCM 6th Edition	SWB Left	0.714	10.7	B
3	Brutsher St at Hayes St	Roundabout	HCM 6th Edition	SB Right		4.6	A
4	Hayes at Werth	Roundabout	HCM 6th Edition	WB Thru		3.5	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report
Intersection 1: Hwy 99W at Providence Dr**

Control Type:	Signalized	Delay (sec / veh):	10.7
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.714

Intersection Setup

Name	Hwy 99W		Hwy 99W		Providence Dr	
Approach	Northeastbound		Southwestbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	1	0
Pocket Length [ft]	100.00	75.00	100.00	100.00	150.00	100.00
Speed [mph]	45.00		45.00		25.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	Hwy 99W		Hwy 99W		Providence Dr	
Base Volume Input [veh/h]	1207	31	79	1789	78	96
Base Volume Adjustment Factor	1.0850	1.0850	1.0850	1.0850	1.0850	1.0850
Heavy Vehicles Percentage [%]	3.27	3.27	3.27	3.27	3.27	3.27
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1310	34	86	1941	85	104
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	341	9	22	505	22	27
Total Analysis Volume [veh/h]	1365	35	90	2022	89	108
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Permissive	Permissive
Signal group	8	0	7	4	5	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	5	0	5	5	5	0
Maximum Green [s]	30	0	30	30	30	0
Amber [s]	3.0	0.0	3.0	3.0	3.0	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	27	0	44	71	19	0
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	0.0
Walk [s]	5	0	0	5	5	0
Pedestrian Clearance [s]	10	0	0	10	10	0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
Minimum Recall	No		No	No	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
C, Cycle Length [s]	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	63	63	6	73	9	9
g / C, Green / Cycle	0.70	0.70	0.07	0.81	0.10	0.10
(v / s)_j Volume / Saturation Flow Rate	0.43	0.02	0.06	0.64	0.06	0.08
s, saturation flow rate [veh/h]	3172	1416	1587	3172	1587	1416
c, Capacity [veh/h]	2204	984	115	2575	158	141
d1, Uniform Delay [s]	7.35	4.29	41.06	4.40	38.70	39.54
k, delay calibration	0.50	0.50	0.11	0.50	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.32	0.07	10.96	2.49	3.16	8.48
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.62	0.04	0.78	0.79	0.57	0.77
d, Delay for Lane Group [s/veh]	8.67	4.36	52.02	6.89	41.86	48.03
Lane Group LOS	A	A	D	A	D	D
Critical Lane Group	No	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	5.25	0.16	2.22	4.05	2.01	2.65
50th-Percentile Queue Length [ft]	131.22	4.09	55.60	101.13	50.30	66.37
95th-Percentile Queue Length [veh]	9.01	0.29	4.00	7.28	3.62	4.78
95th-Percentile Queue Length [ft]	225.15	7.36	100.08	182.04	90.54	119.47

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	8.67	4.36	52.02	6.89	41.86	48.03
Movement LOS	A	A	D	A	D	D
d_A, Approach Delay [s/veh]	8.56		8.81		45.24	
Approach LOS	A		A		D	
d_I, Intersection Delay [s/veh]	10.65					
Intersection LOS	B					
Intersection V/C	0.714					

Other Modes

g_Walk,mi, Effective Walk Time [s]	9.0	9.0	9.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	36.45	36.45	36.45
I_p,int, Pedestrian LOS Score for Intersection	3.455	3.350	2.029
Crosswalk LOS	C	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	0	0
d_b, Bicycle Delay [s]	45.00	45.00	45.00
I_b,int, Bicycle LOS Score for Intersection	5.287	5.875	4.132
Bicycle LOS	F	F	D

Sequence

Ring 1	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



**Intersection Level Of Service Report
Intersection 3: Brutsher St at Hayes St**

Control Type:	Roundabout	Delay (sec / veh):	4.6
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name	Brutsher St			Brutsher St			Hayes St			Hayes St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Brutsher St			Brutsher St			Hayes St			Hayes St		
Base Volume Input [veh/h]	52	67	12	21	99	140	44	30	42	14	78	30
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	52	67	12	21	99	140	44	30	42	14	78	30
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	18	3	6	27	38	12	8	11	4	21	8
Total Analysis Volume [veh/h]	56	72	13	23	106	151	47	32	45	15	84	32
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	104			158			147			178		
Exiting Flow Rate [veh/h]	56			142			123			121		
Demand Flow Rate [veh/h]	52	67	12	21	99	140	44	30	42	14	78	30
Adjusted Demand Flow Rate [veh/h]	56	72	13	23	106	151	47	32	45	15	84	32

Lanes

Overwrite Calculated Critical Headway	No			No			No			No		
User-Defined Critical Headway [s]	4.00			4.00			4.00			4.00		
Overwrite Calculated Follow-Up Time	No			No			No			No		
User-Defined Follow-Up Time [s]	3.00			3.00			3.00			3.00		
A (intercept)	1380.00			1380.00			1380.00			1380.00		
B (coefficient)	0.00102			0.00102			0.00102			0.00102		
HV Adjustment Factor	0.98			0.98			0.98			0.98		
Entry Flow Rate [veh/h]	144			285			127			134		
Capacity of Entry and Bypass Lanes [veh/h]	1242			1175			1189			1151		
Pedestrian Impedance	1.00			1.00			1.00			1.00		
Capacity per Entry Lane [veh/h]	1220			1155			1168			1131		
X, volume / capacity	0.12			0.24			0.11			0.12		

Movement, Approach, & Intersection Results

Lane LOS	A			A			A			A		
95th-Percentile Queue Length [veh]	0.39			0.95			0.36			0.39		
95th-Percentile Queue Length [ft]	9.77			23.80			8.89			9.80		
Approach Delay [s/veh]	3.91			5.33			3.98			4.18		
Approach LOS	A			A			A			A		
Intersection Delay [s/veh]	4.56											
Intersection LOS	A											

**Intersection Level Of Service Report
Intersection 4: Hayes at Werth**

Control Type: Roundabout
 Analysis Method: HCM 6th Edition
 Analysis Period: 15 minutes

Delay (sec / veh): 3.5
 Level Of Service: A

Intersection Setup

Name	Werth			Werth			Hayes St			Providence Dr		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Werth			Werth			Hayes St			Providence Dr		
Base Volume Input [veh/h]	10	0	7	2	0	3	17	30	9	11	105	6
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	0	7	2	0	3	17	30	9	11	105	6
Peak Hour Factor	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	0	2	1	0	1	5	9	3	3	33	2
Total Analysis Volume [veh/h]	13	0	9	3	0	4	22	38	11	14	133	8
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	64			163			17			36		
Exiting Flow Rate [veh/h]	42			148			14			22		
Demand Flow Rate [veh/h]	10	0	7	2	0	3	17	30	9	11	105	6
Adjusted Demand Flow Rate [veh/h]	13	0	9	3	0	4	22	38	11	14	133	8

Lanes

Override Calculated Critical Headway	No			No			No			No		
User-Defined Critical Headway [s]	4.00			4.00			4.00			4.00		
Override Calculated Follow-Up Time	No			No			No			No		
User-Defined Follow-Up Time [s]	3.00			3.00			3.00			3.00		
A (intercept)	1380.00			1380.00			1380.00			1380.00		
B (coefficient)	0.00102			0.00102			0.00102			0.00102		
HV Adjustment Factor	0.98			0.98			0.98			0.98		
Entry Flow Rate [veh/h]	23			8			73			158		
Capacity of Entry and Bypass Lanes [veh/h]	1293			1170			1356			1331		
Pedestrian Impedance	1.00			1.00			1.00			1.00		
Capacity per Entry Lane [veh/h]	1273			1151			1335			1311		
X, volume / capacity	0.02			0.01			0.05			0.12		

Movement, Approach, & Intersection Results

Lane LOS	A			A			A			A		
95th-Percentile Queue Length [veh]	0.05			0.02			0.17			0.40		
95th-Percentile Queue Length [ft]	1.32			0.46			4.21			10.04		
Approach Delay [s/veh]	2.97			3.18			3.11			3.71		
Approach LOS	A			A			A			A		
Intersection Delay [s/veh]	3.46											
Intersection LOS	A											

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Turning Movement Volume: Summary

ID	Intersection Name	Northeastbound		Southwestbound		Northwestbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
1	Hwy 99W at Providence Dr	1310	34	86	1941	85	104	3560

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
3	Brutsher St at Hayes St	52	67	12	21	99	140	44	30	42	14	78	30	629

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4	Hayes at Werth	10	0	7	2	0	3	17	30	9	11	105	6	200

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Turning Movement Volume: Detail

ID	Intersection Name	Volume Type	Northeastbound		Southwestbound		Northwestbound		Total Volume
			Thru	Right	Left	Thru	Left	Right	
1	Hwy 99W at Providence Dr	Final Base	1310	34	86	1941	85	104	3560
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	1310	34	86	1941	85	104	3560

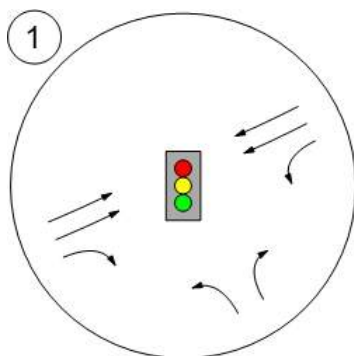
ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
3	Brutsher St at Hayes St	Final Base	52	67	12	21	99	140	44	30	42	14	78	30	629
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	52	67	12	21	99	140	44	30	42	14	78	30	629

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4	Hayes at Werth	Final Base	10	0	7	2	0	3	17	30	9	11	105	6	200
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	10	0	7	2	0	3	17	30	9	11	105	6	200

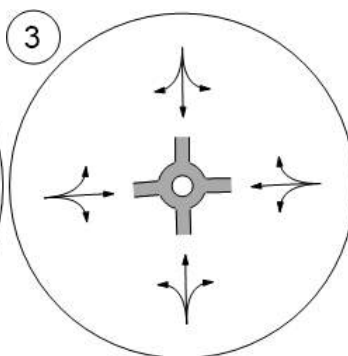
Report Figure 1: Lane Configuration and Traffic Control



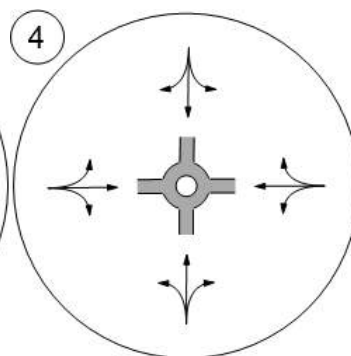
Hwy 99W at Providence Dr



Brutsher St at Hayes St



Hayes at Werth



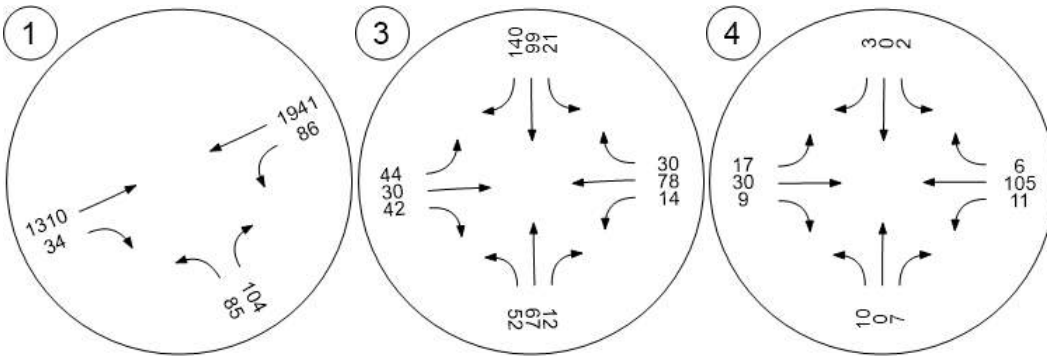
Report Figure 2a: Traffic Volume - Base Volume



Hwy 99W at Providence Dr

Brutsher St at Hayes St

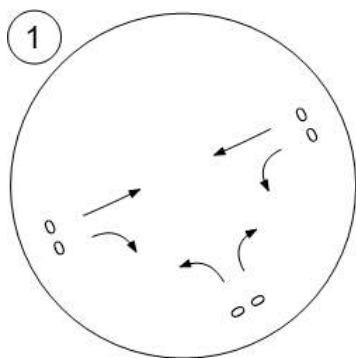
Hayes at Werth



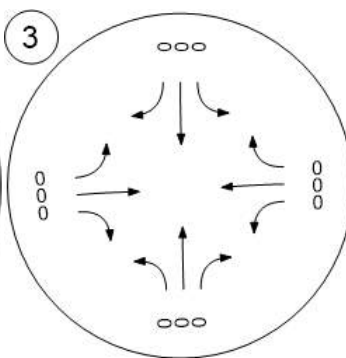
Report Figure 2c: Traffic Volume - Net New Site Trips



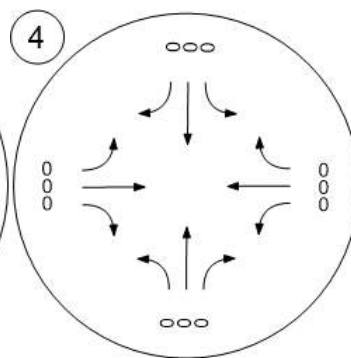
Hwy 99W at Providence Dr



Brutsher St at Hayes St



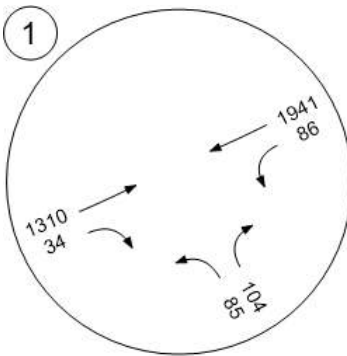
Hayes at Werth



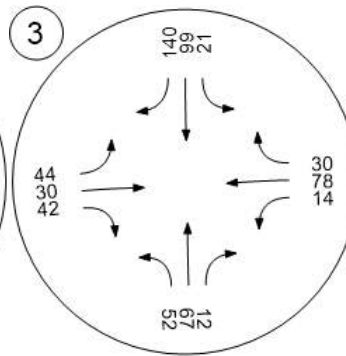
Report Figure 2e: Traffic Volume - Future Total Volume



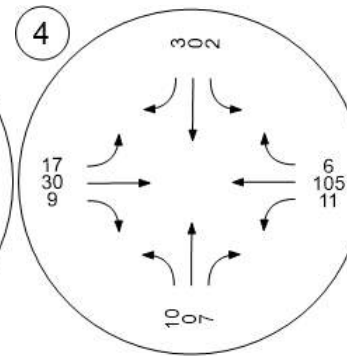
Hwy 99W at Providence Dr



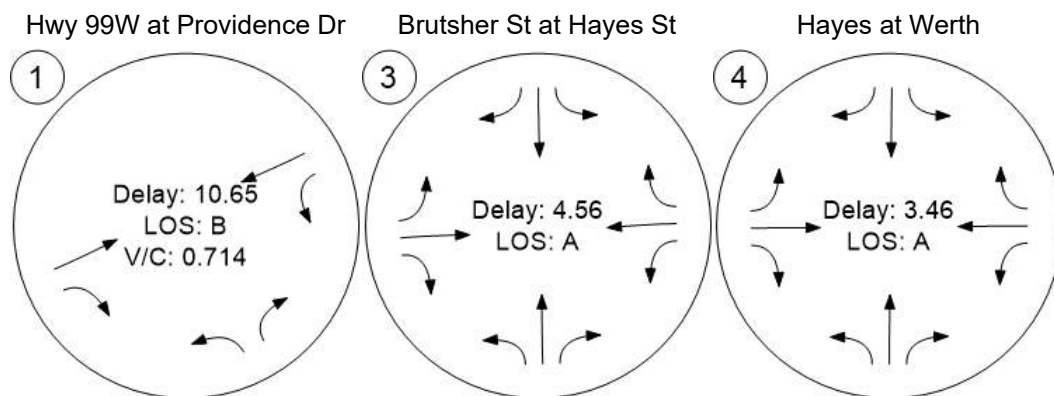
Brutsher St at Hayes St



Hayes at Werth



Report Figure 3: Traffic Conditions



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Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Hwy 99W at Providence Dr	Signalized	HCM 6th Edition	NWB Right	0.661	5.4	A
3	Brutsher St at Hayes St	Roundabout	HCM 6th Edition	NB Thru		3.8	A
4	Hayes at Werth	Roundabout	HCM 6th Edition	EB Thru		3.2	A
5	Site Access at Providence Dr.	Two-way stop	HCM 6th Edition	EB Left	0.012	9.3	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report
Intersection 1: Hwy 99W at Providence Dr**

Control Type:	Signalized	Delay (sec / veh):	5.4
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.661

Intersection Setup

Name	Hwy 99W		Hwy 99W		Providence Dr	
Approach	Northeastbound		Southwestbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	1	0
Pocket Length [ft]	100.00	75.00	100.00	100.00	150.00	100.00
Speed [mph]	45.00		45.00		25.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	Hwy 99W		Hwy 99W		Providence Dr	
Base Volume Input [veh/h]	1725	73	64	991	38	46
Base Volume Adjustment Factor	1.0850	1.0850	1.0850	1.0850	1.0850	1.0850
Heavy Vehicles Percentage [%]	4.50	4.50	4.50	4.50	4.50	4.50
Growth Rate	1.01	1.01	1.01	1.01	1.01	1.01
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	20	10	0	5	3
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1891	100	80	1086	46	54
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	487	26	21	280	12	14
Total Analysis Volume [veh/h]	1949	103	82	1120	47	56
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal group	8	0	0	4	5	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	5	0	0	5	5	0
Maximum Green [s]	30	0	0	30	30	0
Amber [s]	3.0	0.0	0.0	3.0	3.0	0.0
All red [s]	1.0	0.0	0.0	1.0	1.0	0.0
Split [s]	19	0	0	19	101	0
Vehicle Extension [s]	3.0	0.0	0.0	3.0	3.0	0.0
Walk [s]	5	0	0	5	5	0
Pedestrian Clearance [s]	10	0	0	10	10	0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	0.0	2.0	2.0	0.0
Minimum Recall	No			No	No	
Maximum Recall	No			No	No	
Pedestrian Recall	No			No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
C, Cycle Length [s]	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	105	105	105	105	7	7
g / C, Green / Cycle	0.88	0.88	0.88	0.88	0.06	0.06
(v / s)_i Volume / Saturation Flow Rate	0.62	0.07	0.41	0.36	0.03	0.04
s, saturation flow rate [veh/h]	3140	1402	200	3140	1571	1402
c, Capacity [veh/h]	2754	1229	190	2754	88	79
d1, Uniform Delay [s]	2.39	0.98	12.32	1.41	55.04	55.62
k, delay calibration	0.50	0.50	0.50	0.50	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.56	0.13	6.98	0.45	4.89	11.14
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.71	0.08	0.43	0.41	0.53	0.71
d, Delay for Lane Group [s/veh]	3.95	1.11	19.31	1.86	59.93	66.76
Lane Group LOS	A	A	B	A	E	E
Critical Lane Group	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	1.96	0.10	1.49	0.63	1.51	1.92
50th-Percentile Queue Length [ft]	49.00	2.62	37.15	15.81	37.87	48.08
95th-Percentile Queue Length [veh]	3.53	0.19	2.67	1.14	2.73	3.46
95th-Percentile Queue Length [ft]	88.20	4.71	66.86	28.46	68.17	86.55

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	3.95	1.11	19.31	1.86	59.93	66.76
Movement LOS	A	A	B	A	E	E
d_A, Approach Delay [s/veh]	3.81		3.05		63.65	
Approach LOS	A		A		E	
d_I, Intersection Delay [s/veh]	5.37					
Intersection LOS	A					
Intersection V/C	0.661					

Other Modes

g_Walk,mi, Effective Walk Time [s]	9.0	9.0	9.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	51.34	51.34	51.34
I_p,int, Pedestrian LOS Score for Intersection	3.324	3.253	2.150
Crosswalk LOS	C	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	0	0
d_b, Bicycle Delay [s]	60.00	60.00	60.00
I_b,int, Bicycle LOS Score for Intersection	5.825	5.124	4.132
Bicycle LOS	F	F	D

Sequence

Ring 1	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



**Intersection Level Of Service Report
Intersection 3: Brutsher St at Hayes St**

Control Type:	Roundabout	Delay (sec / veh):	3.8
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name	Brutscher St			Brutscher St			Hayes St			Hayes St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Brutscher St			Brutscher St			Hayes St			Hayes St		
Base Volume Input [veh/h]	38	113	16	10	44	37	27	50	31	3	14	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59
Growth Rate	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	3	0	0	1	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	38	114	16	10	44	37	27	54	31	3	15	5
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	10	30	4	3	12	10	7	14	8	1	4	1
Total Analysis Volume [veh/h]	40	121	17	11	47	39	29	57	33	3	16	5
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	99			60			62			193		
Exiting Flow Rate [veh/h]	69			57			51			152		
Demand Flow Rate [veh/h]	38	114	16	10	44	37	27	54	31	3	15	5
Adjusted Demand Flow Rate [veh/h]	40	121	17	11	47	39	29	57	33	3	16	5

Lanes

Overwrite Calculated Critical Headway	No			No			No			No		
User-Defined Critical Headway [s]	4.00			4.00			4.00			4.00		
Overwrite Calculated Follow-Up Time	No			No			No			No		
User-Defined Follow-Up Time [s]	3.00			3.00			3.00			3.00		
A (intercept)	1380.00			1380.00			1380.00			1380.00		
B (coefficient)	0.00102			0.00102			0.00102			0.00102		
HV Adjustment Factor	0.98			0.98			0.98			0.98		
Entry Flow Rate [veh/h]	181			99			121			25		
Capacity of Entry and Bypass Lanes [veh/h]	1249			1299			1296			1134		
Pedestrian Impedance	1.00			1.00			1.00			1.00		
Capacity per Entry Lane [veh/h]	1229			1278			1276			1116		
X, volume / capacity	0.14			0.08			0.09			0.02		

Movement, Approach, & Intersection Results

Lane LOS	A			A			A			A		
95th-Percentile Queue Length [veh]	0.51			0.25			0.31			0.07		
95th-Percentile Queue Length [ft]	12.66			6.15			7.70			1.65		
Approach Delay [s/veh]	4.15			3.43			3.58			3.41		
Approach LOS	A			A			A			A		
Intersection Delay [s/veh]	3.78											
Intersection LOS	A											

**Intersection Level Of Service Report
Intersection 4: Hayes at Werth**

Control Type: Roundabout
 Analysis Method: HCM 6th Edition
 Analysis Period: 15 minutes

Delay (sec / veh): 3.2
 Level Of Service: A

Intersection Setup

Name	Werth			Werth			Hayes St			Providence Dr		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Werth			Werth			Hayes St			Providence Dr		
Base Volume Input [veh/h]	1	0	2	0	0	7	2	45	12	19	26	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40
Growth Rate	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	3	0	0	1	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	0	2	0	0	7	2	48	12	19	27	1
Peak Hour Factor	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	1	0	0	2	1	15	4	6	9	0
Total Analysis Volume [veh/h]	1	0	3	0	0	9	3	62	15	24	35	1
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	69			63			25			4		
Exiting Flow Rate [veh/h]	65			38			25			3		
Demand Flow Rate [veh/h]	1	0	2	0	0	7	2	48	12	19	27	1
Adjusted Demand Flow Rate [veh/h]	1	0	3	0	0	9	3	62	15	24	35	1

Lanes

Overwrite Calculated Critical Headway	No			No			No			No		
User-Defined Critical Headway [s]	4.00			4.00			4.00			4.00		
Overwrite Calculated Follow-Up Time	No			No			No			No		
User-Defined Follow-Up Time [s]	3.00			3.00			3.00			3.00		
A (intercept)	1380.00			1380.00			1380.00			1380.00		
B (coefficient)	0.00102			0.00102			0.00102			0.00102		
HV Adjustment Factor	0.95			0.95			0.95			0.95		
Entry Flow Rate [veh/h]	5			10			85			64		
Capacity of Entry and Bypass Lanes [veh/h]	1287			1294			1345			1375		
Pedestrian Impedance	1.00			1.00			1.00			1.00		
Capacity per Entry Lane [veh/h]	1221			1228			1276			1304		
X, volume / capacity	0.00			0.01			0.06			0.05		

Movement, Approach, & Intersection Results

Lane LOS	A			A			A			A		
95th-Percentile Queue Length [veh]	0.01			0.02			0.20			0.14		
95th-Percentile Queue Length [ft]	0.25			0.55			5.01			3.61		
Approach Delay [s/veh]	2.97			2.99			3.32			3.12		
Approach LOS	A			A			A			A		
Intersection Delay [s/veh]	3.22											
Intersection LOS	A											

**Intersection Level Of Service Report
Intersection 5: Site Access at Providence Dr.**

Control Type:	Two-way stop	Delay (sec / veh):	9.3
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.012

Intersection Setup

Name	Providence Dr		Providence Dr		Site Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration	↰		↳		↔	
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	Providence Dr		Providence Dr		Site Access	
Base Volume Input [veh/h]	0	47	46	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.54	0.54	0.54	0.54	0.54	0.54
Growth Rate	1.01	1.01	1.01	1.01	1.01	1.01
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	3	0	0	30	8	1
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	47	46	30	8	1
Peak Hour Factor	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	15	15	10	3	0
Total Analysis Volume [veh/h]	4	60	59	38	10	1
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.01	0.00
d_M, Delay for Movement [s/veh]	7.40	0.00	0.00	0.00	9.30	8.70
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.13	0.13	0.00	0.00	0.04	0.04
95th-Percentile Queue Length [ft]	3.33	3.33	0.00	0.00	0.97	0.97
d_A, Approach Delay [s/veh]	0.46		0.00		9.25	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.76					
Intersection LOS	A					

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Turning Movement Volume: Summary

ID	Intersection Name	Northeastbound		Southwestbound		Northwestbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
1	Hwy 99W at Providence Dr	1891	100	80	1086	46	54	3257

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
3	Brutsher St at Hayes St	38	114	16	10	44	37	27	54	31	3	15	5	394

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4	Hayes at Werth	1	0	2	0	0	7	2	48	12	19	27	1	119

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
5	Site Access at Providence Dr.	3	47	46	30	8	1	135

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Turning Movement Volume: Detail

ID	Intersection Name	Volume Type	Northeastbound		Southwestbound		Northwestbound		Total Volume
			Thru	Right	Left	Thru	Left	Right	
1	Hwy 99W at Providence Dr	Final Base	1872	79	69	1075	41	50	3186
		Growth Rate	1.01	1.01	1.01	1.01	1.01	1.01	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	20	10	0	5	3	38
		Other	0	0	0	0	0	0	0
		Future Total	1891	100	80	1086	46	54	3257

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume	
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
3	Brutsher St at Hayes St	Final Base	38	113	16	10	44	37	27	50	31	3	14	5	388	
		Growth Rate	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	-	
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Net New Trips	0	0	0	0	0	0	0	0	3	0	0	1	0	4
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	38	114	16	10	44	37	27	54	31	3	15	5	394	

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume	
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
4	Hayes at Werth	Final Base	1	0	2	0	0	7	2	45	12	19	26	1	115	
		Growth Rate	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	-	
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Net New Trips	0	0	0	0	0	0	0	0	3	0	0	1	0	4
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	1	0	2	0	0	7	2	48	12	19	27	1	119	

ID	Intersection Name	Volume Type	Northbound		Southbound		Eastbound		Total Volume
			Left	Thru	Thru	Right	Left	Right	
5	Site Access at Providence Dr.	Final Base	0	47	46	0	0	0	93
		Growth Rate	1.01	1.01	1.01	1.01	1.01	1.01	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	3	0	0	30	8	1	42
		Other	0	0	0	0	0	0	0
		Future Total	3	47	46	30	8	1	135

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Trip Generation summary

Added Trips

Zone ID: Name	Land Use variables	Code	Ind. Var.	Rate	Quantity	% In	% Out	Trips In	Trips Out	Total Trips	% of Total Trips
7: Newberg Surgery Ctr	Med/Dental Office Bldg	ITE 720	ksf	2.390	17.500	79.00	21.00	33	9	42	100.00
Added Trips Total								33	9	42	100.00

17-346 Newberg Surg. Ctr TIA

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TIA.vistro

Scenario 4 AM Developed 17-346

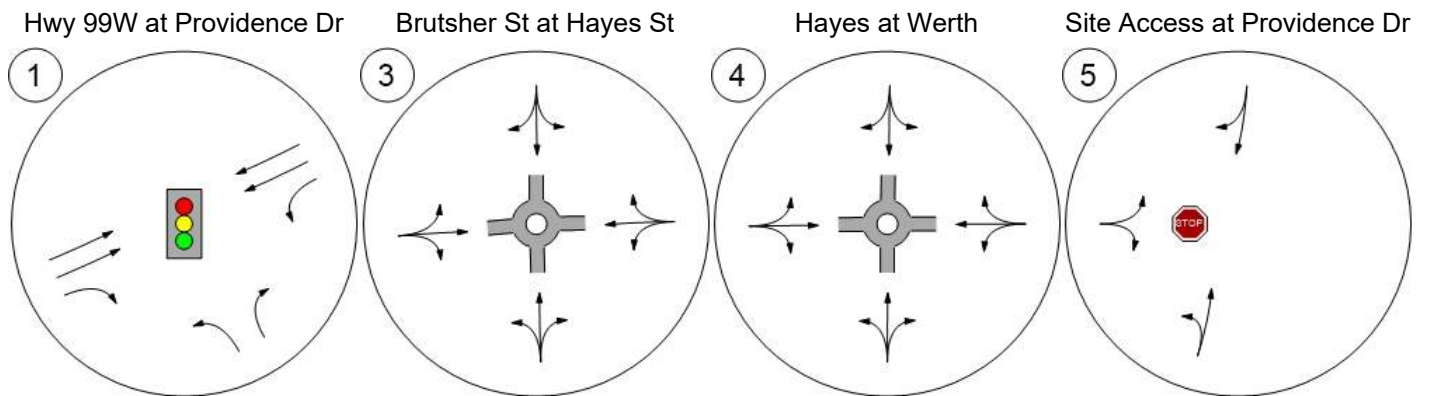
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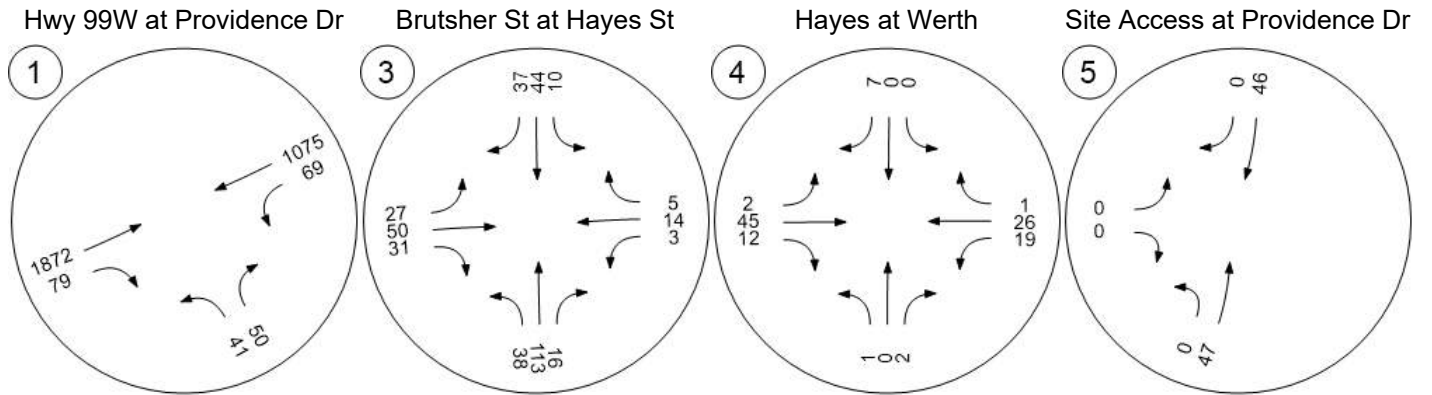
Trip Distribution summary

Zone / Gate	Zone 7: Newberg Surgery Ctr			
	To Newberg Surgery Ctr:		From Newberg Surgery Ctr:	
	Share %	Trips	Share %	Trips
1: Gate	60.00	20	60.00	5
2: Gate	30.00	10	30.00	3
3: Gate	10.00	3	10.00	1
4: Gate	0.00	0	0.00	0
5: Gate	0.00	0	0.00	0
6: Gate	0.00	0	0.00	0
8: Gate	0.00	0	0.00	0
9: Gate	0.00	0	0.00	0
Total	100.00	33	100.00	9

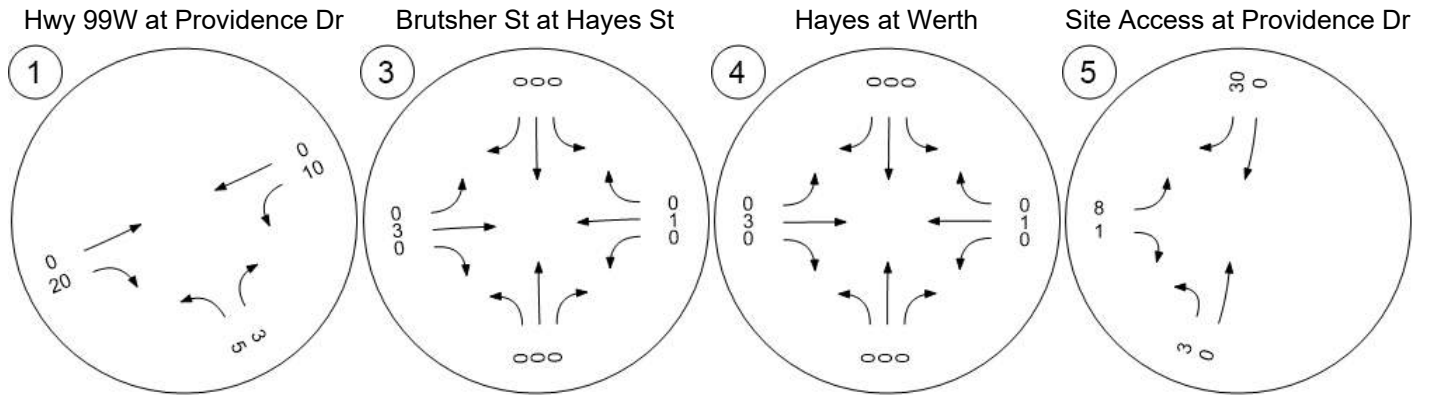
Report Figure 1: Lane Configuration and Traffic Control



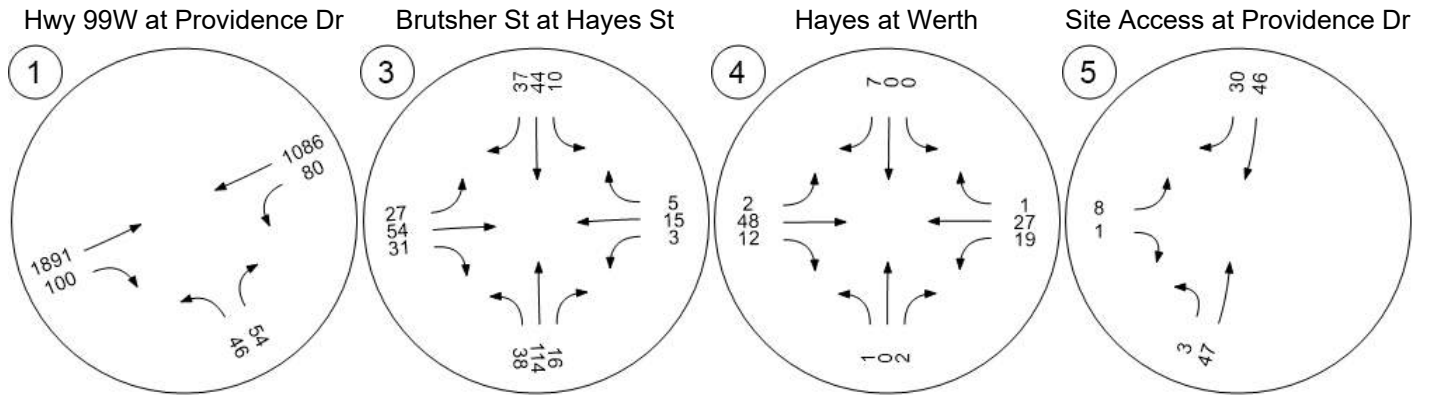
Report Figure 2a: Traffic Volume - Base Volume



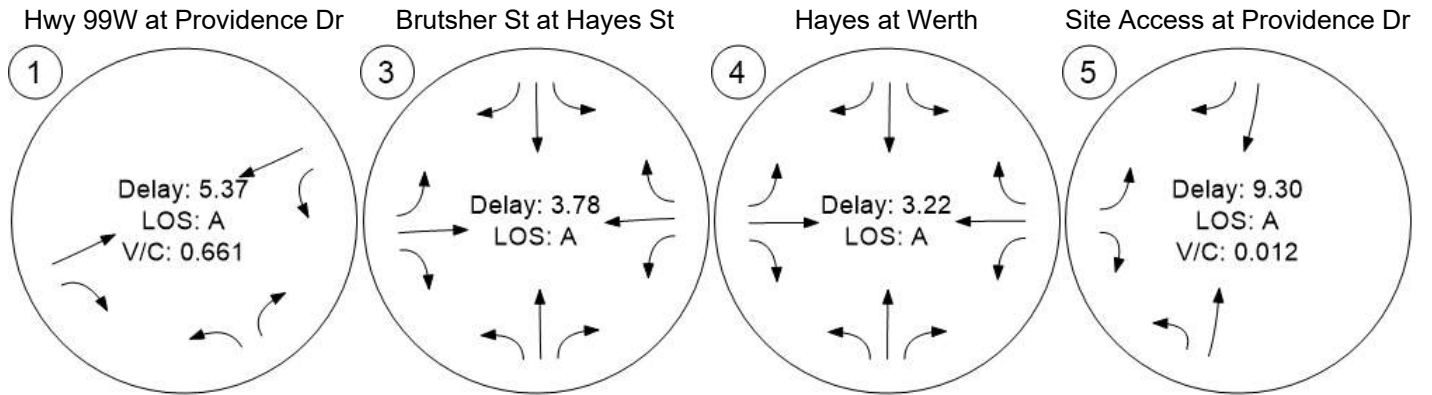
Report Figure 2c: Traffic Volume - Net New Site Trips



Report Figure 2e: Traffic Volume - Future Total Volume



Report Figure 3: Traffic Conditions



17-346 Newberg Surg. Ctr TIA

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Scenario 3 PM Developed 17-346

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Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Hwy 99W at Providence Dr	Signalized	HCM 6th Edition	SWB Left	0.731	12.0	B
3	Brutsher St at Hayes St	Roundabout	HCM 6th Edition	SB Right		4.6	A
4	Hayes at Werth	Roundabout	HCM 6th Edition	WB Thru		3.5	A
5	Site Access at Providence Dr.	Two-way stop	HCM 6th Edition	EB Left	0.067	10.1	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Hwy 99W at Providence Dr

Control Type:	Signalized	Delay (sec / veh):	12.0
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.731

Intersection Setup

Name	Hwy 99W		Hwy 99W		Providence Dr	
Approach	Northeastbound		Southwestbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	1	0
Pocket Length [ft]	100.00	75.00	100.00	100.00	150.00	100.00
Speed [mph]	45.00		45.00		25.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	Hwy 99W		Hwy 99W		Providence Dr	
Base Volume Input [veh/h]	1207	31	79	1789	78	96
Base Volume Adjustment Factor	1.0850	1.0850	1.0850	1.0850	1.0850	1.0850
Heavy Vehicles Percentage [%]	3.27	3.27	3.27	3.27	3.27	3.27
Growth Rate	1.01	1.01	1.01	1.01	1.01	1.01
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	10	5	0	26	14
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1323	44	92	1960	112	119
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	345	11	24	510	29	31
Total Analysis Volume [veh/h]	1378	46	96	2042	117	124
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Permissive	Permissive
Signal group	8	0	7	4	5	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	5	0	5	5	5	0
Maximum Green [s]	30	0	30	30	30	0
Amber [s]	3.0	0.0	3.0	3.0	3.0	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	27	0	44	71	19	0
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	0.0
Walk [s]	5	0	0	5	5	0
Pedestrian Clearance [s]	10	0	0	10	10	0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
Minimum Recall	No		No	No	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
C, Cycle Length [s]	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	61	61	7	72	10	10
g / C, Green / Cycle	0.68	0.68	0.08	0.80	0.11	0.11
(v / s)_j Volume / Saturation Flow Rate	0.43	0.03	0.06	0.64	0.07	0.09
s, saturation flow rate [veh/h]	3172	1416	1587	3172	1587	1416
c, Capacity [veh/h]	2152	961	122	2538	176	157
d1, Uniform Delay [s]	8.22	4.81	40.82	5.05	38.41	38.99
k, delay calibration	0.50	0.50	0.11	0.50	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.47	0.09	10.48	2.83	4.24	8.47
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.64	0.05	0.79	0.80	0.66	0.79
d, Delay for Lane Group [s/veh]	9.70	4.90	51.30	7.88	42.65	47.46
Lane Group LOS	A	A	D	A	D	D
Critical Lane Group	No	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	5.87	0.24	2.35	5.09	2.68	3.03
50th-Percentile Queue Length [ft]	146.70	5.92	58.78	127.16	67.02	75.77
95th-Percentile Queue Length [veh]	9.84	0.43	4.23	8.78	4.83	5.46
95th-Percentile Queue Length [ft]	246.02	10.66	105.80	219.62	120.64	136.38

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	9.70	4.90	51.30	7.88	42.65	47.46
Movement LOS	A	A	D	A	D	D
d_A, Approach Delay [s/veh]	9.54		9.83		45.13	
Approach LOS	A		A		D	
d_I, Intersection Delay [s/veh]	11.96					
Intersection LOS	B					
Intersection V/C	0.731					

Other Modes

g_Walk,mi, Effective Walk Time [s]	9.0	9.0	9.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	36.45	36.45	36.45
I_p,int, Pedestrian LOS Score for Intersection	3.516	3.366	2.045
Crosswalk LOS	D	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	0	0
d_b, Bicycle Delay [s]	45.00	45.00	45.00
I_b,int, Bicycle LOS Score for Intersection	5.307	5.896	4.132
Bicycle LOS	F	F	D

Sequence

Ring 1	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



**Intersection Level Of Service Report
Intersection 3: Brutsher St at Hayes St**

Control Type:	Roundabout	Delay (sec / veh):	4.6
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name	Brutsher St			Brutsher St			Hayes St			Hayes St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	⊕			⊕			⊕			⊕		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Brutsher St			Brutsher St			Hayes St			Hayes St		
Base Volume Input [veh/h]	52	67	12	21	99	140	44	30	42	14	78	30
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76
Growth Rate	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	2	0	0	5	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	53	68	12	21	100	141	44	32	42	14	84	30
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	18	3	6	27	38	12	9	11	4	23	8
Total Analysis Volume [veh/h]	57	73	13	23	108	152	47	34	45	15	90	32
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	106			165			149			180		
Exiting Flow Rate [veh/h]	58			150			125			122		
Demand Flow Rate [veh/h]	53	68	12	21	100	141	44	32	42	14	84	30
Adjusted Demand Flow Rate [veh/h]	57	73	13	23	108	152	47	34	45	15	90	32

Lanes

Override Calculated Critical Headway	No			No			No			No		
User-Defined Critical Headway [s]	4.00			4.00			4.00			4.00		
Override Calculated Follow-Up Time	No			No			No			No		
User-Defined Follow-Up Time [s]	3.00			3.00			3.00			3.00		
A (intercept)	1380.00			1380.00			1380.00			1380.00		
B (coefficient)	0.00102			0.00102			0.00102			0.00102		
HV Adjustment Factor	0.98			0.98			0.98			0.98		
Entry Flow Rate [veh/h]	146			288			129			140		
Capacity of Entry and Bypass Lanes [veh/h]	1239			1167			1186			1149		
Pedestrian Impedance	1.00			1.00			1.00			1.00		
Capacity per Entry Lane [veh/h]	1218			1147			1166			1129		
X, volume / capacity	0.12			0.25			0.11			0.12		

Movement, Approach, & Intersection Results

Lane LOS	A			A			A			A		
95th-Percentile Queue Length [veh]	0.40			0.97			0.36			0.41		
95th-Percentile Queue Length [ft]	9.95			24.37			9.07			10.33		
Approach Delay [s/veh]	3.94			5.40			4.00			4.24		
Approach LOS	A			A			A			A		
Intersection Delay [s/veh]	4.61											
Intersection LOS	A											

**Intersection Level Of Service Report
Intersection 4: Hayes at Werth**

Control Type: Roundabout
 Analysis Method: HCM 6th Edition
 Analysis Period: 15 minutes

Delay (sec / veh): 3.5
 Level Of Service: A

Intersection Setup

Name	Werth			Werth			Hayes St			Providence Dr		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Werth			Werth			Hayes St			Providence Dr		
Base Volume Input [veh/h]	10	0	7	2	0	3	17	30	9	11	105	6
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59
Growth Rate	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	2	0	0	5	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	0	7	2	0	3	17	32	9	11	111	6
Peak Hour Factor	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	0	2	1	0	1	5	10	3	3	35	2
Total Analysis Volume [veh/h]	13	0	9	3	0	4	22	41	11	14	141	8
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	67			171			17			36		
Exiting Flow Rate [veh/h]	45			156			14			22		
Demand Flow Rate [veh/h]	10	0	7	2	0	3	17	32	9	11	111	6
Adjusted Demand Flow Rate [veh/h]	13	0	9	3	0	4	22	41	11	14	141	8

Lanes

Override Calculated Critical Headway	No			No			No			No		
User-Defined Critical Headway [s]	4.00			4.00			4.00			4.00		
Override Calculated Follow-Up Time	No			No			No			No		
User-Defined Follow-Up Time [s]	3.00			3.00			3.00			3.00		
A (intercept)	1380.00			1380.00			1380.00			1380.00		
B (coefficient)	0.00102			0.00102			0.00102			0.00102		
HV Adjustment Factor	0.98			0.98			0.98			0.98		
Entry Flow Rate [veh/h]	23			8			76			166		
Capacity of Entry and Bypass Lanes [veh/h]	1289			1160			1356			1331		
Pedestrian Impedance	1.00			1.00			1.00			1.00		
Capacity per Entry Lane [veh/h]	1269			1142			1335			1311		
X, volume / capacity	0.02			0.01			0.06			0.12		

Movement, Approach, & Intersection Results

Lane LOS	A			A			A			A		
95th-Percentile Queue Length [veh]	0.05			0.02			0.18			0.43		
95th-Percentile Queue Length [ft]	1.32			0.46			4.40			10.63		
Approach Delay [s/veh]	2.97			3.20			3.13			3.76		
Approach LOS	A			A			A			A		
Intersection Delay [s/veh]	3.51											
Intersection LOS	A											

**Intersection Level Of Service Report
Intersection 5: Site Access at Providence Dr.**

Control Type:	Two-way stop	Delay (sec / veh):	10.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.067

Intersection Setup

Name	Providence Dr		Providence Dr		Site Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration	↶		↷		↷	
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	Providence Dr		Providence Dr		Site Access	
Base Volume Input [veh/h]	0	40	122	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.59	1.59	1.59	1.59	1.59	1.59
Growth Rate	1.01	1.01	1.01	1.01	1.01	1.01
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	0	0	15	40	5
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	40	123	15	40	5
Peak Hour Factor	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	13	39	5	13	2
Total Analysis Volume [veh/h]	3	51	156	19	51	6
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.07	0.01
d_M, Delay for Movement [s/veh]	7.57	0.00	0.00	0.00	10.07	9.46
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh]	0.12	0.12	0.00	0.00	0.24	0.24
95th-Percentile Queue Length [ft]	3.00	3.00	0.00	0.00	5.93	5.93
d_A, Approach Delay [s/veh]	0.42		0.00		10.01	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	2.07					
Intersection LOS	B					

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Turning Movement Volume: Summary

ID	Intersection Name	Northeastbound		Southwestbound		Northwestbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
1	Hwy 99W at Providence Dr	1323	44	92	1960	112	119	3650

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
3	Brutsher St at Hayes St	53	68	12	21	100	141	44	32	42	14	84	30	641

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4	Hayes at Werth	10	0	7	2	0	3	17	32	9	11	111	6	208

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
5	Site Access at Providence Dr.	2	40	123	15	40	5	225

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Turning Movement Volume: Detail

ID	Intersection Name	Volume Type	Northeastbound		Southwestbound		Northwestbound		Total Volume
			Thru	Right	Left	Thru	Left	Right	
1	Hwy 99W at Providence Dr	Final Base	1310	34	86	1941	85	104	3560
		Growth Rate	1.01	1.01	1.01	1.01	1.01	1.01	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	10	5	0	26	14	55
		Other	0	0	0	0	0	0	0
		Future Total	1323	44	92	1960	112	119	3650

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume	
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
3	Brutsher St at Hayes St	Final Base	52	67	12	21	99	140	44	30	42	14	78	30	629	
		Growth Rate	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	-	
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Net New Trips	0	0	0	0	0	0	0	0	2	0	0	5	0	7
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	53	68	12	21	100	141	44	32	42	14	84	30	641	

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume	
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
4	Hayes at Werth	Final Base	10	0	7	2	0	3	17	30	9	11	105	6	200	
		Growth Rate	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	-	
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Net New Trips	0	0	0	0	0	0	0	0	2	0	0	5	0	7
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	10	0	7	2	0	3	17	32	9	11	111	6	208	

ID	Intersection Name	Volume Type	Northbound		Southbound		Eastbound		Total Volume
			Left	Thru	Thru	Right	Left	Right	
5	Site Access at Providence Dr.	Final Base	0	40	122	0	0	0	162
		Growth Rate	1.01	1.01	1.01	1.01	1.01	1.01	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	2	0	0	15	40	5	62
		Other	0	0	0	0	0	0	0
		Future Total	2	40	123	15	40	5	225

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Trip Generation summary

Added Trips

Zone ID: Name	Land Use variables	Code	Ind. Var.	Rate	Quantity	% In	% Out	Trips In	Trips Out	Total Trips	% of Total Trips
7: Newberg Sugery Ctr	Med/Dental Office	ITE 720	ksf	3.570	17.500	28.00	72.00	17	45	62	100.00
Added Trips Total								17	45	62	100.00

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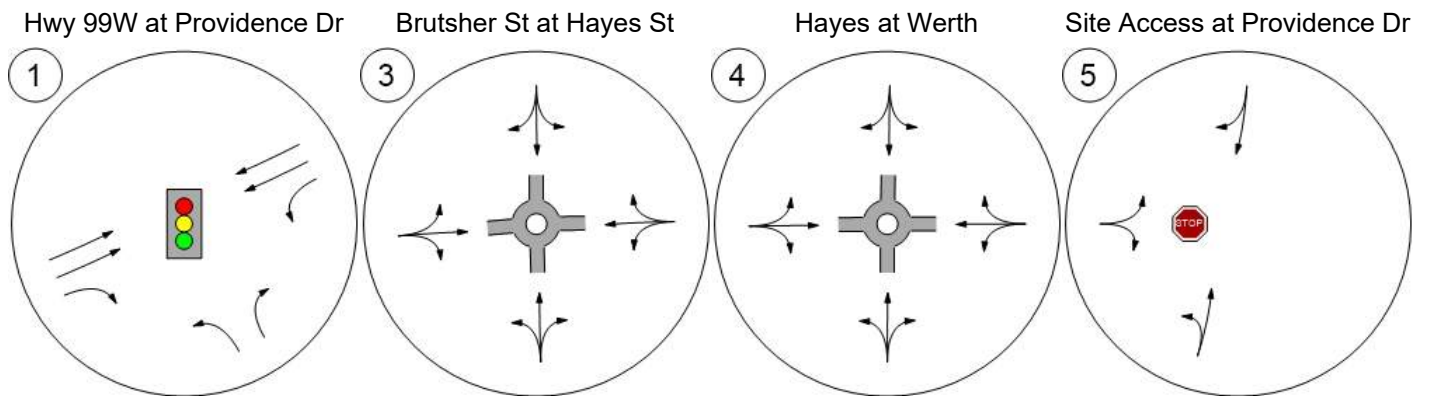
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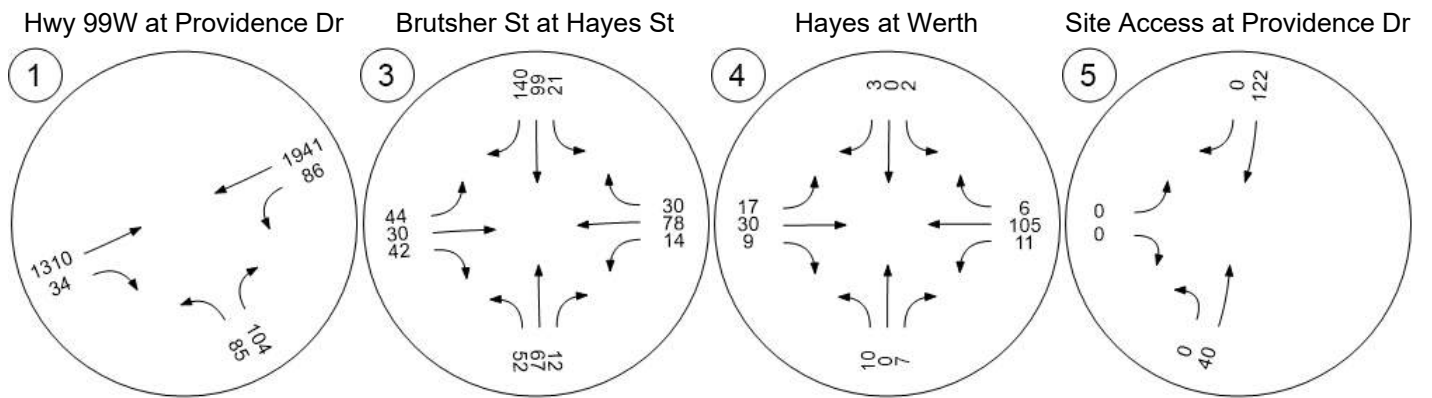
Trip Distribution summary

Zone / Gate	Zone 7: Newberg Sugery Ctr			
	To Newberg Sugery Ctr:		From Newberg Sugery Ctr:	
	Share %	Trips	Share %	Trips
1: Gate	60.00	10	60.00	26
2: Gate	30.00	5	30.00	14
3: Gate	10.00	2	10.00	5
4: Gate	0.00	0	0.00	0
5: Gate	0.00	0	0.00	0
6: Gate	0.00	0	0.00	0
8: Gate	0.00	0	0.00	0
9: Gate	0.00	0	0.00	0
Total	100.00	17	100.00	45

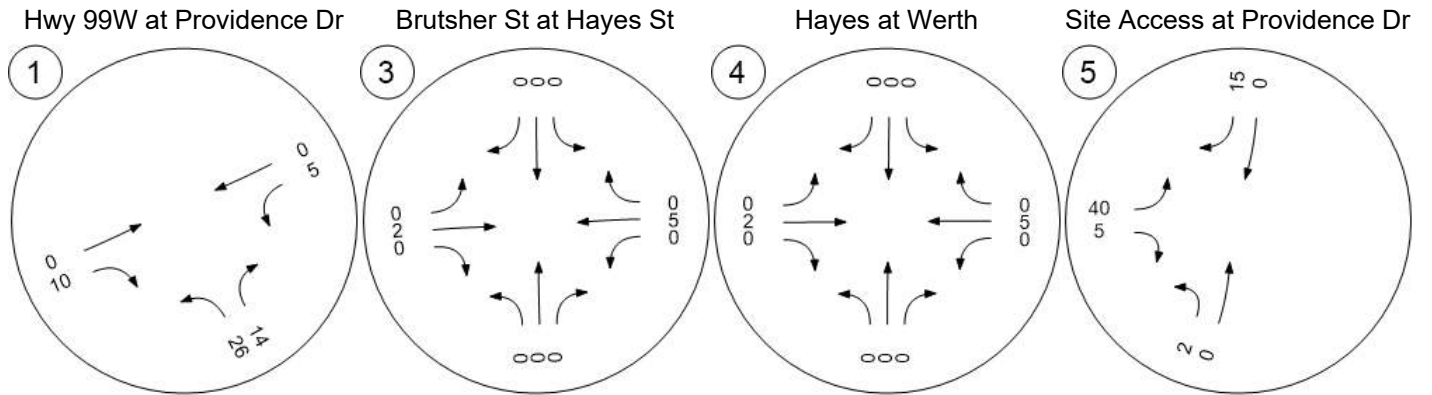
Report Figure 1: Lane Configuration and Traffic Control



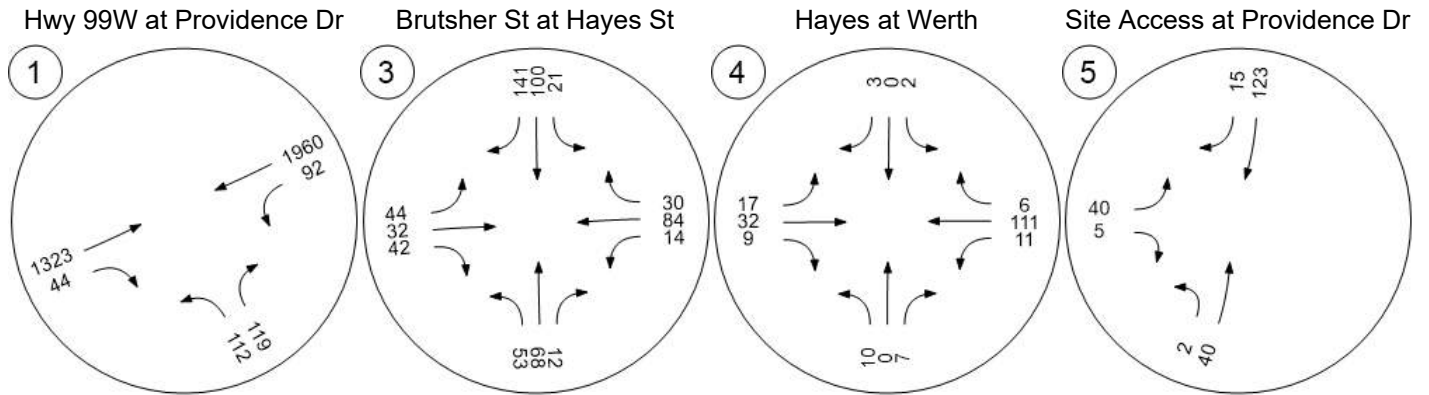
Report Figure 2a: Traffic Volume - Base Volume



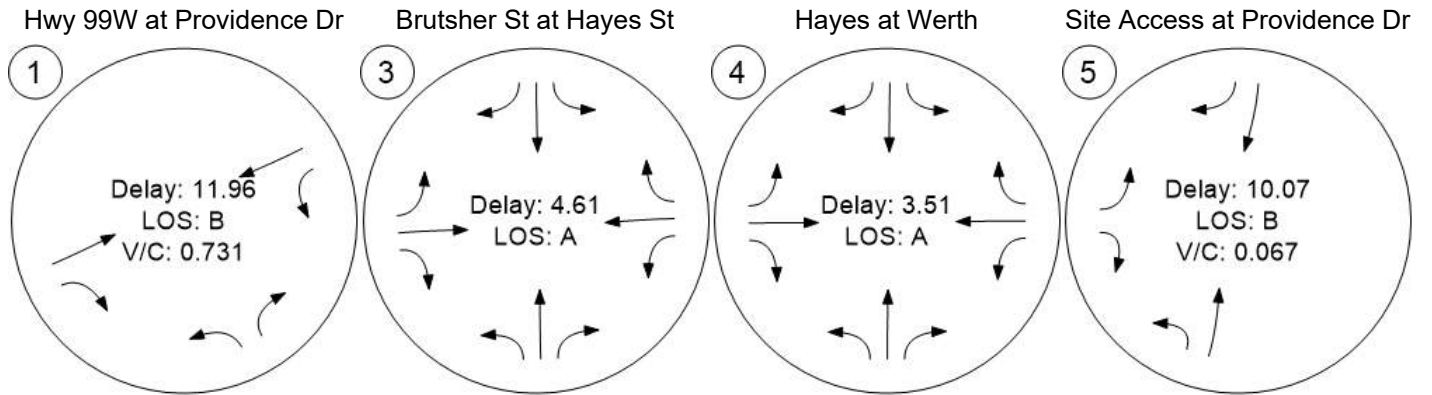
Report Figure 2c: Traffic Volume - Net New Site Trips



Report Figure 2e: Traffic Volume - Future Total Volume



Report Figure 3: Traffic Conditions



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Scenario 6 AM Future 17-346

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Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Hwy 99W at Providence Dr	Signalized	HCM 6th Edition	NWB Right	0.758	7.7	A
3	Brutsher St at Hayes St	Roundabout	HCM 6th Edition	NB Thru		4.0	A
4	Hayes at Werth	Roundabout	HCM 6th Edition	EB Thru		3.3	A
5	Site Access at Providence Dr.	Two-way stop	HCM 6th Edition	EB Left	0.012	9.4	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Hwy 99W at Providence Dr

Control Type:	Signalized	Delay (sec / veh):	7.7
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.758

Intersection Setup

Name	Hwy 99W		Hwy 99W		Providence Dr	
Approach	Northeastbound		Southwestbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	1	0
Pocket Length [ft]	100.00	75.00	100.00	100.00	150.00	100.00
Speed [mph]	45.00		45.00		25.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	Hwy 99W		Hwy 99W		Providence Dr	
Base Volume Input [veh/h]	1725	73	64	991	38	46
Base Volume Adjustment Factor	1.0850	1.0850	1.0850	1.0850	1.0850	1.0850
Heavy Vehicles Percentage [%]	4.50	4.50	4.50	4.50	4.50	4.50
Growth Rate	1.16	1.16	1.16	1.16	1.16	1.16
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	20	10	0	5	3
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2172	112	90	1247	53	61
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	560	29	23	321	14	16
Total Analysis Volume [veh/h]	2239	115	93	1286	55	63
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal group	8	0	0	4	5	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	5	0	0	5	5	0
Maximum Green [s]	30	0	0	30	30	0
Amber [s]	3.0	0.0	0.0	3.0	3.0	0.0
All red [s]	1.0	0.0	0.0	1.0	1.0	0.0
Split [s]	19	0	0	19	101	0
Vehicle Extension [s]	3.0	0.0	0.0	3.0	3.0	0.0
Walk [s]	5	0	0	5	5	0
Pedestrian Clearance [s]	10	0	0	10	10	0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	0.0	2.0	2.0	0.0
Minimum Recall	No			No	No	
Maximum Recall	No			No	No	
Pedestrian Recall	No			No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
C, Cycle Length [s]	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	105	105	105	105	7	7
g / C, Green / Cycle	0.87	0.87	0.87	0.87	0.06	0.06
(v / s)_j Volume / Saturation Flow Rate	0.71	0.08	0.62	0.41	0.04	0.04
s, saturation flow rate [veh/h]	3140	1402	150	3140	1571	1402
c, Capacity [veh/h]	2736	1221	139	2736	97	87
d1, Uniform Delay [s]	3.46	1.08	33.04	1.68	54.66	55.23
k, delay calibration	0.50	0.50	0.50	0.50	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.86	0.15	22.61	0.58	5.05	10.83
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.82	0.09	0.67	0.47	0.56	0.72
d, Delay for Lane Group [s/veh]	6.33	1.24	55.65	2.26	59.71	66.05
Lane Group LOS	A	A	E	A	E	E
Critical Lane Group	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	3.91	0.14	3.64	1.01	1.77	2.15
50th-Percentile Queue Length [ft]	97.75	3.56	91.04	25.22	44.16	53.69
95th-Percentile Queue Length [veh]	7.04	0.26	6.55	1.82	3.18	3.87
95th-Percentile Queue Length [ft]	175.95	6.42	163.87	45.40	79.49	96.65

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	6.33	1.24	55.65	2.26	59.71	66.05
Movement LOS	A	A	E	A	E	E
d_A, Approach Delay [s/veh]	6.08		5.87		63.09	
Approach LOS	A		A		E	
d_I, Intersection Delay [s/veh]	7.75					
Intersection LOS	A					
Intersection V/C	0.758					

Other Modes

g_Walk,mi, Effective Walk Time [s]	9.0	9.0	9.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	51.34	51.34	51.34
I_p,int, Pedestrian LOS Score for Intersection	3.474	3.392	2.176
Crosswalk LOS	C	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	0	0
d_b, Bicycle Delay [s]	60.00	60.00	60.00
I_b,int, Bicycle LOS Score for Intersection	6.074	5.270	4.132
Bicycle LOS	F	F	D

Sequence

Ring 1	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



**Intersection Level Of Service Report
Intersection 3: Brutsher St at Hayes St**

Control Type:	Roundabout	Delay (sec / veh):	4.0
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name	Brutsher St			Brutsher St			Hayes St			Hayes St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Brutsher St			Brutsher St			Hayes St			Hayes St		
Base Volume Input [veh/h]	38	113	16	10	44	37	27	50	31	3	14	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59
Growth Rate	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	3	0	0	1	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	44	130	18	12	51	43	31	60	36	3	17	6
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	35	5	3	14	11	8	16	10	1	5	2
Total Analysis Volume [veh/h]	47	138	19	13	54	46	33	64	38	3	18	6
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	112			69			71			221		
Exiting Flow Rate [veh/h]	78			66			58			174		
Demand Flow Rate [veh/h]	44	130	18	12	51	43	31	60	36	3	17	6
Adjusted Demand Flow Rate [veh/h]	47	138	19	13	54	46	33	64	38	3	18	6

Lanes

Override Calculated Critical Headway	No			No			No			No		
User-Defined Critical Headway [s]	4.00			4.00			4.00			4.00		
Override Calculated Follow-Up Time	No			No			No			No		
User-Defined Follow-Up Time [s]	3.00			3.00			3.00			3.00		
A (intercept)	1380.00			1380.00			1380.00			1380.00		
B (coefficient)	0.00102			0.00102			0.00102			0.00102		
HV Adjustment Factor	0.98			0.98			0.98			0.98		
Entry Flow Rate [veh/h]	208			115			138			28		
Capacity of Entry and Bypass Lanes [veh/h]	1232			1287			1284			1101		
Pedestrian Impedance	1.00			1.00			1.00			1.00		
Capacity per Entry Lane [veh/h]	1213			1266			1264			1084		
X, volume / capacity	0.17			0.09			0.11			0.02		

Movement, Approach, & Intersection Results

Lane LOS	A			A			A			A		
95th-Percentile Queue Length [veh]	0.60			0.29			0.36			0.08		
95th-Percentile Queue Length [ft]	15.11			7.34			8.95			1.92		
Approach Delay [s/veh]	4.41			3.57			3.72			3.53		
Approach LOS	A			A			A			A		
Intersection Delay [s/veh]	3.97											
Intersection LOS	A											

**Intersection Level Of Service Report
Intersection 4: Hayes at Werth**

Control Type: Roundabout
 Analysis Method: HCM 6th Edition
 Analysis Period: 15 minutes

Delay (sec / veh): 3.3
 Level Of Service: A

Intersection Setup

Name	Werth			Werth			Hayes St			Providence Dr		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Werth			Werth			Hayes St			Providence Dr		
Base Volume Input [veh/h]	1	0	2	0	0	7	2	45	12	19	26	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40
Growth Rate	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	3	0	0	1	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	0	2	0	0	8	2	55	14	22	31	1
Peak Hour Factor	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	1	0	0	3	1	18	4	7	10	0
Total Analysis Volume [veh/h]	1	0	3	0	0	10	3	71	18	28	40	1
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	78			73			30			4		
Exiting Flow Rate [veh/h]	75			43			30			3		
Demand Flow Rate [veh/h]	1	0	2	0	0	8	2	55	14	22	31	1
Adjusted Demand Flow Rate [veh/h]	1	0	3	0	0	10	3	71	18	28	40	1

Lanes

Overwrite Calculated Critical Headway	No			No			No			No		
User-Defined Critical Headway [s]	4.00			4.00			4.00			4.00		
Overwrite Calculated Follow-Up Time	No			No			No			No		
User-Defined Follow-Up Time [s]	3.00			3.00			3.00			3.00		
A (intercept)	1380.00			1380.00			1380.00			1380.00		
B (coefficient)	0.00102			0.00102			0.00102			0.00102		
HV Adjustment Factor	0.95			0.95			0.95			0.95		
Entry Flow Rate [veh/h]	5			11			97			73		
Capacity of Entry and Bypass Lanes [veh/h]	1275			1282			1340			1375		
Pedestrian Impedance	1.00			1.00			1.00			1.00		
Capacity per Entry Lane [veh/h]	1210			1216			1271			1304		
X, volume / capacity	0.00			0.01			0.07			0.05		

Movement, Approach, & Intersection Results

Lane LOS	A			A			A			A		
95th-Percentile Queue Length [veh]	0.01			0.02			0.23			0.17		
95th-Percentile Queue Length [ft]	0.25			0.62			5.85			4.19		
Approach Delay [s/veh]	3.00			3.03			3.42			3.18		
Approach LOS	A			A			A			A		
Intersection Delay [s/veh]	3.29											
Intersection LOS	A											

**Intersection Level Of Service Report
Intersection 5: Site Access at Providence Dr.**

Control Type:	Two-way stop	Delay (sec / veh):	9.4
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.012

Intersection Setup

Name	Providence Dr		Providence Dr		Site Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration	↰		↳		↔	
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	Providence Dr		Providence Dr		Site Access	
Base Volume Input [veh/h]	0	47	46	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.54	0.54	0.54	0.54	0.54	0.54
Growth Rate	1.16	1.16	1.16	1.16	1.16	1.16
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	3	0	0	30	8	1
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	55	53	30	8	1
Peak Hour Factor	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	18	17	10	3	0
Total Analysis Volume [veh/h]	4	71	68	38	10	1
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.01	0.00
d_M, Delay for Movement [s/veh]	7.42	0.00	0.00	0.00	9.42	8.75
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.16	0.16	0.00	0.00	0.04	0.04
95th-Percentile Queue Length [ft]	3.96	3.96	0.00	0.00	1.00	1.00
d_A, Approach Delay [s/veh]	0.40		0.00		9.36	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.69					
Intersection LOS	A					

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Turning Movement Volume: Summary

ID	Intersection Name	Northeastbound		Southwestbound		Northwestbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
1	Hwy 99W at Providence Dr	2172	112	90	1247	53	61	3735

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
3	Brutsher St at Hayes St	44	130	18	12	51	43	31	60	36	3	17	6	451

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4	Hayes at Werth	1	0	2	0	0	8	2	55	14	22	31	1	136

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
5	Site Access at Providence Dr.	3	55	53	30	8	1	150

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Turning Movement Volume: Detail

ID	Intersection Name	Volume Type	Northeastbound		Southwestbound		Northwestbound		Total Volume
			Thru	Right	Left	Thru	Left	Right	
1	Hwy 99W at Providence Dr	Final Base	1872	79	69	1075	41	50	3186
		Growth Rate	1.16	1.16	1.16	1.16	1.16	1.16	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	20	10	0	5	3	38
		Other	0	0	0	0	0	0	0
		Future Total	2172	112	90	1247	53	61	3735

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume	
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
3	Brutsher St at Hayes St	Final Base	38	113	16	10	44	37	27	50	31	3	14	5	388	
		Growth Rate	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	-	
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Net New Trips	0	0	0	0	0	0	0	0	3	0	0	1	0	4
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	44	130	18	12	51	43	31	60	36	3	17	6	451	

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume	
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
4	Hayes at Werth	Final Base	1	0	2	0	0	7	2	45	12	19	26	1	115	
		Growth Rate	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	-	
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Net New Trips	0	0	0	0	0	0	0	0	3	0	0	1	0	4
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	1	0	2	0	0	8	2	55	14	22	31	1	136	

ID	Intersection Name	Volume Type	Northbound		Southbound		Eastbound		Total Volume
			Left	Thru	Thru	Right	Left	Right	
5	Site Access at Providence Dr.	Final Base	0	47	46	0	0	0	93
		Growth Rate	1.16	1.16	1.16	1.16	1.16	1.16	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	3	0	0	30	8	1	42
		Other	0	0	0	0	0	0	0
		Future Total	3	55	53	30	8	1	150

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Trip Generation summary

Added Trips

Zone ID: Name	Land Use variables	Code	Ind. Var.	Rate	Quantity	% In	% Out	Trips In	Trips Out	Total Trips	% of Total Trips
7: Newberg Surgery Ctr	Med/Dental Office Bldg	ITE 720	ksf	2.390	17.500	79.00	21.00	33	9	42	100.00
Added Trips Total								33	9	42	100.00

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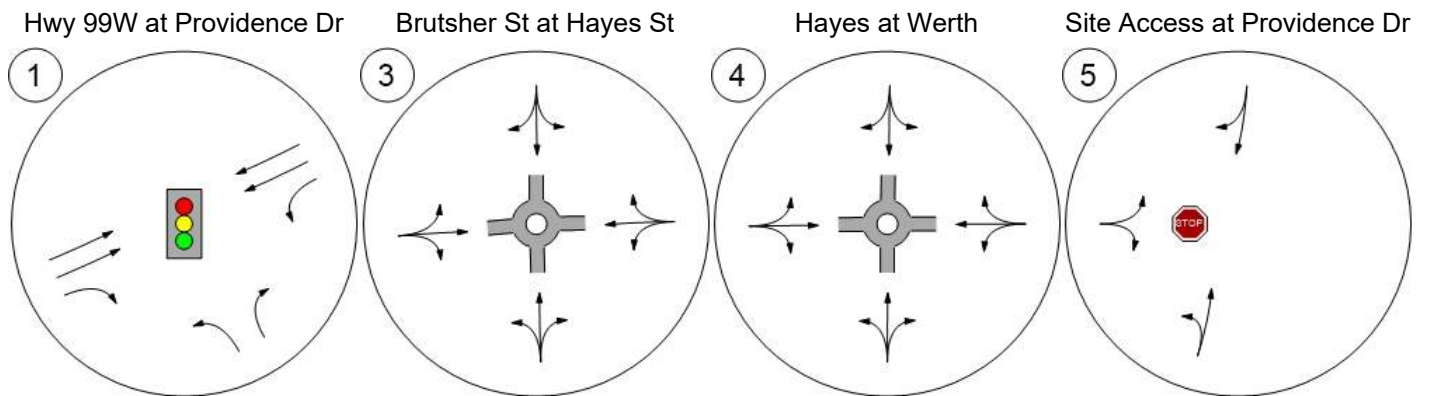
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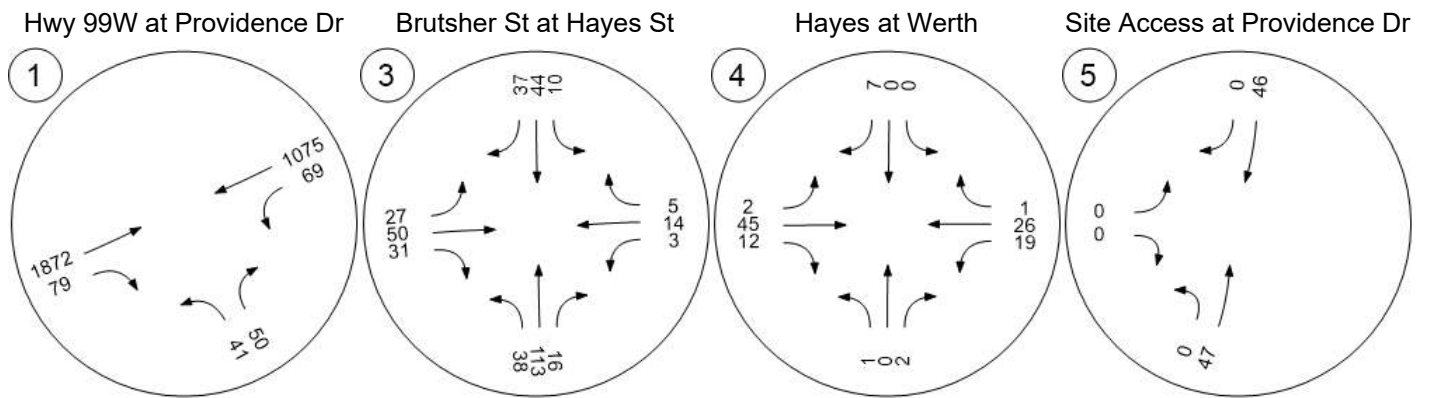
Trip Distribution summary

Zone / Gate	Zone 7: Newberg Surgery Ctr			
	To Newberg Surgery Ctr:		From Newberg Surgery Ctr:	
	Share %	Trips	Share %	Trips
1: Gate	60.00	20	60.00	5
2: Gate	30.00	10	30.00	3
3: Gate	10.00	3	10.00	1
4: Gate	0.00	0	0.00	0
5: Gate	0.00	0	0.00	0
6: Gate	0.00	0	0.00	0
8: Gate	0.00	0	0.00	0
9: Gate	0.00	0	0.00	0
Total	100.00	33	100.00	9

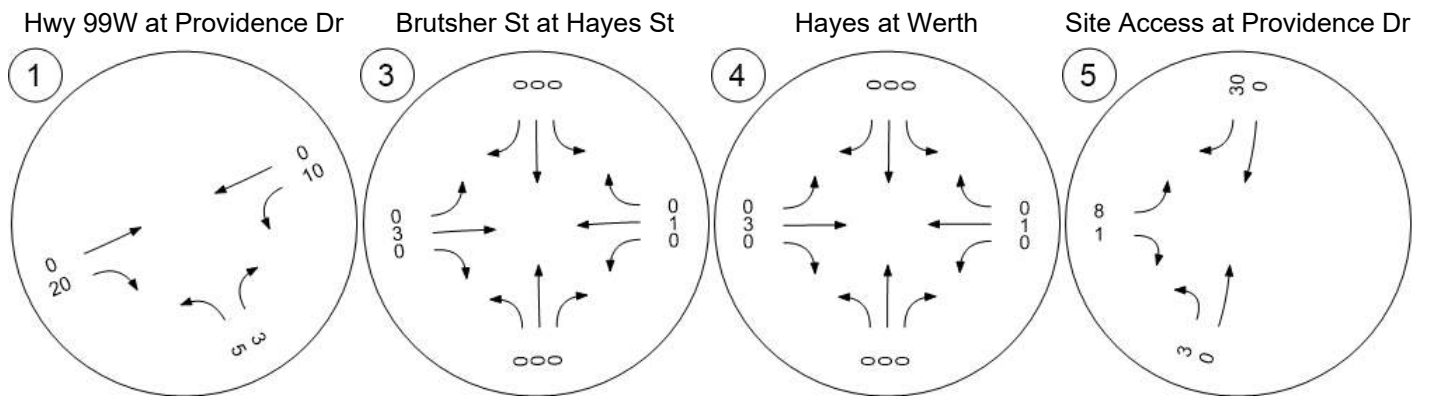
Report Figure 1: Lane Configuration and Traffic Control



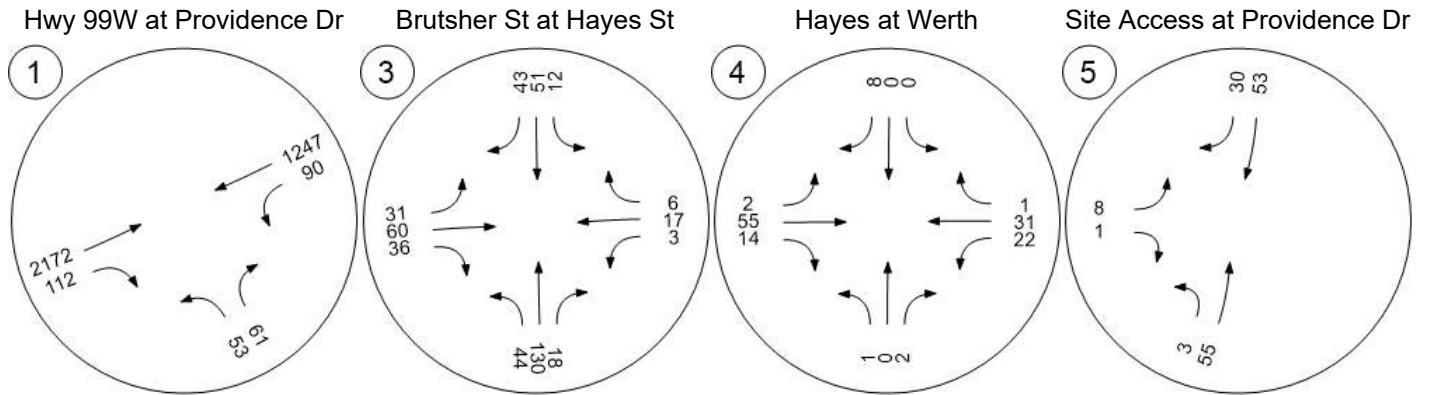
Report Figure 2a: Traffic Volume - Base Volume



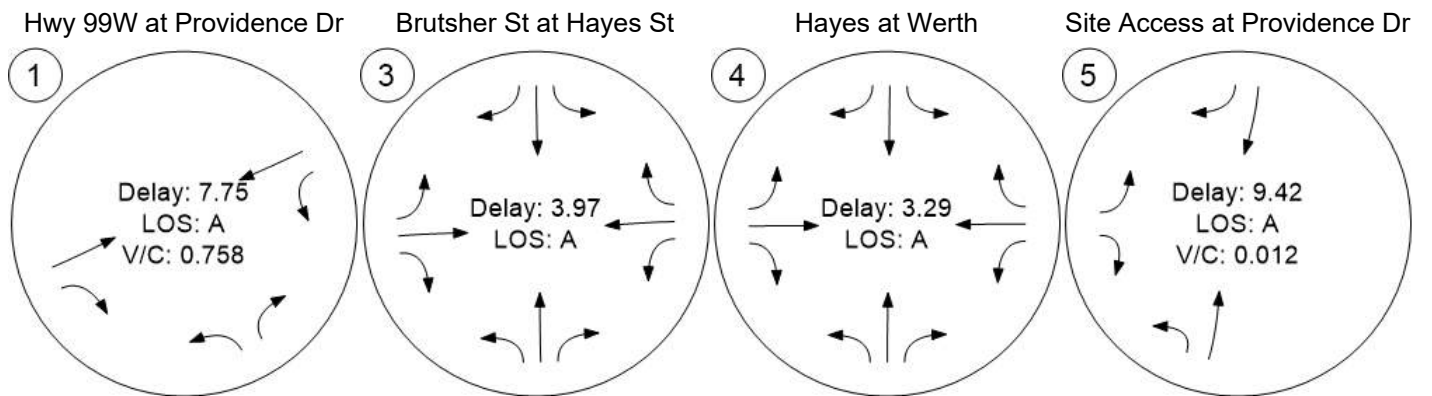
Report Figure 2c: Traffic Volume - Net New Site Trips



Report Figure 2e: Traffic Volume - Future Total Volume



Report Figure 3: Traffic Conditions



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Intersection Analysis Summary



ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Hwy 99W at Providence Dr	Signalized	HCM 6th Edition	SWB Left	0.839	17.6	B
3	Brutsher St at Hayes St	Roundabout	HCM 6th Edition	SB Right		5.0	A
4	Hayes at Werth	Roundabout	HCM 6th Edition	WB Thru		3.6	A
5	Site Access at Providence Dr.	Two-way stop	HCM 6th Edition	EB Left	0.069	10.3	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Hwy 99W at Providence Dr

Control Type:	Signalized	Delay (sec / veh):	17.6
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.839

Intersection Setup

Name	Hwy 99W		Hwy 99W		Providence Dr	
Approach	Northeastbound		Southwestbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	1	0
Pocket Length [ft]	100.00	75.00	100.00	100.00	150.00	100.00
Speed [mph]	45.00		45.00		25.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	Hwy 99W		Hwy 99W		Providence Dr	
Base Volume Input [veh/h]	1207	31	79	1789	78	96
Base Volume Adjustment Factor	1.0850	1.0850	1.0850	1.0850	1.0850	1.0850
Heavy Vehicles Percentage [%]	3.27	3.27	3.27	3.27	3.27	3.27
Growth Rate	1.16	1.16	1.16	1.16	1.16	1.16
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	10	5	0	26	14
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1520	49	105	2252	125	135
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	396	13	27	586	33	35
Total Analysis Volume [veh/h]	1583	51	109	2346	130	141
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Permissive	Permissive
Signal group	8	0	7	4	5	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	5	0	5	5	5	0
Maximum Green [s]	30	0	30	30	30	0
Amber [s]	3.0	0.0	3.0	3.0	3.0	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	27	0	44	71	19	0
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	0.0
Walk [s]	5	0	0	5	5	0
Pedestrian Clearance [s]	10	0	0	10	10	0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
Minimum Recall	No		No	No	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
C, Cycle Length [s]	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	59	59	8	71	11	11
g / C, Green / Cycle	0.66	0.66	0.09	0.79	0.12	0.12
(v / s)_j Volume / Saturation Flow Rate	0.50	0.04	0.07	0.74	0.08	0.10
s, saturation flow rate [veh/h]	3172	1416	1587	3172	1587	1416
c, Capacity [veh/h]	2084	930	138	2500	195	174
d1, Uniform Delay [s]	10.57	5.49	40.31	7.75	37.73	38.47
k, delay calibration	0.50	0.50	0.11	0.50	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.66	0.11	9.70	8.40	3.90	8.69
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.76	0.05	0.79	0.94	0.67	0.81
d, Delay for Lane Group [s/veh]	13.23	5.60	50.01	16.15	41.63	47.16
Lane Group LOS	B	A	D	B	D	D
Critical Lane Group	No	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	8.66	0.29	2.63	10.67	2.94	3.44
50th-Percentile Queue Length [ft]	216.56	7.33	65.69	266.81	73.54	85.99
95th-Percentile Queue Length [veh]	13.49	0.53	4.73	16.03	5.30	6.19
95th-Percentile Queue Length [ft]	337.24	13.19	118.25	400.75	132.38	154.78

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	13.23	5.60	50.01	16.15	41.63	47.16
Movement LOS	B	A	D	B	D	D
d_A, Approach Delay [s/veh]	13.00		17.65		44.51	
Approach LOS	B		B		D	
d_I, Intersection Delay [s/veh]	17.58					
Intersection LOS	B					
Intersection V/C	0.839					

Other Modes

g_Walk,mi, Effective Walk Time [s]	9.0	9.0	9.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	36.45	36.45	36.45
I_p,int, Pedestrian LOS Score for Intersection	3.688	3.524	2.058
Crosswalk LOS	D	D	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	0	0
d_b, Bicycle Delay [s]	45.00	45.00	45.00
I_b,int, Bicycle LOS Score for Intersection	5.480	6.158	4.132
Bicycle LOS	F	F	D

Sequence

Ring 1	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



**Intersection Level Of Service Report
Intersection 3: Brutsher St at Hayes St**

Control Type: Roundabout
 Analysis Method: HCM 6th Edition
 Analysis Period: 15 minutes

Delay (sec / veh): 5.0
 Level Of Service: A

Intersection Setup

Name	Brutsher St			Brutsher St			Hayes St			Hayes St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Brutsher St			Brutsher St			Hayes St			Hayes St		
Base Volume Input [veh/h]	52	67	12	21	99	140	44	30	42	14	78	30
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76
Growth Rate	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	2	0	0	5	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	60	78	14	24	115	162	51	37	49	16	95	35
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	16	21	4	6	31	44	14	10	13	4	26	9
Total Analysis Volume [veh/h]	65	84	15	26	124	174	55	40	53	17	102	38
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	123			187			170			208		
Exiting Flow Rate [veh/h]	67			170			143			141		
Demand Flow Rate [veh/h]	60	78	14	24	115	162	51	37	49	16	95	35
Adjusted Demand Flow Rate [veh/h]	65	84	15	26	124	174	55	40	53	17	102	38

Lanes

Override Calculated Critical Headway	No			No			No			No		
User-Defined Critical Headway [s]	4.00			4.00			4.00			4.00		
Override Calculated Follow-Up Time	No			No			No			No		
User-Defined Follow-Up Time [s]	3.00			3.00			3.00			3.00		
A (intercept)	1380.00			1380.00			1380.00			1380.00		
B (coefficient)	0.00102			0.00102			0.00102			0.00102		
HV Adjustment Factor	0.98			0.98			0.98			0.98		
Entry Flow Rate [veh/h]	167			330			151			160		
Capacity of Entry and Bypass Lanes [veh/h]	1218			1141			1161			1117		
Pedestrian Impedance	1.00			1.00			1.00			1.00		
Capacity per Entry Lane [veh/h]	1197			1121			1141			1098		
X, volume / capacity	0.14			0.29			0.13			0.14		

Movement, Approach, & Intersection Results

Lane LOS	A			A			A			A		
95th-Percentile Queue Length [veh]	0.47			1.21			0.45			0.50		
95th-Percentile Queue Length [ft]	11.87			30.15			11.15			12.47		
Approach Delay [s/veh]	4.17			5.96			4.28			4.54		
Approach LOS	A			A			A			A		
Intersection Delay [s/veh]	5.00											
Intersection LOS	A											

**Intersection Level Of Service Report
Intersection 4: Hayes at Werth**

Control Type: Roundabout
 Analysis Method: HCM 6th Edition
 Analysis Period: 15 minutes

Delay (sec / veh): 3.6
 Level Of Service: A

Intersection Setup

Name	Werth			Werth			Hayes St			Providence Dr		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Werth			Werth			Hayes St			Providence Dr		
Base Volume Input [veh/h]	10	0	7	2	0	3	17	30	9	11	105	6
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59
Growth Rate	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	2	0	0	5	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	12	0	8	2	0	3	20	37	10	13	127	7
Peak Hour Factor	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	0	3	1	0	1	6	12	3	4	40	2
Total Analysis Volume [veh/h]	15	0	10	3	0	4	25	47	13	16	161	9
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	76			195			19			41		
Exiting Flow Rate [veh/h]	51			179			16			25		
Demand Flow Rate [veh/h]	12	0	8	2	0	3	20	37	10	13	127	7
Adjusted Demand Flow Rate [veh/h]	15	0	10	3	0	4	25	47	13	16	161	9

Lanes

Override Calculated Critical Headway	No			No			No			No		
User-Defined Critical Headway [s]	4.00			4.00			4.00			4.00		
Override Calculated Follow-Up Time	No			No			No			No		
User-Defined Follow-Up Time [s]	3.00			3.00			3.00			3.00		
A (intercept)	1380.00			1380.00			1380.00			1380.00		
B (coefficient)	0.00102			0.00102			0.00102			0.00102		
HV Adjustment Factor	0.98			0.98			0.98			0.98		
Entry Flow Rate [veh/h]	26			8			87			189		
Capacity of Entry and Bypass Lanes [veh/h]	1277			1132			1354			1324		
Pedestrian Impedance	1.00			1.00			1.00			1.00		
Capacity per Entry Lane [veh/h]	1257			1114			1332			1304		
X, volume / capacity	0.02			0.01			0.06			0.14		

Movement, Approach, & Intersection Results

Lane LOS	A			A			A			A		
95th-Percentile Queue Length [veh]	0.06			0.02			0.20			0.50		
95th-Percentile Queue Length [ft]	1.52			0.47			5.11			12.44		
Approach Delay [s/veh]	3.02			3.29			3.21			3.94		
Approach LOS	A			A			A			A		
Intersection Delay [s/veh]	3.64											
Intersection LOS	A											

**Intersection Level Of Service Report
Intersection 5: Site Access at Providence Dr.**

Control Type:	Two-way stop	Delay (sec / veh):	10.3
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.069

Intersection Setup

Name	Providence Dr		Providence Dr		Site Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration	↶		↷		↵	
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	Providence Dr		Providence Dr		Site Access	
Base Volume Input [veh/h]	0	40	122	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.59	1.59	1.59	1.59	1.59	1.59
Growth Rate	1.16	1.16	1.16	1.16	1.16	1.16
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	0	0	15	40	5
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	46	142	15	40	5
Peak Hour Factor	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	15	45	5	13	2
Total Analysis Volume [veh/h]	3	58	180	19	51	6
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.07	0.01
d_M, Delay for Movement [s/veh]	7.62	0.00	0.00	0.00	10.30	9.62
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh]	0.14	0.14	0.00	0.00	0.25	0.25
95th-Percentile Queue Length [ft]	3.48	3.48	0.00	0.00	6.19	6.19
d_A, Approach Delay [s/veh]	0.37		0.00		10.23	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	1.91					
Intersection LOS	B					

17-346 Newberg Surg. Ctr TIA

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Scenario 5 PM Future 17-346

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3/6/2017

Turning Movement Volume: Summary

ID	Intersection Name	Northeastbound		Southwestbound		Northwestbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
1	Hwy 99W at Providence Dr	1520	49	105	2252	125	135	4186

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
3	Brutsher St at Hayes St	60	78	14	24	115	162	51	37	49	16	95	35	736

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4	Hayes at Werth	12	0	8	2	0	3	20	37	10	13	127	7	239

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
5	Site Access at Providence Dr.	2	46	142	15	40	5	250

17-346 Newberg Surg. Ctr TIA

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Scenario 5 PM Future 17-346

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3/6/2017

Turning Movement Volume: Detail

ID	Intersection Name	Volume Type	Northeastbound		Southwestbound		Northwestbound		Total Volume
			Thru	Right	Left	Thru	Left	Right	
1	Hwy 99W at Providence Dr	Final Base	1310	34	86	1941	85	104	3560
		Growth Rate	1.16	1.16	1.16	1.16	1.16	1.16	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	10	5	0	26	14	55
		Other	0	0	0	0	0	0	0
		Future Total	1520	49	105	2252	125	135	4186

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume	
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
3	Brutsher St at Hayes St	Final Base	52	67	12	21	99	140	44	30	42	14	78	30	629	
		Growth Rate	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	-	
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Net New Trips	0	0	0	0	0	0	0	0	2	0	0	5	0	7
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	60	78	14	24	115	162	51	37	49	16	95	35	736	

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume	
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
4	Hayes at Werth	Final Base	10	0	7	2	0	3	17	30	9	11	105	6	200	
		Growth Rate	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	-	
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Net New Trips	0	0	0	0	0	0	0	0	2	0	0	5	0	7
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	12	0	8	2	0	3	20	37	10	13	127	7	239	

ID	Intersection Name	Volume Type	Northbound		Southbound		Eastbound		Total Volume
			Left	Thru	Thru	Right	Left	Right	
5	Site Access at Providence Dr.	Final Base	0	40	122	0	0	0	162
		Growth Rate	1.16	1.16	1.16	1.16	1.16	1.16	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	2	0	0	15	40	5	62
		Other	0	0	0	0	0	0	0
		Future Total	2	46	142	15	40	5	250

17-346 Newberg Surg. Ctr TIA

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3/6/2017

Trip Generation summary

Added Trips

Zone ID: Name	Land Use variables	Code	Ind. Var.	Rate	Quantity	% In	% Out	Trips In	Trips Out	Total Trips	% of Total Trips
7: Newberg Sugery Ctr	Med/Dental Office	ITE 720	ksf	3.570	17.500	28.00	72.00	17	45	62	100.00
Added Trips Total								17	45	62	100.00

17-346 Newberg Surg. Ctr TIA

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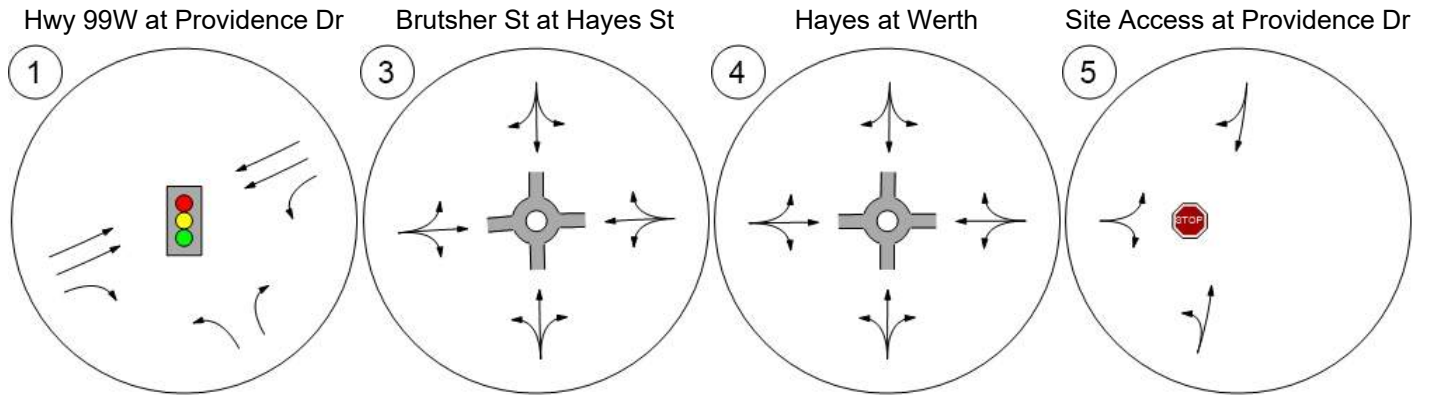
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3/6/2017

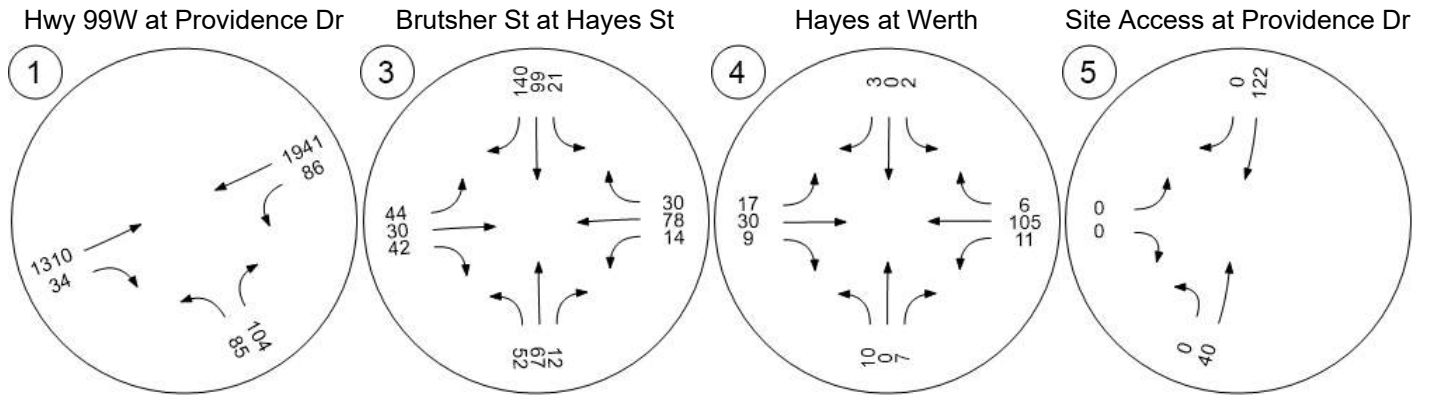
Trip Distribution summary

Zone / Gate	Zone 7: Newberg Sugery Ctr			
	To Newberg Sugery Ctr:		From Newberg Sugery Ctr:	
	Share %	Trips	Share %	Trips
1: Gate	60.00	10	60.00	26
2: Gate	30.00	5	30.00	14
3: Gate	10.00	2	10.00	5
4: Gate	0.00	0	0.00	0
5: Gate	0.00	0	0.00	0
6: Gate	0.00	0	0.00	0
8: Gate	0.00	0	0.00	0
9: Gate	0.00	0	0.00	0
Total	100.00	17	100.00	45

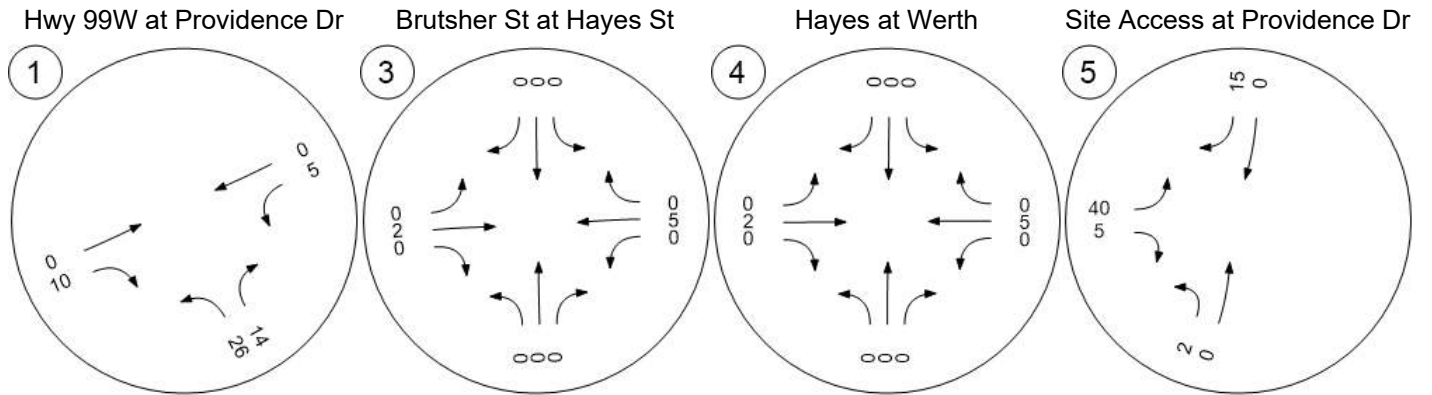
Report Figure 1: Lane Configuration and Traffic Control



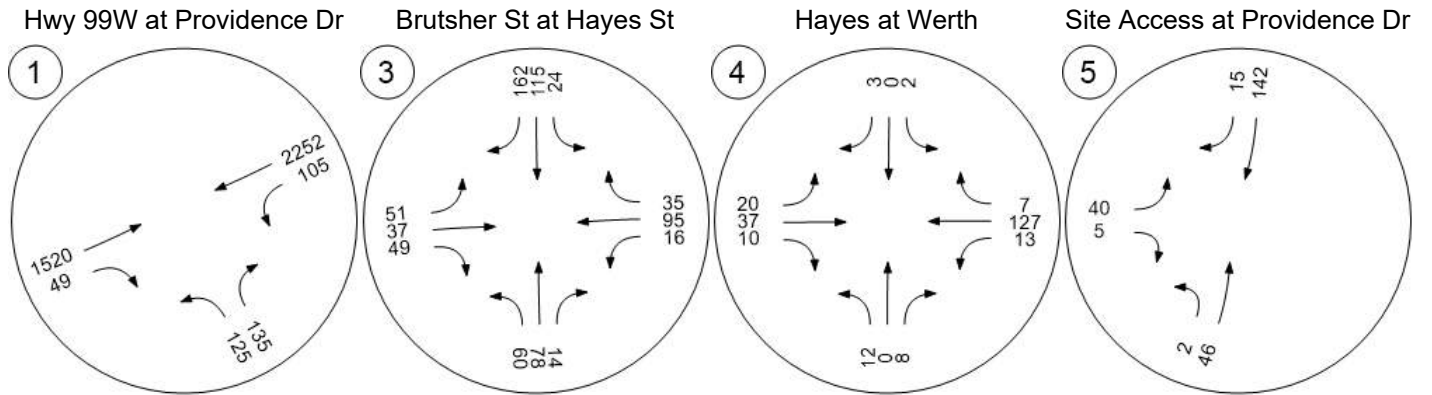
Report Figure 2a: Traffic Volume - Base Volume



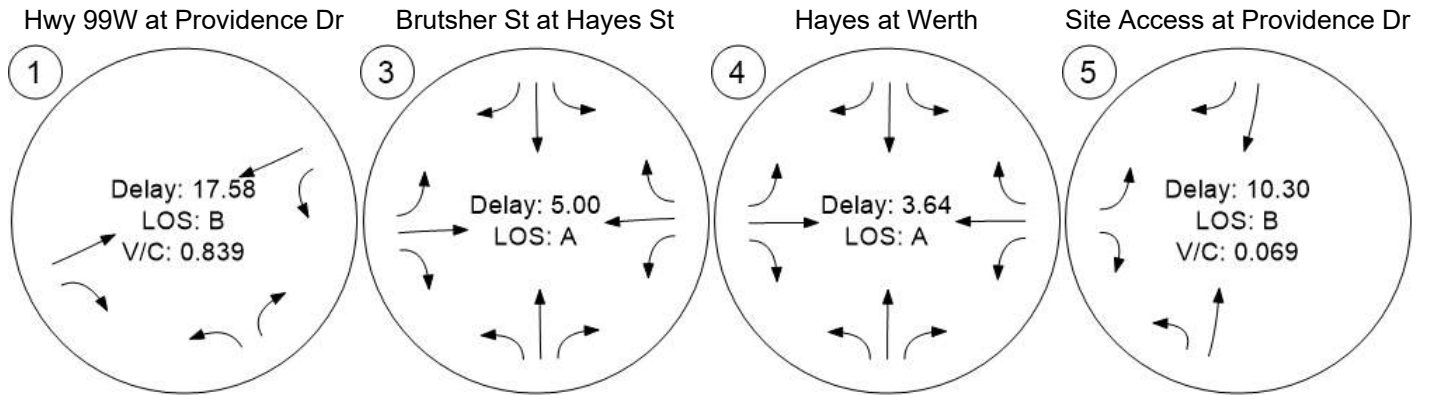
Report Figure 2c: Traffic Volume - Net New Site Trips



Report Figure 2e: Traffic Volume - Future Total Volume



Report Figure 3: Traffic Conditions



Appendix F
Year 2020 Background with
Reassigned Traffic Conditions
Level of Service Worksheets

HCS 2010 Roundabouts Report

General Information					Site Information				
Analyst	ZHB				Intersection	Springbrook/Crestview			
Agency or Co.	KAI				E/W Street Name	Crestview Dr			
Date Performed	10/21/2017				N/S Street Name	Springbrook Rd			
Analysis Year	2020				Analysis Time Period (hrs)	0.25			
Time Period	Background with Reassigned Traffic AM				Peak Hour Factor	0.66			
Project Description	Crestview Crossing				Jurisdiction				

Volume Adjustments and Site Characteristics																
Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	2	54	23	54	0	4	24	67	2	49	254	3	1	211	145	135
Percent Heavy Vehicles, %	9	9	13	3	0	0	0	0	2	2	4	0	25	25	4	7
Flow Rate (v _{PCE}), pc/h	3	89	39	84	0	6	36	102	3	76	400	5	2	400	228	219
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment													
Approach	EB			WB			NB			SB			
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	
Critical Headway (s)		4.9734			4.9734			4.9734			4.9734		
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087		

Flow Computations, Capacity and v/c Ratios												
Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v _e), pc/h		215			144			484			849	
Entry Volume veh/h		200			144			467			746	
Circulating Flow (v _c), pc/h	639			573			533			124		
Exiting Flow (v _{ex}), pc/h	444			334			593			321		
Capacity (c _{PCE}), pc/h		720			770			802			1216	
Capacity (c), veh/h		671			770			774			1068	
v/c Ratio (x)		0.30			0.19			0.60			0.70	

Delay and Level of Service												
Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		9.1			6.7			14.5			14.3	
Lane LOS		A			A			B			B	
95% Queue, veh		1.3			0.7			4.1			6.0	
Approach Delay, s/veh	9.1			6.7			14.5			14.3		
Approach LOS	A			A			B			B		
Intersection Delay, s/veh LOS	13.0						B					

HCM Unsignalized Intersection Capacity Analysis

2: Libra St & Crestview Dr

02/15/2018






















Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↶			↷	↶	↷
Traffic Volume (veh/h)	222	5	8	86	6	5
Future Volume (Veh/h)	222	5	8	86	6	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	2%	
Peak Hour Factor	0.68	0.68	0.68	0.68	0.68	0.68
Hourly flow rate (vph)	326	7	12	126	9	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			333		480	330
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			333		480	330
tC, single (s)			4.1		6.6	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.7	3.3
p0 queue free %			99		98	99
cM capacity (veh/h)			1238		513	716
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	333	138	16			
Volume Left	0	12	9			
Volume Right	7	0	7			
cSH	1700	1238	586			
Volume to Capacity	0.20	0.01	0.03			
Queue Length 95th (ft)	0	1	2			
Control Delay (s)	0.0	0.8	11.3			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.8	11.3			
Approach LOS			B			
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			22.0%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Springbrook Rd & Haworth Ave/Shopping Center






























02/15/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	61	27	174	37	13	15	66	155	5	16	117	69
Future Volume (vph)	61	27	174	37	13	15	66	155	5	16	117	69
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	73	33	210	45	16	18	80	187	6	19	141	83
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1	SB 2					
Volume Total (vph)	106	210	79	80	193	19	224					
Volume Left (vph)	73	0	45	80	0	19	0					
Volume Right (vph)	0	210	18	0	6	0	83					
Hadj (s)	0.42	-0.65	0.05	0.58	0.09	0.72	-0.16					
Departure Headway (s)	6.5	5.4	6.4	6.6	6.1	6.8	5.9					
Degree Utilization, x	0.19	0.32	0.14	0.15	0.33	0.04	0.37					
Capacity (veh/h)	521	624	510	520	564	501	581					
Control Delay (s)	9.8	9.7	10.5	9.5	10.8	8.8	11.0					
Approach Delay (s)	9.7		10.5	10.4		10.8						
Approach LOS	A		B	B		B						
Intersection Summary												
Delay			10.3									
Level of Service			B									
Intersection Capacity Utilization			36.6%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

4: Springbrook Rd & OR 99W
























02/15/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 		 	 		 			 		
Traffic Volume (vph)	43	1338	75	81	804	75	179	140	99	206	120	70
Future Volume (vph)	43	1338	75	81	804	75	179	140	99	206	120	70
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		0%			0%			3%			0%	
Total Lost time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	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	1.00	1.00	1.00	1.00
Fr _t	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fl _t Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1583	3197	1430	2906	3050	1403	2997	1642	1423	3101	1577	1408
Fl _t Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1583	3197	1430	2906	3050	1403	2997	1642	1423	3101	1577	1408
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	48	1503	84	91	903	84	201	157	111	231	135	79
RTOR Reduction (vph)	0	0	37	0	0	38	0	0	96	0	0	69
Lane Group Flow (vph)	48	1503	47	91	903	46	201	157	15	231	135	10
Confl. Peds. (#/hr)							3					3
Heavy Vehicles (%)	5%	4%	4%	11%	9%	6%	6%	5%	3%	4%	11%	4%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	6.9	67.1	67.1	6.2	66.4	66.4	15.2	16.1	16.1	14.1	15.0	15.0
Effective Green, g (s)	6.9	67.1	67.1	6.2	66.4	66.4	15.2	16.1	16.1	14.1	15.0	15.0
Actuated g/C Ratio	0.06	0.56	0.56	0.05	0.55	0.55	0.13	0.13	0.13	0.12	0.12	0.12
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.3	4.2	4.2	2.3	4.0	4.0	2.3	2.3	2.3	2.3	2.3	2.3
Lane Grp Cap (vph)	91	1787	799	150	1687	776	379	220	190	364	197	176
v/s Ratio Prot	0.03	c0.47		0.03	c0.30		0.07	c0.10		c0.07	0.09	
v/s Ratio Perm			0.03			0.03			0.01			0.01
v/c Ratio	0.53	0.84	0.06	0.61	0.54	0.06	0.53	0.71	0.08	0.63	0.69	0.06
Uniform Delay, d1	55.0	22.0	12.1	55.7	17.0	12.4	49.1	49.7	45.5	50.5	50.2	46.3
Progression Factor	1.00	1.00	1.00	0.84	0.55	0.11	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.5	5.0	0.1	5.0	1.1	0.1	1.0	9.4	0.1	3.0	8.3	0.1
Delay (s)	58.5	27.0	12.2	52.0	10.6	1.5	50.0	59.1	45.6	53.4	58.5	46.3
Level of Service	E	C	B	D	B	A	D	E	D	D	E	D
Approach Delay (s)		27.2			13.4			52.0			53.7	
Approach LOS		C			B			D			D	
Intersection Summary												
HCM 2000 Control Delay			29.5				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			16.5		
Intersection Capacity Utilization			65.0%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Brutscher St & OR 99W

02/15/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	1499	43	70	907	28	58	3	87	11	5	27
Future Volume (vph)	19	1499	43	70	907	28	58	3	87	11	5	27
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		2%			0%			0%			-2%	
Total Lost time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	0.99		1.00	0.99	
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	1.00	0.85	1.00	1.00	0.85	1.00	0.85		1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1567	3165	1265	1568	3079	1273	1433	1408		1678	1361	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.73	1.00		0.56	1.00	
Satd. Flow (perm)	1567	3165	1265	1568	3079	1273	1109	1408		991	1361	
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)	21	1629	47	76	986	30	63	3	95	12	5	29
RTOR Reduction (vph)	0	0	13	0	0	7	0	86	0	0	26	0
Lane Group Flow (vph)	21	1629	34	76	986	23	63	12	0	12	8	0
Confl. Peds. (#/hr)	2					2			1	1		
Confl. Bikes (#/hr)			1									1
Heavy Vehicles (%)	5%	4%	14%	6%	8%	14%	16%	0%	5%	0%	40%	7%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4				8
Permitted Phases			2			6	4			8		
Actuated Green, G (s)	3.2	86.6	86.6	9.2	92.6	92.6	11.7	11.7		11.7	11.7	
Effective Green, g (s)	3.2	86.6	86.6	9.2	92.6	92.6	11.7	11.7		11.7	11.7	
Actuated g/C Ratio	0.03	0.72	0.72	0.08	0.77	0.77	0.10	0.10		0.10	0.10	
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.3	4.8	4.8	2.3	4.8	4.8	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	41	2284	912	120	2375	982	108	137		96	132	
v/s Ratio Prot	0.01	c0.51		c0.05	0.32			0.01			0.01	
v/s Ratio Perm			0.03			0.02	c0.06			0.01		
v/c Ratio	0.51	0.71	0.04	0.63	0.42	0.02	0.58	0.09		0.12	0.06	
Uniform Delay, d1	57.6	9.6	4.8	53.8	4.6	3.2	51.8	49.3		49.5	49.2	
Progression Factor	1.14	0.14	0.03	1.28	0.47	0.60	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.0	1.2	0.0	7.5	0.5	0.0	6.5	0.2		0.4	0.1	
Delay (s)	69.6	2.5	0.2	76.4	2.6	1.9	58.3	49.5		49.9	49.3	
Level of Service	E	A	A	E	A	A	E	D		D	D	
Approach Delay (s)		3.3			7.8			53.0			49.5	
Approach LOS		A			A			D			D	

Intersection Summary

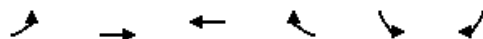
HCM 2000 Control Delay	8.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

6: OR 99W & Vittoria Way

06/05/2018























Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↕↕	↕↕		↵	
Traffic Volume (veh/h)	4	1551	1033	21	52	24
Future Volume (Veh/h)	4	1551	1033	21	52	24
Sign Control		Free	Free		Stop	
Grade		-2%	2%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	4	1668	1111	23	56	26
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage (veh)		2	2			
Upstream signal (ft)			521			
pX, platoon unblocked	0.82				0.82	0.82
vC, conflicting volume	1134				1964	567
vC1, stage 1 conf vol					1122	
vC2, stage 2 conf vol					842	
vCu, unblocked vol	729				1740	39
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	99				79	97
cM capacity (veh/h)	726				267	847
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	4	834	834	741	393	82
Volume Left	4	0	0	0	0	56
Volume Right	0	0	0	0	23	26
cSH	726	1700	1700	1700	1700	341
Volume to Capacity	0.01	0.49	0.49	0.44	0.23	0.24
Queue Length 95th (ft)	0	0	0	0	0	23
Control Delay (s)	10.0	0.0	0.0	0.0	0.0	18.9
Lane LOS	A					C
Approach Delay (s)	0.0			0.0		18.9
Approach LOS						C
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			57.9%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

7: Providence Dr/Crestview Dr & OR 99W

02/15/2018

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	0	1536	67	73	1019	69	35	6	63	214	5	0	
Future Volume (vph)	0	1536	67	73	1019	69	35	6	63	214	5	0	
Ideal Flow (vphpl)	1750	1750	1750	1750	1800	1750	1750	1750	1750	1750	1750	1750	
Grade (%)		-3%			2%			3%			2%		
Total Lost time (s)		6.0	6.0	4.5	4.5			4.5	4.5		4.5		
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00	1.00		1.00		
Fr _t		1.00	0.85	1.00	0.99			1.00	0.85		1.00		
Fl _t Protected		1.00	1.00	0.95	1.00			0.96	1.00		0.95		
Satd. Flow (prot)		3214	1480	1614	3111			1601	1465		1573		
Fl _t Permitted		1.00	1.00	0.95	1.00			0.79	1.00		0.70		
Satd. Flow (perm)		3214	1480	1614	3111			1324	1465		1151		
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)	0	1670	73	79	1108	75	38	7	68	233	5	0	
RTOR Reduction (vph)	0	0	29	0	3	0	0	0	52	0	0	0	
Lane Group Flow (vph)	0	1670	44	79	1180	0	0	45	16	0	238	0	
Heavy Vehicles (%)	5%	5%	2%	2%	8%	5%	3%	5%	0%	5%	5%	5%	
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	Perm	Perm	NA		
Protected Phases	5	2		1	6			8				4	
Permitted Phases			2				8		8	4			
Actuated Green, G (s)		68.9	68.9	8.2	83.1			27.9	27.9		27.9		
Effective Green, g (s)		68.9	68.9	8.2	83.1			27.9	27.9		27.9		
Actuated g/C Ratio		0.57	0.57	0.07	0.69			0.23	0.23		0.23		
Clearance Time (s)		6.0	6.0	4.5	4.5			4.5	4.5		4.5		
Vehicle Extension (s)		5.0	5.0	4.0	4.0			4.0	4.0		4.0		
Lane Grp Cap (vph)		1845	849	110	2154			307	340		267		
v/s Ratio Prot		c0.52		c0.05	0.38								
v/s Ratio Perm			0.03					0.03	0.01		c0.21		
v/c Ratio		0.91	0.05	0.72	0.55			0.15	0.05		0.89		
Uniform Delay, d ₁		22.7	11.2	54.8	9.1			36.6	35.7		44.6		
Progression Factor		1.54	2.47	1.00	1.00			1.00	1.00		1.00		
Incremental Delay, d ₂		6.1	0.1	21.2	1.0			0.3	0.1		29.3		
Delay (s)		41.1	27.8	76.0	10.1			36.9	35.8		73.9		
Level of Service		D	C	E	B			D	D		E		
Approach Delay (s)		40.6			14.3			36.2			73.9		
Approach LOS		D			B			D			E		
Intersection Summary													
HCM 2000 Control Delay			32.9									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.89										
Actuated Cycle Length (s)			120.0									Sum of lost time (s)	15.0
Intersection Capacity Utilization			82.8%									ICU Level of Service	E
Analysis Period (min)			15										

c Critical Lane Group

Intersection

Int Delay, s/veh 0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↖↗		↖	
Traffic Vol, veh/h	3	1808	1153	29	62	6
Future Vol, veh/h	3	1808	1153	29	62	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	250	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	-2	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	33	4	7	7	3	0
Mvmt Flow	3	1903	1214	31	65	6

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1244	0	622
Stage 1	-	-	1229
Stage 2	-	-	958
Critical Hdwy	4.76	-	6.7
Critical Hdwy Stg 1	-	-	5.46
Critical Hdwy Stg 2	-	-	5.46
Follow-up Hdwy	2.53	-	3.3
Pot Cap-1 Maneuver	412	-	450
Stage 1	-	-	272
Stage 2	-	-	368
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	412	-	450
Mov Cap-2 Maneuver	-	-	164
Stage 1	-	-	272
Stage 2	-	-	365

Approach	EB	WB	SB
HCM Control Delay, s	0	0	39.4
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	412	-	-	-	174
HCM Lane V/C Ratio	0.008	-	-	-	0.411
HCM Control Delay (s)	13.8	-	-	-	39.4
HCM Lane LOS	B	-	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	1.8

Notes

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

HCS 2010 Roundabouts Report

General Information					Site Information				
Analyst	ZHB				Intersection	Springbrook/Crestview			
Agency or Co.	KAI				E/W Street Name	Crestview Dr			
Date Performed	10/21/2017				N/S Street Name	Springbrook Rd			
Analysis Year	2020				Analysis Time Period (hrs)	0.25			
Time Period	Background with Reassigned Traffic PM				Peak Hour Factor	0.93			
Project Description	Crestview Crossing				Jurisdiction				

Volume Adjustments and Site Characteristics																
Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment	LTR				LTR				LTR				LTR			
Volume (V), veh/h	0	53	2	13	0	5	2	162	0	7	374	13	2	182	263	49
Percent Heavy Vehicles, %	0	0	0	0	20	20	0	0	0	0	3	0	0	0	2	0
Flow Rate (v _{PCE}), pc/h	0	57	2	14	0	6	2	174	0	8	414	14	2	196	288	53
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment													
Approach	EB			WB			NB			SB			
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	
Critical Headway (s)		4.9734			4.9734			4.9734			4.9734		
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087		

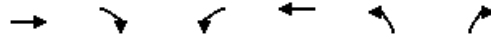
Flow Computations, Capacity and v/c Ratios												
Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v _e), pc/h		73			182			436			539	
Entry Volume veh/h		73			181			424			533	
Circulating Flow (v _c), pc/h		492			481			257			16	
Exiting Flow (v _{ex}), pc/h		212			63			647			308	
Capacity (c _{PCE}), pc/h		836			845			1062			1358	
Capacity (c), veh/h		836			841			1033			1343	
v/c Ratio (x)		0.09			0.22			0.41			0.40	

Delay and Level of Service												
Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		5.2			6.5			7.9			6.4	
Lane LOS		A			A			A			A	
95% Queue, veh		0.3			0.8			2.0			1.9	
Approach Delay, s/veh		5.2			6.5			7.9			6.4	
Approach LOS		A			A			A			A	
Intersection Delay, s/veh LOS	6.9						A					

HCM Unsignalized Intersection Capacity Analysis

2: Libra St & Crestview Dr

02/15/2018






















Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↶			↷	↶	↷
Traffic Volume (veh/h)	185	5	9	163	8	14
Future Volume (Veh/h)	185	5	9	163	8	14
Sign Control	Free			Free	Stop	
Grade	0%			0%	2%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	234	6	11	206	10	18
Pedestrians						2
Lane Width (ft)						12.0
Walking Speed (ft/s)						3.5
Percent Blockage						0
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			242			467
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			242			467
tC, single (s)			4.1			6.4
tC, 2 stage (s)						
tF (s)			2.2			3.5
p0 queue free %			99			98
cM capacity (veh/h)			1334			552
						803
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	240	217	28			
Volume Left	0	11	10			
Volume Right	6	0	18			
cSH	1700	1334	691			
Volume to Capacity	0.14	0.01	0.04			
Queue Length 95th (ft)	0	1	3			
Control Delay (s)	0.0	0.5	10.4			
Lane LOS			A			B
Approach Delay (s)	0.0	0.5	10.4			
Approach LOS			B			
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			27.3%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Springbrook Rd & Haworth Ave/Shopping Center

02/15/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	83	63	219	91	68	86	136	208	5	67	183	40
Future Volume (vph)	83	63	219	91	68	86	136	208	5	67	183	40
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	86	66	228	95	71	90	142	217	5	70	191	42
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1	SB 2					
Volume Total (vph)	152	228	256	142	222	70	233					
Volume Left (vph)	86	0	95	142	0	70	0					
Volume Right (vph)	0	228	90	0	5	0	42					
Hadj (s)	0.30	-0.68	-0.12	0.53	0.03	0.53	-0.06					
Departure Headway (s)	7.5	6.5	7.1	7.8	7.2	7.9	7.3					
Degree Utilization, x	0.32	0.41	0.51	0.31	0.45	0.15	0.47					
Capacity (veh/h)	453	522	467	432	463	429	461					
Control Delay (s)	12.8	12.8	17.2	12.9	14.8	11.1	15.3					
Approach Delay (s)	12.8		17.2	14.1		14.4						
Approach LOS	B		C	B		B						






























Intersection Summary

Delay	14.4		
Level of Service	B		
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis

4: Springbrook Rd & OR 99W

02/15/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 		 	 		 			 		
Traffic Volume (vph)	104	1144	124	141	1458	150	374	179	124	217	212	86
Future Volume (vph)	104	1144	124	141	1458	150	374	179	124	217	212	86
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		0%			0%			3%			0%	
Total Lost time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frft	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1583	3137	1440	2854	3197	1423	3177	1674	1361	3193	1699	1438
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1583	3137	1440	2854	3197	1423	3177	1674	1361	3193	1699	1438
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	106	1167	127	144	1488	153	382	183	127	221	216	88
RTOR Reduction (vph)	0	0	63	0	0	76	0	0	109	0	0	69
Lane Group Flow (vph)	106	1167	64	144	1488	77	382	183	18	221	216	19
Confl. Peds. (#/hr)	2		9	9		2	14					14
Confl. Bikes (#/hr)									2			1
Heavy Vehicles (%)	5%	6%	1%	13%	4%	2%	0%	3%	6%	1%	3%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	11.5	71.0	71.0	9.9	69.4	69.4	20.5	19.9	19.9	22.7	22.1	22.1
Effective Green, g (s)	11.5	71.0	71.0	9.9	69.4	69.4	20.5	19.9	19.9	22.7	22.1	22.1
Actuated g/C Ratio	0.08	0.51	0.51	0.07	0.50	0.50	0.15	0.14	0.14	0.16	0.16	0.16
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.3	4.2	4.2	2.3	4.0	4.0	2.3	2.3	2.3	2.3	2.3	2.3
Lane Grp Cap (vph)	130	1590	730	201	1584	705	465	237	193	517	268	226
v/s Ratio Prot	c0.07	0.37		0.05	c0.47		c0.12	0.11		0.07	c0.13	
v/s Ratio Perm			0.04			0.05			0.01			0.01
v/c Ratio	0.82	0.73	0.09	0.72	0.94	0.11	0.82	0.77	0.09	0.43	0.81	0.08
Uniform Delay, d1	63.2	27.1	17.8	63.7	33.3	18.8	58.0	57.9	52.2	52.8	56.9	50.3
Progression Factor	1.00	1.00	1.00	0.94	1.05	1.70	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	30.1	3.0	0.2	7.0	8.8	0.2	10.8	13.6	0.1	0.3	15.5	0.1
Delay (s)	93.3	30.1	18.0	66.6	43.8	32.2	68.8	71.5	52.3	53.1	72.3	50.4
Level of Service	F	C	B	E	D	C	E	E	D	D	E	D
Approach Delay (s)		33.8			44.6			66.5			60.6	
Approach LOS		C			D			E			E	

Intersection Summary
























HCM 2000 Control Delay	46.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	92.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

5: Brutscher St & OR 99W

02/15/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	1023	101	220	1477	41	243	16	134	21	10	51
Future Volume (vph)	32	1023	101	220	1477	41	243	16	134	21	10	51
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		2%			0%			0%			-2%	
Total Lost time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	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	0.98		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87		1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1646	3105	1402	1646	3197	1352	1620	1442		1674	1471	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.72	1.00		0.52	1.00	
Satd. Flow (perm)	1646	3105	1402	1646	3197	1352	1221	1442		911	1471	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	33	1066	105	229	1539	43	253	17	140	22	10	53
RTOR Reduction (vph)	0	0	44	0	0	13	0	110	0	0	42	0
Lane Group Flow (vph)	33	1066	61	229	1539	30	253	47	0	22	21	0
Confl. Peds. (#/hr)							5		3	3		5
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	6%	5%	1%	4%	10%	2%	0%	4%	0%	0%	4%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4				8
Permitted Phases			2			6	4			8		
Actuated Green, G (s)	5.4	74.9	74.9	22.3	91.8	91.8	30.3	30.3		30.3	30.3	
Effective Green, g (s)	5.4	74.9	74.9	22.3	91.8	91.8	30.3	30.3		30.3	30.3	
Actuated g/C Ratio	0.04	0.54	0.54	0.16	0.66	0.66	0.22	0.22		0.22	0.22	
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.3	4.8	4.8	2.3	4.8	4.8	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	63	1661	750	262	2096	886	264	312		197	318	
v/s Ratio Prot	0.02	c0.34		c0.14	c0.48			0.03				0.01
v/s Ratio Perm			0.04			0.02	c0.21			0.02		
v/c Ratio	0.52	0.64	0.08	0.87	0.73	0.03	0.96	0.15		0.11	0.07	
Uniform Delay, d1	66.0	23.1	15.8	57.5	16.0	8.5	54.2	44.4		44.0	43.6	
Progression Factor	0.72	1.26	2.01	0.83	0.48	0.29	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.7	1.4	0.2	15.7	1.3	0.0	43.5	0.2		0.2	0.1	
Delay (s)	51.2	30.5	32.0	63.2	9.0	2.5	97.7	44.6		44.2	43.7	
Level of Service	D	C	C	E	A	A	F	D		D	D	
Approach Delay (s)		31.2			15.7			77.4			43.8	
Approach LOS		C			B			E			D	

Intersection Summary

HCM 2000 Control Delay	28.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	79.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

6: OR 99W & Vittoria Way

























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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	32	1161	1760	128	26	18
Future Volume (Veh/h)	32	1161	1760	128	26	18
Sign Control		Free	Free		Stop	
Grade		-2%	2%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	34	1248	1892	138	28	19
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage (veh)		2	2			
Upstream signal (ft)			522			
pX, platoon unblocked	0.52				0.52	0.52
vC, conflicting volume	2030				2653	1015
vC1, stage 1 conf vol					1961	
vC2, stage 2 conf vol					692	
vCu, unblocked vol	1121				2328	0
tC, single (s)	4.2				7.0	6.9
tC, 2 stage (s)					6.0	
tF (s)	2.2				3.6	3.3
p0 queue free %	89				80	97
cM capacity (veh/h)	316				142	563
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	34	624	624	1261	769	47
Volume Left	34	0	0	0	0	28
Volume Right	0	0	0	0	138	19
cSH	316	1700	1700	1700	1700	203
Volume to Capacity	0.11	0.37	0.37	0.74	0.45	0.23
Queue Length 95th (ft)	9	0	0	0	0	22
Control Delay (s)	17.7	0.0	0.0	0.0	0.0	28.0
Lane LOS	C					D
Approach Delay (s)	0.5			0.0		28.0
Approach LOS						D
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			67.2%		ICU Level of Service	C
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
7: Providence Dr/Crestview Dr & OR 99W

02/15/2018

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		 			 						 		
Traffic Volume (vph)	0	1155	15	79	1774	140	114	10	116	174	0	0	
Future Volume (vph)	0	1155	15	79	1774	140	114	10	116	174	0	0	
Ideal Flow (vphpl)	1750	1750	1750	1750	1800	1750	1750	1750	1750	1750	1750	1750	
Grade (%)		-3%			2%			3%			2%		
Total Lost time (s)		6.0	6.0	4.5	4.5			4.5	4.5		4.5		
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00	1.00		1.00		
Frbp, ped/bikes		1.00	0.98	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		
Fr t		1.00	0.85	1.00	0.99			1.00	0.85		1.00		
Fl t Protected		1.00	1.00	0.95	1.00			0.96	1.00		0.95		
Satd. Flow (prot)		3184	1479	1646	3224			1631	1465		1614		
Fl t Permitted		1.00	1.00	0.95	1.00			0.79	1.00		0.57		
Satd. Flow (perm)		3184	1479	1646	3224			1347	1465		972		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	0	1229	16	84	1887	149	121	11	123	185	0	0	
RTOR Reduction (vph)	0	0	6	0	3	0	0	0	98	0	0	0	
Lane Group Flow (vph)	0	1229	10	84	2033	0	0	132	25	0	185	0	
Confl. Bikes (#/hr)			1										
Heavy Vehicles (%)	2%	6%	0%	0%	4%	2%	1%	2%	0%	2%	2%	2%	
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	Perm	Perm	NA		
Protected Phases	5	2		1	6			8				4	
Permitted Phases			2				8		8	4			
Actuated Green, G (s)		83.9	83.9	12.3	102.2			28.8	28.8		28.8		
Effective Green, g (s)		83.9	83.9	12.3	102.2			28.8	28.8		28.8		
Actuated g/C Ratio		0.60	0.60	0.09	0.73			0.21	0.21		0.21		
Clearance Time (s)		6.0	6.0	4.5	4.5			4.5	4.5		4.5		
Vehicle Extension (s)		5.0	5.0	4.0	4.0			4.0	4.0		4.0		
Lane Grp Cap (vph)		1908	886	144	2353			277	301		199		
v/s Ratio Prot		0.39		0.05	c0.63								
v/s Ratio Perm			0.01					0.10	0.02		c0.19		
v/c Ratio		0.64	0.01	0.58	0.86			0.48	0.08		0.93		
Uniform Delay, d1		18.3	11.3	61.4	13.8			49.0	44.9		54.6		
Progression Factor		0.42	1.00	1.00	1.00			1.00	1.00		1.00		
Incremental Delay, d2		1.4	0.0	7.0	4.5			1.8	0.2		44.3		
Delay (s)		9.1	11.3	68.3	18.3			50.7	45.1		98.9		
Level of Service		A	B	E	B			D	D		F		
Approach Delay (s)		9.1			20.3			48.0			98.9		
Approach LOS		A			C			D			F		
Intersection Summary													
HCM 2000 Control Delay			22.3									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.92										
Actuated Cycle Length (s)			140.0									Sum of lost time (s)	15.0
Intersection Capacity Utilization			90.3%									ICU Level of Service	E
Analysis Period (min)			15										
c Critical Lane Group													

Intersection

Int Delay, s/veh 4.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↖↗		↖	
Traffic Vol, veh/h	31	1441	1991	75	61	17
Future Vol, veh/h	31	1441	1991	75	61	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	250	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	-2	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	5	4	0	2	0
Mvmt Flow	33	1549	2141	81	66	18

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	2222	0	1111
Stage 1	-	-	2181
Stage 2	-	-	841
Critical Hdwy	4.1	-	6.7
Critical Hdwy Stg 1	-	-	5.44
Critical Hdwy Stg 2	-	-	5.44
Follow-up Hdwy	2.2	-	3.3
Pot Cap-1 Maneuver	238	-	220
Stage 1	-	-	92
Stage 2	-	-	421
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	238	-	220
Mov Cap-2 Maneuver	-	-	70
Stage 1	-	-	92
Stage 2	-	-	363

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	196.3
HCM LOS			F

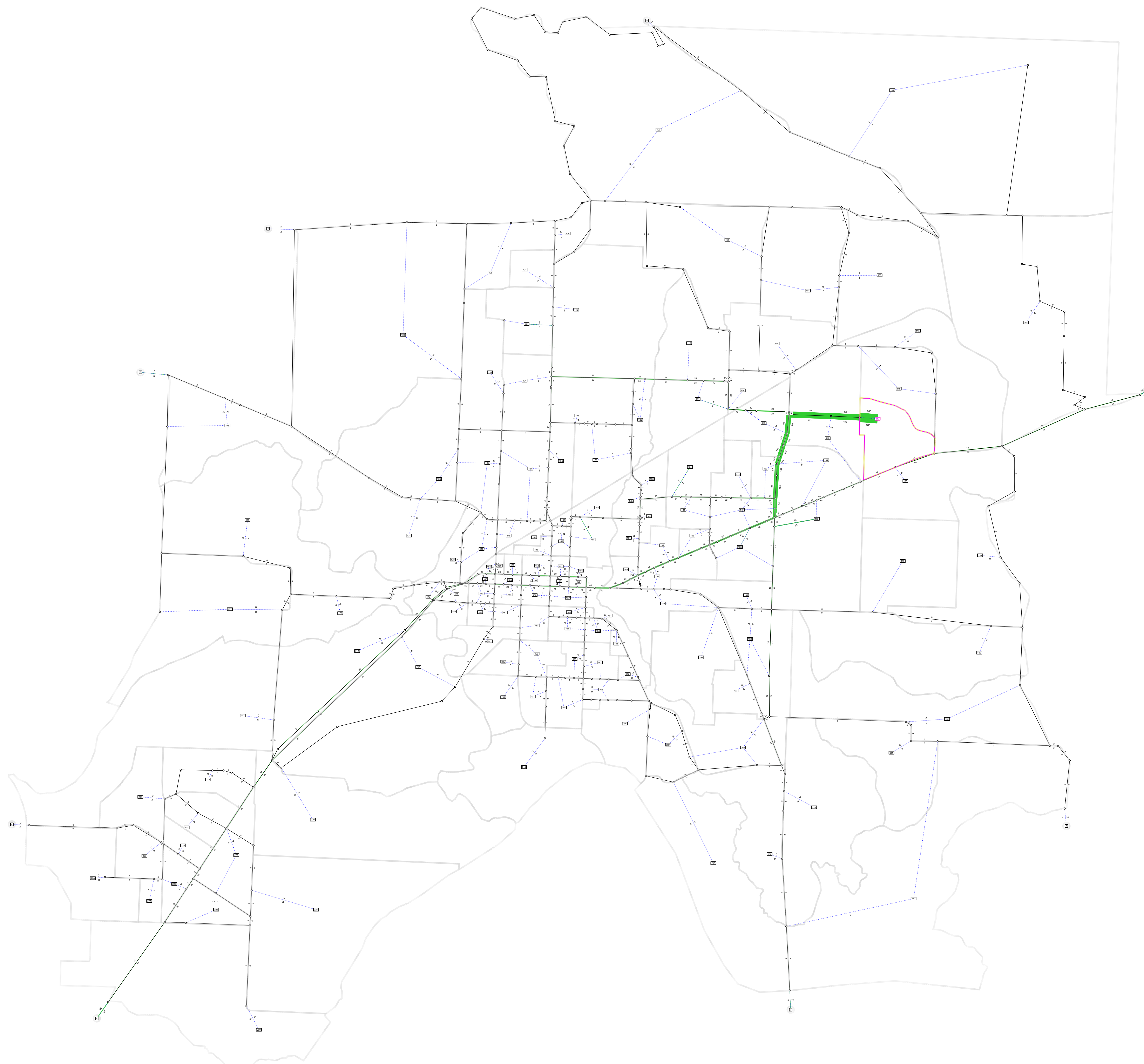
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	238	-	-	-	82
HCM Lane V/C Ratio	0.14	-	-	-	1.023
HCM Control Delay (s)	22.6	-	-	-	196.3
HCM Lane LOS	C	-	-	-	F
HCM 95th %tile Q(veh)	0.5	-	-	-	5.7

Notes

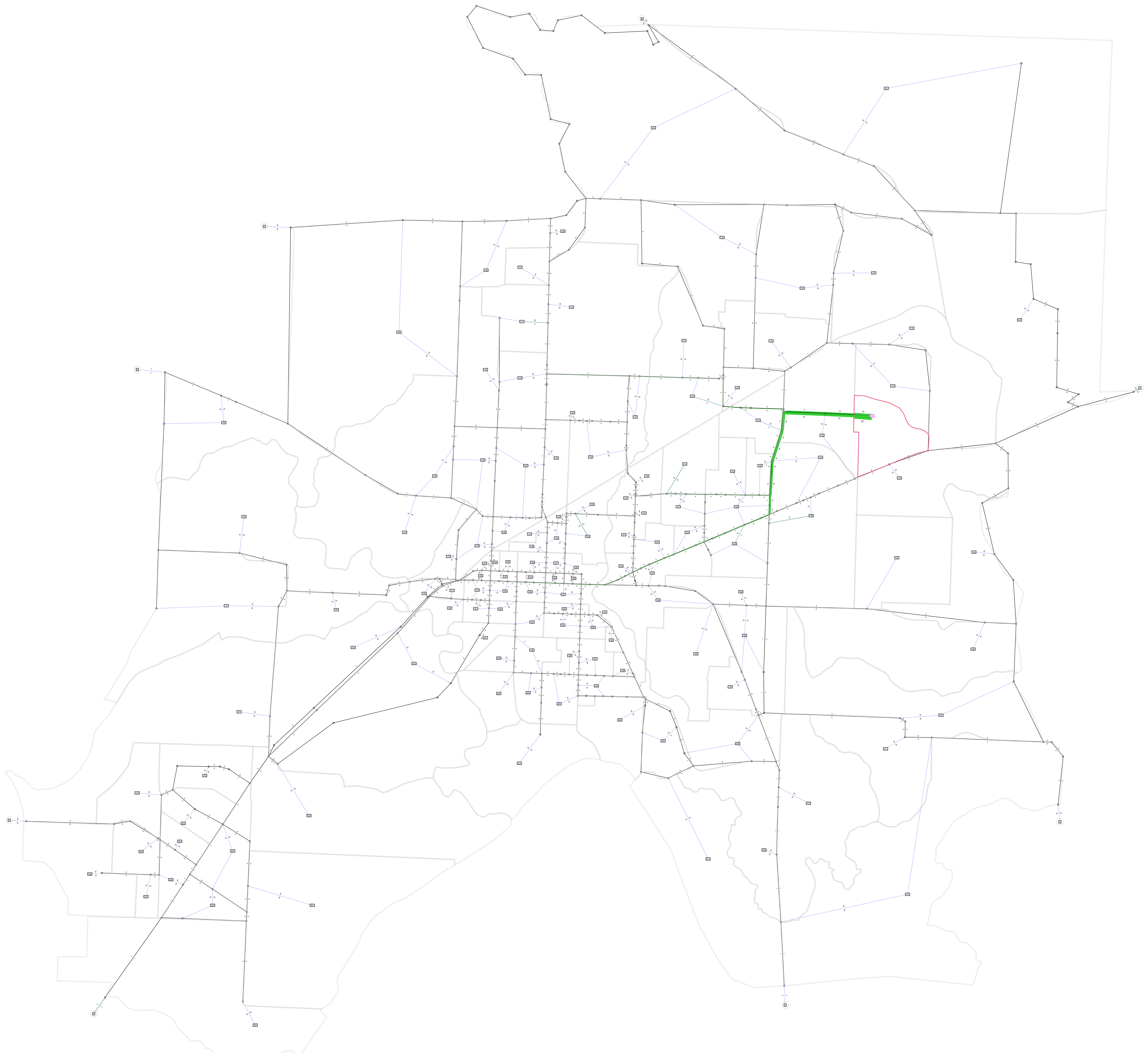
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Appendix G
Select Zone Analysis Results

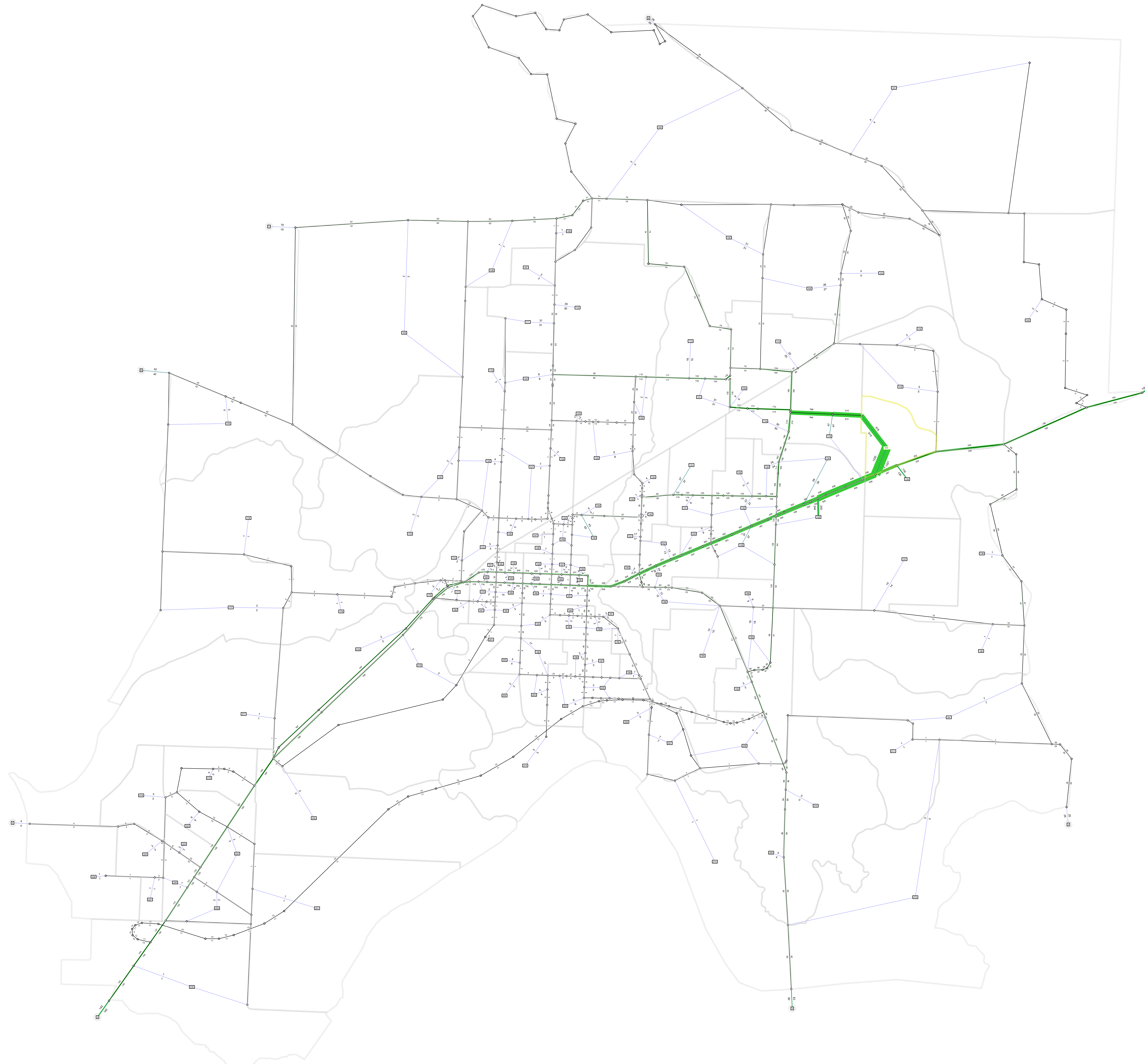
Newberg Transportation Model 2000
Select Zone 117 Daily Volumes

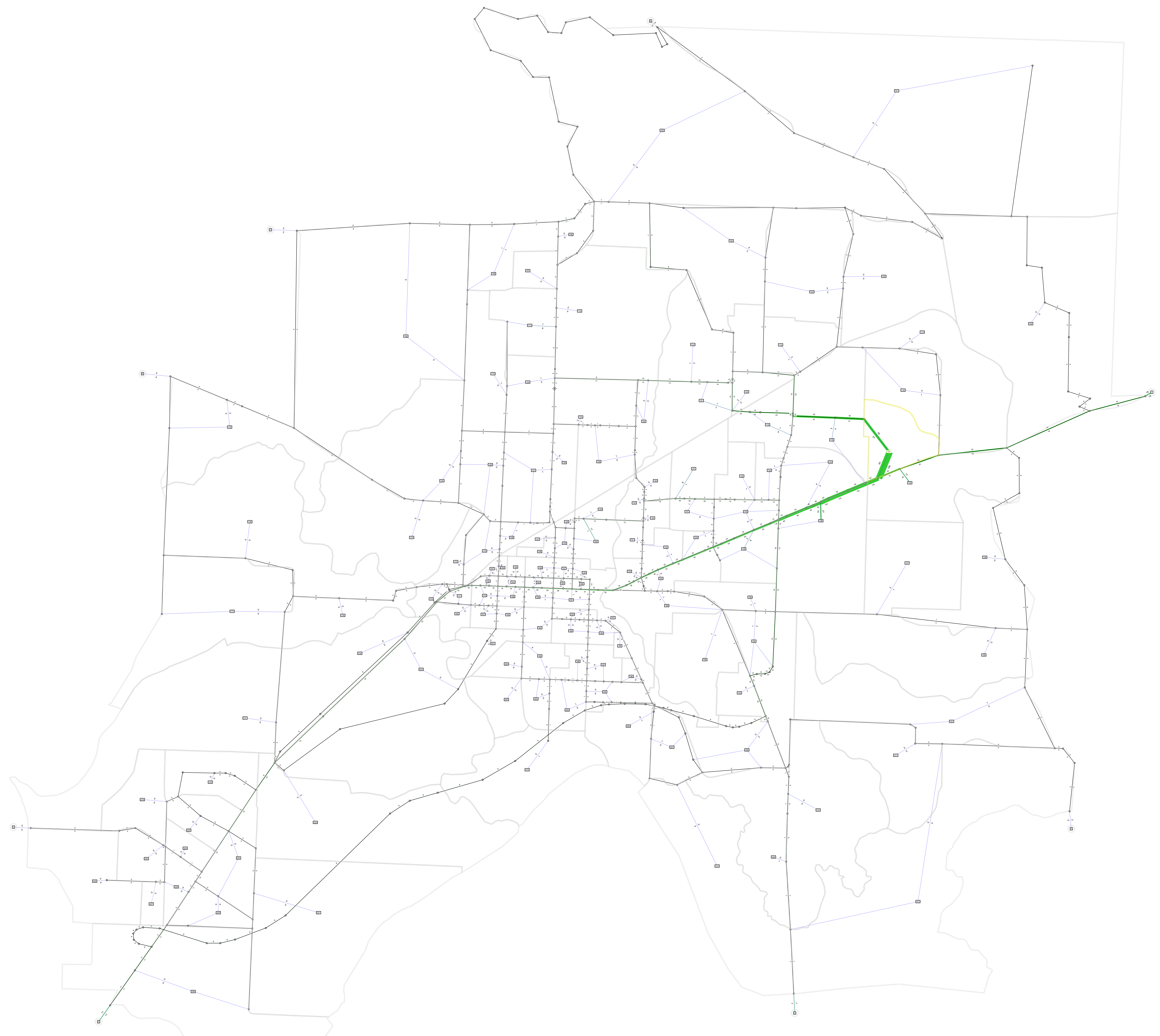


Newberg Transportation Model 2025
Select Zone 117 PM Peak Volumes



Newberg Transportation Model 2025
ODOT Request 001
Select Zone 117 Daily Volumes





Appendix H
Year 2020 Total Conditions
Level of Service Worksheets

HCS 2010 Roundabouts Report

General Information					Site Information				
Analyst	ZHB				Intersection	Springbrook/Crestview			
Agency or Co.	KAI				E/W Street Name	Crestview Dr			
Date Performed	10/21/2017				N/S Street Name	Springbrook Rd			
Analysis Year	2020				Analysis Time Period (hrs)	0.25			
Time Period	Total AM				Peak Hour Factor	0.66			
Project Description	Crestview Crossing				Jurisdiction				

Volume Adjustments and Site Characteristics																
Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	2	54	29	54	0	20	40	83	2	49	254	8	1	216	145	135
Percent Heavy Vehicles, %	9	9	13	3	0	0	0	0	2	2	4	0	25	25	4	7
Flow Rate (v _{pce}), pc/h	3	89	50	84	0	30	61	126	3	76	400	12	2	409	228	219
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment													
Approach	EB			WB			NB			SB			
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	
Critical Headway (s)		4.9734			4.9734			4.9734			4.9734		
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087		

Flow Computations, Capacity and v/c Ratios												
Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v _e), pc/h		226			217			491			858	
Entry Volume veh/h		210			217			474			753	
Circulating Flow (v _c), pc/h		672			573			553			173	
Exiting Flow (v _{ex}), pc/h		471			359			617			345	
Capacity (c _{pce}), pc/h		696			770			785			1157	
Capacity (c), veh/h		647			770			758			1015	
v/c Ratio (x)		0.32			0.28			0.63			0.74	

Delay and Level of Service												
Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		9.8			7.9			15.4			16.7	
Lane LOS		A			A			C			C	
95% Queue, veh		1.4			1.2			4.4			7.1	
Approach Delay, s/veh		9.8			7.9			15.4			16.7	
Approach LOS		A			A			C			C	
Intersection Delay, s/veh LOS	14.3						B					

HCM Unsignalized Intersection Capacity Analysis

2: Libra St & Crestview Dr

02/15/2018






















Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↶			↷	↶	↷
Traffic Volume (veh/h)	238	5	8	134	6	5
Future Volume (Veh/h)	238	5	8	134	6	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	2%	
Peak Hour Factor	0.68	0.68	0.68	0.68	0.68	0.68
Hourly flow rate (vph)	350	7	12	197	9	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			357		574	354
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			357		574	354
tC, single (s)			4.1		6.6	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.7	3.3
p0 queue free %			99		98	99
cM capacity (veh/h)			1213		451	695
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	357	209	16			
Volume Left	0	12	9			
Volume Right	7	0	7			
cSH	1700	1213	533			
Volume to Capacity	0.21	0.01	0.03			
Queue Length 95th (ft)	0	1	2			
Control Delay (s)	0.0	0.5	12.0			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.5	12.0			
Approach LOS			B			
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			23.6%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Springbrook Rd & Haworth Ave/Shopping Center






























02/15/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	61	27	179	37	13	15	82	155	5	16	117	69
Future Volume (vph)	61	27	179	37	13	15	82	155	5	16	117	69
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	73	33	216	45	16	18	99	187	6	19	141	83
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1	SB 2					
Volume Total (vph)	106	216	79	99	193	19	224					
Volume Left (vph)	73	0	45	99	0	19	0					
Volume Right (vph)	0	216	18	0	6	0	83					
Hadj (s)	0.42	-0.65	0.05	0.58	0.09	0.72	-0.16					
Departure Headway (s)	6.5	5.5	6.5	6.6	6.1	6.8	5.9					
Degree Utilization, x	0.19	0.33	0.14	0.18	0.33	0.04	0.37					
Capacity (veh/h)	517	618	504	519	561	496	576					
Control Delay (s)	9.9	9.9	10.6	9.8	10.8	8.9	11.2					
Approach Delay (s)	9.9		10.6	10.5		11.0						
Approach LOS	A		B	B		B						
Intersection Summary												
Delay			10.4									
Level of Service			B									
Intersection Capacity Utilization			36.9%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

4: Springbrook Rd & OR 99W























02/15/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 		 	 		 			 		
Traffic Volume (vph)	43	1349	75	89	836	91	179	140	102	211	120	70
Future Volume (vph)	43	1349	75	89	836	91	179	140	102	211	120	70
Ideal Flow (vphpl)	1750	1750	1750	1750	1800	1750	1750	1750	1750	1750	1750	1750
Grade (%)		0%			0%			3%			0%	
Total Lost time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	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	1.00	1.00	1.00	1.00
Fr t	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fl t Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1583	3197	1430	2906	3138	1403	2997	1642	1423	3101	1577	1408
Fl t Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1583	3197	1430	2906	3138	1403	2997	1642	1423	3101	1577	1408
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	48	1516	84	100	939	102	201	157	115	237	135	79
RTOR Reduction (vph)	0	0	37	0	0	46	0	0	100	0	0	69
Lane Group Flow (vph)	48	1516	47	100	939	56	201	157	15	237	135	10
Confl. Peds. (#/hr)							3					3
Heavy Vehicles (%)	5%	4%	4%	11%	9%	6%	6%	5%	3%	4%	11%	4%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	6.9	66.7	66.7	6.3	66.1	66.1	15.5	16.1	16.1	14.4	15.0	15.0
Effective Green, g (s)	6.9	66.7	66.7	6.3	66.1	66.1	15.5	16.1	16.1	14.4	15.0	15.0
Actuated g/C Ratio	0.06	0.56	0.56	0.05	0.55	0.55	0.13	0.13	0.13	0.12	0.12	0.12
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.3	4.2	4.2	2.3	4.0	4.0	2.3	2.3	2.3	2.3	2.3	2.3
Lane Grp Cap (vph)	91	1776	794	152	1728	772	387	220	190	372	197	176
v/s Ratio Prot	0.03	c0.47		0.03	c0.30		0.07	c0.10		c0.08	0.09	
v/s Ratio Perm			0.03			0.04			0.01			0.01
v/c Ratio	0.53	0.85	0.06	0.66	0.54	0.07	0.52	0.71	0.08	0.64	0.69	0.06
Uniform Delay, d1	55.0	22.5	12.2	55.8	17.3	12.6	48.8	49.7	45.5	50.3	50.2	46.3
Progression Factor	1.00	1.00	1.00	0.77	0.45	0.06	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.5	5.5	0.1	7.7	1.1	0.2	0.7	9.4	0.1	2.9	8.3	0.1
Delay (s)	58.5	28.0	12.4	50.8	8.9	0.9	49.5	59.1	45.6	53.2	58.5	46.3
Level of Service	E	C	B	D	A	A	D	E	D	D	E	D
Approach Delay (s)		28.1			11.8			51.7			53.6	
Approach LOS		C			B			D			D	
Intersection Summary												
HCM 2000 Control Delay			29.2				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			16.5		
Intersection Capacity Utilization			66.3%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Brutscher St & OR 99W

02/15/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	1518	43	86	963	28	58	3	92	11	5	27
Future Volume (vph)	19	1518	43	86	963	28	58	3	92	11	5	27
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		2%			0%			0%			-2%	
Total Lost time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	0.99		1.00	0.99	
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	1.00	0.85	1.00	1.00	0.85	1.00	0.85		1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1567	3165	1265	1568	3079	1273	1433	1408		1678	1361	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.73	1.00		0.54	1.00	
Satd. Flow (perm)	1567	3165	1265	1568	3079	1273	1109	1408		951	1361	
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)	21	1650	47	93	1047	30	63	3	100	12	5	29
RTOR Reduction (vph)	0	0	13	0	0	7	0	90	0	0	26	0
Lane Group Flow (vph)	21	1650	34	93	1047	23	63	13	0	12	8	0
Confl. Peds. (#/hr)	2					2			1	1		
Confl. Bikes (#/hr)			1									1
Heavy Vehicles (%)	5%	4%	14%	6%	8%	14%	16%	0%	5%	0%	40%	7%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4				8
Permitted Phases			2			6	4			8		
Actuated Green, G (s)	3.2	84.6	84.6	11.2	92.6	92.6	11.7	11.7		11.7	11.7	
Effective Green, g (s)	3.2	84.6	84.6	11.2	92.6	92.6	11.7	11.7		11.7	11.7	
Actuated g/C Ratio	0.03	0.70	0.70	0.09	0.77	0.77	0.10	0.10		0.10	0.10	
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.3	4.8	4.8	2.3	4.8	4.8	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	41	2231	891	146	2375	982	108	137		92	132	
v/s Ratio Prot	0.01	c0.52		c0.06	0.34			0.01				0.01
v/s Ratio Perm			0.03			0.02	c0.06			0.01		
v/c Ratio	0.51	0.74	0.04	0.64	0.44	0.02	0.58	0.09		0.13	0.06	
Uniform Delay, d1	57.6	10.9	5.4	52.4	4.7	3.2	51.8	49.3		49.5	49.2	
Progression Factor	1.14	0.15	0.02	1.46	0.18	0.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.9	1.4	0.0	5.5	0.4	0.0	6.5	0.2		0.5	0.1	
Delay (s)	69.5	3.0	0.2	82.2	1.3	0.0	58.3	49.5		50.0	49.3	
Level of Service	E	A	A	F	A	A	E	D		D	D	
Approach Delay (s)		3.8			7.7			52.9			49.5	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay	8.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

6: OR 99W & Vittoria Way

06/05/2018


























Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↕↕	↕↕		↵	
Traffic Volume (veh/h)	4	1575	1105	21	52	24
Future Volume (Veh/h)	4	1575	1105	21	52	24
Sign Control		Free	Free		Stop	
Grade		-2%	2%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	4	1694	1188	23	56	26
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage (veh)		2	2			
Upstream signal (ft)			521			
pX, platoon unblocked	0.74				0.74	0.74
vC, conflicting volume	1211				2054	606
vC1, stage 1 conf vol					1200	
vC2, stage 2 conf vol					855	
vCu, unblocked vol	569				1715	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	99				80	97
cM capacity (veh/h)	746				274	803
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	4	847	847	792	419	82
Volume Left	4	0	0	0	0	56
Volume Right	0	0	0	0	23	26
cSH	746	1700	1700	1700	1700	346
Volume to Capacity	0.01	0.50	0.50	0.47	0.25	0.24
Queue Length 95th (ft)	0	0	0	0	0	23
Control Delay (s)	9.9	0.0	0.0	0.0	0.0	18.6
Lane LOS	A					C
Approach Delay (s)	0.0			0.0		18.6
Approach LOS						C
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			58.7%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

7: Providence Dr & OR 99W

02/15/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (vph)	24	1536	67	73	1019	77	35	11	63	238	21	72
Future Volume (vph)	24	1536	67	73	1019	77	35	11	63	238	21	72
Ideal Flow (vphpl)	1750	1750	1750	1750	1800	1750	1750	1750	1750	1750	1750	1750
Grade (%)		-3%			2%			3%			2%	
Total Lost time (s)	6.0	6.0	6.0	4.5	4.5			4.5	4.5		4.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	
Flt	1.00	1.00	0.85	1.00	0.99			1.00	0.85		0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.97	
Satd. Flow (prot)	1607	3214	1480	1614	3108			1605	1465		1546	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.73	1.00		0.76	
Satd. Flow (perm)	1607	3214	1480	1614	3108			1218	1465		1209	
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)	26	1670	73	79	1108	84	38	12	68	259	23	78
RTOR Reduction (vph)	0	0	26	0	4	0	0	0	48	0	9	0
Lane Group Flow (vph)	26	1670	47	79	1188	0	0	50	20	0	351	0
Heavy Vehicles (%)	5%	5%	2%	2%	8%	5%	3%	5%	0%	5%	5%	5%
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8				4
Permitted Phases			2				8		8	4		
Actuated Green, G (s)	3.6	63.7	63.7	6.8	66.9			34.5	34.5		34.5	
Effective Green, g (s)	3.6	63.7	63.7	6.8	66.9			34.5	34.5		34.5	
Actuated g/C Ratio	0.03	0.53	0.53	0.06	0.56			0.29	0.29		0.29	
Clearance Time (s)	6.0	6.0	6.0	4.5	4.5			4.5	4.5		4.5	
Vehicle Extension (s)	4.0	5.0	5.0	4.0	4.0			4.0	4.0		4.0	
Lane Grp Cap (vph)	48	1706	785	91	1732			350	421		347	
v/s Ratio Prot	0.02	c0.52		c0.05	0.38							
v/s Ratio Perm			0.03					0.04	0.01		c0.29	
v/c Ratio	0.54	0.98	0.06	0.87	0.69			0.14	0.05		1.01	
Uniform Delay, d1	57.4	27.5	13.6	56.2	19.0			31.8	30.9		42.8	
Progression Factor	0.88	1.52	2.08	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	10.8	14.2	0.1	54.6	2.2			0.3	0.1		51.6	
Delay (s)	61.3	55.8	28.4	110.7	21.3			32.0	30.9		94.3	
Level of Service	E	E	C	F	C			C	C		F	
Approach Delay (s)		54.8			26.8			31.4			94.3	
Approach LOS		D			C			C			F	
Intersection Summary												
HCM 2000 Control Delay			47.9			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			15.0			
Intersection Capacity Utilization			89.9%			ICU Level of Service			E			
Analysis Period (min)			15									

c Critical Lane Group

Intersection

Int Delay, s/veh 0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↖↗		↖	
Traffic Vol, veh/h	3	1832	1161	29	62	6
Future Vol, veh/h	3	1832	1161	29	62	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	250	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	-2	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	33	4	7	7	3	0
Mvmt Flow	3	1928	1222	31	65	6

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1253	0	626
Stage 1	-	-	1237
Stage 2	-	-	971
Critical Hdwy	4.76	-	6.7
Critical Hdwy Stg 1	-	-	5.46
Critical Hdwy Stg 2	-	-	5.46
Follow-up Hdwy	2.53	-	3.3
Pot Cap-1 Maneuver	408	-	447
Stage 1	-	-	270
Stage 2	-	-	363
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	408	-	447
Mov Cap-2 Maneuver	-	-	162
Stage 1	-	-	270
Stage 2	-	-	360

Approach	EB	WB	SB
HCM Control Delay, s	0	0	40.1
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	408	-	-	-	172
HCM Lane V/C Ratio	0.008	-	-	-	0.416
HCM Control Delay (s)	13.9	-	-	-	40.1
HCM Lane LOS	B	-	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	1.9

Notes

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

HCS 2010 Roundabouts Report

General Information					Site Information				
Analyst	ZHB				Intersection	Crestview/East-West Connector			
Agency or Co.	KAI				E/W Street Name	East-West Connector			
Date Performed	10/21/2017				N/S Street Name	Crestview Dr			
Analysis Year	2020				Analysis Time Period (hrs)	0.25			
Time Period	Total AM				Peak Hour Factor	0.92			
Project Description	Crestview Crossing				Jurisdiction				

Volume Adjustments and Site Characteristics																
Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	14	0	32	0	39	0	17	0	11	89	13	0	5	260	5
Percent Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5	0
Flow Rate (v _{pce}), pc/h	0	15	0	35	0	42	0	18	0	12	102	14	0	5	297	5
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment													
Approach	EB			WB			NB			SB			
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	
Critical Headway (s)		4.9734			4.9734			4.9734			4.9734		
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087		

Flow Computations, Capacity and v/c Ratios													
Approach	EB			WB			NB			SB			
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	
Entry Flow (v _e), pc/h		50			60			128			307		
Entry Volume veh/h		50			60			123			293		
Circulating Flow (v _c), pc/h	344			129			20			54			
Exiting Flow (v _{ex}), pc/h	19			17			135			374			
Capacity (c _{pce}), pc/h		972			1210			1352			1306		
Capacity (c), veh/h		972			1210			1301			1246		
v/c Ratio (x)		0.05			0.05			0.09			0.24		

Delay and Level of Service													
Approach	EB			WB			NB			SB			
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	
Lane Control Delay (d), s/veh		4.2			3.4			3.5			5.0		
Lane LOS		A			A			A			A		
95% Queue, veh		0.2			0.2			0.3			0.9		
Approach Delay, s/veh	4.2			3.4			3.5			5.0			
Approach LOS	A			A			A			A			
Intersection Delay, s/veh LOS	4.4						A						

HCS 2010 Roundabouts Report

General Information					Site Information				
Analyst	ZHB				Intersection	Springbrook/Crestview			
Agency or Co.	KAI				E/W Street Name	Crestview Dr			
Date Performed	10/21/2017				N/S Street Name	Springbrook Rd			
Analysis Year	2020				Analysis Time Period (hrs)	0.25			
Time Period	Total PM				Peak Hour Factor	0.93			
Project Description	Crestview Crossing				Jurisdiction				

Volume Adjustments and Site Characteristics																
Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment	LTR				LTR				LTR				LTR			
Volume (V), veh/h	0	53	20	13	0	16	13	172	0	7	374	31	2	200	263	49
Percent Heavy Vehicles, %	0	0	0	0	20	20	0	0	0	0	3	0	0	0	2	0
Flow Rate (v _{PCE}), pc/h	0	57	22	14	0	21	14	185	0	8	414	33	2	215	288	53
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment													
Approach	EB			WB			NB			SB			
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	
Critical Headway (s)		4.9734			4.9734			4.9734			4.9734		
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087		

Flow Computations, Capacity and v/c Ratios												
Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v _e), pc/h		93			220			455			558	
Entry Volume veh/h		93			217			443			552	
Circulating Flow (v _c), pc/h		526			481			296			43	
Exiting Flow (v _{ex}), pc/h		270			75			658			323	
Capacity (c _{PCE}), pc/h		807			845			1021			1321	
Capacity (c), veh/h		807			832			994			1307	
v/c Ratio (x)		0.12			0.26			0.45			0.42	

Delay and Level of Service												
Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		5.6			7.1			8.7			6.9	
Lane LOS		A			A			A			A	
95% Queue, veh		0.4			1.0			2.3			2.1	
Approach Delay, s/veh		5.6			7.1			8.7			6.9	
Approach LOS		A			A			A			A	
Intersection Delay, s/veh LOS	7.5						A					

HCM Unsignalized Intersection Capacity Analysis

2: Libra St & Crestview Dr

02/15/2018






















Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↶			↷	↶	↷
Traffic Volume (veh/h)	239	5	9	195	8	14
Future Volume (Veh/h)	239	5	9	195	8	14
Sign Control	Free			Free	Stop	
Grade	0%			0%	2%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	303	6	11	247	10	18
Pedestrians						2
Lane Width (ft)						12.0
Walking Speed (ft/s)						3.5
Percent Blockage						0
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			311			577 308
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			311			577 308
tC, single (s)			4.1			6.4 6.2
tC, 2 stage (s)						
tF (s)			2.2			3.5 3.3
p0 queue free %			99			98 98
cM capacity (veh/h)			1258			476 735
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	309	258	28			
Volume Left	0	11	10			
Volume Right	6	0	18			
cSH	1700	1258	616			
Volume to Capacity	0.18	0.01	0.05			
Queue Length 95th (ft)	0	1	4			
Control Delay (s)	0.0	0.4	11.1			
Lane LOS			A			B
Approach Delay (s)	0.0	0.4	11.1			
Approach LOS			B			
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			27.6%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Springbrook Rd & Haworth Ave/Shopping Center

02/15/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	83	63	226	91	68	86	141	208	5	67	183	40
Future Volume (vph)	83	63	226	91	68	86	141	208	5	67	183	40
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	86	66	235	95	71	90	147	217	5	70	191	42
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1	SB 2					
Volume Total (vph)	152	235	256	147	222	70	233					
Volume Left (vph)	86	0	95	147	0	70	0					
Volume Right (vph)	0	235	90	0	5	0	42					
Hadj (s)	0.30	-0.68	-0.12	0.53	0.03	0.53	-0.06					
Departure Headway (s)	7.5	6.5	7.2	7.8	7.3	7.9	7.3					
Degree Utilization, x	0.32	0.43	0.51	0.32	0.45	0.15	0.47					
Capacity (veh/h)	452	521	466	431	462	427	458					
Control Delay (s)	12.8	13.1	17.4	13.2	14.9	11.1	15.5					
Approach Delay (s)	13.0		17.4	14.2		14.5						
Approach LOS	B		C	B		B						

























Intersection Summary

Delay	14.5
Level of Service	B
Intersection Capacity Utilization	50.8%
ICU Level of Service	A
Analysis Period (min)	15

HCM Signalized Intersection Capacity Analysis

4: Springbrook Rd & OR 99W

02/15/2018























												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	1182	124	151	1478	155	374	179	142	224	212	81
Future Volume (vph)	94	1182	124	151	1478	155	374	179	142	224	212	81
Ideal Flow (vphpl)	1750	1750	1750	1750	1800	1750	1750	1750	1750	1750	1750	1750
Grade (%)		0%			0%			3%			0%	
Total Lost time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frft	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1583	3137	1440	2854	3288	1423	3177	1674	1361	3193	1699	1438
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1583	3137	1440	2854	3288	1423	3177	1674	1361	3193	1699	1438
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	96	1206	127	154	1508	158	382	183	145	229	216	83
RTOR Reduction (vph)	0	0	63	0	0	77	0	0	124	0	0	65
Lane Group Flow (vph)	96	1206	64	154	1508	81	382	183	21	229	216	18
Confl. Peds. (#/hr)	2		9	9		2	14					14
Confl. Bikes (#/hr)									2			1
Heavy Vehicles (%)	5%	6%	1%	13%	4%	2%	0%	3%	6%	1%	3%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	10.7	70.6	70.6	10.4	70.3	70.3	20.4	19.9	19.9	22.6	22.1	22.1
Effective Green, g (s)	10.7	70.6	70.6	10.4	70.3	70.3	20.4	19.9	19.9	22.6	22.1	22.1
Actuated g/C Ratio	0.08	0.50	0.50	0.07	0.50	0.50	0.15	0.14	0.14	0.16	0.16	0.16
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.3	4.2	4.2	2.3	4.0	4.0	2.3	2.3	2.3	2.3	2.3	2.3
Lane Grp Cap (vph)	120	1581	726	212	1651	714	462	237	193	515	268	226
v/s Ratio Prot	c0.06	0.38		0.05	c0.46		c0.12	0.11		0.07	c0.13	
v/s Ratio Perm			0.04			0.06			0.02			0.01
v/c Ratio	0.80	0.76	0.09	0.73	0.91	0.11	0.83	0.77	0.11	0.44	0.81	0.08
Uniform Delay, d1	63.6	28.0	18.0	63.4	32.1	18.4	58.1	57.9	52.3	53.0	56.9	50.3
Progression Factor	1.00	1.00	1.00	1.02	0.95	1.43	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	29.5	3.5	0.2	7.2	6.5	0.2	11.2	13.6	0.1	0.4	15.5	0.1
Delay (s)	93.1	31.5	18.2	71.8	36.9	26.6	69.3	71.5	52.5	53.4	72.3	50.4
Level of Service	F	C	B	E	D	C	E	E	D	D	E	D
Approach Delay (s)		34.5			39.0			66.4			60.7	
Approach LOS		C			D			E			E	
Intersection Summary												
HCM 2000 Control Delay			44.4				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			16.5		
Intersection Capacity Utilization			90.7%				ICU Level of Service			E		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

5: Brutscher St & OR 99W

02/15/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	1086	101	231	1512	41	243	16	152	21	10	51
Future Volume (vph)	32	1086	101	231	1512	41	243	16	152	21	10	51
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		2%			0%			0%			-2%	
Total Lost time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	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	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.86		1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1646	3105	1402	1646	3197	1352	1620	1438		1675	1471	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.72	1.00		0.50	1.00	
Satd. Flow (perm)	1646	3105	1402	1646	3197	1352	1221	1438		875	1471	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	33	1131	105	241	1575	43	253	17	158	22	10	53
RTOR Reduction (vph)	0	0	37	0	0	14	0	121	0	0	41	0
Lane Group Flow (vph)	33	1131	68	241	1575	29	253	54	0	22	22	0
Confl. Peds. (#/hr)							5		3	3		5
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	6%	5%	1%	4%	10%	2%	0%	4%	0%	0%	4%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4				8
Permitted Phases			2			6	4			8		
Actuated Green, G (s)	3.9	69.3	69.3	25.6	91.0	91.0	32.6	32.6		32.6	32.6	
Effective Green, g (s)	3.9	69.3	69.3	25.6	91.0	91.0	32.6	32.6		32.6	32.6	
Actuated g/C Ratio	0.03	0.49	0.49	0.18	0.65	0.65	0.23	0.23		0.23	0.23	
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.3	4.8	4.8	2.3	4.8	4.8	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	45	1536	693	300	2078	878	284	334		203	342	
v/s Ratio Prot	0.02	c0.36		0.15	c0.49			0.04				0.02
v/s Ratio Perm			0.05			0.02	c0.21			0.03		
v/c Ratio	0.73	0.74	0.10	0.80	0.76	0.03	0.89	0.16		0.11	0.07	
Uniform Delay, d1	67.5	28.1	18.8	54.8	16.9	8.8	52.0	42.8		42.3	41.8	
Progression Factor	0.75	1.09	1.19	0.72	0.49	0.37	1.00	1.00		1.00	1.00	
Incremental Delay, d2	33.1	2.3	0.2	1.4	0.2	0.0	27.3	0.2		0.2	0.1	
Delay (s)	83.4	32.9	22.5	41.1	8.6	3.3	79.3	43.0		42.4	41.9	
Level of Service	F	C	C	D	A	A	E	D		D	D	
Approach Delay (s)		33.3			12.7			64.4			42.0	
Approach LOS		C			B			E			D	

Intersection Summary

HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

6: OR 99W & Vittoria Way

06/05/2018



























Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↕↕	↕↕		↵	
Traffic Volume (veh/h)	32	1242	1806	128	26	18
Future Volume (Veh/h)	32	1242	1806	128	26	18
Sign Control		Free	Free		Stop	
Grade		-2%	2%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	34	1335	1942	138	28	19
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage (veh)		2	2			
Upstream signal (ft)			522			
pX, platoon unblocked	0.42				0.42	0.42
vC, conflicting volume	2080				2746	1040
vC1, stage 1 conf vol					2011	
vC2, stage 2 conf vol					736	
vCu, unblocked vol	788				2391	0
tC, single (s)	4.2				7.0	6.9
tC, 2 stage (s)					6.0	
tF (s)	2.2				3.6	3.3
p0 queue free %	90				83	96
cM capacity (veh/h)	341				168	454
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	34	668	668	1295	785	47
Volume Left	34	0	0	0	0	28
Volume Right	0	0	0	0	138	19
cSH	341	1700	1700	1700	1700	225
Volume to Capacity	0.10	0.39	0.39	0.76	0.46	0.21
Queue Length 95th (ft)	8	0	0	0	0	19
Control Delay (s)	16.7	0.0	0.0	0.0	0.0	25.2
Lane LOS	C					D
Approach Delay (s)	0.4			0.0		25.2
Approach LOS						D
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			68.6%		ICU Level of Service	C
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

7: Providence Dr/Crestview Dr & OR 99W

02/15/2018

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		 			 						 		
Traffic Volume (vph)	81	1155	32	79	1774	167	114	28	116	190	11	51	
Future Volume (vph)	81	1155	32	79	1774	167	114	28	116	190	11	51	
Ideal Flow (vphpl)	1750	1750	1750	1750	1800	1750	1750	1750	1750	1750	1750	1750	
Grade (%)		-3%			2%			3%			2%		
Total Lost time (s)	6.0	6.0	6.0	4.5	4.5			4.5	4.5		4.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00		
Frpb, ped/bikes	1.00	1.00	0.98	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		
Fr _t	1.00	1.00	0.85	1.00	0.99			1.00	0.85		0.97		
Fl _t Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.96		
Satd. Flow (prot)	1654	3184	1479	1646	3219			1638	1465		1592		
Fl _t Permitted	0.95	1.00	1.00	0.95	1.00			0.70	1.00		0.58		
Satd. Flow (perm)	1654	3184	1479	1646	3219			1187	1465		964		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	86	1229	34	84	1887	178	121	30	123	202	12	54	
RTOR Reduction (vph)	0	0	15	0	5	0	0	0	92	0	7	0	
Lane Group Flow (vph)	86	1229	19	84	2060	0	0	151	31	0	261	0	
Confl. Bikes (#/hr)			1										
Heavy Vehicles (%)	2%	6%	0%	0%	4%	2%	1%	2%	0%	2%	2%	2%	
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	Perm	Perm	NA		
Protected Phases	5	2		1	6			8				4	
Permitted Phases			2				8		8	4			
Actuated Green, G (s)	7.0	77.8	77.8	12.3	83.1			34.9	34.9		34.9		
Effective Green, g (s)	7.0	77.8	77.8	12.3	83.1			34.9	34.9		34.9		
Actuated g/C Ratio	0.05	0.56	0.56	0.09	0.59			0.25	0.25		0.25		
Clearance Time (s)	6.0	6.0	6.0	4.5	4.5			4.5	4.5		4.5		
Vehicle Extension (s)	4.0	5.0	5.0	4.0	4.0			4.0	4.0		4.0		
Lane Grp Cap (vph)	82	1769	821	144	1910			295	365		240		
v/s Ratio Prot	c0.05	0.39		0.05	c0.64								
v/s Ratio Perm			0.01					0.13	0.02		c0.27		
v/c Ratio	1.05	0.69	0.02	0.58	1.08			0.51	0.08		1.09		
Uniform Delay, d1	66.5	22.5	14.0	61.4	28.5			45.2	40.3		52.5		
Progression Factor	1.09	0.53	1.00	1.00	1.00			1.00	1.00		1.00		
Incremental Delay, d2	101.6	1.8	0.0	7.0	45.4			2.0	0.1		83.7		
Delay (s)	173.8	13.7	14.0	68.3	73.9			47.2	40.4		136.3		
Level of Service	F	B	B	E	E			D	D		F		
Approach Delay (s)		23.9			73.7			44.2			136.3		
Approach LOS		C			E			D			F		
Intersection Summary													
HCM 2000 Control Delay			59.2			HCM 2000 Level of Service			E				
HCM 2000 Volume to Capacity ratio			1.08										
Actuated Cycle Length (s)			140.0			Sum of lost time (s)		15.0					
Intersection Capacity Utilization			96.8%			ICU Level of Service		F					
Analysis Period (min)			15										
c Critical Lane Group													

Intersection

Int Delay, s/veh 4.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Vol, veh/h	31	1430	2018	75	61	17
Future Vol, veh/h	31	1430	2018	75	61	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	250	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	-2	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	5	4	0	2	0
Mvmt Flow	33	1538	2170	81	66	18

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	2251	0	1125
Stage 1	-	-	2210
Stage 2	-	-	835
Critical Hdwy	4.1	-	6.7
Critical Hdwy Stg 1	-	-	5.44
Critical Hdwy Stg 2	-	-	5.44
Follow-up Hdwy	2.2	-	3.3
Pot Cap-1 Maneuver	232	-	215
Stage 1	-	-	89
Stage 2	-	-	424
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	232	-	215
Mov Cap-2 Maneuver	-	-	69
Stage 1	-	-	89
Stage 2	-	-	364

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	201.5
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	232	-	-	-	81
HCM Lane V/C Ratio	0.144	-	-	-	1.035
HCM Control Delay (s)	23.1	-	-	-	201.5
HCM Lane LOS	C	-	-	-	F
HCM 95th %tile Q(veh)	0.5	-	-	-	5.8

Notes

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

HCS 2010 Roundabouts Report

General Information					Site Information				
Analyst	ZHB				Intersection	Crestview/East-West Connector			
Agency or Co.	KAI				E/W Street Name	East-West Connector			
Date Performed	10/21/2017				N/S Street Name	Crestview Dr			
Analysis Year	2020				Analysis Time Period (hrs)	0.25			
Time Period	Total PM				Peak Hour Factor	0.94			
Project Description	Crestview Crossing				Jurisdiction				

Volume Adjustments and Site Characteristics																
Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment	LTR				LTR				LTR				LTR			
Volume (V), veh/h	0	9	0	21	0	25	0	11	0	36	197	43	0	19	201	15
Percent Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0
Flow Rate (v _{PCE}), pc/h	0	10	0	22	0	27	0	12	0	38	214	46	0	20	218	16
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment													
Approach	EB			WB			NB			SB			
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	
Critical Headway (s)		4.9734			4.9734			4.9734			4.9734		
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087		

Flow Computations, Capacity and v/c Ratios												
Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v _e), pc/h		32			39			298			254	
Entry Volume veh/h		32			39			294			250	
Circulating Flow (v _c), pc/h		265			262			30			65	
Exiting Flow (v _{ex}), pc/h		66			54			236			267	
Capacity (c _{PCE}), pc/h		1053			1057			1338			1292	
Capacity (c), veh/h		1053			1057			1320			1270	
v/c Ratio (x)		0.03			0.04			0.22			0.20	


























Delay and Level of Service												
Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		3.7			3.7			4.6			4.5	
Lane LOS		A			A			A			A	
95% Queue, veh		0.1			0.1			0.9			0.7	
Approach Delay, s/veh		3.7			3.7			4.6			4.5	
Approach LOS		A			A			A			A	
Intersection Delay, s/veh LOS	4.5						A					

Appendix I
Year 2020 Total Conditions with
Mitigation Level of Service
Worksheets

HCM Signalized Intersection Capacity Analysis

7: Providence Dr & OR 99W



























02/15/2018

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	24	1536	67	73	1019	77	35	11	63	238	21	72	
Future Volume (vph)	24	1536	67	73	1019	77	35	11	63	238	21	72	
Ideal Flow (vphpl)	1750	1750	1750	1750	1800	1750	1750	1750	1750	1750	1750	1750	
Grade (%)		-3%			2%			3%			2%		
Total Lost time (s)	6.0	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1607	3214	1480	1614	3135	1402	1590	1642	1465	1567	1650	1402	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.74	1.00	1.00	0.75	1.00	1.00	
Satd. Flow (perm)	1607	3214	1480	1614	3135	1402	1242	1642	1465	1237	1650	1402	
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)	26	1670	73	79	1108	84	38	12	68	259	23	78	
RTOR Reduction (vph)	0	0	29	0	0	33	0	0	52	0	0	60	
Lane Group Flow (vph)	26	1670	44	79	1108	51	38	12	16	259	23	18	
Heavy Vehicles (%)	5%	5%	2%	2%	8%	5%	3%	5%	0%	5%	5%	5%	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	
Protected Phases	5	2		1	6			8				4	
Permitted Phases			2			6	8		8	4		4	
Actuated Green, G (s)	3.6	68.8	68.8	8.1	73.3	73.3	28.1	28.1	28.1	28.1	28.1	28.1	
Effective Green, g (s)	3.6	68.8	68.8	8.1	73.3	73.3	28.1	28.1	28.1	28.1	28.1	28.1	
Actuated g/C Ratio	0.03	0.57	0.57	0.07	0.61	0.61	0.23	0.23	0.23	0.23	0.23	0.23	
Clearance Time (s)	6.0	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	4.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	48	1842	848	108	1914	856	290	384	343	289	386	328	
v/s Ratio Prot	0.02	c0.52		c0.05	c0.35			0.01				0.01	
v/s Ratio Perm			0.03			0.04	0.03		0.01	c0.21		0.01	
v/c Ratio	0.54	0.91	0.05	0.73	0.58	0.06	0.13	0.03	0.05	0.90	0.06	0.06	
Uniform Delay, d1	57.4	22.7	11.3	54.9	14.1	9.4	36.3	35.4	35.6	44.5	35.7	35.7	
Progression Factor	0.89	1.57	2.47	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.8	6.0	0.1	23.6	1.3	0.1	0.3	0.0	0.1	28.3	0.1	0.1	
Delay (s)	61.7	41.6	27.9	78.5	15.3	9.6	36.6	35.5	35.7	72.9	35.8	35.8	
Level of Service	E	D	C	E	B	A	D	D	D	E	D	D	
Approach Delay (s)		41.3			18.9			35.9			62.4		
Approach LOS		D			B			D			E		
Intersection Summary													
HCM 2000 Control Delay			35.2									HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.88										
Actuated Cycle Length (s)			120.0									Sum of lost time (s)	15.0
Intersection Capacity Utilization			84.0%									ICU Level of Service	E
Analysis Period (min)			15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Providence Dr/Crestview Dr & OR 99W

02/15/2018

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		 			 								
Traffic Volume (vph)	81	1155	32	79	1774	167	114	28	116	190	11	46	
Future Volume (vph)	81	1155	32	79	1774	167	114	28	116	190	11	46	
Ideal Flow (vphpl)	1750	1750	1750	1750	1800	1750	1750	1750	1750	1750	1750	1750	
Grade (%)		-3%			2%			3%			2%		
Total Lost time (s)	6.0	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.98	1.00	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	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1654	3184	1479	1646	3256	1444	1621	1690	1465	1614	1699	1444	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.75	1.00	1.00	0.74	1.00	1.00	
Satd. Flow (perm)	1654	3184	1479	1646	3256	1444	1280	1690	1465	1253	1699	1444	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	86	1229	34	84	1887	178	121	30	123	202	12	49	
RTOR Reduction (vph)	0	0	13	0	0	46	0	0	100	0	0	40	
Lane Group Flow (vph)	86	1229	21	84	1887	132	121	30	23	202	12	9	
Confl. Bikes (#/hr)			1										
Heavy Vehicles (%)	2%	6%	0%	0%	4%	2%	1%	2%	0%	2%	2%	2%	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	
Protected Phases	5	2		1	6			8				4	
Permitted Phases			2			6	8		8	4		4	
Actuated Green, G (s)	9.8	86.0	86.0	12.3	88.5	88.5	26.7	26.7	26.7	26.7	26.7	26.7	
Effective Green, g (s)	9.8	86.0	86.0	12.3	88.5	88.5	26.7	26.7	26.7	26.7	26.7	26.7	
Actuated g/C Ratio	0.07	0.61	0.61	0.09	0.63	0.63	0.19	0.19	0.19	0.19	0.19	0.19	
Clearance Time (s)	6.0	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	4.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	115	1955	908	144	2058	912	244	322	279	238	324	275	
v/s Ratio Prot	c0.05	0.39		0.05	c0.58			0.02				0.01	
v/s Ratio Perm			0.01			0.09	0.09		0.02	c0.16		0.01	
v/c Ratio	0.75	0.63	0.02	0.58	0.92	0.15	0.50	0.09	0.08	0.85	0.04	0.03	
Uniform Delay, d1	63.9	17.0	10.6	61.4	22.5	10.4	50.6	46.7	46.6	54.7	46.2	46.1	
Progression Factor	1.26	0.14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	19.5	1.2	0.0	7.0	8.0	0.3	2.2	0.2	0.2	24.3	0.1	0.1	
Delay (s)	100.0	3.6	10.6	68.3	30.5	10.8	52.8	46.8	46.8	79.0	46.2	46.2	
Level of Service	F	A	B	E	C	B	D	D	D	E	D	D	
Approach Delay (s)		10.0			30.3			49.4			71.4		
Approach LOS		A			C			D			E		
Intersection Summary													
HCM 2000 Control Delay			27.5									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.89										
Actuated Cycle Length (s)			140.0									Sum of lost time (s)	15.0
Intersection Capacity Utilization			87.2%									ICU Level of Service	E
Analysis Period (min)			15										
c Critical Lane Group													

Appendix J
SimTraffic Queuing Worksheets

Intersection: 2: Libra St & Crestview Dr

Movement	NB
Directions Served	LR
Maximum Queue (ft)	44
Average Queue (ft)	9
95th Queue (ft)	34
Link Distance (ft)	217
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Springbrook Rd & Haworth Ave/Shopping Center

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	TR	L	TR
Maximum Queue (ft)	95	168	66	95	158	114	210
Average Queue (ft)	38	56	31	31	58	18	108
95th Queue (ft)	67	125	57	69	109	69	190
Link Distance (ft)		420	165		443		183
Upstream Blk Time (%)							6
Queuing Penalty (veh)							0
Storage Bay Dist (ft)	90			90		90	
Storage Blk Time (%)	0	2		0	2	0	16
Queuing Penalty (veh)	0	2		0	1	0	3

Intersection: 4: Springbrook Rd & OR 99W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	T	R	L	L	T
Maximum Queue (ft)	320	524	561	225	77	95	228	239	24	130	148	241
Average Queue (ft)	43	273	273	21	21	46	128	135	0	42	80	99
95th Queue (ft)	154	447	453	162	59	83	207	219	0	102	133	186
Link Distance (ft)		2053	2053				1271	1271				1159
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	350			350	430	430			370	320	320	
Storage Blk Time (%)		4	4	0								
Queuing Penalty (veh)		2	3	0								

Intersection: 4: Springbrook Rd & OR 99W

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	L	T	R
Maximum Queue (ft)	106	182	194	417	155
Average Queue (ft)	47	143	165	159	37
95th Queue (ft)	95	212	220	353	108
Link Distance (ft)				443	
Upstream Blk Time (%)				1	
Queuing Penalty (veh)				3	
Storage Bay Dist (ft)	320	170	170		130
Storage Blk Time (%)		2	12	7	0
Queuing Penalty (veh)		3	22	33	0

Intersection: 5: Brutscher St & OR 99W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	TR	L	TR
Maximum Queue (ft)	53	140	162	35	128	138	174	75	145	137	53	62
Average Queue (ft)	11	35	43	4	44	36	52	5	53	45	8	16
95th Queue (ft)	38	99	115	21	101	101	130	32	118	103	34	44
Link Distance (ft)		1271	1271			1266	1266			345		357
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	260			200	350			80	220		50	
Storage Blk Time (%)			0				2	0			1	1
Queuing Penalty (veh)			0				1	0			0	0

Intersection: 6: OR 99W & Vittoria Way

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	23	163
Average Queue (ft)	2	62
95th Queue (ft)	15	126
Link Distance (ft)		204
Upstream Blk Time (%)		0
Queuing Penalty (veh)		0
Storage Bay Dist (ft)	100	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: Providence Dr & OR 99W

Movement	EB	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	T	R	L	T	T	L	R
Maximum Queue (ft)	219	230	125	128	90	98	78	105
Average Queue (ft)	91	104	16	61	34	30	28	35
95th Queue (ft)	191	216	76	117	83	82	66	77
Link Distance (ft)	447	447			1785	1785	301	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			100	230				160
Storage Blk Time (%)		6	0					0
Queuing Penalty (veh)		3	0					0

Intersection: 8: OR 99W & Benjamin Rd

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	38	297
Average Queue (ft)	2	158
95th Queue (ft)	17	349
Link Distance (ft)		526
Upstream Blk Time (%)		1
Queuing Penalty (veh)		0
Storage Bay Dist (ft)	250	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 77

Intersection: 2: Libra St & Crestview Dr

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	6	35
Average Queue (ft)	0	15
95th Queue (ft)	0	40
Link Distance (ft)	476	243
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Springbrook Rd & Haworth Ave/Shopping Center

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	TR	L	TR
Maximum Queue (ft)	115	485	220	115	296	115	326
Average Queue (ft)	86	351	171	68	114	72	289
95th Queue (ft)	156	600	263	131	224	163	314
Link Distance (ft)		441	194		432		267
Upstream Blk Time (%)		48	55				99
Queuing Penalty (veh)		0	0				0
Storage Bay Dist (ft)	90			90		90	
Storage Blk Time (%)	7	73		1	18	0	99
Queuing Penalty (veh)	14	106		4	25	0	67

Intersection: 4: Springbrook Rd & OR 99W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	T	R	L	L	T
Maximum Queue (ft)	328	465	475	148	214	410	571	589	395	332	345	1699
Average Queue (ft)	201	213	217	5	79	111	254	266	87	303	335	1616
95th Queue (ft)	385	475	455	76	174	257	530	553	352	394	383	1901
Link Distance (ft)		3631	3631				1270	1270				1649
Upstream Blk Time (%)												77
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	350			350	430	430			370	320	320	
Storage Blk Time (%)	14	0	1	0			2	4	0	9	65	12
Queuing Penalty (veh)	76	0	1	0			2	11	0	26	197	62

Intersection: 4: Springbrook Rd & OR 99W

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	L	T	R
Maximum Queue (ft)	276	182	195	451	155
Average Queue (ft)	91	144	171	427	69
95th Queue (ft)	259	229	247	482	175
Link Distance (ft)				432	
Upstream Blk Time (%)				40	
Queuing Penalty (veh)				265	
Storage Bay Dist (ft)	320	170	170		130
Storage Blk Time (%)	0	11	30	60	1
Queuing Penalty (veh)	0	33	89	286	5

Intersection: 5: Brutscher St & OR 99W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	TR	L	TR
Maximum Queue (ft)	211	409	375	225	374	984	979	105	245	388	61	123
Average Queue (ft)	27	180	188	70	313	571	565	10	214	250	12	33
95th Queue (ft)	109	360	364	216	453	1383	1382	55	295	487	41	87
Link Distance (ft)		1270	1270			1264	1264			345		357
Upstream Blk Time (%)						6	6			41		
Queuing Penalty (veh)						54	56			0		
Storage Bay Dist (ft)	260			200	350			80	220			50
Storage Blk Time (%)		3	7	0	39	2	18	0	50	3	2	7
Queuing Penalty (veh)		1	7	0	297	4	8	0	74	8	1	2

Intersection: 6: OR 99W & Vittoria Way

Movement	EB	WB	WB	SB
Directions Served	L	T	TR	LR
Maximum Queue (ft)	72	204	208	158
Average Queue (ft)	20	94	95	88
95th Queue (ft)	52	382	384	200
Link Distance (ft)		449	449	209
Upstream Blk Time (%)		4	5	10
Queuing Penalty (veh)		42	45	0
Storage Bay Dist (ft)	100			
Storage Blk Time (%)	0			
Queuing Penalty (veh)	2			

Intersection: 7: Providence Dr & OR 99W

Movement	EB	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	T	R	L	T	T	L	R
Maximum Queue (ft)	259	285	106	189	768	748	218	131
Average Queue (ft)	118	128	7	92	303	305	90	46
95th Queue (ft)	214	228	51	196	1174	1169	177	106
Link Distance (ft)	449	449			1785	1785	301	
Upstream Blk Time (%)					1	1	0	
Queuing Penalty (veh)					11	13	0	
Storage Bay Dist (ft)			100	230				160
Storage Blk Time (%)		10	0	0	12		2	0
Queuing Penalty (veh)		2	0	0	8		2	0

Intersection: 8: OR 99W & Benjamin Rd

Movement	EB	WB	WB	SB
Directions Served	L	T	TR	LR
Maximum Queue (ft)	95	158	164	541
Average Queue (ft)	28	52	51	510
95th Queue (ft)	73	354	347	607
Link Distance (ft)		746	746	526
Upstream Blk Time (%)		2	3	83
Queuing Penalty (veh)		0	0	0
Storage Bay Dist (ft)	250			
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 1908

Intersection: 2: Libra St & Crestview Dr

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	30	54
Average Queue (ft)	3	10
95th Queue (ft)	17	37
Link Distance (ft)	400	217
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Springbrook Rd & Haworth Ave/Shopping Center

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	TR	L	TR
Maximum Queue (ft)	80	90	75	90	119	56	101
Average Queue (ft)	34	48	33	30	48	13	51
95th Queue (ft)	60	75	60	62	91	41	84
Link Distance (ft)		420	165		443		183
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	90			90		90	
Storage Blk Time (%)	0	0		0	1	0	0
Queuing Penalty (veh)	0	0		0	1	0	0

Queuing and Blocking Report
 2020 Background AM with rerouted traffic

02/16/2018

Intersection: 4: Springbrook Rd & OR 99W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	T	L	L	T	R
Maximum Queue (ft)	235	390	410	62	81	98	184	185	160	190	210	118
Average Queue (ft)	36	237	233	4	23	45	90	92	41	103	100	41
95th Queue (ft)	122	353	361	70	62	87	160	162	131	175	178	95
Link Distance (ft)		2012	2012				1271	1271				526
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	350			350	430	430			320	320		320
Storage Blk Time (%)		1	1	0								
Queuing Penalty (veh)		0	1	0								

Intersection: 4: Springbrook Rd & OR 99W

Movement	SB	SB	SB	SB
Directions Served	L	L	T	R
Maximum Queue (ft)	164	194	319	154
Average Queue (ft)	67	104	105	45
95th Queue (ft)	141	176	240	119
Link Distance (ft)			443	
Upstream Blk Time (%)			0	
Queuing Penalty (veh)			0	
Storage Bay Dist (ft)	170	170		130
Storage Blk Time (%)	0	1	6	0
Queuing Penalty (veh)	0	1	16	1

Intersection: 5: Brutscher St & OR 99W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	TR	L	TR
Maximum Queue (ft)	43	166	180	47	148	126	130	51	146	125	37	62
Average Queue (ft)	8	57	68	6	49	18	24	3	52	43	7	15
95th Queue (ft)	29	135	145	28	110	71	80	23	109	91	27	42
Link Distance (ft)		1271	1271			1266	1266			345		357
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	260			200	350			80	220			50
Storage Blk Time (%)			0				1				0	1
Queuing Penalty (veh)			0				0				0	0

Intersection: 6: OR 99W & Vittoria Way

Movement	EB	EB	EB	WB	SB
Directions Served	L	T	T	TR	LR
Maximum Queue (ft)	25	30	56	4	197
Average Queue (ft)	2	1	2	0	88
95th Queue (ft)	15	13	23	3	174
Link Distance (ft)		1266	1266	458	204
Upstream Blk Time (%)					4
Queuing Penalty (veh)					0
Storage Bay Dist (ft)	100				
Storage Blk Time (%)		0			
Queuing Penalty (veh)		0			

Intersection: 7: Providence Dr/Crestview Dr & OR 99W

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	T	T	R	L	T	TR	LT	R	LTR
Maximum Queue (ft)	435	450	125	133	174	197	99	94	314
Average Queue (ft)	240	257	36	57	70	75	32	29	167
95th Queue (ft)	400	408	119	109	138	152	77	67	263
Link Distance (ft)	458	458			1777	1777	1122		1218
Upstream Blk Time (%)	0	0							
Queuing Penalty (veh)	0	1							
Storage Bay Dist (ft)			100	230				160	
Storage Blk Time (%)	17	19	0		0		0		
Queuing Penalty (veh)	0	13	0		0		0		

Intersection: 8: OR 99W & Benjamin Rd

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	34	454
Average Queue (ft)	2	290
95th Queue (ft)	15	541
Link Distance (ft)		526
Upstream Blk Time (%)		17
Queuing Penalty (veh)		0
Storage Bay Dist (ft)	250	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 35

Intersection: 2: Libra St & Crestview Dr

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	33	40
Average Queue (ft)	2	19
95th Queue (ft)	16	45
Link Distance (ft)	476	243
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Springbrook Rd & Haworth Ave/Shopping Center

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	TR	L	TR
Maximum Queue (ft)	95	123	134	113	138	90	161
Average Queue (ft)	45	59	63	47	60	32	64
95th Queue (ft)	77	97	108	88	105	67	112
Link Distance (ft)		441	194		432		267
Upstream Blk Time (%)			0				
Queuing Penalty (veh)			0				
Storage Bay Dist (ft)	90			90		90	
Storage Blk Time (%)	0	1		1	2	0	3
Queuing Penalty (veh)	1	2		1	2	0	2

Intersection: 4: Springbrook Rd & OR 99W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	T	R	L	L	T
Maximum Queue (ft)	344	444	450	299	146	454	900	896	395	268	307	271
Average Queue (ft)	131	284	273	15	52	140	492	505	198	166	209	137
95th Queue (ft)	267	406	392	137	113	384	851	861	523	258	296	231
Link Distance (ft)		1827	1827				1270	1270				526
Upstream Blk Time (%)							1	1				
Queuing Penalty (veh)							6	8				
Storage Bay Dist (ft)	350			350	430	430			370	320	320	
Storage Blk Time (%)	0	2	2	0		0	11	18	0		0	0
Queuing Penalty (veh)	0	2	3	0		0	15	27	1		1	0

Intersection: 4: Springbrook Rd & OR 99W

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	L	T	R
Maximum Queue (ft)	124	180	195	427	155
Average Queue (ft)	46	67	121	199	76
95th Queue (ft)	94	142	214	384	170
Link Distance (ft)				432	
Upstream Blk Time (%)				1	
Queuing Penalty (veh)				3	
Storage Bay Dist (ft)	320	170	170		130
Storage Blk Time (%)		0	1	23	0
Queuing Penalty (veh)		1	2	68	2

Intersection: 5: Brutscher St & OR 99W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	TR	L	TR
Maximum Queue (ft)	70	386	423	225	374	790	744	105	245	372	71	127
Average Queue (ft)	23	184	200	60	297	485	482	15	212	227	15	36
95th Queue (ft)	57	345	375	199	439	1292	1292	67	288	460	47	88
Link Distance (ft)		1270	1270			1264	1264			345		357
Upstream Blk Time (%)						3	3			28		
Queuing Penalty (veh)						23	27			0		
Storage Bay Dist (ft)	260			200	350			80	220		50	
Storage Blk Time (%)		2	7	0	29	4	19	0	42	0	1	9
Queuing Penalty (veh)		1	7	0	214	8	8	0	63	1	1	2

Intersection: 6: OR 99W & Vittoria Way

Movement	EB	WB	WB	SB
Directions Served	L	T	TR	LR
Maximum Queue (ft)	70	194	210	186
Average Queue (ft)	25	64	67	73
95th Queue (ft)	63	301	311	182
Link Distance (ft)		454	454	209
Upstream Blk Time (%)		1	2	7
Queuing Penalty (veh)		13	15	0
Storage Bay Dist (ft)	100			
Storage Blk Time (%)	0			
Queuing Penalty (veh)	0			

Intersection: 7: Providence Dr/Crestview Dr & OR 99W

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	T	T	R	L	T	TR	LT	R	LTR
Maximum Queue (ft)	257	255	59	215	612	610	214	164	282
Average Queue (ft)	105	113	3	81	236	244	99	59	152
95th Queue (ft)	202	207	27	170	780	781	187	128	250
Link Distance (ft)	454	454			1780	1780	301		852
Upstream Blk Time (%)					0		0		
Queuing Penalty (veh)					0		0		
Storage Bay Dist (ft)			100	230				160	
Storage Blk Time (%)	8	10	0		5		3	0	
Queuing Penalty (veh)	0	1	0		4		3	0	

Intersection: 8: OR 99W & Benjamin Rd

Movement	EB	WB	WB	SB
Directions Served	L	T	TR	LR
Maximum Queue (ft)	100	16	43	541
Average Queue (ft)	32	1	3	512
95th Queue (ft)	74	12	21	594
Link Distance (ft)		746	746	526
Upstream Blk Time (%)				87
Queuing Penalty (veh)				0
Storage Bay Dist (ft)	250			
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 538

Intersection: 2: Libra St & Crestview Dr

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	39	58
Average Queue (ft)	2	11
95th Queue (ft)	16	41
Link Distance (ft)	400	217
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Springbrook Rd & Haworth Ave/Shopping Center

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	TR	L	TR
Maximum Queue (ft)	74	90	67	86	94	47	119
Average Queue (ft)	34	47	32	32	37	11	51
95th Queue (ft)	58	75	58	63	69	37	87
Link Distance (ft)		420	165		443		183
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	90			90		90	
Storage Blk Time (%)	0	0		0	0	0	1
Queuing Penalty (veh)	0	0		0	0	0	0

Intersection: 4: Springbrook Rd & OR 99W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	T	L	L	T	R
Maximum Queue (ft)	152	526	518	150	82	102	192	187	157	204	208	146
Average Queue (ft)	33	270	267	13	26	50	91	92	44	112	94	44
95th Queue (ft)	96	456	459	126	67	88	159	156	136	183	171	103
Link Distance (ft)		2201	2201				1271	1271				526
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	350			350	430	430			320	320		320
Storage Blk Time (%)		4	4	0								
Queuing Penalty (veh)		2	4	0								

Intersection: 4: Springbrook Rd & OR 99W

Movement	SB	SB	SB	SB
Directions Served	L	L	T	R
Maximum Queue (ft)	158	188	258	139
Average Queue (ft)	63	102	91	37
95th Queue (ft)	135	168	175	93
Link Distance (ft)			443	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	170	170		130
Storage Blk Time (%)	0	0	4	0
Queuing Penalty (veh)	0	0	13	0

Intersection: 5: Brutscher St & OR 99W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	TR	L	TR
Maximum Queue (ft)	60	227	210	80	169	103	101	56	133	143	51	86
Average Queue (ft)	10	70	79	8	72	12	20	3	56	49	8	19
95th Queue (ft)	36	175	179	44	144	58	72	25	119	108	29	66
Link Distance (ft)		1271	1271			1266	1266			345		357
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	260			200	350			80	220			50
Storage Blk Time (%)		0	1	0			1	0			0	2
Queuing Penalty (veh)		0	0	0			0	0			0	0

Intersection: 6: OR 99W & Vittoria Way

Movement	EB	EB	EB	SB
Directions Served	L	T	T	LR
Maximum Queue (ft)	18	108	129	194
Average Queue (ft)	1	9	11	125
95th Queue (ft)	12	59	68	239
Link Distance (ft)		1266	1266	204
Upstream Blk Time (%)				25
Queuing Penalty (veh)				0
Storage Bay Dist (ft)	100			
Storage Blk Time (%)		0		
Queuing Penalty (veh)		0		

Intersection: 7: Providence Dr & OR 99W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	R	L	T	T	R	L	T	R	L
Maximum Queue (ft)	93	455	463	125	151	230	240	48	84	49	74	223
Average Queue (ft)	23	283	302	31	60	116	111	12	26	9	32	165
95th Queue (ft)	66	438	457	111	118	209	215	38	69	35	67	237
Link Distance (ft)		446	446			1773	1773			820		
Upstream Blk Time (%)		0	1									
Queuing Penalty (veh)		4	7									
Storage Bay Dist (ft)	100			100	230			230	160		160	200
Storage Blk Time (%)	0	21	23	0		0	0					9
Queuing Penalty (veh)	2	5	15	0		0	0					8

Intersection: 7: Providence Dr & OR 99W

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	318	102
Average Queue (ft)	56	25
95th Queue (ft)	236	66
Link Distance (ft)	1100	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		200
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 8: OR 99W & Benjamin Rd

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	32	502
Average Queue (ft)	2	401
95th Queue (ft)	15	642
Link Distance (ft)		526
Upstream Blk Time (%)		33
Queuing Penalty (veh)		0
Storage Bay Dist (ft)	250	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 62

Intersection: 2: Libra St & Crestview Dr

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	42	40
Average Queue (ft)	3	15
95th Queue (ft)	20	41
Link Distance (ft)	476	243
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Springbrook Rd & Haworth Ave/Shopping Center

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	TR	L	TR
Maximum Queue (ft)	95	122	113	93	94	58	104
Average Queue (ft)	42	57	60	50	41	30	56
95th Queue (ft)	72	97	93	86	75	53	88
Link Distance (ft)		441	194		432		267
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	90			90		90	
Storage Blk Time (%)	0	1		0	0	0	1
Queuing Penalty (veh)	0	2		1	0	0	0

Intersection: 4: Springbrook Rd & OR 99W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	T	R	L	L	T
Maximum Queue (ft)	351	449	429	300	150	454	680	695	395	264	303	271
Average Queue (ft)	114	296	293	21	66	158	458	471	117	155	203	132
95th Queue (ft)	255	416	408	161	132	408	641	658	413	232	278	229
Link Distance (ft)		1902	1902				1270	1270				526
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	350			350	430	430			370	320	320	
Storage Blk Time (%)		3	3	0		0	9	19	0		0	
Queuing Penalty (veh)		3	3	0		0	14	15	0		0	

Intersection: 4: Springbrook Rd & OR 99W

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	L	T	R
Maximum Queue (ft)	155	169	195	413	155
Average Queue (ft)	52	78	127	202	72
95th Queue (ft)	115	150	216	377	170
Link Distance (ft)				432	
Upstream Blk Time (%)				0	
Queuing Penalty (veh)				3	
Storage Bay Dist (ft)	320	170	170		130
Storage Blk Time (%)		0	0	25	0
Queuing Penalty (veh)		0	1	75	1

Intersection: 5: Brutscher St & OR 99W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	TR	L	TR
Maximum Queue (ft)	192	369	394	225	340	550	548	105	244	364	47	82
Average Queue (ft)	26	179	193	53	212	300	306	19	176	112	12	25
95th Queue (ft)	103	339	353	177	369	529	512	76	265	279	37	61
Link Distance (ft)		1270	1270			1264	1264			345		357
Upstream Blk Time (%)										1		
Queuing Penalty (veh)										0		
Storage Bay Dist (ft)	260			200	350			80	220		50	
Storage Blk Time (%)		2	5	0	8	2	23	0	9		1	3
Queuing Penalty (veh)		1	6	0	59	5	9	0	14		1	1

Intersection: 6: OR 99W & Vittoria Way

Movement	EB	WB	WB	SB
Directions Served	L	T	TR	LR
Maximum Queue (ft)	83	5	72	146
Average Queue (ft)	30	0	2	48
95th Queue (ft)	69	3	43	115
Link Distance (ft)		447	447	209
Upstream Blk Time (%)				1
Queuing Penalty (veh)				0
Storage Bay Dist (ft)	100			
Storage Blk Time (%)	1			
Queuing Penalty (veh)	4			

Intersection: 7: Providence Dr/Crestview Dr & OR 99W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	R	L	T	T	R	L	T	R	L
Maximum Queue (ft)	123	180	170	84	255	571	582	255	182	196	119	224
Average Queue (ft)	78	63	60	6	94	319	323	100	95	32	54	160
95th Queue (ft)	131	148	134	41	212	535	543	279	163	98	103	241
Link Distance (ft)		447	447			1773	1773			1329		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	100			100	230			230	160		160	200
Storage Blk Time (%)	14	2	2	0		13	13	0	3			11
Queuing Penalty (veh)	83	2	1	0		11	22	0	4			6

Intersection: 7: Providence Dr/Crestview Dr & OR 99W

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	376	108
Average Queue (ft)	54	25
95th Queue (ft)	237	71
Link Distance (ft)	1119	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		200
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 8: OR 99W & Benjamin Rd

Movement	EB	WB	SB
Directions Served	L	TR	LR
Maximum Queue (ft)	78	14	545
Average Queue (ft)	26	1	523
95th Queue (ft)	68	7	589
Link Distance (ft)		746	526
Upstream Blk Time (%)			90
Queuing Penalty (veh)			0
Storage Bay Dist (ft)	250		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 348

Queuing and Blocking Report
 2020 Total AM Phase II Sensitivity Analysis

02/16/2018

Intersection: 7: Providence Dr & OR 99W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	R	L	T	T	R	L	T	R	L
Maximum Queue (ft)	125	461	466	125	159	288	276	207	91	62	103	224
Average Queue (ft)	71	296	313	27	62	151	150	24	31	19	38	176
95th Queue (ft)	130	479	491	99	120	252	257	99	74	49	79	244
Link Distance (ft)		445	445			1774	1774			1117		
Upstream Blk Time (%)		1	1									
Queuing Penalty (veh)		6	10									
Storage Bay Dist (ft)	100			100	230			230	160		160	200
Storage Blk Time (%)	8	21	24	0		1	1	0				11
Queuing Penalty (veh)	64	15	16	0		1	1	0				14

Intersection: 7: Providence Dr & OR 99W

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	419	146
Average Queue (ft)	83	35
95th Queue (ft)	308	90
Link Distance (ft)	1221	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		200
Storage Blk Time (%)		0
Queuing Penalty (veh)		0

Queuing and Blocking Report
 2020 Total PM Phase II Sensitivity Analysis

02/16/2018

Intersection: 7: Providence Dr/Crestview Dr & OR 99W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	R	L	T	T	R	L	T	R	L
Maximum Queue (ft)	124	302	273	83	254	894	891	255	160	125	146	225
Average Queue (ft)	102	111	95	6	111	470	473	131	81	31	53	174
95th Queue (ft)	147	245	204	36	248	965	968	312	140	84	106	253
Link Distance (ft)		446	446			1774	1774			951		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	100			100	230			230	160		160	200
Storage Blk Time (%)	32	3	5	0	0	20	20	0	1		0	17
Queuing Penalty (veh)	181	4	2	0	0	16	41	1	1		0	23

Intersection: 7: Providence Dr/Crestview Dr & OR 99W

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	464	183
Average Queue (ft)	108	65
95th Queue (ft)	362	134
Link Distance (ft)	980	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		200
Storage Blk Time (%)		
Queuing Penalty (veh)		

Appendix K
Year 2020 Phase II Sensitivity
Analysis Level of Service
Worksheets

HCM Signalized Intersection Capacity Analysis

7: Providence Dr & OR 99W

02/15/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	69	1536	67	73	1019	92	35	22	63	246	27	96	
Future Volume (vph)	69	1536	67	73	1019	92	35	22	63	246	27	96	
Ideal Flow (vphpl)	1750	1750	1750	1750	1800	1750	1750	1750	1750	1750	1750	1750	
Grade (%)		-3%			2%			3%			2%		
Total Lost time (s)	6.0	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1607	3214	1480	1614	3135	1402	1590	1642	1465	1567	1650	1402	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.74	1.00	1.00	0.74	1.00	1.00	
Satd. Flow (perm)	1607	3214	1480	1614	3135	1402	1236	1642	1465	1224	1650	1402	
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)	75	1670	73	79	1108	100	38	24	68	267	29	104	
RTOR Reduction (vph)	0	0	24	0	0	44	0	0	52	0	0	79	
Lane Group Flow (vph)	75	1670	49	79	1108	56	38	24	16	267	29	25	
Heavy Vehicles (%)	5%	5%	2%	2%	8%	5%	3%	5%	0%	5%	5%	5%	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	
Protected Phases	5	2		1	6			8				4	
Permitted Phases			2			6	8		8	4		4	
Actuated Green, G (s)	9.2	68.2	68.2	7.9	66.9	66.9	28.9	28.9	28.9	28.9	28.9	28.9	
Effective Green, g (s)	9.2	68.2	68.2	7.9	66.9	66.9	28.9	28.9	28.9	28.9	28.9	28.9	
Actuated g/C Ratio	0.08	0.57	0.57	0.07	0.56	0.56	0.24	0.24	0.24	0.24	0.24	0.24	
Clearance Time (s)	6.0	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	4.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	123	1826	841	106	1747	781	297	395	352	294	397	337	
v/s Ratio Prot	0.05	c0.52		c0.05	0.35			0.01				0.02	
v/s Ratio Perm			0.03			0.04	0.03		0.01	c0.22		0.02	
v/c Ratio	0.61	0.91	0.06	0.75	0.63	0.07	0.13	0.06	0.05	0.91	0.07	0.07	
Uniform Delay, d1	53.7	23.3	11.6	55.1	18.2	12.2	35.7	35.1	35.0	44.3	35.2	35.2	
Progression Factor	0.86	1.55	1.93	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	7.2	6.7	0.1	25.8	1.8	0.2	0.3	0.1	0.1	30.1	0.1	0.1	
Delay (s)	53.2	42.9	22.4	80.9	19.9	12.4	35.9	35.2	35.0	74.4	35.3	35.3	
Level of Service	D	D	C	F	B	B	D	D	D	E	D	D	
Approach Delay (s)		42.5			23.1			35.3			61.4		
Approach LOS		D			C			D			E		
Intersection Summary													
HCM 2000 Control Delay			37.4									HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.90										
Actuated Cycle Length (s)			120.0									Sum of lost time (s)	15.0
Intersection Capacity Utilization			84.5%									ICU Level of Service	E
Analysis Period (min)			15										

c Critical Lane Group

HCS 2010 Roundabouts Report

General Information					Site Information				
Analyst	ZHB				Intersection	Crestview/East-West Connector			
Agency or Co.	KAI				E/W Street Name	East-West Connector			
Date Performed	10/21/2017				N/S Street Name	Crestview Dr			
Analysis Year	2020				Analysis Time Period (hrs)	0.25			
Time Period	Total AM Phase II Sensitivity Analysis				Peak Hour Factor	0.92			
Project Description	Crestview Crossing				Jurisdiction				

Volume Adjustments and Site Characteristics																
Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	14	0	32	0	77	0	35	0	11	89	83	0	37	260	5
Percent Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5	0
Flow Rate (v _{pce}), pc/h	0	15	0	35	0	84	0	38	0	12	102	90	0	40	297	5
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			



























Critical and Follow-Up Headway Adjustment													
Approach	EB			WB			NB			SB			
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	
Critical Headway (s)		4.9734			4.9734			4.9734			4.9734		
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087		

Flow Computations, Capacity and v/c Ratios												
Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v _e), pc/h		50			122			204			342	
Entry Volume veh/h		50			122			199			328	
Circulating Flow (v _c), pc/h		421			129			55			96	
Exiting Flow (v _{ex}), pc/h		130			17			155			416	
Capacity (c _{pce}), pc/h		899			1210			1305			1251	
Capacity (c), veh/h		899			1210			1274			1200	
v/c Ratio (x)		0.06			0.10			0.16			0.27	

Delay and Level of Service												
Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		4.5			3.8			4.1			5.5	
Lane LOS		A			A			A			A	
95% Queue, veh		0.2			0.3			0.6			1.1	
Approach Delay, s/veh		4.5			3.8			4.1			5.5	
Approach LOS		A			A			A			A	
Intersection Delay, s/veh LOS	4.7						A					

HCM Signalized Intersection Capacity Analysis
7: Providence Dr/Crestview Dr & OR 99W

02/15/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Traffic Volume (vph)	130	1136	32	79	1745	206	114	35	116	222	19	116
Future Volume (vph)	130	1136	32	79	1745	206	114	35	116	222	19	116
Ideal Flow (vphpl)	1750	1750	1750	1750	1800	1750	1750	1750	1750	1750	1750	1750
Grade (%)		-3%			2%			3%			2%	
Total Lost time (s)	6.0	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	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	1.00	1.00	1.00	1.00
Fr t	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fl t Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1654	3184	1479	1646	3256	1444	1621	1690	1465	1614	1699	1444
Fl t Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.74	1.00	1.00	0.73	1.00	1.00
Satd. Flow (perm)	1654	3184	1479	1646	3256	1444	1270	1690	1465	1245	1699	1444
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	138	1209	34	84	1856	219	121	37	123	236	20	123
RTOR Reduction (vph)	0	0	14	0	0	59	0	0	98	0	0	98
Lane Group Flow (vph)	138	1209	20	84	1856	160	121	37	25	236	20	25
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	2%	6%	0%	0%	4%	2%	1%	2%	0%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8				4
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	13.0	83.8	83.8	12.3	83.1	83.1	28.9	28.9	28.9	28.9	28.9	28.9
Effective Green, g (s)	13.0	83.8	83.8	12.3	83.1	83.1	28.9	28.9	28.9	28.9	28.9	28.9
Actuated g/C Ratio	0.09	0.60	0.60	0.09	0.59	0.59	0.21	0.21	0.21	0.21	0.21	0.21
Clearance Time (s)	6.0	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	4.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	153	1905	885	144	1932	857	262	348	302	257	350	298
v/s Ratio Prot	c0.08	0.38		0.05	c0.57			0.02				0.01
v/s Ratio Perm			0.01			0.11	0.10		0.02	c0.19		0.02
v/c Ratio	0.90	0.63	0.02	0.58	0.96	0.19	0.46	0.11	0.08	0.92	0.06	0.09
Uniform Delay, d1	62.9	18.2	11.4	61.4	26.9	13.0	48.7	45.1	44.9	54.4	44.6	44.9
Progression Factor	1.29	0.13	0.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	37.7	1.2	0.0	7.0	13.1	0.5	1.8	0.2	0.2	35.2	0.1	0.2
Delay (s)	118.6	3.6	0.2	68.3	40.0	13.5	50.5	45.3	45.0	89.6	44.7	45.0
Level of Service	F	A	A	E	D	B	D	D	D	F	D	D
Approach Delay (s)		15.0			38.4			47.4			72.7	
Approach LOS		B			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			34.4				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			15.0		
Intersection Capacity Utilization			91.3%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCS 2010 Roundabouts Report

General Information					Site Information				
Analyst	ZHB				Intersection	Crestview/East-West Connector			
Agency or Co.	KAI				E/W Street Name	East-West Connector			
Date Performed	10/21/2017				N/S Street Name	Crestview Dr			
Analysis Year	2020				Analysis Time Period (hrs)	0.25			
Time Period	Total PM Phase II Sensitivity Analysis				Peak Hour Factor	0.94			
Project Description	Crestview Crossing				Jurisdiction				

Volume Adjustments and Site Characteristics																
Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	6	10	14	0	142	10	39	0	29	197	145	0	43	201	12
Percent Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0
Flow Rate (v _{pce}), pc/h	0	6	11	15	0	151	11	41	0	31	214	154	0	46	218	13
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment													
Approach	EB			WB			NB			SB			
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	
Critical Headway (s)		4.9734			4.9734			4.9734			4.9734		
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087		

Flow Computations, Capacity and v/c Ratios												
Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v _e), pc/h		32			203			399			277	
Entry Volume veh/h		32			203			395			273	
Circulating Flow (v _c), pc/h		415			251			63			193	
Exiting Flow (v _{ex}), pc/h		211			55			261			384	
Capacity (c _{pce}), pc/h		904			1069			1294			1134	
Capacity (c), veh/h		904			1069			1281			1116	
v/c Ratio (x)		0.04			0.19			0.31			0.24	

Delay and Level of Service												
Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		4.3			5.1			5.6			5.5	
Lane LOS		A			A			A			A	
95% Queue, veh		0.1			0.7			1.3			1.0	
Approach Delay, s/veh		4.3			5.1			5.6			5.5	
Approach LOS		A			A			A			A	
Intersection Delay, s/veh LOS		5.4							A			