

CRESTVIEW GREEN

NEWBERG, OREGON

January 2022



Inside front cover

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Crestview Green

Newberg, Oregon

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Project Number 26677

January 2022



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CONTENTS

Executive Summary	2
Introduction	5
Existing Conditions	10
Transportation Impact Analysis.....	17
Conclusions and Recommendations	32
References	35

LIST OF FIGURES

Figure 1. Site Vicinity	6
Figure 2. Proposed Site Plan.....	7
Figure 3. Existing Lane Configurations and Traffic Control Devices.....	11
Figure 4. Year 2021 Existing Traffic Conditions.....	14
Figure 5. Assumed Lane Configurations and Traffic Control Devices	18
Figure 6. Year 2026 Background Traffic Conditions.....	19
Figure 7. Reassigned Benjamin Road Trips	21
Figure 8. Site-Generated Trips.....	23
Figure 9. Year 2026 Total Traffic Conditions.....	24
Figure 10. Year 2026 Total Traffic Conditions with Mitigation.....	27
Figure 11. Year 2026 Total Traffic Conditions with Right In at Benjamin.....	28

LIST OF TABLES

Table 1. OR 99W Mobility Targets	8
Table 2. Existing Transportation Facilities	10
Table 3. COVID-19 Adjustment Factor from ATR 36-004	12
Table 4. Summary of ODOT Crash Data (January 1, 2015 to December 31, 2019)	15
Table 5. Estimated Trip Generation	22
Table 6. Summary of 95th-percentile Queues	29

APPENDICES

- A. Scoping Correspondence
- B. Turning Movement Counts
- C. Existing Conditions Level of Service Worksheets
- D. ODOT Crash Data
- E. Year 2026 Background Conditions Level of Service Worksheets
- F. Year 2026 Total Conditions Level of Service Worksheets
- G. Year 2026 Total Mitigated Conditions Level of Service Worksheets
- H. Benjamin Road Right-In Access Sensitivity Analysis Level of Service Worksheets
- I. *SimTraffic* Queuing and Blocking Reports

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Section 1

Executive Summary

EXECUTIVE SUMMARY

Westwood Homes proposes to develop up to 14 single family homes, 96 townhomes, and 24 apartment units for the 10.6-acre site bounded by Benjamin Road to the east, OR 99W to the south, Crestview Crossing to the west, and the Spring Brook wetlands to the north. The subject property is currently occupied by farm land and two single-family homes. It is bordered by residential uses to the north and east. No direct access to the residential units is proposed from OR 99W.

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

FINDINGS

- All of the study intersections currently meet the applicable ODOT mobility targets and City level of service standards.
- An analysis of the most recent documented five years of reported crash data from ODOT at the study intersections revealed that all crash rates at the study intersections fall below the statewide average. The OR 99W/Springbrook Road intersection appeared in the top five percent of the highest-ranking locations on the ODOT Region 2 SPIS ranking.
- The study intersections are forecast to continue meeting ODOT mobility targets and City level of service standards under year 2026 background traffic conditions, with the following exception:
 - The OR 99W/Providence Drive/Crestview Drive intersection is projected to experience a v/c ratio of 0.94 during the weekday AM peak hour and 0.96 during the weekday PM peak hour after construction of the Crestview Drive extension and the Crestview Crossing development, both of which exceed the ODOT mobility target of 0.80.
- The proposed Crestview Green subdivision is projected to generate a total of 1,010 weekday trips, of which 72 (17 in, 55 out) are forecast to occur during the AM peak hour and 88 (55 in, 33 out) are forecast to occur during the PM peak hour.
- The study intersections are forecast to meet ODOT mobility targets and City level of service standards under year 2026 total traffic conditions during the weekday AM and PM peak hours, with the following exceptions:
 - The OR 9W/Springbrook Road intersection is projected to operate at a v/c of 0.86 during the weekday PM peak hour. While slightly above the 0.85 mobility target, the additional trips generated by Crestview Green development represent fewer than one percent of the total intersection peak hour volume. While not modeled in this report, traffic demand at this intersection is expected to decrease with the eventual completion of the Newberg-Dundee Bypass, which will divert through traffic around Newberg and result in improved AM and PM peak hour operations at this intersection. Therefore, no near-term improvements are recommended.
 - The OR 99W/Brutscher Street intersection is projected to operate at a v/c of 0.86 during the weekday PM peak hour. However, because the v/c ratio is forecast to exceed the target by 0.01 (v/c = 0.86), and operations at the intersection are expected to improve after completion of the Newberg-Dundee bypass, no near-term improvements are recommended.
 - The OR 99W/Providence Drive/Crestview Drive intersection is projected to operate at a v/c of 0.98 during the weekday AM peak hour and at capacity (1.00) during the weekday PM peak hour, both of which exceed the ODOT mobility target of 0.80. These operations can be improved by modifying the lane configuration on the southbound Crestview Drive approach to include a separate left-turn lane and a shared through/left-turn lane and converting to split phasing.

- Provision of a right-in access at Benjamin Road is not projected to substantially change the level of service or v/c ratio at the OR 99W/Providence Drive/Crestview Drive intersection relative to total traffic conditions with full closure of Benjamin Road.
- All 95th-percentile queues are projected to be accommodated within existing storage lengths, with the following exceptions:
 - The 95th-percentile queues on several movements at Springbrook Road/OR 99W currently exceed the available turn lane storage lengths and are projected to continue doing so under background and total conditions.

RECOMMENDATIONS

- To address the impact of the Crestview Green development and the closure of Benjamin Road, it is recommended that the lane configuration on the southbound Crestview Drive extension where it meets OR 99W be revised to include an exclusive left turn lane, a shared left/through lane, and an exclusive right turn lane. The turn lane storage lengths are projected to adequately store the 95th-percentile queues as designed.
- It is also recommended to adjust the OR 99W/Providence Drive/Crestview Drive intersection to split phasing for the northbound Providence Drive and southbound Crestview Drive approaches.
- The following activities are recommended to maximize the safety and efficiency of the internal intersections and roadways:
 - All local streets within the development should have two travel lanes.
 - Landscaping, utilities, and signage near the internal intersections and site access points should be located and maintained to provide adequate stopping and intersection sight distance.

Additional details of the study methodology, findings, and recommendations are provided herein.



Section 2 Introduction

INTRODUCTION

Westwood Homes proposes to develop up to 14 single family homes, 96 townhomes, and 24 apartment units for the 10.6-acre site bounded by Benjamin Road to the east, OR 99W to the south, Crestview Crossing (currently under construction) to the west, and the Spring Brook wetlands to the north. The subject property is currently occupied by farm land and two single-family homes. Figure 1 displays a map of the site vicinity, and Figure 2 displays the project site plan. Completion and occupancy of the subdivision as described herein is expected to occur by 2026.

SCOPE AND ANALYSIS METHODOLOGY

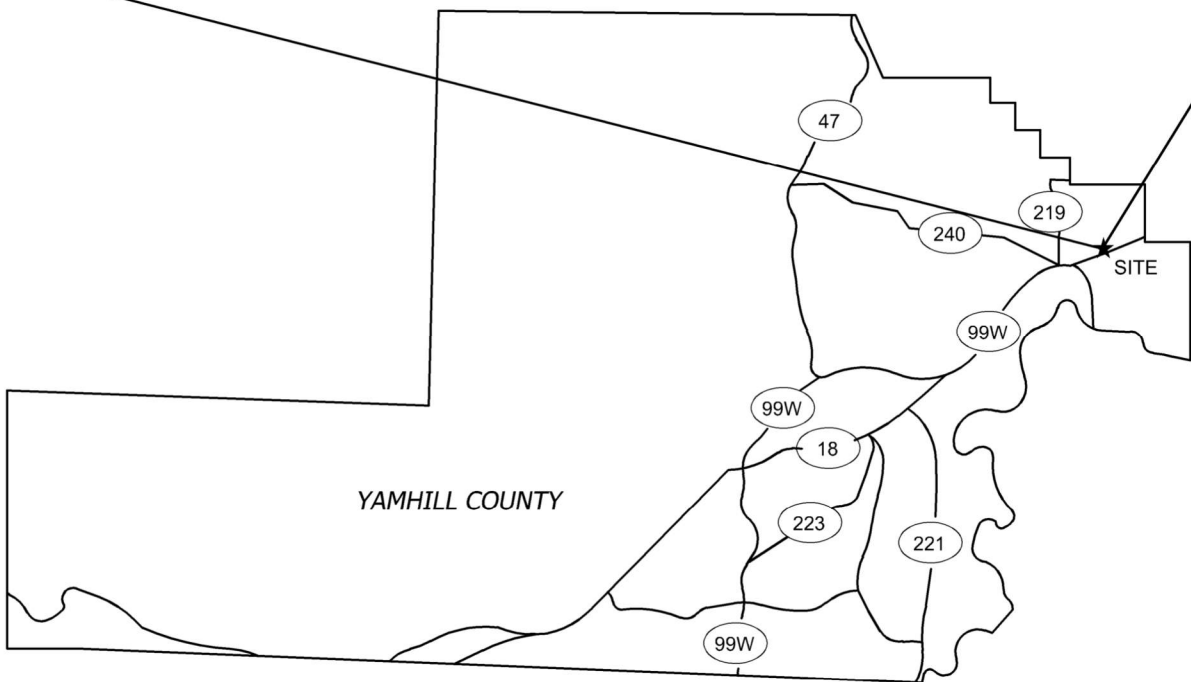
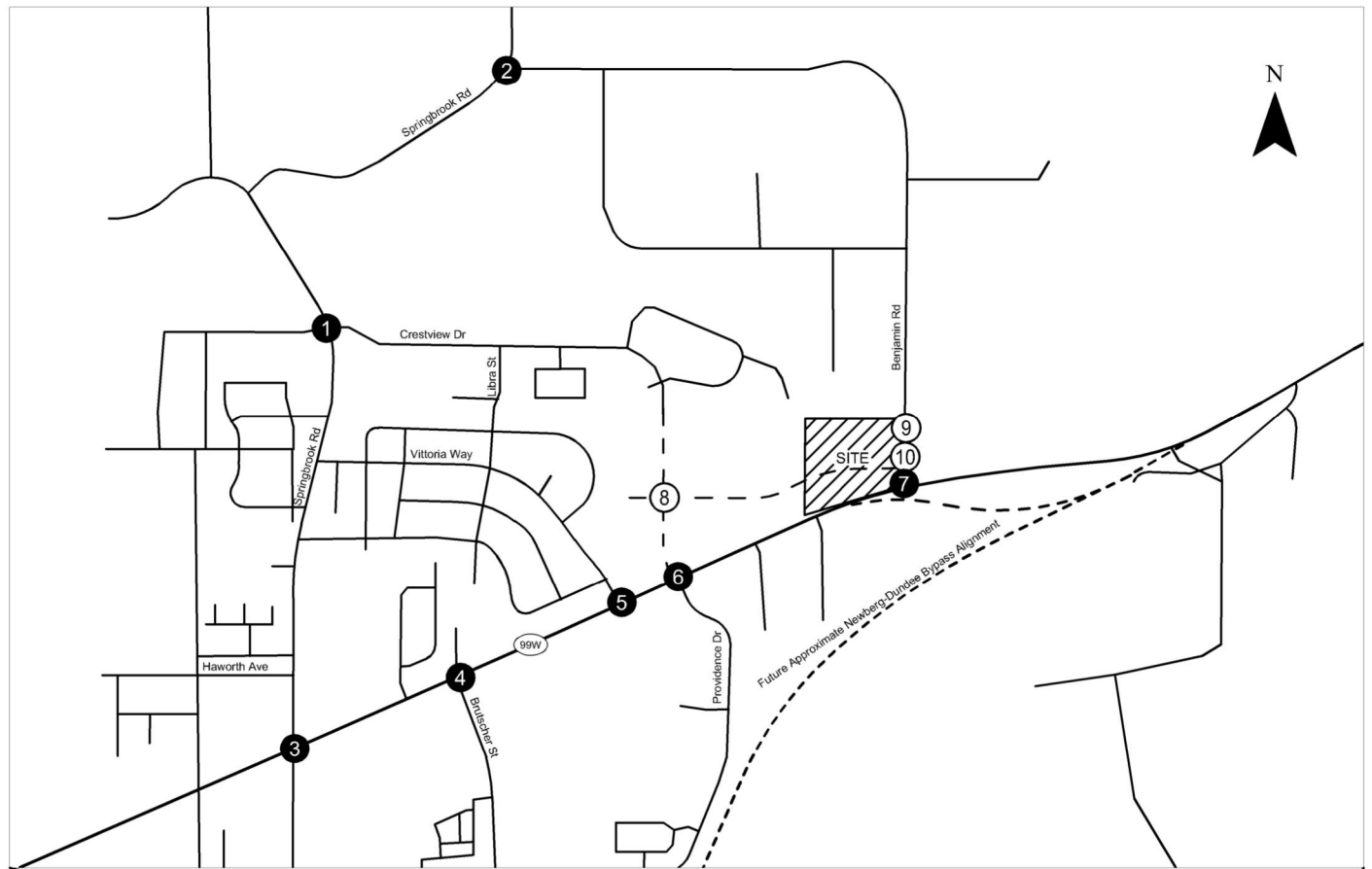
This analysis determines the transportation-related impacts associated with the proposed Crestview Green subdivision and was prepared in accordance with City of Newberg and Oregon Department of Transportation (ODOT) requirements. The study intersections and scope of this analysis were determined based on conversations with City of Newberg, Yamhill County, and ODOT staff and are documented in a scoping memorandum dated October 1, 2021 and subsequent review comments (included in Appendix "A").

Study Intersections

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

1. Crestview Drive/Springbrook Road
2. Benjamin Road/Springbrook Road
3. Springbrook Road/OR 99W
4. Brutscher Street/OR 99W
5. Vittoria Way/OR 99W
6. Providence Drive/Future Crestview Drive extension/OR 99W
7. Benjamin Road/OR 99W
8. Future Crestview Drive extension/Jory Road
9. Benjamin Road/Willakenzie Road
10. Benjamin Road/Jory Road

These study intersections are displayed in Figure 1.

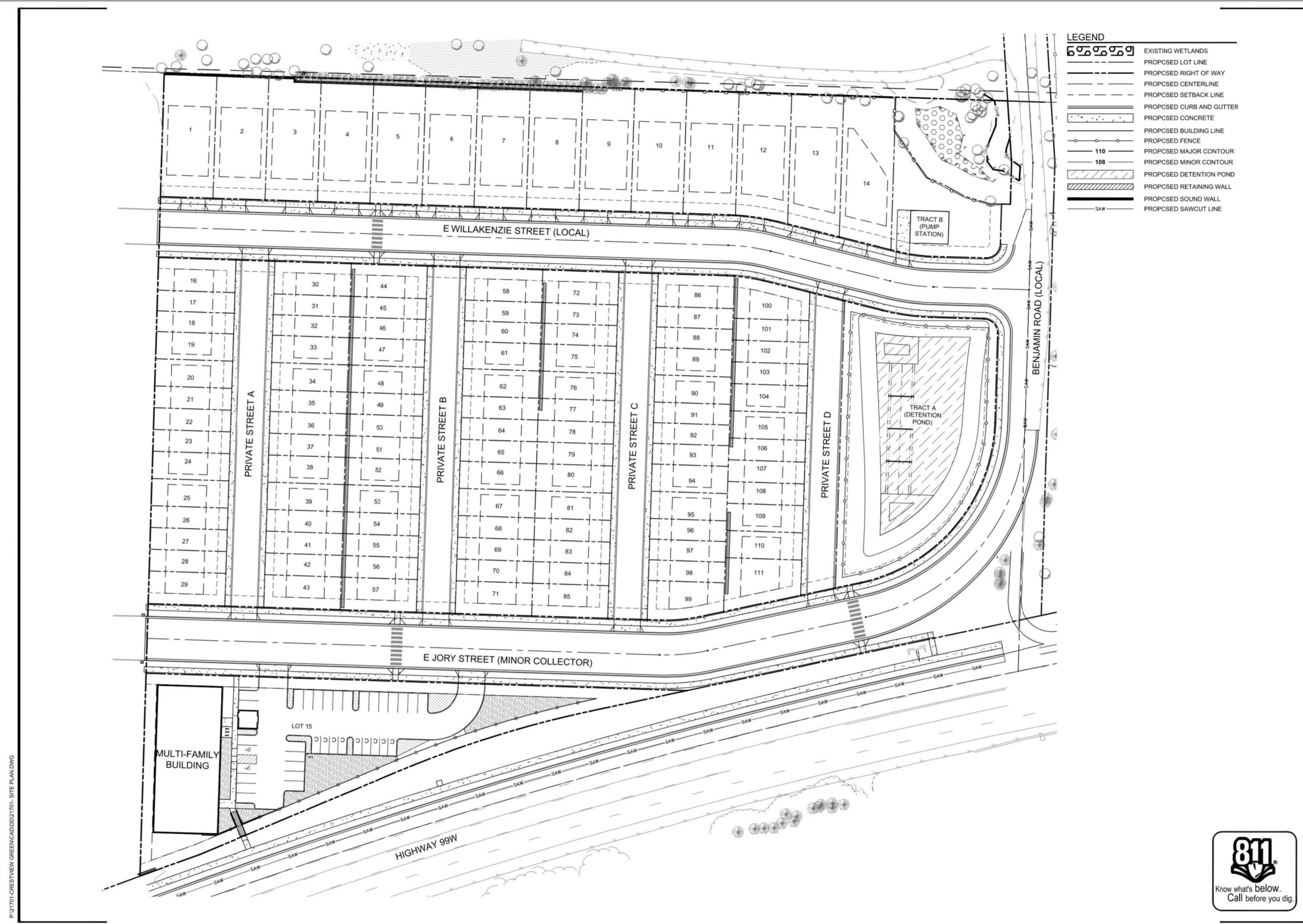


- - Study Intersection (Existing)
- - Study Intersection (Future)

Site Vicinity
Newberg, Oregon

Figure
1

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LEGEND

	EXISTING WETLANDS
	PROPOSED LOT LINE
	PROPOSED RIGHT OF WAY
	PROPOSED CENTERLINE
	PROPOSED SETBACK LINE
	PROPOSED CURB AND GUTTER
	PROPOSED CONCRETE
	PROPOSED BUILDING LINE
	PROPOSED FENCE
	PROPOSED MAJOR CONTOUR
	PROPOSED MINOR CONTOUR
	PROPOSED DETENTION POND
	PROPOSED RETAINING WALL
	PROPOSED SOUND WALL
	PROPOSED SAWCUT LINE



PUBLISH DATE
01/11/2022
ISSUED FOR
LAND USE DOCUMENTS
REVISIONS

OVERALL SITE PLAN
CRESTVIEW GREEN
PLANNED UNIT DEVELOPMENT
WESTWOOD HOMES LLC
NEWBERG, OR

PROJECT INFORMATION
3J PROJECT # | 21701
TAX LOT(S) | 3S2W16 900, 1000
LAND USE # | TBD
DESIGNED BY | JMF, SRC, JGW
CHECKED BY | JJS

SHEET NUMBER
C200



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P:\21701-CRESTVIEW GREEN\CAD\21701-SITE PLAN.DWG

Site Plan Provided by 3J Consulting 1/11/2022

Preliminary Site Plan
Newberg, Oregon

Figure
2



Study Scope

This report documents an evaluation of the following transportation items:

- Year 2021 existing conditions analysis, including *Highway Capacity Manual (HCM), 6th Edition* (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 the latest five years of ODOT-reported crash data and the ODOT Region 2 Safety Priority Index System (SPIS) list at the study intersections;
- Build-out year 2026 background conditions, including regional growth and in-process traffic but not traffic from Crestview Green, including *HCM 6th Edition* 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 2026 total conditions, including Crestview Green traffic, including *HCM 6th Edition* v/c ratio, control delay, and 95th-percentile queuing analysis at the study intersections during the weekday AM and PM peak hours;
- On-site traffic operations and circulation.

Analysis Methodology and Applicable Standards

All intersection capacity analyses described in this report were performed in accordance with the procedures stated in the *HCM 6th Edition*. The operations and queuing analysis presented in this report were completed using *Synchro 10* and *SimTraffic 10* software, with the exception of the roundabout analysis, which was completed using *Highway Capacity Software (HCS) 7*. Per *HCM 6th Edition* methodology, the reported traffic operations are based on 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* (Reference 2). 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)	ODOT Mobility Target (v/c)
OR 99W/Springbrook Road	35	0.85
OR 99W/Brutscher Street	35	0.85
OR 99W/Vittoria Way	45	0.80 major approach; 0.90 minor approach
OR 99W/Providence Drive	45	0.80
OR 99W/Benjamin Road	55	0.70 major approach; 0.90 minor approach

With the exception of the intersections on Benjamin Road, which are outside City of Newberg limits, all other non-ODOT 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 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. (Kittelson) staff visited and inventoried the proposed Crestview Green site in November 2021. At that time, Kittelson collected information regarding site conditions, adjacent land uses, existing traffic operations, and transportation facilities within the study area.

SITE CONDITIONS AND ADJACENT LAND USES

The subject property is located on the north side of OR 99W (Portland Road) to the northwest of Benjamin Road. The site is currently occupied by farmland and two single-family homes, and it is bordered by residential uses on all sides. The Crestview Crossing residential development is currently under construction to the west of the subject property.

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

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 ⁴	Major Collector	2	25 mph	Both sides east of Birdhaven Loop	East of Birdhaven Loop	No
Providence Drive	Major Collector	2	25 mph	Yes	Yes	No
Brutscher Street	Major Collector	2-3	25 mph	Both Sides south of OR 99W	South of Fred Meyer entrance	No
Vittoria Way	Minor Collector	2	25 mph	Partial ⁵	No	Yes
Jory Road ⁶	Minor Collector	2	25 mph	Yes	No	Yes
Willakenzie Road ⁶	Local Street	2	25 mph	Yes	No	Yes
Benjamin Road	Local Street	2	45 mph	No	No	No

¹City of Newberg Transportation System Plan (TSP, Reference 3)

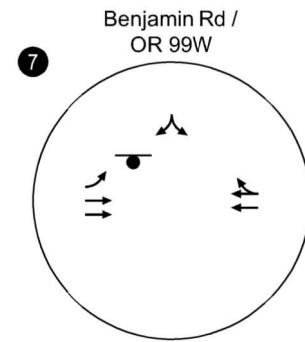
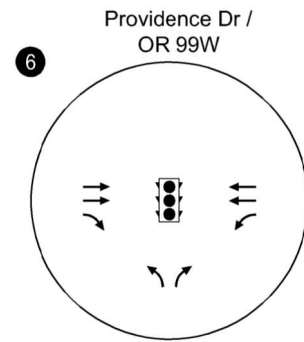
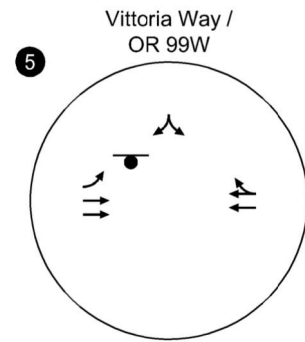
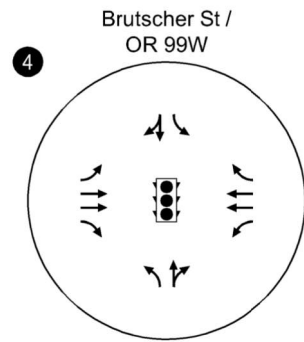
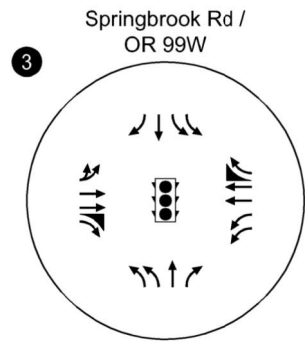
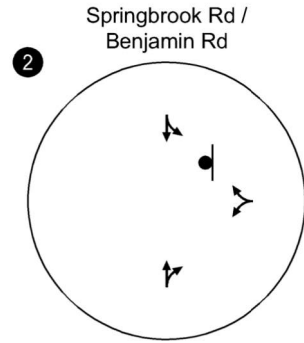
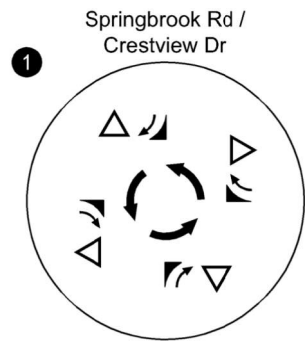
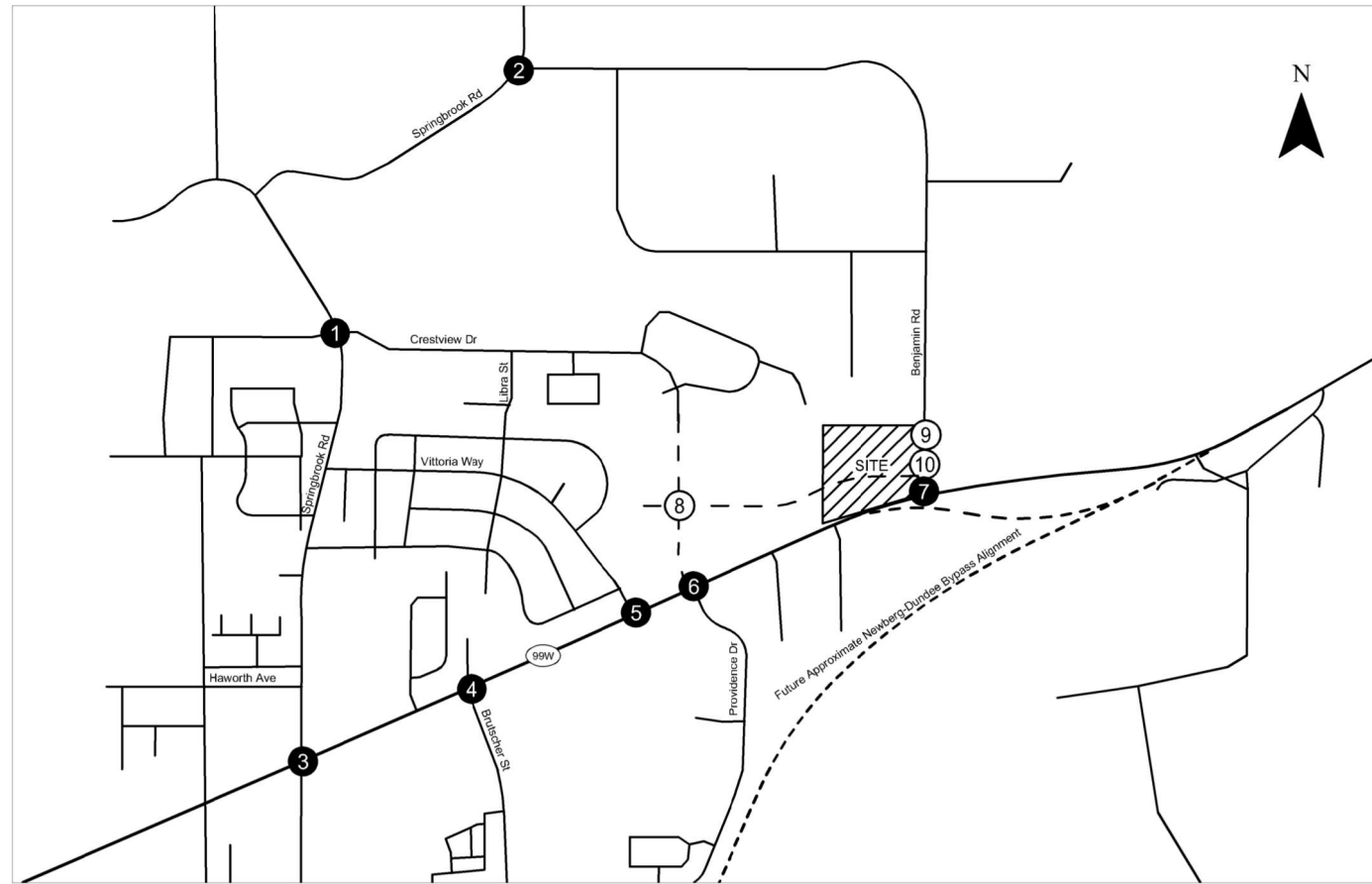
²Posted speed is 35 mph at and west of Brutscher Street, 45 mph from east of Brutscher Street to east of Providence Drive, and 55 mph at and east of Benjamin Road

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

⁴Will be extended south to OR 99W as part of Crestview Crossing.

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

⁶Future roadway—values are estimated.



- 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 Green development site is bordered to the south by OR 99W, which is maintained by ODOT and is classified as a Major Arterial in the Newberg TSP. Crestview Drive, which is classified a Major Collector, is currently being extended south through the Crestview Crossing development to the west and will connect to OR 99W to form the fourth leg of the existing OR 99W/Providence Drive intersection. As shown in Figure 2, several new local streets will be constructed to serve Crestview Green, as well as one new east-west collector (Jory Road), which will connect to Benjamin Road just north of OR 99W.

Pedestrian and Bicycle Facilities

There are currently no sidewalks provided within the proposed site frontage along Benjamin Road. 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 with the exception of the frontage improvements being constructed along OR 99W as part of the adjacent Crestview Crossing development.

Transit Facilities

The following bus services in the site vicinity are provided by Yamhill County Transit Area (YCTA, Reference 4):

- Route 7: Newberg Providence stops at Providence Hospital, which is approximately 0.40 mile southwest of the Crestview Green site frontage. Service connects to the Newberg Central Business District and is provided on weekdays at approximately 65-minute intervals from approximately 7:15 AM to 6:15 PM.
- Route 44/44X: Tigard stops in both directions of OR 99W on the west side of Providence Drive, which is approximately ¼ mile west of the Crestview Green site frontage. Service connects to Tigard, Tualatin, Sherwood, Dundee, Lafayette, and the northern part of McMinnville once a day in each direction on weekdays, as well as four times a day in each direction on Saturdays.

TRAFFIC VOLUMES AND PEAK HOUR OPERATIONS

Turning movement counts were conducted at the study intersections on a typical weekday in October 2021 when school was in session during the morning (6 – 9 AM) and afternoon (3 – 6 PM) peak periods. The analysis time periods are based on a corridor-wide peak hour along OR 99W: 7:05 – 8:05 AM and 4:25 – 5:25 PM, respectively.

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

ODOT COVID-19 Adjustment

Historical data from ATR 36-004 (Newberg) was used to develop an adjustment factor to account for fluctuations in traffic demand due to the ongoing COVID-19 pandemic. Weekday ADTs were obtained from the ODOT ATR data from October 2019 (excluding federal and school holidays) and compared as shown in Table 3:

Table 3. COVID-19 Adjustment Factor from ATR 36-004

Month	Weekday ADT*
October 2019	39,809
October 2021	36,826
COVID-19 Adjustment Factor	1.081

*Excluding federal and school holidays

Note that historical turning movement volumes from 2017 were available from the Crestview Crossing TIA—these were also compared with the 2021 turning movement volumes. Some turning movement volumes were observed to increase between 2017 and 2021—this is likely due to the completion of Phase 1 of the Newberg-Dundee Bypass in January 2018. The resulting COVID-19 adjustment factor of 1.081 was applied to the turning movement volumes that were observed to be lower than those from 2017.

ODOT Seasonal Adjustment

Per ODOT requirements, a seasonal adjustment factor of 1.056 was applied to the existing mainline traffic volumes. Appendix “A” contains the calculations used to determine the ODOT seasonal adjustment factor.

Figure 4 provides a summary of the seasonally-adjusted year 2021 turning movement counts.

Calibration to Field Observations

ODOT requires a base saturation flow rate of 1,750 vehicles per hour per lane be used outside of the Portland metro area. Based on a field observation and video data collected in 2017 as part of the Crestview Crossing TIA, vehicles exhibited driving behavior typical of urban areas. Thus, a saturation flow rate study was prepared to calibrate the analysis to real-world observations. Consistent with the Crestview Crossing TIA, the base saturation flow rate was calibrated to 1,800 vehicles per hour¹ per lane for the following two movements:

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

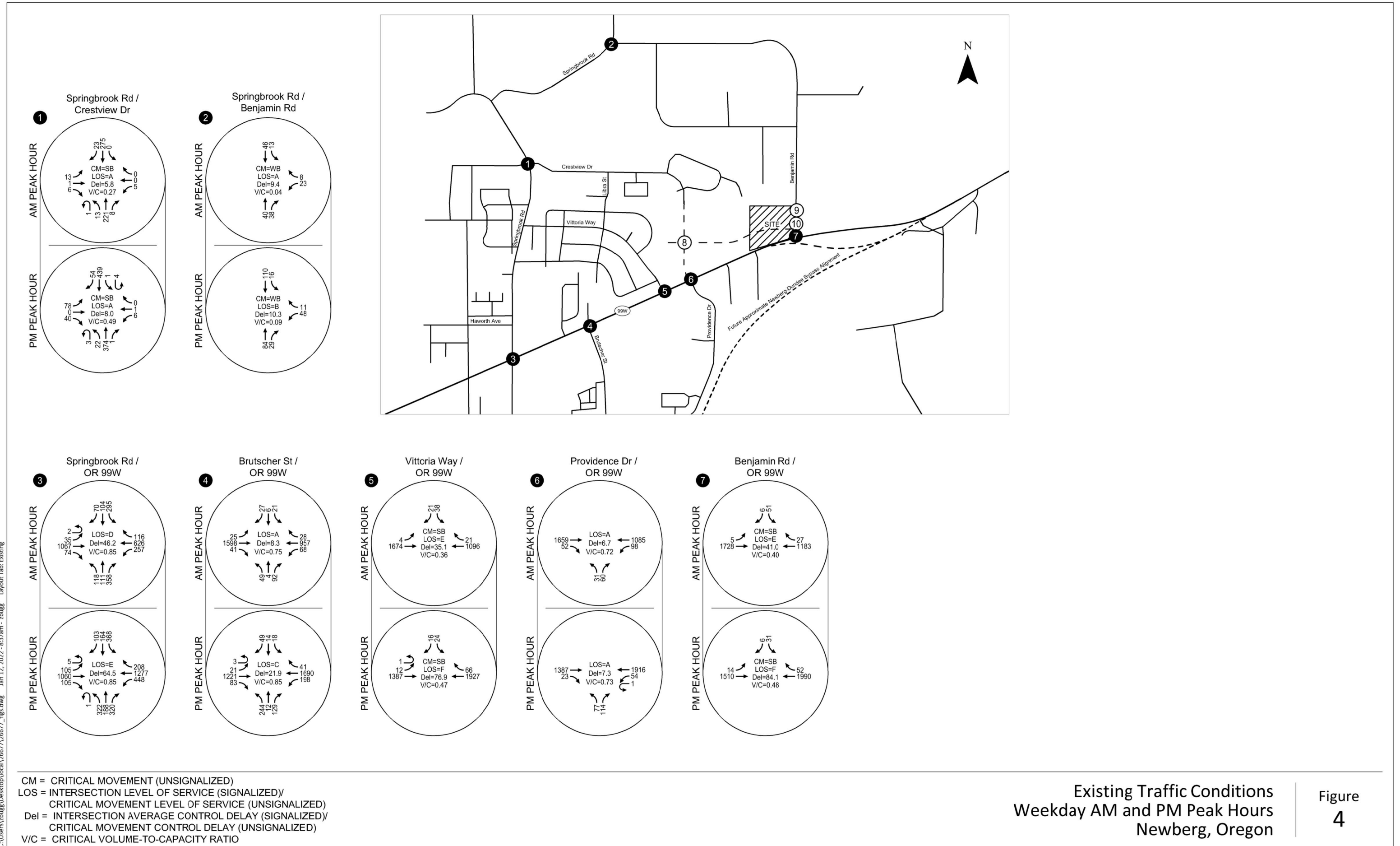
Operations Analysis

Figure 4 also displays the existing operations at each of the study intersections during the weekday AM and PM peak hours. As shown, the following two stop-controlled intersections along OR 99W currently meet ODOT mobility standards, but they do experience failing levels of service for the stop-controlled movement:

- The southbound stop-controlled Vittoria Way approach to OR 99W currently experiences level of service “F” during the weekday PM peak hour. However, the southbound approach operates at a v/c ratio of 0.47 which meets ODOT’s 0.90 side street mobility target.
- The southbound stop-controlled Benjamin Road approach to OR 99W currently experiences level of service “E” during the weekday AM peak hour and level of service “F” during the weekday PM peak hour. However, the southbound approach operates at a v/c ratio of 0.40 during the weekday AM peak hour and 0.48 during the weekday PM peak hour, which meet ODOT’s 0.90 side street mobility target.

Appendix “C” contains the existing conditions worksheets.

¹ Note that this is consistent with the calibration and saturation flow adjustment prepared for the previously approved Crestview Crossing TIA, and it is documented in the Crestview Crossing TIA report accordingly.



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

Figure
 4

Traffic Safety

ODOT-reported crash data was reviewed for the most recent five-year period, from January 1, 2015 to December 31, 2019. Table 4 summarizes the reported crash data at the study intersections. The crash rates were compared with the statewide average crash rates based on area type (urban/rural) and intersection control/configuration (stop- or signal-control, 3- or 4-leg). As shown, all intersection crash rates fell below the respective statewide average crash rates.

Table 4. Summary of ODOT Crash Data (January 1, 2015 to December 31, 2019)

Intersection	Crash Severity			Crash Type					Total Crashes	Crash Rate*	Statewide Average Crash Rate	Crash Rate > Average?
	Fatal	Injury	PDO	Rear End	Turning	Angle	Ped	Other				
Springbrook Rd / Crestview Dr	0	0	0	0	0	0	0	0	0	0.000	N/A	No
Springbrook Rd / Benjamin Rd	0	1	0	0	1	0	0	0	1	0.184	0.196	No
Springbrook Rd / OR 99W	0	18	20	28	4	2	2	2	38	0.445	0.477	No
Brutscher St / OR 99W	0	16	11	11	10	5	0	1	27	0.397	0.477	No
Vittoria Way / OR 99W	0	3	0	0	2	0	0	1	3	0.048	0.131	No
Providence Dr / OR 99W	0	5	5	8	1	1	0	0	10	0.153	0.275	No
Benjamin Rd / OR 99W	0	4	1	1	3	1	0	0	5	0.076	0.196	No

*Per million entering vehicles

ODOT Region 2 maintains a ranking of intersections with potential safety concerns known as the SPIS (Reference 5). Based upon the 2019 ranking (the latest data available), the OR 99W/Springbrook Road intersection appeared in the top five percent of the highest-scoring locations in Region 2.

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 Green subdivision is expected to be fully built and occupied, year 2026. The impact of traffic generated by the development during the weekday AM and PM peak hours was examined as follows:

- Trips associated with the Crestview Green residential development to the west were identified as in-process by the City of Newberg and included in the background traffic volumes;
- Year 2026 background 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, as documented in the Crestview Crossing TIA;
- Site trip distribution patterns were identified based upon a select zone analysis of the Newberg Model, consistent with the Crestview Crossing TIA;
- Year 2026 total traffic volumes at the study intersections were developed by adding the site-generated trips to the year 2026 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 2026 BACKGROUND TRAFFIC CONDITIONS

The year 2026 background traffic conditions analysis identifies how the study area's transportation system will operate without the proposed Crestview Green development. This analysis includes traffic attributed to planned developments and general growth in the region but does not include traffic from Crestview Green.

Planned Developments and Transportation Improvements

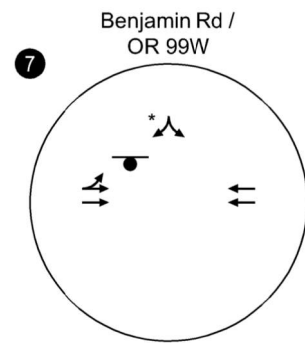
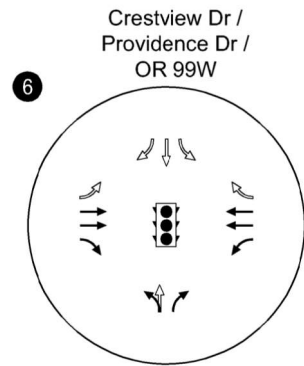
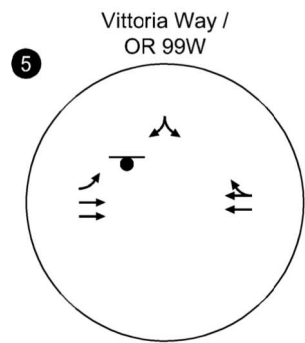
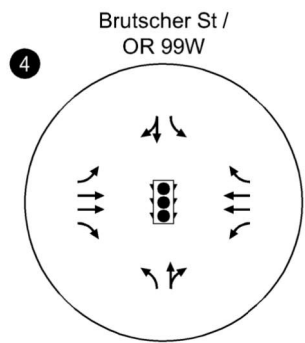
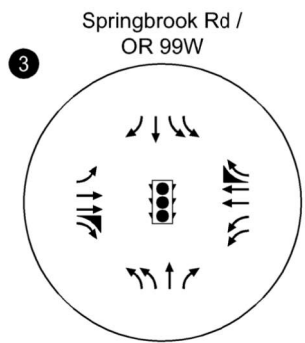
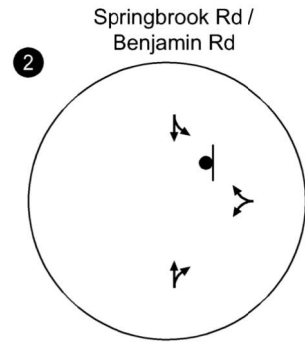
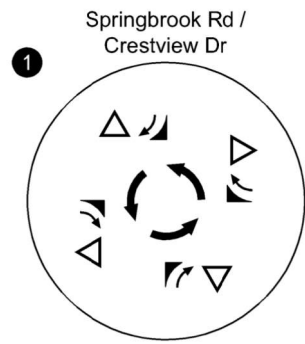
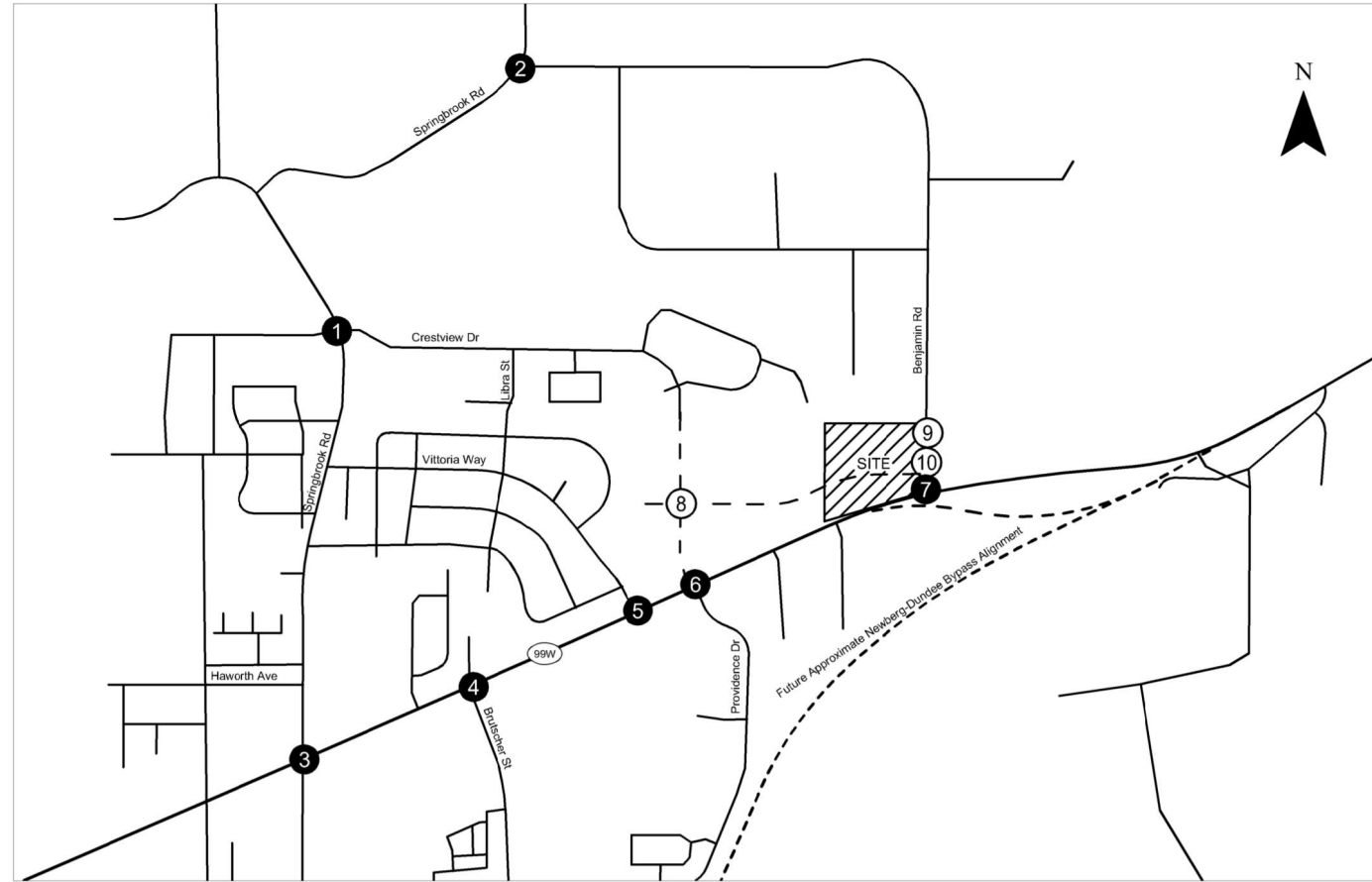
The City of Newberg identified one in-process development within the site vicinity: the Crestview Crossing residential development, which is currently under construction to the west of Crestview Green. Crestview Crossing will also include the southward extension of Crestview Drive to connect with OR 99W at the intersection with Providence Drive. The Crestview Drive extension will create a new network link and likely lead to substantial rerouted traffic to avoid the OR 99W/Springbrook Road intersection and vicinity. The Crestview Crossing TIA documents a methodology to estimate the weekday AM and PM peak hour volume assumed to use the Crestview Crossing extension and be rerouted from other roadways west of the Crestview Drive extension.

One additional transportation improvement, the final phase of the Newberg-Dundee Bypass, was identified but is not expected to be completed before occupancy of Crestview Green. Therefore, the Newberg-Dundee Bypass was not included in the year 2026 background traffic conditions analysis. However, the planned alignment has been shown in the Figures for reference purposes.

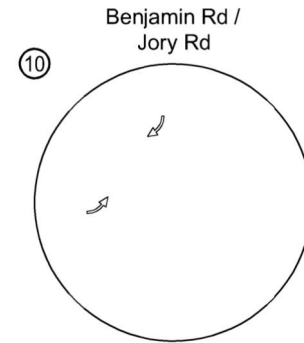
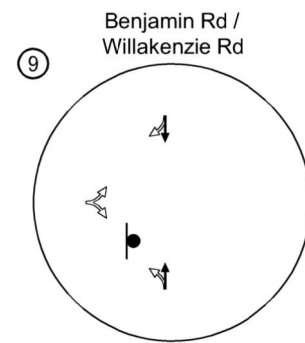
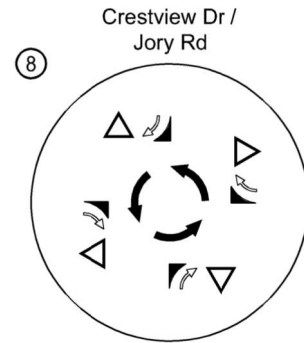
Figure 5 displays the assumed lane configurations and traffic control devices after the Crestview Drive extension is completed.

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 6 displays the year 2026 background traffic volumes at the study intersections during the weekday AM and PM peak hours, which include



*Background conditions only; will be closed as part of site development

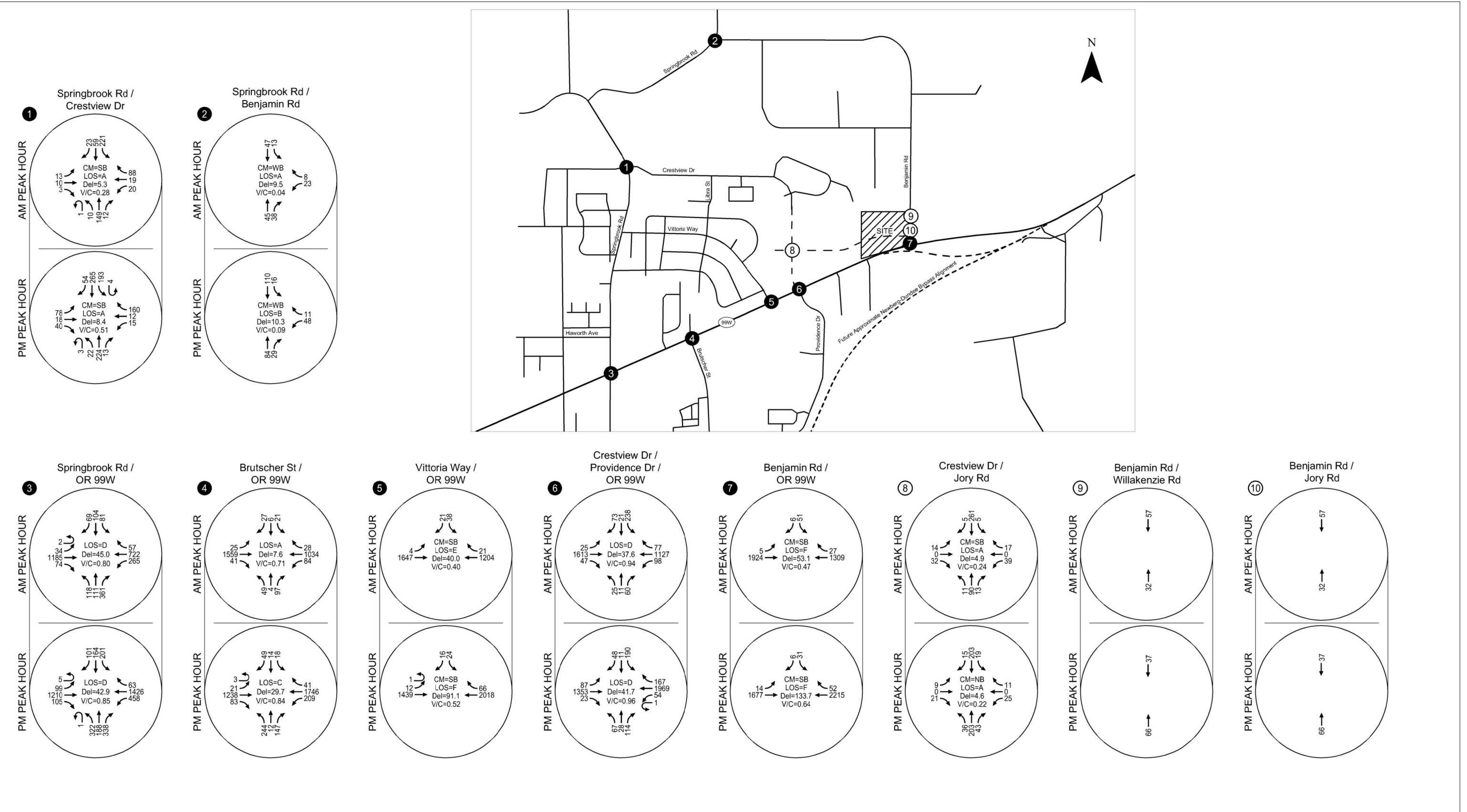


- STOP SIGN
- TRAFFIC SIGNAL
- ROUNDABOUT
- YIELD
- EXISTING
- PROPOSED

Assumed Lane Configurations and Traffic Control Devices
Newberg, Oregon

Figure 5

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Year 2026 Background Traffic Conditions
Weekday AM and PM Peak Hours
Newberg, Oregon

Figure
6

general area growth and in-process trips identified previously. The traffic volumes in Figure 6 also incorporate the assumed reassigned traffic from the Crestview Drive extension.

Operations Analysis

Figure 6 also displays the corresponding operations analysis for the year 2026 background traffic volumes. Each of the study intersections is forecast to continue to meet their corresponding governing agency (City and ODOT) standards and mobility targets except for the following:

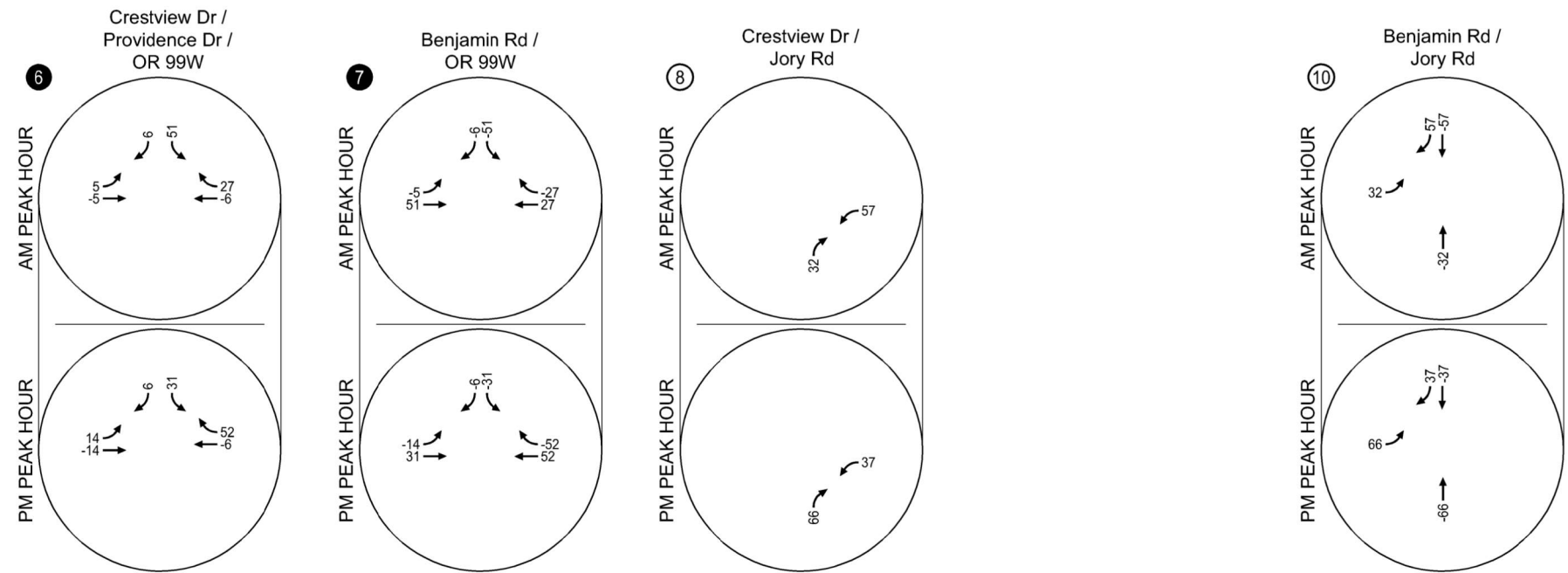
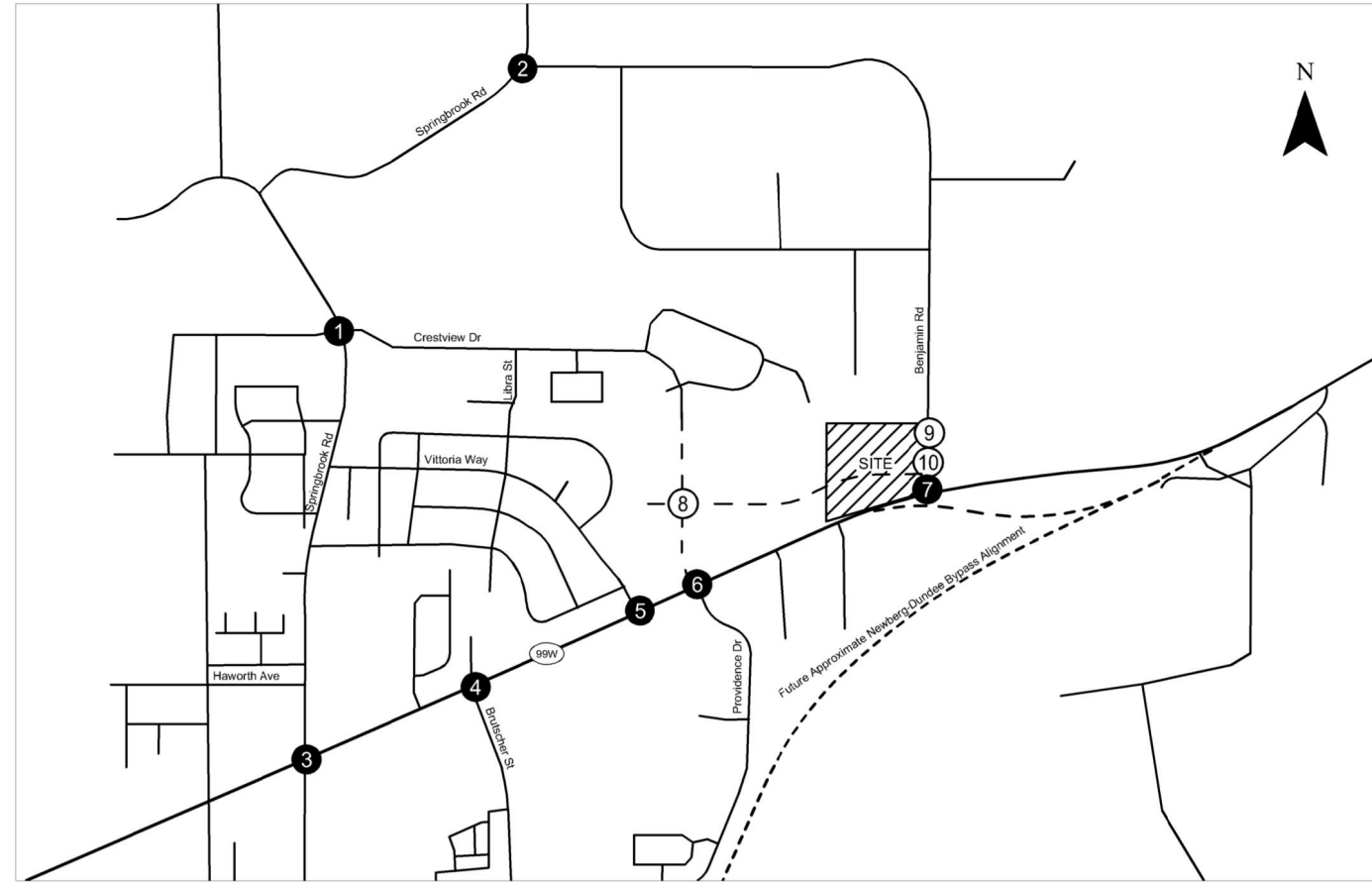
- The OR 99W/Providence Drive/Crestview Drive intersection is projected to operate at a v/c ratio of 0.94 during the weekday AM peak hour and 0.96 during the weekday PM peak hour after construction of the Crestview Drive extension and the Crestview Crossing development, both of which exceed the ODOT mobility target of 0.80.

Appendix "E" contains the year 2026 background traffic operations worksheets.

PROPOSED DEVELOPMENT PLAN

Per the site plan displayed in Figure 2, the Crestview Green subdivision will include up to 14 single-family homes, 96 townhomes, and 24 apartment units. The site development will include an eastward extension of two roadways that are currently under construction as part of Crestview Crossing: Jory Road (collector street) and Willakenzie Road (local street). Willakenzie Road will tee into Benjamin Road, and Benjamin Road will be truncated at Jory Road. ODOT staff have expressed a desire to close Benjamin Road at OR 99W, as the existing intersection has safety and visibility concerns. Therefore, all Benjamin Road traffic will be rerouted to Jory Road. Figure 7 illustrates the reassigned trips from Benjamin Road onto the other study area roadways. In the long-term, Jory Road will be extended eastward as a frontage road along the north side of OR 99W after the Newberg-Dundee Bypass is constructed; however, given the unknown timeline for funding and completion of the Newberg-Dundee Bypass, ODOT staff have requested the site plan and TIA be completed without assuming completion of the Newberg-Dundee Bypass.

The projected weekday daily, AM peak hour, and PM peak hour vehicle trip ends for the proposed development were identified based on the Institute of Transportation Engineers' (ITE) *Trip Generation Manual, 11th Edition* (Reference 6). Table 5 summarizes the estimated trip generation for the proposed subdivision. The fitted curve was selected based on guidance provided in the ITE Trip Generation Manual.



Reassigned Benjamin Road Trips
Weekday AM and PM Peak Hours
Newberg, Oregon

Figure
7

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Table 5. Estimated Trip Generation

Land Use	ITE Code	Units	Weekday Daily	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
Single-Family (fitted curve)	210	14	166	12	3	9	16	10	6
Multifamily (Low-Rise) (fitted curve)	220	120	844	60	14	46	72	45	27
Total Trips			1,010	72	17	55	88	55	33

As shown, the proposed Crestview Green subdivision is projected to generate a total of 1,010 weekday trips, of which 72 (17 in, 55 out) are forecast to occur during the AM peak hour and 88 (55 in, 33 out) are forecast to occur during the PM peak hour.

Site Trip Distribution and Assignment

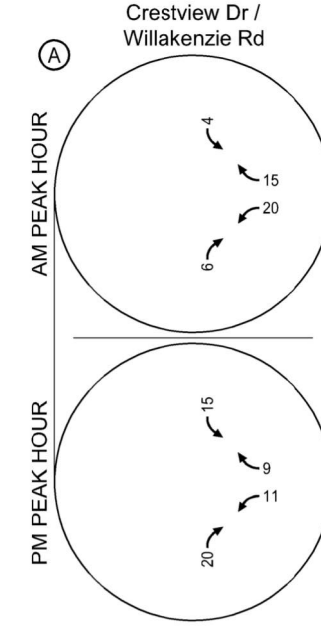
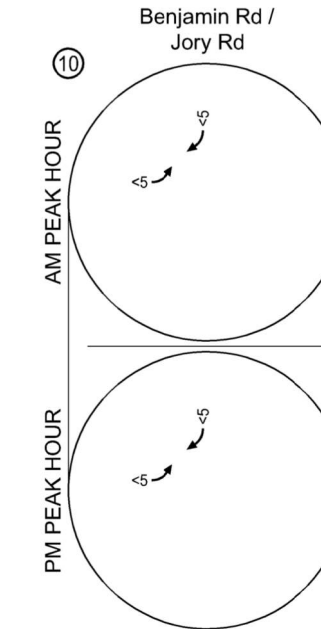
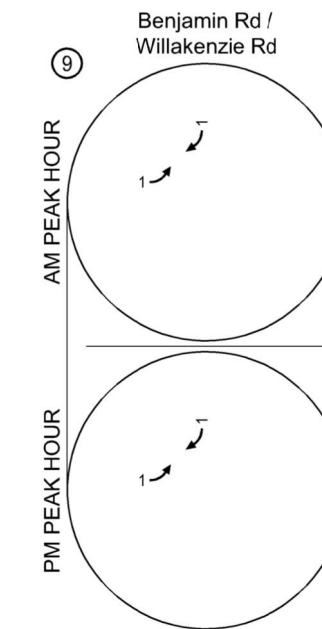
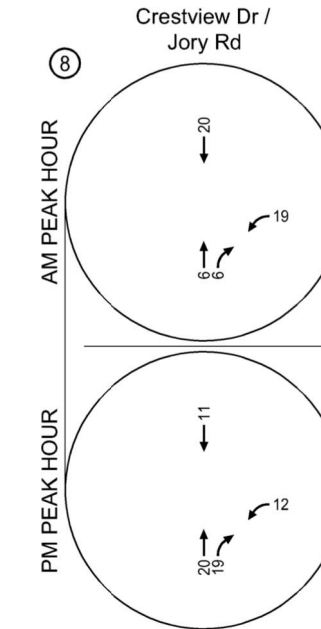
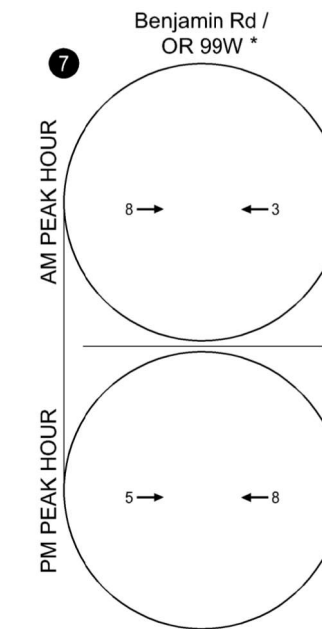
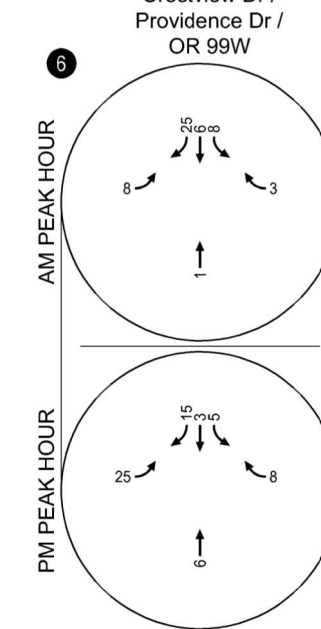
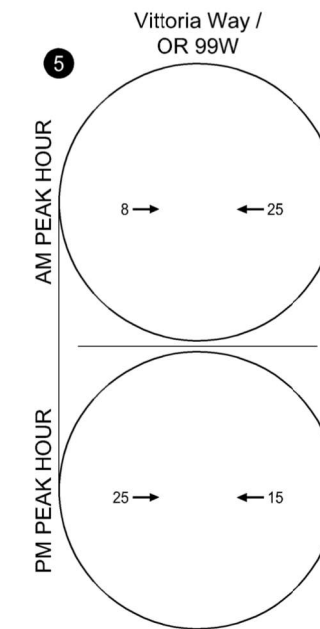
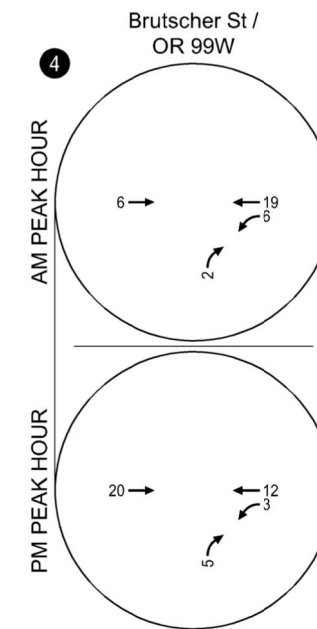
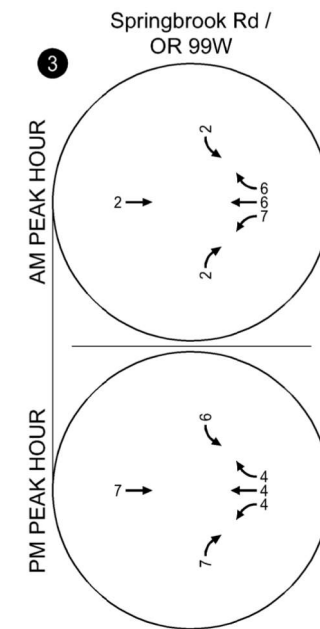
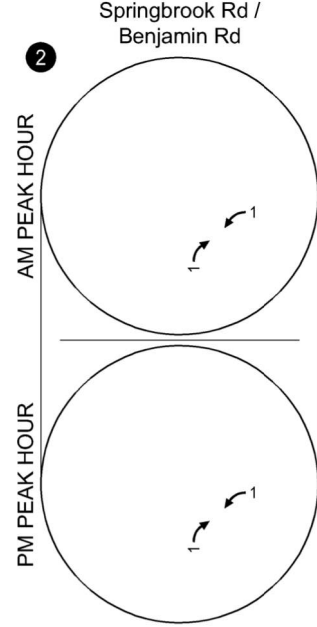
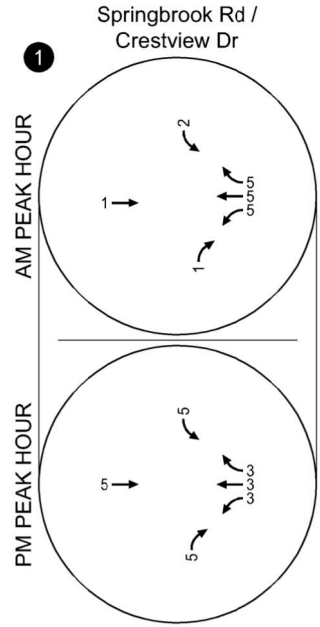
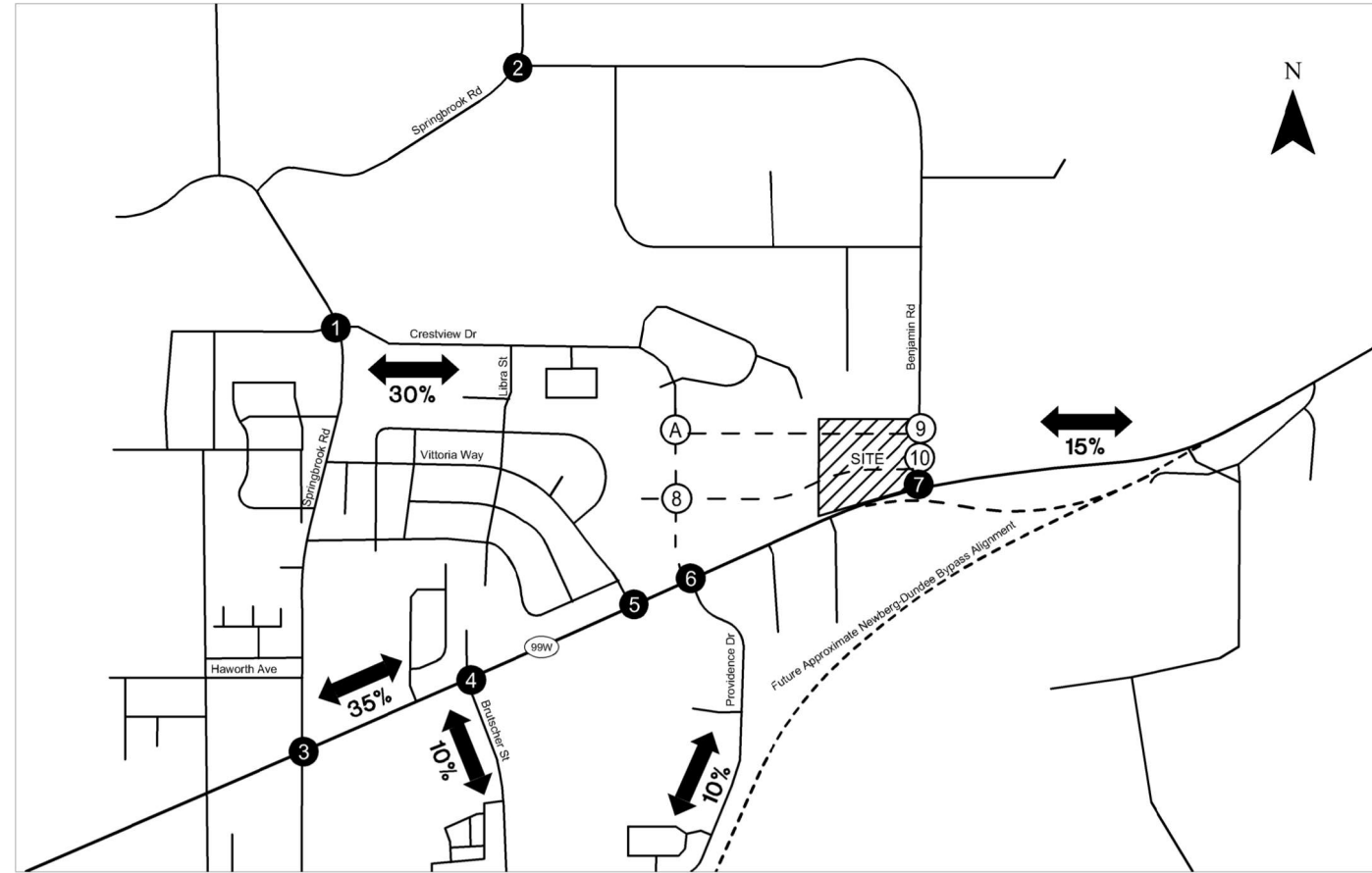
The site-generated trips were distributed onto the study area roadways according to a select zone analysis of TAZ 117, which includes the Crestview Green site, from the Newberg Transportation Planning Model, provided by ODOT in 2017 and is consistent with the Crestview Crossing TIA. This model was reviewed and distribution percentages were assigned as follows:

- 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, and
- 30 percent to the north along the Crestview Drive extension.

Trips were then distributed at the Springbrook Road/OR 99W and Springbrook Road/Crestview Drive intersections based on existing turning movement counts. Figure 8 illustrates the resulting trip distribution and assignment for the proposed subdivision during the weekday AM and PM peak hours. Note the Crestview Drive/Willakenzie Road intersection has been shown as Intersection "A" in Figure 8 for the purposes of trip tracking into/out of Crestview Green through Crestview Crossing.

YEAR 2026 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 Green subdivision. The weekday AM and PM peak hour site-generated traffic volumes shown in Figure 8 were added to the year 2026 background traffic volumes shown in Figure 6 to arrive at the year 2026 total traffic volumes shown in Figure 9.

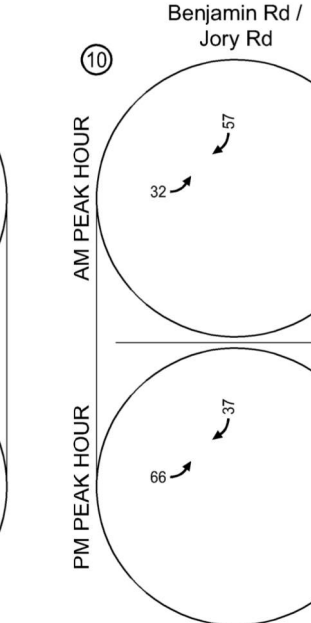
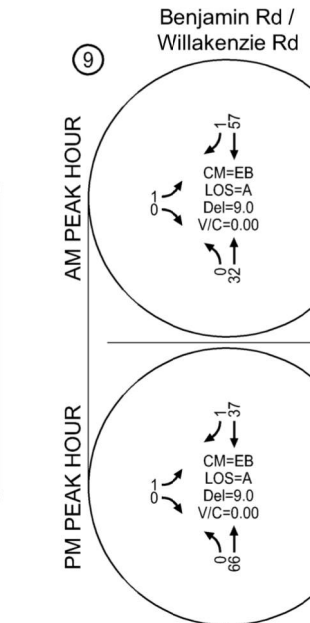
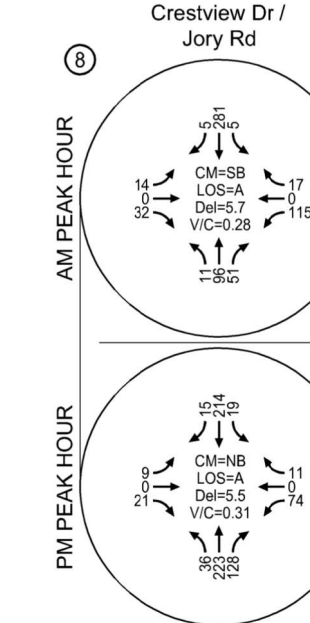
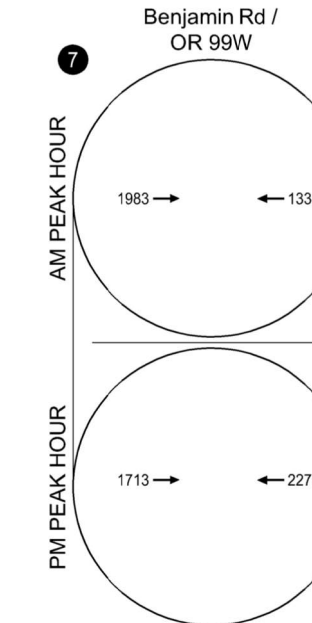
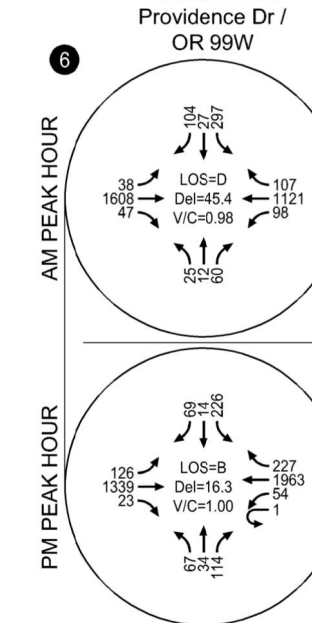
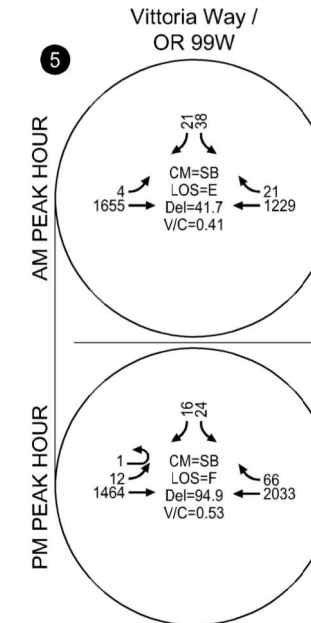
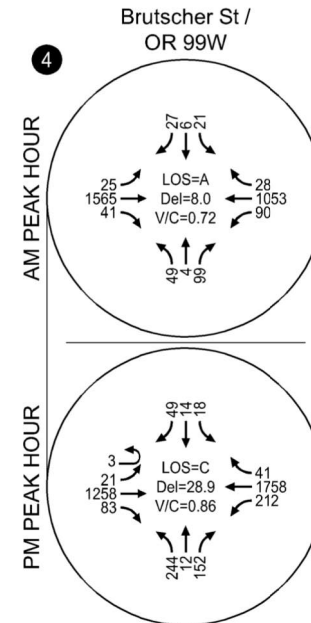
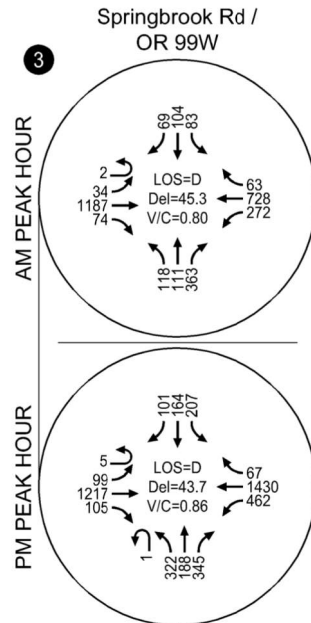
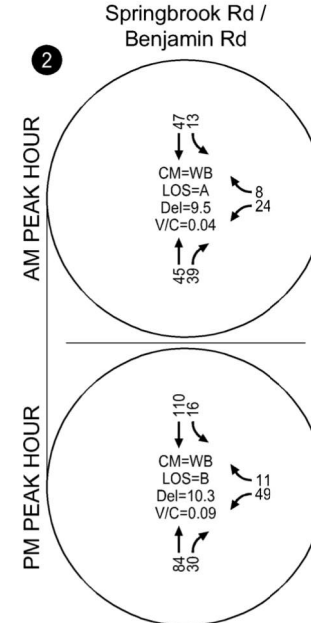
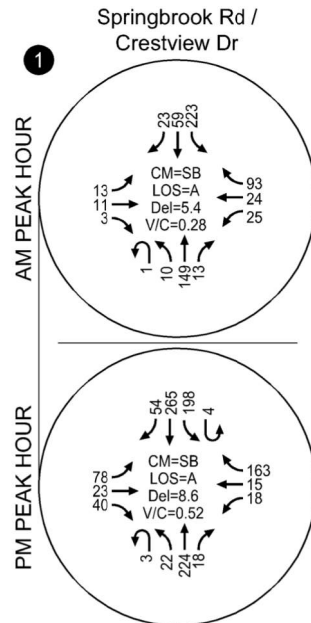
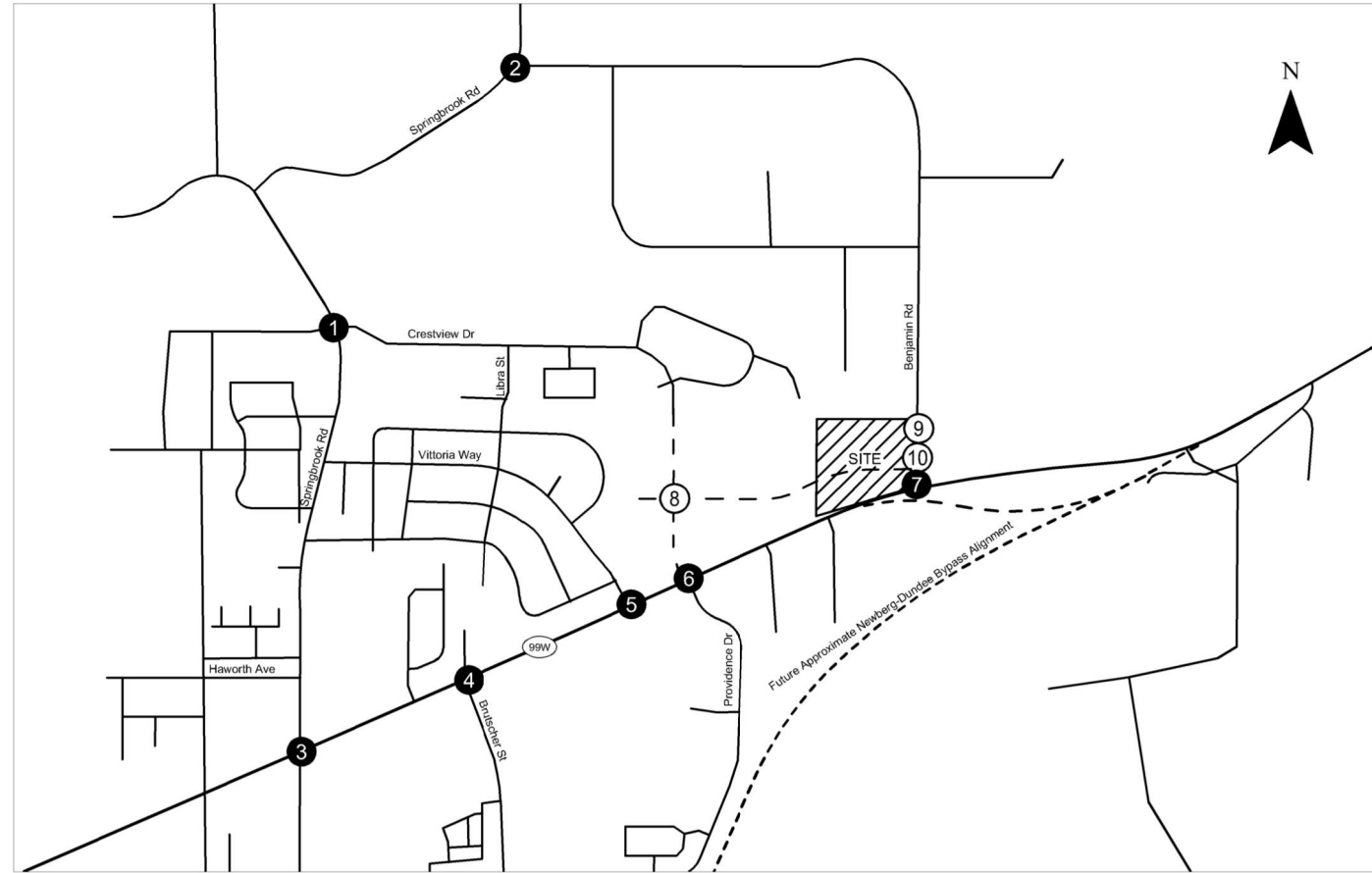


*Benjamin Rd connection to OR 99W assumed to be closed

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

Figure
8

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Year 2026 Total Traffic Conditions
 Weekday AM and PM Peak Hours
 Newberg, Oregon

Figure
 9

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Operations Analysis

The weekday AM and PM peak hour turning movement volumes shown in Figure 9 were used to conduct an operational analysis at each study intersection to determine the year 2026 total traffic conditions. The assumed lane configurations at the new intersections along Benjamin Road are displayed in Figure 5. The results of the total traffic conditions analysis shown in Figure 9 indicate that all study intersections are forecast to meet ODOT mobility targets and City level of service standards under year 2026 total traffic conditions during the weekday AM and PM peak hours except the following:

- The OR 9W/Springbrook Road intersection is projected to operate at a v/c of 0.86 during the weekday PM peak hour. While slightly above the 0.85 mobility target, the additional trips generated by Crestview Green development represent fewer than one percent of the total intersection peak hour volume. While not modeled in this report, traffic demand at this intersection is expected to decrease with the completion of the Newberg-Dundee Bypass, which will divert through traffic around Newberg and result in improved AM and PM peak hour operations at this intersection. Therefore, no near-term improvements are recommended.
- The OR 99W/Brutscher Street intersection is projected to operate at a v/c of 0.86 during the weekday PM peak hour. However, because the v/c ratio is forecast to exceed the target by 0.01 (v/c = 0.86), and operations at the intersection are expected to improve after completion of the Newberg-Dundee bypass, no near-term improvements are recommended.
- The OR 99W/Providence Drive/Crestview Drive intersection is projected to operate at a v/c of 0.98 during the weekday AM peak hour and at capacity (1.00) during the weekday PM peak hour, both of which exceed the ODOT mobility target of 0.80. To address this deficiency, we recommend adjusting the lane configuration on the southbound Crestview Drive approach, as well as the signal phasing at the intersection, relative to what was assumed in the Crestview Crossing TIA—this is discussed in the following section.

Appendix "F" contains the year 2026 total traffic level of service worksheets.

Recommended Mitigation at OR 99W/Providence Drive/Crestview Drive

The previously prepared and approved Crestview Crossing TIA assumed the southbound Crestview Drive extension would be designed with three approach lanes at the OR 99W intersection: exclusive left, exclusive through, and exclusive right, and the analysis also assumed the southbound left turns would operate as permissive movements (i.e. all northbound Providence Drive and southbound Crestview Drive movements would operate within a single phase). This was assumed to avoid additional lost time at the intersection and mitigate impacts to the eastbound and westbound OR 99W mainline approaches. The projected southbound left turn volume at this intersection under year 2026 background traffic conditions during the weekday PM peak hour is 190 trips, which reflects both Crestview Crossing trips and traffic that will reroute to the Crestview Drive extension as described in the Crestview Crossing TIA.

However, with the closure of Benjamin Road at OR 99W (assumed to occur with the Crestview Green development), the existing traffic accessing Benjamin Road will be diverted to Crestview Drive at the OR 99W intersection and through the Crestview Crossing and Crestview Green developments, adding trips to the southbound left turn movement at OR 99W/Providence Drive/Crestview Drive. Addition of the Crestview Green trips will further increase demand for this left turn movement. Consequently, the OR 99W/Providence Drive/Crestview Drive intersection v/c ratios are forecast to exceed the ODOT mobility target of 0.80 during both peak hours after this additional traffic with the assumed lane configuration and signal timing in the Crestview Crossing TIA.

To address this deficiency and to also enhance the safety and efficiency of the intersection, we recommend modifying the center lane of the southbound approach from the previously recommended exclusive through lane to a shared left/through lane and providing split signal phasing at the intersection (i.e. all southbound Crestview Drive movements will receive a protected phase independent of the

northbound Providence Drive movements). Figure 10 displays the assumed lane configuration at the intersection and the results under these assumed modifications. As shown, the v/c ratio is improved to 0.93 during the weekday AM peak hour and 0.97 during the weekday PM peak hour, thus improving the impact of the proposed site traffic volumes (5 southbound left turns) and most of the background impact of the rerouted Benjamin Road traffic volumes (independent of this project).

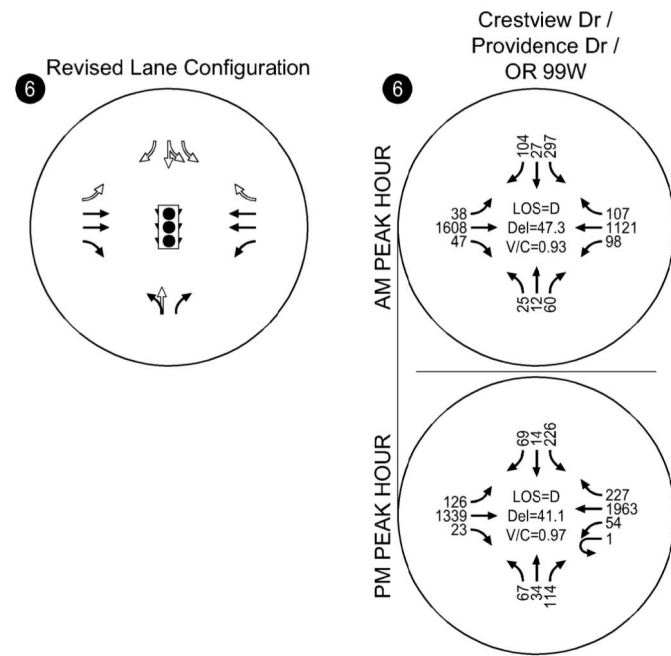
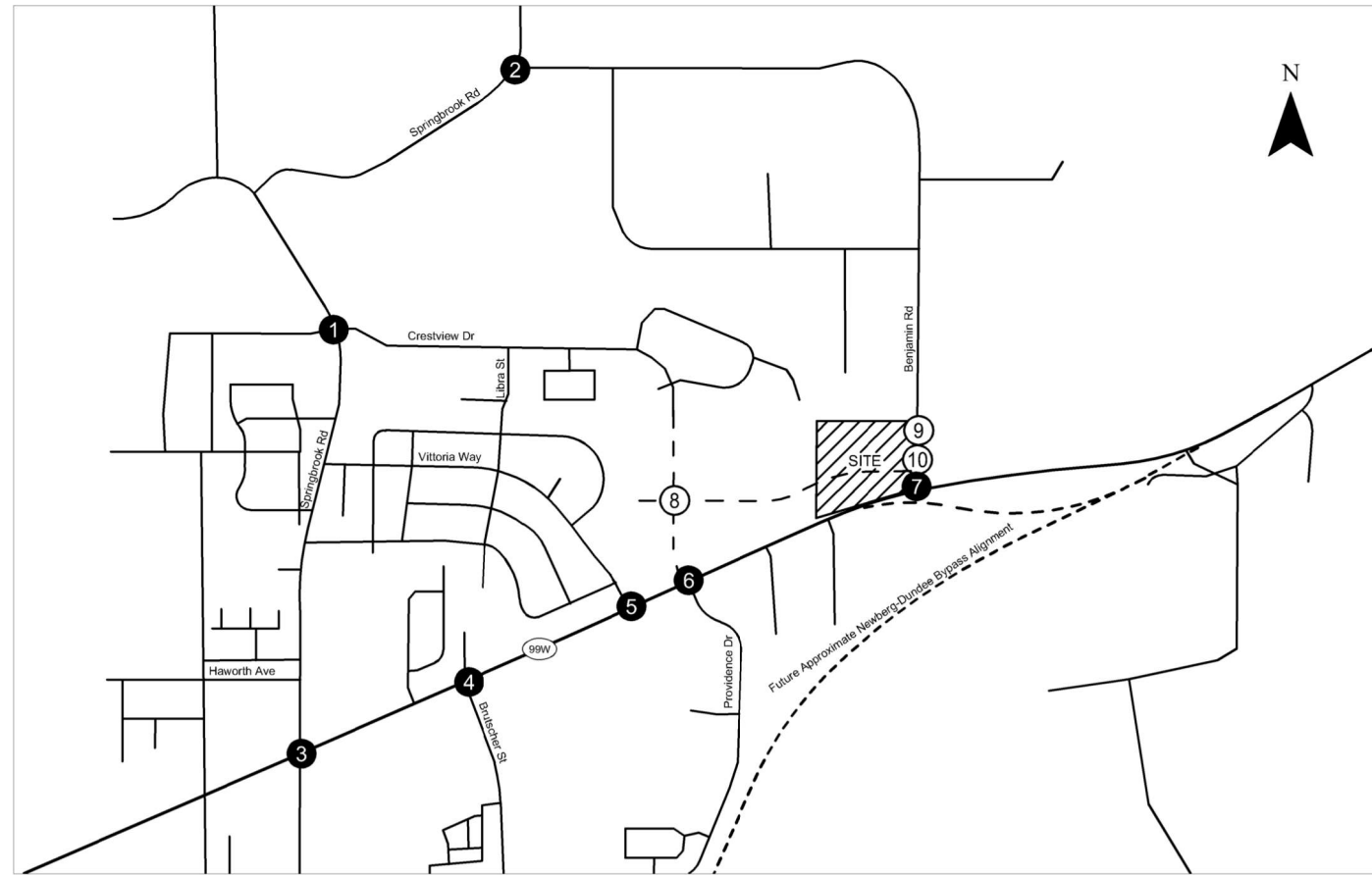
Appendix "G" contains the level of service worksheets for the OR 99W/Providence Drive/Crestview Drive intersection reflecting the year 2026 total traffic with improvements.

Benjamin Road Right-In Access Sensitivity Analysis

During project scoping, Yamhill County requested the development team assess the feasibility of providing a right-in access from westbound OR 99W onto northbound Benjamin Road but closing all other movements, including southbound Benjamin Road south of Jory Road. The purpose of this alternative would be to continue serving existing developments north of Crestview Green and also to compare relative impacts to the OR 99W/Providence Drive/Crestview Drive intersection given that the v/c ratio at that intersection is projected to exceed ODOT mobility targets after closure of Benjamin Road. Figure 11 displays the traffic volumes and corresponding traffic operations at the study intersections assuming the westbound right-in at Benjamin Road remains.

As shown, provision of the right-in access at Benjamin Road is not projected to substantially change the level of service or v/c ratio at the OR 99W/Providence Drive/Crestview Drive intersection relative to total traffic conditions with full closure of Benjamin Road. As this alternative creates additional environmental impacts and constructability issues relative to the full closure of Benjamin Road, and it is inconsistent with the eventual design of OR 99W in the area after the Newberg-Dundee Bypass is completed (it is projected to tie into the existing alignment of OR 99W just north of this location), we recommend moving forward with full closure of Benjamin Road south of Jory Road.

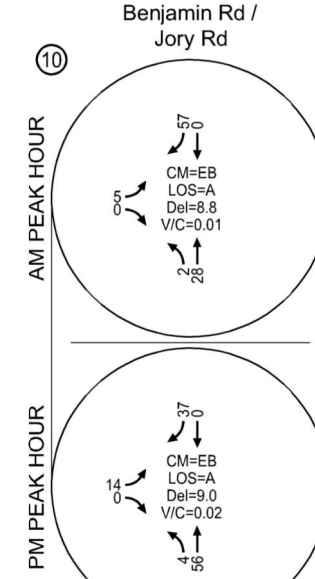
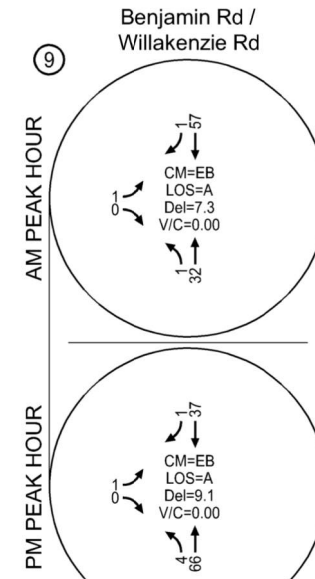
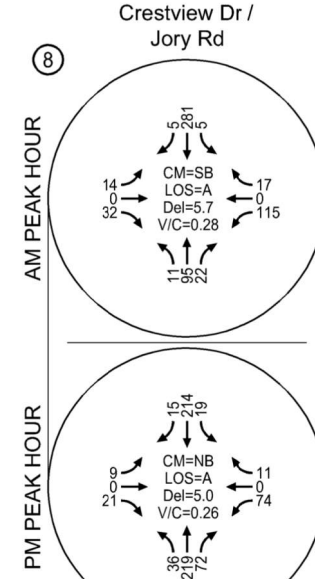
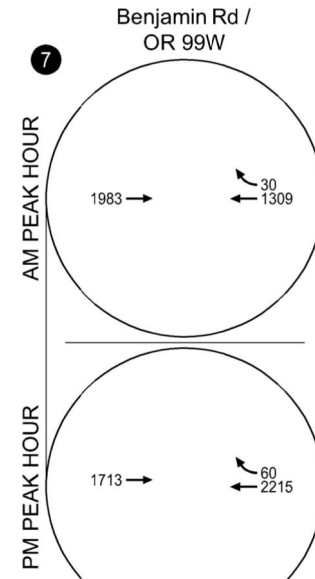
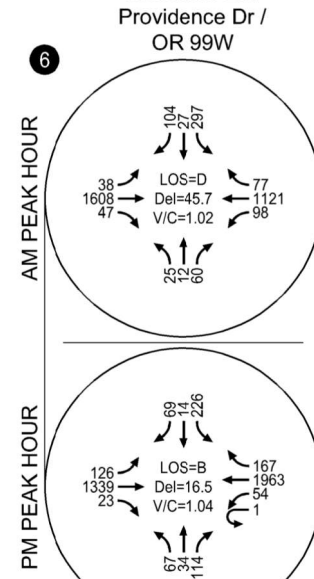
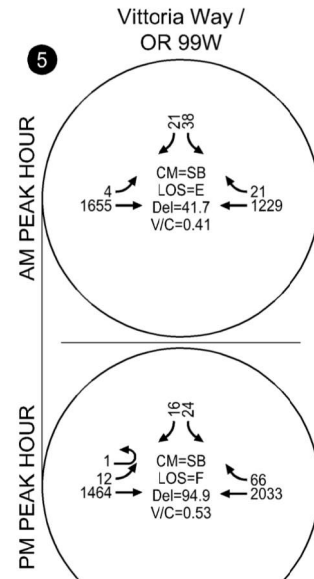
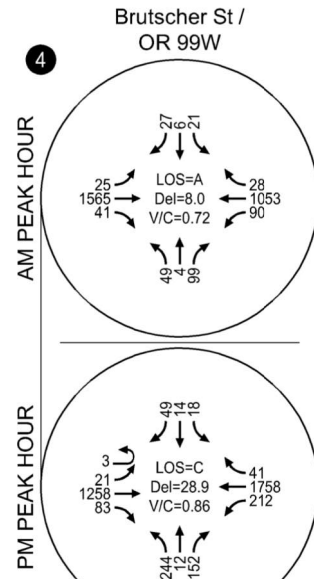
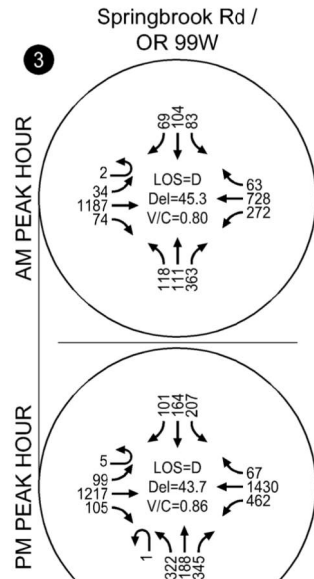
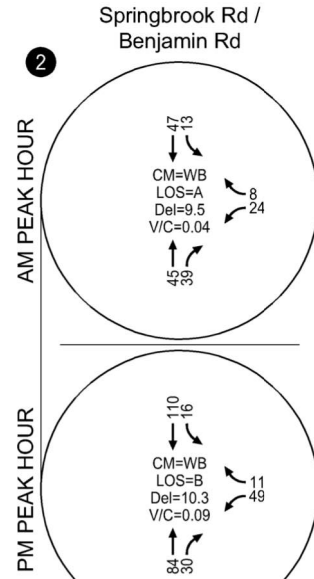
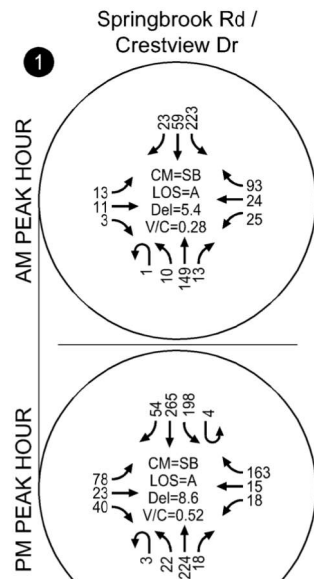
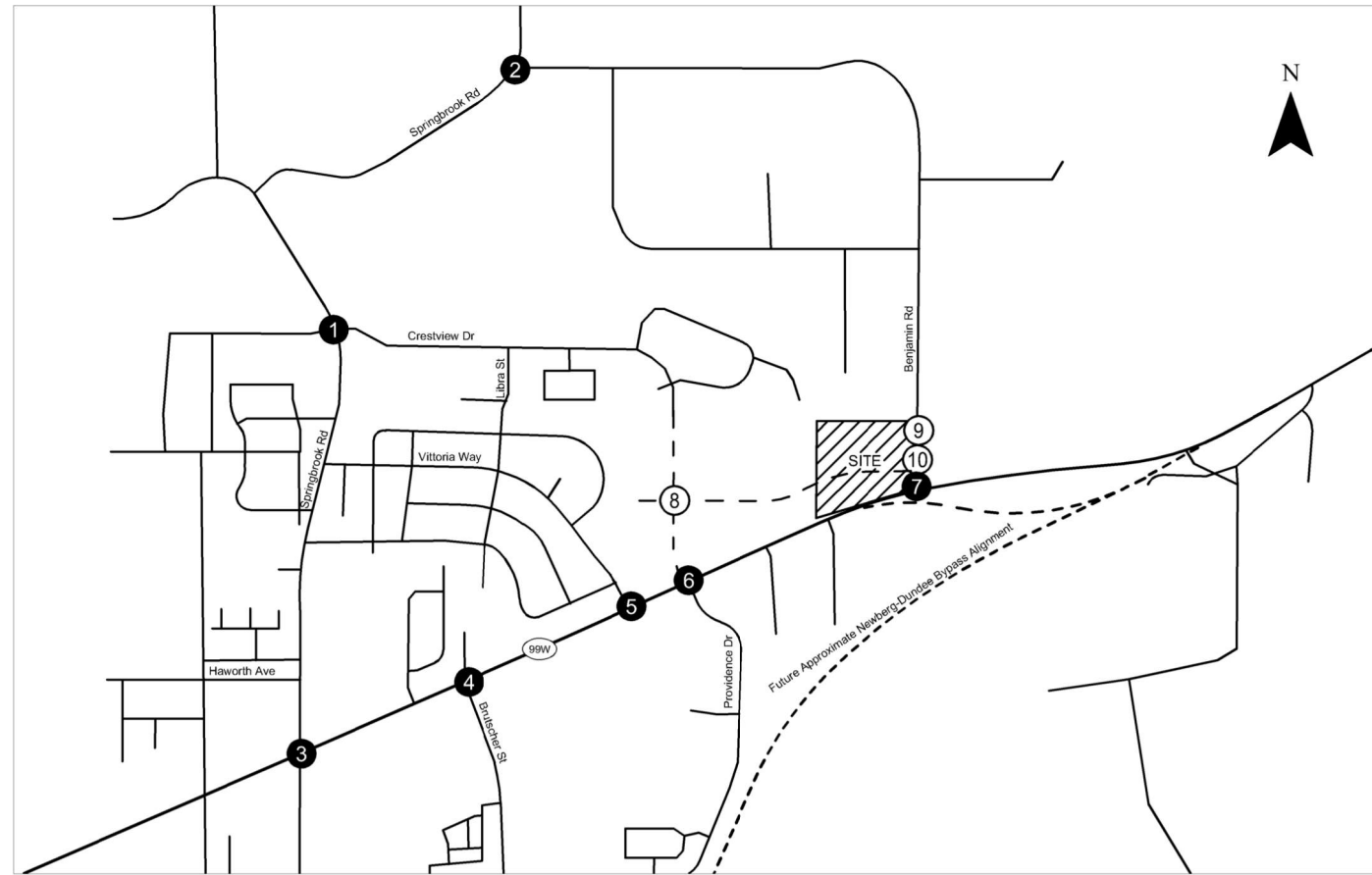
Appendix "H" contains the level of service worksheets reflecting the Benjamin Road right-in access sensitivity analysis.



Year 2026 Total Traffic Conditions with Mitigation
 Weekday AM and PM Peak Hours
 Newberg, Oregon

Figure
 10

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Year 2026 Total Traffic Conditions with Right In at Benjamin
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 will 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 the 95th-percentile queues elsewhere. Table 6 lists the estimated 95th-percentile queue (Q95) for each movement at the study intersections under existing, year 2026 background, and year 2026 total traffic conditions. Reported queues are rounded up to the nearest vehicle length (approximately 25 feet).

Table 6. Summary of 95th-percentile Queues

Intersection	Movement	Storage (ft)	Weekday AM Peak Hour Q95 (ft)			Weekday PM Peak Hour Q95 (ft)			Queue Storage Adequate?
			Existing	Background	Total/Mitigated	Existing	Background	Total/Mitigated	
1: Springbrook Rd/ Crestview Dr	EB	>500	25	25	25	25	25	25	Yes
	WB	>500	<25	25	25	<25	50	50	Yes
	NB	>500	25	25	25	75	50	50	Yes
	SB	>500	50	50	50	75	75	100	Yes
2: N Springbrook Rd/ Benjamin Rd	WB	>500	25	25	25	25	25	25	Yes
3: Springbrook Rd/ OR 99W	EB L	400	100	125	100	350	350	375	Yes
	EB T	>500	475	475	450	550	700	650	Yes
	EB R	350	175	125	75	125	300	325	Yes
	WB L	430	250	250	275	700	700	725	No
	WB T	>500	250	250	175	1,525	1,300	1,450	No*
	WB R	370	<25	<25	<25	275	225	150	Yes
	NB L	320	150	125	175	475	475	475	No
	NB T	320	925	850	925	2,200	2,175	1,875	No*
	NB R	320	475	475	475	525	525	500	No
	SB L	170	275	125	125	350	375	375	No
4: Brutscher St/ OR 99W	EB L	260	100	100	75	100	125	100	Yes
	EB T	>500	350	350	350	400	450	450	Yes
	EB R	200	100	125	125	150	200	200	Yes
	WB L	>500	150	150	175	525	550	550	Yes
	WB T	>500	175	250	75	1,425	1,025	1,250	Yes
	WB R	150	25	50	25	150	175	150	Yes
	NB L	>300	100	100	100	300	300	300	Yes
	NB T/R	>500	125	150	150	1,000	925	850	Yes
	SB L	>300	75	75	75	50	50	50	Yes
5: Vittoria Way/ OR 99W	EB L	100	<25	<25	<25	25	25	25	Yes
	SB	>500	50	50	50	50	75	75	Yes
6: Providence Dr/ Crestview Dr/OR 99W	EB L	>300		75	100 / 100		175	350 / 225	Yes
	EB T	>500	300	575	575 / 600	325	175	200 / 250	Yes
	EB R	125	100	125	150 / 125	75	50	25 / 50	Yes
	WB L	>500	200	175	200 / 200	150	325	325 / 325	Yes
	WB T	>500	100	325	300 / 350	600	2,375	5,100 / 5,325	Yes
	WB R	500		50	150 / 150		400	450 / 450	Yes
	NB L	160	75	75	75 / 75	150	125	125 / 125	Yes
	NB T	>500		50	50 / 50		75	75 / 75	Yes
	NB R	160	100	75	100 / 100	125	125	125 / 125	Yes
	SB L	250		300	325 / 250		250	325 / 225	Yes
7: Benjamin Rd/ OR 99W	SB T	300		200	625 / 275		125	425 / 250	Yes
	SB R	200		75	150 / 150		100	125 / 125	Yes
	EB L	100	<25	<25		25	25		
8: Crestview Dr/ Jory Rd	SB	>500	50	75		50	75		
	EB	100		25	25		25	25	Yes
	WB	>500		25	25		25	25	Yes
	NB	300		25	25		25	50	Yes
9: Benjamin Rd/ Willakenzie Dr	SB	>500		25	50		25	25	Yes
	EB	>500			<25			<25	Yes

*Queue expected to extend to upstream signal/stop sign during a portion of the peak hour

As shown, all 95th-percentile queues are projected to be accommodated within existing storage lengths, with the following exceptions:

- The 95th-percentile queues on several movements at Springbrook Road/OR 99W currently exceed the available turn lane storage lengths and are projected to continue doing so under background and total conditions. Much of the demand at this intersection reflects traffic accessing the Newberg-Dundee Bypass, which currently ends at Springbrook Road to the south. This demand is projected to substantially decrease after completion of the bypass. Completion of the Crestview Drive extension through Crestview Crossing is projected to further relieve demand at the intersection, much more so than any new traffic associated with Crestview Green. Therefore, no additional improvements are recommended.
- Note 95th-percentile queues along westbound OR 99W are projected to be especially long at the signalized intersections within the study area, including at Providence Drive/Crestview Drive. As documented in the Crestview Crossing TIA, the additional signal phases in conflict with the westbound movement on OR 99W (eastbound left and southbound left/through/right) are projected to substantially increase queuing on the westbound approach. While the closure of the Benjamin Road intersection to the east will add even more traffic to the OR 99W/Providence Drive/Crestview Drive intersection, this also creates additional storage for queues on westbound OR 99W upstream of the intersection. Additionally, demand for this movement is projected to be substantially decreased upon completion of the Newberg-Dundee bypass. Therefore, no additional improvements are recommended at the intersection.

Appendix "I" contains the SimTraffic queueing worksheets.

ON-SITE CIRCULATION/SITE ACCESS OPERATIONS

Internal circulation was evaluated to confirm whether the site will provide sufficient on-site circulation for pedestrian movements and internal traffic. Figure 2 illustrates the proposed development plan. The following activities are recommended to maximize the safety and efficiency of the internal intersections and roadways:

- All local streets within the development should have two travel lanes.
- Landscaping, utilities, and signage near the internal intersections and site access points should be located and maintained to provide adequate stopping and intersection sight distance.



Section 5 Findings and Recommendations

FINDINGS AND RECOMMENDATIONS

The results of the traffic impact analysis indicate the proposed Crestview Green subdivision can be constructed while maintaining acceptable levels of service and safety on the surrounding transportation system, provided the recommended mitigation measures are in place. The findings and recommendations of the analysis are discussed below.

FINDINGS

- All of the study intersections currently meet the applicable ODOT mobility targets and City level of service standards.
- An analysis of the most recent documented five years of reported crash data from ODOT at the study intersections revealed that all crash rates at the study intersections fall below the statewide average. The OR 99W/Springbrook Road intersection appeared in the top five percent of the highest-ranking locations on the ODOT Region 2 SPIS ranking.
- The study intersections are forecast to continue meeting ODOT mobility targets and City level of service standards under year 2026 background traffic conditions, with the following exception:
 - The OR 99W/Providence Drive/Crestview Drive intersection is projected to experience a v/c ratio of 0.94 during the weekday AM peak hour and 0.96 during the weekday PM peak hour after construction of the Crestview Drive extension and the Crestview Crossing development, both of which exceed the ODOT mobility target of 0.80.
- The proposed Crestview Green subdivision is projected to generate a total of 1,010 weekday trips, of which 72 (17 in, 55 out) are forecast to occur during the AM peak hour and 88 (55 in, 33 out) are forecast to occur during the PM peak hour.
- The study intersections are forecast to meet ODOT mobility targets and City level of service standards under year 2026 total traffic conditions during the weekday AM and PM peak hours, with the following exceptions:
 - The OR 9W/Springbrook Road intersection is projected to operate at a v/c of 0.86 during the weekday PM peak hour. While slightly above the 0.85 mobility target, the additional trips generated by Crestview Green development represent fewer than one percent of the total intersection peak hour volume. While not modeled in this report, traffic demand at this intersection is expected to decrease with the eventual completion of the Newberg-Dundee Bypass, which will divert through traffic around Newberg and result in improved AM and PM peak hour operations at this intersection. Therefore, no near-term improvements are recommended.
 - The OR 99W/Brutscher Street intersection is projected to operate at a v/c of 0.86 during the weekday PM peak hour. However, because the v/c ratio is forecast to exceed the target by 0.01 (v/c = 0.86), and operations at the intersection are expected to improve after completion of the Newberg-Dundee bypass, no near-term improvements are recommended.
 - The OR 99W/Providence Drive/Crestview Drive intersection is projected to operate at a v/c of 0.98 during the weekday AM peak hour and at capacity (1.00) during the weekday PM peak hour, both of which exceed the ODOT mobility target of 0.80. These operations can be improved by modifying the lane configuration on the southbound Crestview Drive approach to include a separate left-turn lane and a shared through/left-turn lane and converting to split phasing.
- Provision of a right-in access at Benjamin Road is not projected to substantially change the level of service or v/c ratio at the OR 99W/Providence Drive/Crestview Drive intersection relative to total traffic conditions with full closure of Benjamin Road.
- All 95th-percentile queues are projected to be accommodated within existing storage lengths, with the following exceptions:

- The 95th-percentile queues on several movements at Springbrook Road/OR 99W currently exceed the available turn lane storage lengths and are projected to continue doing so under background and total conditions.

RECOMMENDATIONS

- To address the impact of the Crestview Green development and the closure of Benjamin Road, it is recommended that the lane configuration on the southbound Crestview Drive extension where it meets OR 99W be revised to include an exclusive left turn lane, a shared left/through lane, and an exclusive right turn lane. The turn lane storage lengths are projected to adequately store the 95th-percentile queues as designed.
- It is also recommended to adjust the OR 99W/Providence Drive/Crestview Drive intersection to split phasing for the northbound Providence Drive and southbound Crestview Drive approaches.
- The following activities are recommended to maximize the safety and efficiency of the internal intersections and roadways:
 - All local streets within the development should have two travel lanes.
 - Landscaping, utilities, and signage near the internal intersections and site access points should be located and maintained to provide adequate stopping and intersection sight distance.



Section 6 References

REFERENCES

1. Transportation Research Board. *Highway Capacity Manual, 6th Edition*. Transportation Research Board of the National Academies: Washington, DC, 2015.
2. Oregon Department of Transportation. *1999 Oregon Highway Plan*. ODOT: Salem, OR, 1999.
3. DKS Associates. *Newberg Transportation System Plan*. 2016.
<<http://newbergoregon.gov/engineering/page/transportation-system-plan-updated-2021>>.
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4. Yamhill County Transit. "Routes and Schedules." 2021. <<http://ycbus.org>>. Accessed 10-15-2021.
5. Oregon Department of Transportation. "2019 – On-State, All SPIS Sites – By Score, Region 2." 2019.
<<http://www.oregon.gov/ODOT/Engineering/Pages/SPIS-Reports-On-State.aspx>>. Accessed 10-18-2021.
6. Institute of Transportation Engineers. *Trip Generation, 11th Edition*. Institute of Transportation Engineers: Washington, DC, 2021.

Appendix A

Scoping Correspondence

SCOPING MEMORANDUM

November 2, 2021

Project #: 26677

To: Brett Musick, City of Newberg

CC: Arielle Ferber, P.E., ODOT Region 2
Casey Knecht, ODOT Region 2
Greg Haffner, Yamhill County

From: Zachary Bugg, PhD and Matt Hughart

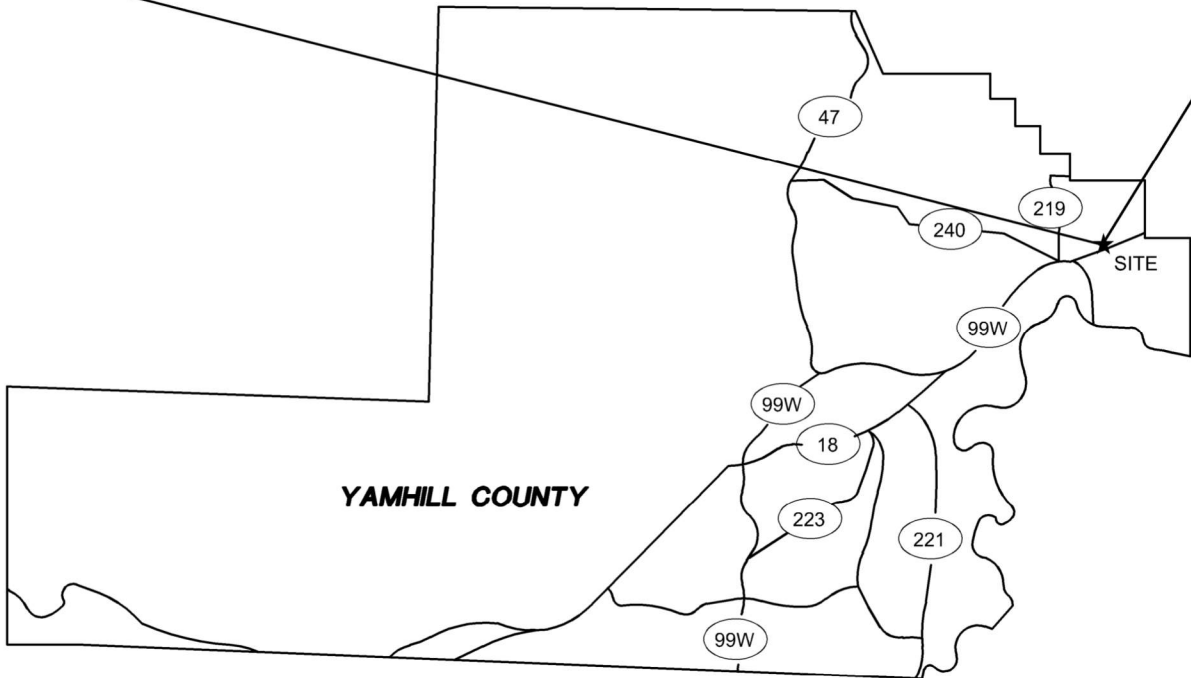
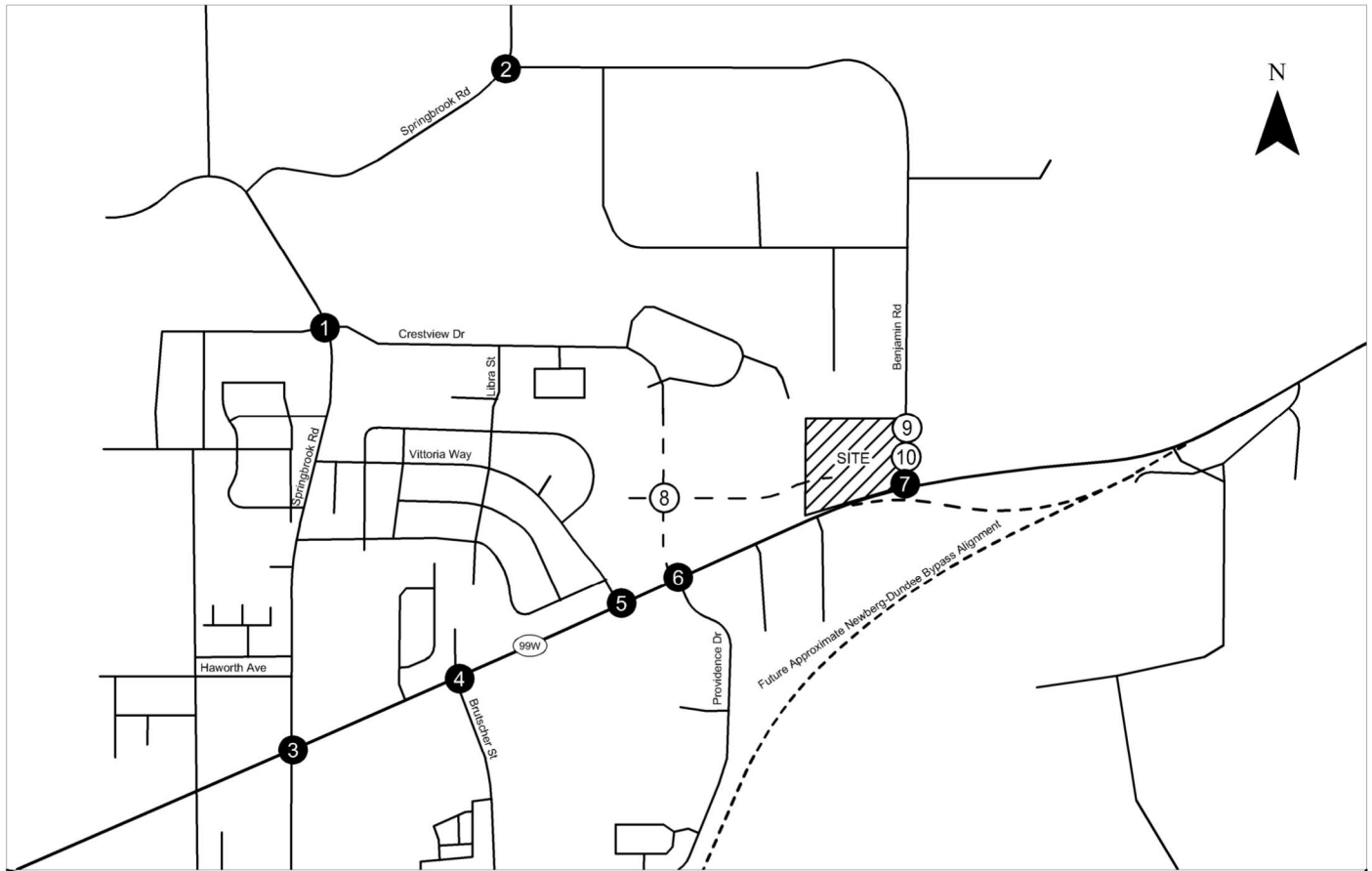
RE: Crestview Green Traffic Impact Analysis Scoping

This document presents the assumed study area and project assumptions for preparing a Traffic Impact Analysis (TIA) associated with the proposed Crestview Green residential development to be located at the northwest corner of the OR 99W/Benjamin Road intersection in Newberg, Oregon. The assumptions for scoping the TIA are based on a review of the concept site plan, discussions with City of Newberg staff and Oregon Department of Transportation (ODOT), and previous work in the area.

Proposed Development

The applicant, 3J Consulting, is preparing a conditional use application for approximately 15 single family homes, 97 townhomes, and 24 apartment units for the 10.6-acre site bounded by Benjamin Road to the east, OR 99W to the south, Crestview Crossing, and the Spring Brook wetlands to the north. The property is currently occupied by two single-family homes and agricultural land uses and is zoned as a mix of residential (R-1 and R-2) and commercial (C-2). Full build-out of the development is projected in 2023.

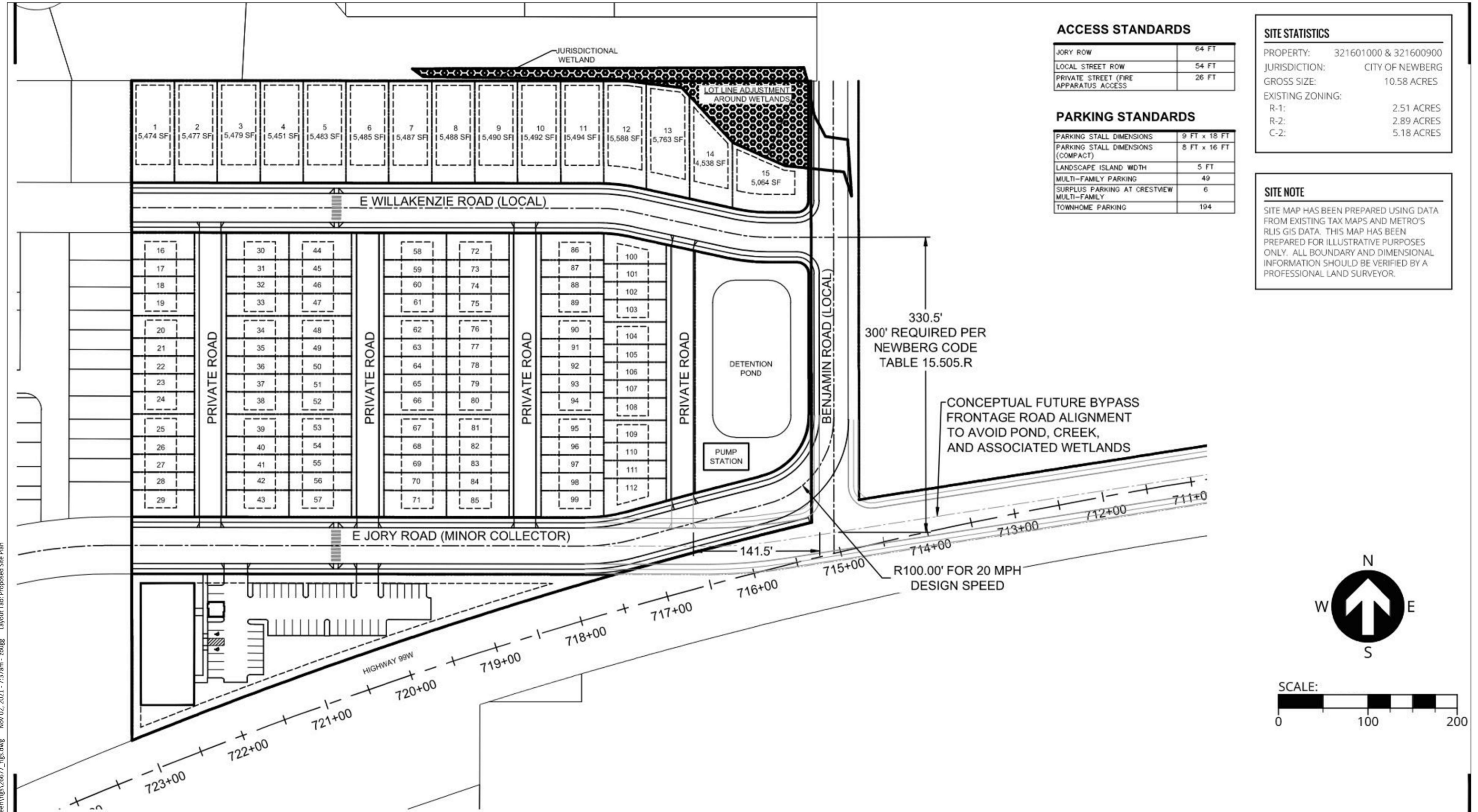
Figure 1 displays a map of the site vicinity, and Figure 2 displays the proposed site plan. As shown, the site development includes an extension of the east-west local street (Willakenzie Road) proposed by Crestview Crossing, which will ultimately tee into Benjamin Road, and the east-west minor collector (Jory Road) proposed by Crestview Crossing, which will ultimately become a frontage road for OR 99W in the vicinity of the Newberg-Dundee Bypass interchange. Per City and ODOT requirements, a TIA is needed as part of the design review application for the development. This memorandum presents the proposed TIA methodology and reflects the outcome of conversations with City and ODOT staff.



- - Study Intersection (Existing)
- - Study Intersection (Future)

Site Vicinity
Newberg, Oregon

Figure
1



H:\26\26677 - Crestview Green\figs\26677_fig.dwg Nov 02, 2021 - 7:37am - zbugg Layout Tab: Proposed Site Plan

Site Plan Provided by 3J Consulting 10/6/2021

Preliminary 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, 10th Edition* (Reference 1). Table 1 displays the estimated weekday daily and AM and PM peak hour trips associated with the proposed development.

Table 1. Estimated Trip Generation

Land Use	ITE Code	Units	Weekday Daily	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
Single-Family	210	15	182	11	3	8	16	10	6
Multifamily (Low-Rise)	220	121	886	57	13	44	70	44	26
Total Trips			1,068	68	16	52	86	54	32

As shown, the proposed development is estimated to generate a total of 1,068 weekday daily, 68 weekday AM peak hour, and 86 weekday PM peak hour trips.

Trip Distribution and Assignment

The study area is contained within the Newberg Transportation Planning Model. A select-zone analysis was previously prepared for the Crestview Crossing residential development to the west, which resulted in the following trip distribution pattern:

- To/from the northeast via OR 99W: 15%
- To/from the northwest via Crestview Drive: 30%
- To/from the southwest via OR 99W: 35%
- To/from the south via Brutscher Street: 10%
- To/from the south via Providence Drive: 10%

We propose to use the same trip distribution pattern for the Crestview Green development.

Study Area and Intersections

Based on the estimated trip generation and distribution, as well as prior conversations with City staff, the following intersections are proposed for analysis:

1. Crestview Drive/Springbrook Road
2. Benjamin Road/Springbrook Road
3. OR 99W/Springbrook Road
4. OR 99W/Brutscher Street
5. OR 99W/Vittoria Way
6. OR 99W/Providence Drive/Crestview Drive (future)
7. OR 99W/Benjamin Road
8. Jory Road/Crestview Drive (future)
9. Jory Road/Benjamin Road (future)
10. Willakenzie Road/Benjamin Road (future)

Based on the assumed trip distribution described above, no other major intersections along study area roadways are forecast to experience an increase of more than 50 peak hour trips as a result of Crestview Green.

Existing Traffic Volumes

Existing traffic volumes will be determined from manual turn movement counts collected at the study intersections on a typical weekday during the morning and evening peak periods in October 2021. As previously discussed in the Trip Generation section, intersection turning movement counts will be collected from 6:00 AM –9:00 AM and from 3:00 PM – 6:00 PM in order to fully capture the larger array of peak time period site-generated traffic volumes.

Seasonal Adjustment

Per ODOT requirements, a seasonal factor will be applied to the study intersections along the OR 99W corridor. To determine an appropriate seasonal factor, three methodologies were investigated as outlined in ODOT's Analysis Procedures Manual (APM): On-Site ATR Method, ATR Characteristic Table Method, ATR Seasonal Trend Method. ATR Station 36-004 is located on OR 99W just west of Brutscher Street in Newberg and was used to calculate the ODOT Seasonal Adjustment factor for October. Table 2 contains the seasonal factor information for this count station and month. Per the ODOT Analysis Procedures Manual, the last five years of count station data should be used (data from 2020 was not used due to the COVID-19 pandemic's effect on traffic volumes). The peak month percent of AADT and the count month (October) percent of AADT should be compared, with the highest and lowest values removed (highlighted in grey).

Table 2. ODOT Seasonal Adjustment

Year	2019	2018	2017	2016	2015
Peak Month % of AADT	108	105	105	108	107
Count Month (October) % of AADT	103	100	102	99	101

As shown, a seasonal factor of $(105 + 108 + 107) / (100 + 102 + 101) = 1.056$ will be applied to mainline traffic volumes on OR 99W.

COVID-19 Adjustment

As of the fall 2021 semester, City of Newberg schools are operating in-person, and area traffic volumes are nearly the same as pre-COVID-19 levels. Therefore, no additional adjustment will be applied to the existing traffic volumes beyond the ODOT seasonal adjustment.

Performance Measures and Operating Standards

Intersection operating targets adopted by the City of Newberg and ODOT are summarized below.

ODOT Mobility Targets

ODOT uses volume-to-capacity (v/c) ratios to assess intersection operations. Table 6 of the Oregon Highway Plan (OHP) provides volume-to-capacity ratio targets for all signalized/roundabout and unsignalized intersections located outside the Portland metropolitan area. Based on the OHP, Table 3 summarizes the v/c

ratio that will be used to identify the existing/future operational issues at all study intersections along the OR 99W study corridor.

Table 3. ODOT Mobility Targets

Intersection	Posted Speed on OR 99W (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	0.70

City of Newberg Operating Standards

With the exception of Benjamin Road intersections, which are outside the City limits, all of the study intersections are additionally subject to City of Newberg operating standards, which specify level of service (LOS) D or better.

Analysis Time Periods

Existing and estimated build-out year 2023 conditions at the study intersections will be analyzed using Synchro/SimTraffic Version 10 software. Turning movement counts at the study intersections will be collected during the morning (6 – 9 AM) and afternoon (3 – 6 PM) peak periods on a typical mid-weekday when local schools are in session, with the system peak hours identified for analysis. The following scenarios will be analyzed in the TIA for the weekday AM and PM system peak hours:

- Existing (year 2021) traffic conditions,
- Background (year 2023) traffic conditions, including planned transportation improvements and traffic from regional growth and approved in-process developments, and
- Total (year 2023) traffic conditions, including trips associated with Crestview Green.

Background Growth and In Process Developments

The Crestview Crossing residential development is currently under construction to the west of Crestview Green and will be included as in-process trips in the year 2023 background traffic volumes. 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. We request the City and/or ODOT confirm the two-percent annual growth rate and provide any other developments to be included as in-process.

Crestview Drive Extension

The completion of Crestview Crossing will result in a major network connection via the southward extension of Crestview Drive to OR 99W. The methodology for network traffic reassignment described in the Crestview Crossing TIA will be followed to develop the year 2023 background traffic volumes at the study intersections west of Crestview Green.

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. Additionally, the ODOT Statewide Priority Index System (SPIS) will 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*

*To reflect the proposed southward extension of Crestview Drive, we will include the assumed signal timings and lane configuration at the future OR 99W/Providence Drive/Crestview Drive intersection from the Crestview Crossing TIA.

Next Steps

We trust this memorandum provides adequate documentation of the proposed land use action, methodology, and assumptions for the Crestview Green TIA. We formally request the City of Newberg and ODOT Region 2 provide written confirmation and/or comments regarding the proposed methodology and assumptions as soon as possible so that we may proceed with our analysis. If you have any questions, please call us at 910-399-5699.

References

1. Institute of Transportation Engineers. *Trip Generation, 10th Edition*. 2017.



Oregon

Kate Brown, Governor

Department of Transportation

Region 2 Tech Center

455 Airport Road SE, Building A

Salem, Oregon 97301-5397

Telephone (503) 986-2990

Fax (503) 986-2839

DATE: October 18, 2021

TO: Casey Knecht, PE
Development Review Coordinator

FROM: Arielle Ferber, PE
Traffic Analysis Engineer

SUBJECT: Crestview Green (Newberg, OR) – Outright Use
Methodology and Assumptions Memo Review Comments

ODOT Region 2 Traffic has completed our review of the submitted methodology and assumptions memo (dated October 6, 2021) to address traffic impacts due to development on the northwest quadrant of Pacific Highway West No 91 (OR 99W) and Benjamin Road in the city of Newberg, with respect to consistency and compliance with ODOT's Analysis Procedures Manual, Version 2 (APM). The APM was most recently updated in October 2020. The current version is published online at: <http://www.oregon.gov/ODOT/TD/TP/Pages/APM.aspx>. As a result, we submit the following comments for the City's consideration:

Recommended items to be addressed:

1. Figure 2 (Preliminary Site Plan) notes that in the near-term Benjamin Road may be restricted to RIRO for safety reasons which may require re-routing of exiting LILO volumes to Crestview. The TIA should provide further discussion on the potential restriction, what would warrant the restriction, and analyze for the RIRO conditions, if appropriate.
2. The trip generation utilized Land Use Code (LUC) 220 (Multifamily Low-Rise) for all multifamily. Per the Institute of Transportation Engineers *Trip Generation, 10th Edition* (2017) LUC 220 (Low-Rise) has the characteristics of one- and two-story buildings while LUC 221 (Mid-Rise) has the characteristics of three- to ten-story buildings. While the memo does not specify the number of stories associated with the 24 apartment units, the square footage allocated to the apartment units on the site plan appear consistent with a building with three- to ten-stories. The trip generation should be updated, if appropriate.
3. At the OR 99W at Benjamin Road intersection OR 99W is classified as a statewide highway, freight route, non-MPO, non-UGB, giving an OHP mobility target of 0.70, not 0.75.

Thank you for the opportunity to review this traffic impact analysis scoping memorandum.

So long as the above comments are incorporated, this methodology memorandum can be anticipated to direct a study that will appropriately address traffic impacts of the proposed development in accordance with ODOT analysis procedures and methodologies.

If there are any questions regarding these comments, please contact me at (503) 986-2857 or Arielle.Ferber@ODOT.state.or.us

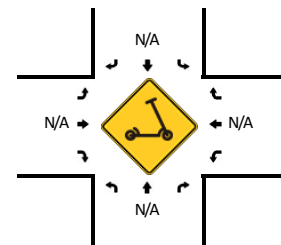
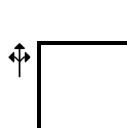
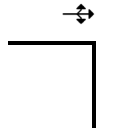
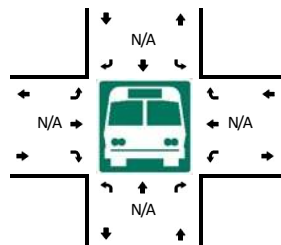
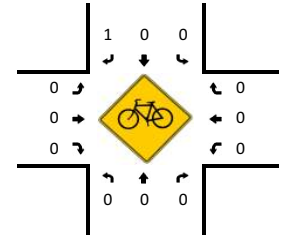
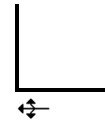
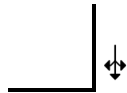
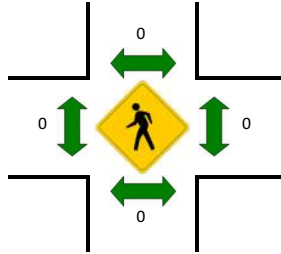
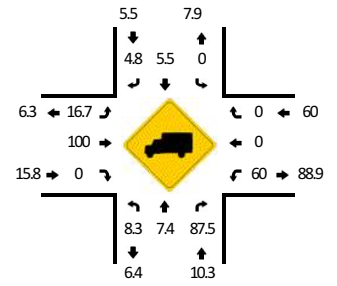
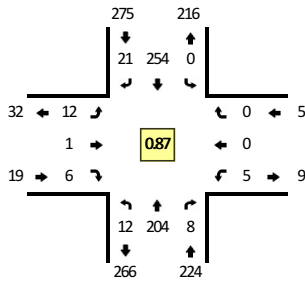
Appendix B

Turning Movement Counts

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

QC JOB #: 15594711
DATE: Wed, Oct 27 2021

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



5-Min Count Period Beginning At	N Springbrook Rd (Northbound)				N Springbrook Rd (Southbound)				E Crestview Dr (Eastbound)				E Crestview Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	0	4	0	0	0	10	0	0	0	0	0	1	0	0	0	0	15	
6:05 AM	0	5	1	0	0	10	0	0	0	0	0	0	0	0	1	0	17	
6:10 AM	0	5	0	0	0	14	0	0	0	1	0	0	0	0	0	0	20	
6:15 AM	0	6	1	0	0	12	0	0	0	0	0	0	0	0	0	0	19	
6:20 AM	1	4	0	0	0	11	0	0	0	0	0	1	0	0	1	0	18	
6:25 AM	0	8	0	0	0	19	0	0	0	0	0	0	0	1	0	0	28	
6:30 AM	0	3	1	0	0	12	1	0	0	0	0	0	0	0	0	0	17	
6:35 AM	0	5	0	0	0	18	0	0	0	0	0	1	0	1	0	0	25	
6:40 AM	0	13	0	0	0	14	0	0	0	0	0	0	0	0	0	0	27	
6:45 AM	0	12	1	0	0	19	1	0	0	0	0	0	0	0	0	0	33	
6:50 AM	0	8	0	0	0	15	0	0	0	1	0	0	0	0	0	0	24	
6:55 AM	1	8	4	1	0	8	2	0	0	0	0	0	0	0	0	0	24	267
7:00 AM	0	10	0	0	0	22	0	0	0	0	0	0	0	0	0	0	32	284
7:05 AM	0	13	1	0	0	18	1	0	0	1	0	2	0	0	0	0	36	303
7:10 AM	0	15	0	0	0	10	0	0	0	1	0	1	0	1	0	0	28	311
7:15 AM	1	11	0	1	0	21	0	0	0	0	0	1	0	0	0	0	35	327
7:20 AM	0	8	0	0	0	17	1	0	0	1	0	3	0	0	0	0	30	339
7:25 AM	3	8	2	1	0	18	3	0	0	0	0	0	0	0	0	0	35	346
7:30 AM	0	14	0	0	0	22	0	0	0	0	0	1	0	0	0	0	37	366
7:35 AM	2	13	0	0	0	23	4	0	0	0	0	0	0	1	0	0	43	384
7:40 AM	5	24	1	1	0	22	3	0	0	0	0	0	0	0	0	0	56	413
7:45 AM	2	12	0	0	0	23	1	0	0	1	0	1	0	1	0	0	41	421
7:50 AM	2	19	0	0	0	21	0	0	0	0	0	1	0	0	0	0	43	440
7:55 AM	2	25	0	0	0	15	3	0	0	1	0	0	0	0	0	0	46	462
8:00 AM	2	23	0	0	0	21	1	0	0	2	0	1	0	0	0	0	50	480
8:05 AM	2	9	1	0	0	22	0	0	0	0	0	0	0	0	0	0	34	478
8:10 AM	0	16	1	0	0	27	2	0	0	0	0	1	0	0	0	0	47	497
8:15 AM	0	22	3	0	0	15	0	0	0	0	1	0	0	1	0	0	42	504
8:20 AM	2	15	0	0	0	17	2	0	0	0	0	0	0	0	0	0	36	510
8:25 AM	1	15	0	0	0	25	2	0	0	0	0	0	0	2	0	0	45	520
8:30 AM	0	14	0	0	0	18	0	0	0	1	0	0	0	0	0	0	33	516
8:35 AM	1	13	0	0	0	24	1	0	0	2	0	1	0	0	0	0	42	515
8:40 AM	0	24	0	0	0	15	4	0	0	1	0	0	0	0	0	0	44	503
8:45 AM	0	13	1	0	0	23	4	0	0	1	0	1	0	0	0	0	43	505
8:50 AM	2	24	1	1	0	24	1	0	0	1	0	1	0	1	0	0	56	518
8:55 AM	1	16	1	0	0	23	4	0	0	4	0	1	0	1	0	0	51	523

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	12	212	12	4	0	280	36	0	24	0	12	0	8	0	0	0	600
Heavy Trucks	0	4	12		0	0	0		4	0	0		4	0	0		24
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	4		0	0	0		0	0	0		4
Scoters																	

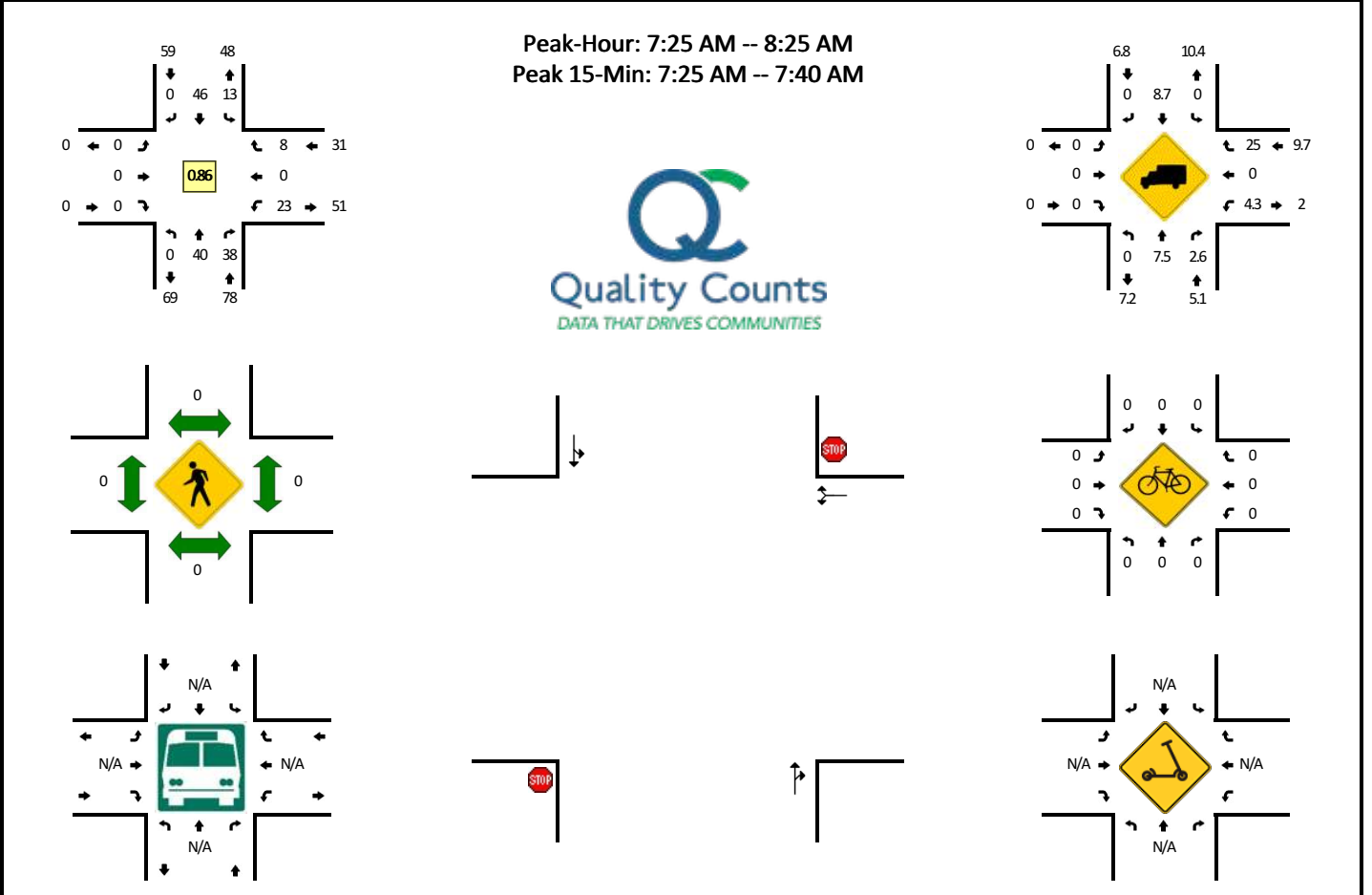
Comments:

Report generated on 11/4/2021 3:17 PM

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

LOCATION: N Springbrook Rd -- NE Benjamin Rd
CITY/STATE: Yamhill, OR

QC JOB #: 15594713
DATE: Wed, Oct 27 2021



5-Min Count Period Beginning At	N Springbrook Rd (Northbound)				N Springbrook Rd (Southbound)				NE Benjamin Rd (Eastbound)				NE Benjamin Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	0	2	6	0	1	1	0	0	0	0	0	0	0	0	0	0	10	
6:05 AM	0	1	3	0	1	0	0	0	0	0	0	0	0	0	0	0	5	
6:10 AM	0	2	4	0	1	1	0	0	0	0	0	0	0	0	0	0	8	
6:15 AM	0	1	3	0	0	0	0	0	0	0	0	0	2	0	0	0	6	
6:20 AM	0	1	2	0	0	0	0	0	0	0	0	0	1	0	0	0	4	
6:25 AM	0	2	2	0	0	0	0	0	0	0	0	0	1	0	1	0	6	
6:30 AM	0	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	4	
6:35 AM	0	1	6	0	0	3	0	0	0	0	0	0	0	0	0	0	10	
6:40 AM	0	3	1	0	1	2	0	0	0	0	0	0	3	0	0	0	10	
6:45 AM	0	0	3	0	1	1	0	0	0	0	0	0	0	0	0	0	5	
6:50 AM	0	3	3	0	0	1	0	0	0	0	0	0	1	0	0	0	8	
6:55 AM	0	0	4	0	0	1	0	0	0	0	0	0	0	0	0	0	5	81
7:00 AM	0	4	2	0	1	4	0	0	0	0	0	0	1	0	0	0	12	83
7:05 AM	0	3	3	0	0	1	0	0	0	0	0	0	3	0	1	0	11	89
7:10 AM	0	2	3	0	0	1	0	0	0	0	0	0	1	0	0	0	7	88
7:15 AM	0	2	1	0	2	2	0	0	0	0	0	0	1	0	1	0	9	91
7:20 AM	0	3	4	0	0	1	0	0	0	0	0	0	1	0	2	0	11	98
7:25 AM	0	3	3	0	2	5	0	0	0	0	0	0	2	0	0	0	15	107
7:30 AM	0	3	3	0	0	5	0	0	0	0	0	0	6	0	0	0	17	120
7:35 AM	0	2	8	0	1	3	0	0	0	0	0	0	3	0	0	0	17	127
7:40 AM	0	3	2	0	2	2	0	0	0	0	0	0	3	0	1	0	13	130
7:45 AM	0	4	4	0	1	4	0	0	0	0	0	0	2	0	0	0	15	140
7:50 AM	0	3	3	0	1	5	0	0	0	0	0	0	0	0	0	0	12	144
7:55 AM	0	1	3	0	0	4	0	0	0	0	0	0	1	0	0	0	9	148
8:00 AM	0	7	3	0	1	8	0	0	0	0	0	0	2	0	2	0	23	159
8:05 AM	0	4	2	0	0	2	0	0	0	0	0	0	2	0	2	0	12	160
8:10 AM	0	2	3	0	0	1	0	0	0	0	0	0	1	0	1	0	8	161
8:15 AM	0	4	4	0	1	4	0	0	0	0	0	0	1	0	1	0	15	167
8:20 AM	0	4	0	0	4	3	0	0	0	0	0	0	0	0	1	0	12	168
8:25 AM	0	2	3	0	1	4	0	0	0	0	0	0	2	0	1	0	13	166
8:30 AM	0	1	1	0	1	4	0	0	0	0	0	0	1	0	2	0	10	159
8:35 AM	0	3	0	0	1	5	0	0	0	0	0	0	0	0	0	0	9	151
8:40 AM	0	3	1	0	1	4	0	0	0	0	0	0	5	0	1	0	15	153
8:45 AM	0	3	8	0	2	2	0	0	0	0	0	0	2	0	1	0	18	156
8:50 AM	0	1	4	0	2	2	0	0	0	0	0	0	1	0	2	0	12	156
8:55 AM	0	8	5	0	0	3	0	0	0	0	0	0	4	0	0	0	20	167

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	32	56	0	12	52	0	0	0	0	0	0	44	0	0	0	196
Heavy Trucks	0	0	0		0	8	0		0	0	0		4	0	0		12
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scoters																	

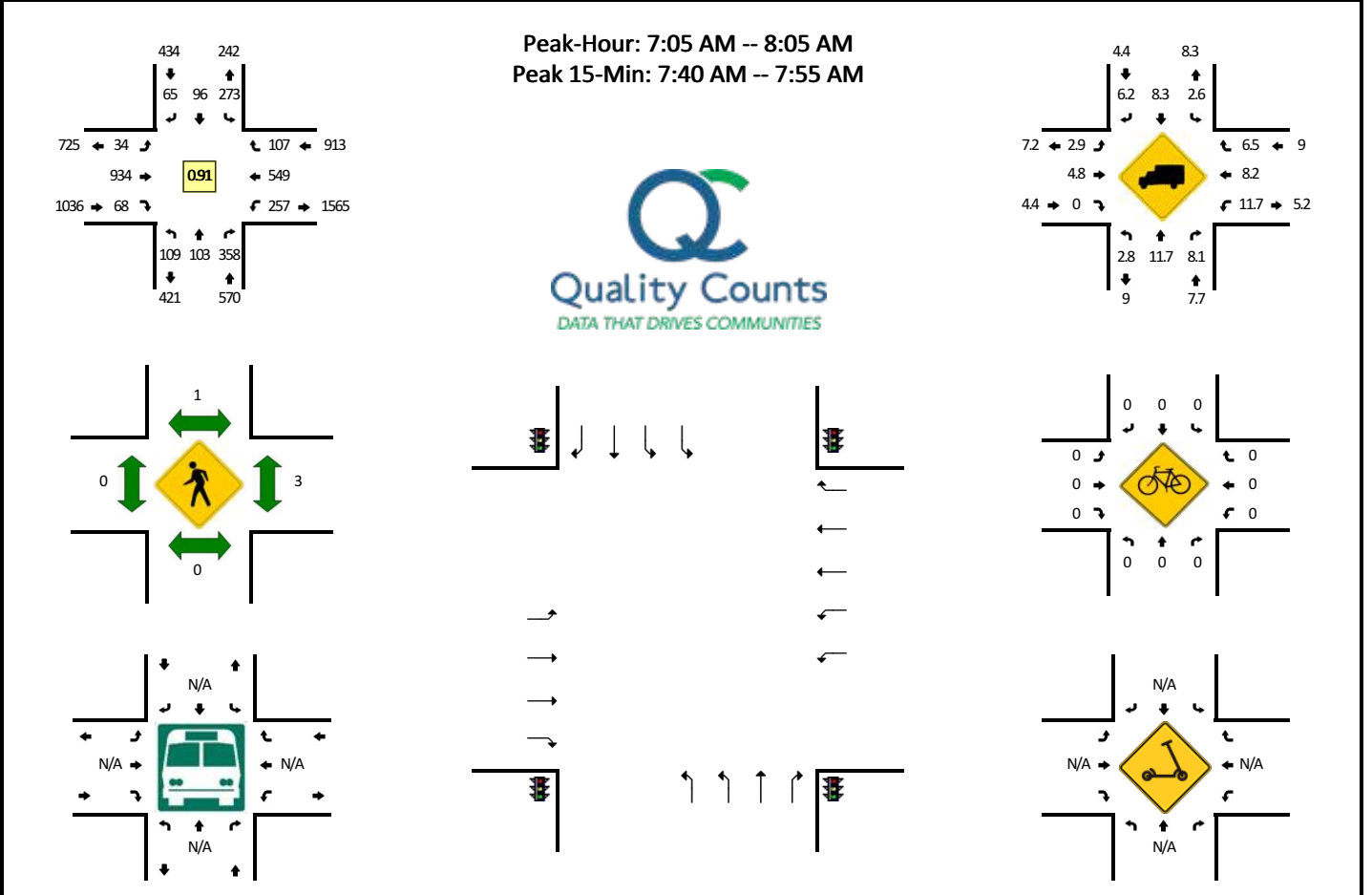
Comments:

Report generated on 11/4/2021 3:17 PM

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

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

QC JOB #: 15594701
DATE: Wed, Oct 27 2021



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		
6:00 AM	4	0	17	0	8	0	2	0	0	76	1	0	10	13	3	0	134	
6:05 AM	4	3	18	0	16	2	1	0	2	48	0	0	6	9	1	0	110	
6:10 AM	1	4	21	0	12	1	4	0	0	79	1	1	8	15	4	0	151	
6:15 AM	2	4	19	0	19	5	2	0	1	68	3	0	11	11	0	0	145	
6:20 AM	4	0	24	0	17	3	0	0	2	73	0	0	9	19	2	0	153	
6:25 AM	8	6	29	0	17	6	0	0	0	70	1	0	21	27	6	0	191	
6:30 AM	4	4	19	0	22	2	2	0	2	116	4	0	13	20	1	0	209	
6:35 AM	4	5	36	0	19	10	0	0	3	86	5	0	13	31	5	0	217	
6:40 AM	3	5	27	0	22	5	4	0	0	104	0	0	10	29	5	0	214	
6:45 AM	4	9	30	0	34	7	1	0	0	76	4	0	16	23	6	0	210	
6:50 AM	4	3	36	0	16	4	7	0	0	82	11	0	25	34	9	0	231	
6:55 AM	6	10	26	0	15	5	3	0	1	79	1	0	29	36	5	0	216	2181
7:00 AM	4	9	22	0	15	4	4	0	2	84	6	0	17	34	3	0	204	2251
7:05 AM	4	13	30	0	39	5	4	0	2	61	6	0	20	39	10	0	233	2374
7:10 AM	6	4	15	0	13	4	3	0	3	114	1	0	9	32	7	0	211	2434
7:15 AM	5	5	29	0	28	6	10	0	2	69	6	0	25	41	5	0	231	2520
7:20 AM	10	3	30	0	23	4	1	0	0	115	6	0	17	40	7	0	256	2623
7:25 AM	10	10	41	0	22	10	3	0	1	70	2	1	29	38	7	0	244	2676
7:30 AM	8	9	37	0	25	9	8	0	1	93	7	0	13	44	5	0	259	2726
7:35 AM	5	11	38	0	15	13	8	0	3	57	7	0	29	43	15	0	244	2753
7:40 AM	8	7	29	0	31	5	4	0	5	92	6	0	17	50	9	0	263	2802
7:45 AM	15	10	36	0	14	14	3	0	0	71	3	1	34	64	4	0	269	2861
7:50 AM	16	6	23	0	19	10	7	0	4	89	13	0	19	59	13	0	278	2908
7:55 AM	16	15	22	0	27	6	6	0	7	52	6	0	25	47	14	0	243	2935
8:00 AM	6	10	28	0	17	10	8	0	4	51	5	0	20	52	11	0	222	2953
8:05 AM	9	10	22	0	16	2	3	0	3	68	5	0	15	56	12	0	221	2941
8:10 AM	9	8	23	0	25	9	4	0	1	62	5	0	32	45	8	0	231	2961
8:15 AM	9	8	27	0	15	6	4	0	3	76	3	0	12	52	10	0	225	2955
8:20 AM	9	17	24	0	18	8	6	0	0	54	4	0	21	32	9	0	202	2901
8:25 AM	9	6	13	0	31	9	5	0	3	79	6	0	17	72	7	0	257	2914
8:30 AM	11	9	35	0	11	11	5	0	1	61	8	1	23	63	12	0	251	2906
8:35 AM	8	7	17	1	34	6	3	0	5	84	11	0	14	58	13	0	261	2923
8:40 AM	22	19	27	0	16	11	5	0	2	63	6	0	16	48	14	0	249	2909
8:45 AM	16	9	19	0	27	5	12	0	3	77	3	0	12	73	17	0	273	2913
8:50 AM	17	15	21	0	25	9	4	0	2	43	9	0	21	60	15	0	241	2876
8:55 AM	9	8	17	0	35	12	9	0	5	57	6	0	15	64	8	0	245	2878

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	156	92	352	0	256	116	56	0	36	1008	88	4	280	692	104	0	3240
Heavy Trucks	8	16	36		4	16	8		0	64	0		40	56	8		256
Buses																	
Pedestrians		0				0				0				4			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scoters																	

Comments:

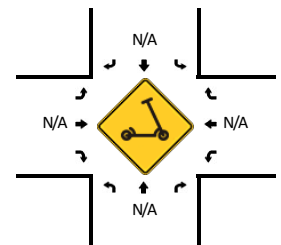
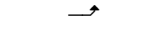
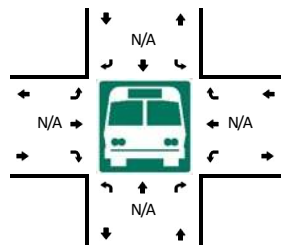
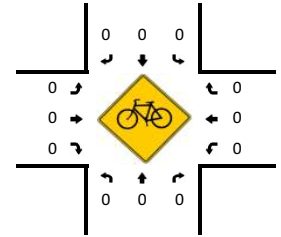
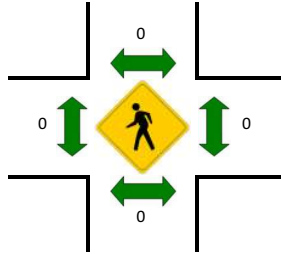
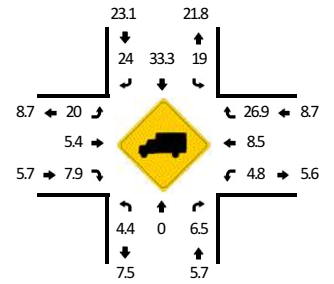
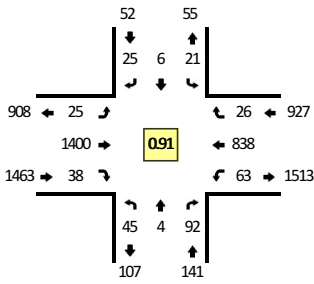
Report generated on 1/12/2022 5:50 AM

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

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

QC JOB #: 15594703
DATE: Wed, Oct 27 2021

Peak-Hour: 7:05 AM -- 8:05 AM
Peak 15-Min: 7:35 AM -- 7:50 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		
6:00 AM	2	0	6	0	1	0	1	0	1	100	1	0	0	24	0	0	136	
6:05 AM	1	0	1	0	1	0	0	0	0	81	0	0	1	22	0	0	107	
6:10 AM	0	1	2	0	0	0	0	0	1	99	2	0	0	24	0	0	129	
6:15 AM	1	0	3	0	2	1	2	0	1	97	0	0	4	20	0	0	131	
6:20 AM	0	0	6	0	0	0	2	0	1	117	1	0	0	29	0	0	156	
6:25 AM	0	0	8	0	1	0	1	0	0	106	1	0	4	47	1	0	169	
6:30 AM	0	0	5	0	0	0	1	0	1	137	1	0	4	36	0	0	185	
6:35 AM	2	1	11	0	0	1	0	0	3	139	1	0	7	49	1	0	215	
6:40 AM	0	0	2	0	2	0	2	0	4	138	2	0	3	51	2	0	206	
6:45 AM	3	0	13	0	2	0	1	0	2	127	0	0	8	33	1	0	190	
6:50 AM	3	2	6	0	5	1	2	0	2	128	3	0	5	71	3	0	231	
6:55 AM	2	0	6	0	1	1	1	0	0	131	2	0	4	62	1	0	211	
7:00 AM	2	1	8	0	0	0	2	0	2	90	2	0	4	51	2	0	164	
7:05 AM	6	0	10	0	1	0	3	0	1	123	2	0	5	56	1	0	208	
7:10 AM	4	0	6	0	1	0	2	0	2	132	1	0	3	51	1	0	203	
7:15 AM	1	2	12	0	1	1	1	0	1	111	7	0	4	53	3	0	197	
7:20 AM	5	0	9	0	1	0	3	0	4	137	3	0	2	67	3	0	234	
7:25 AM	3	0	12	0	5	1	2	0	2	134	2	0	6	64	1	0	232	
7:30 AM	3	0	6	0	1	1	1	0	2	128	7	0	5	58	1	0	213	
7:35 AM	10	0	7	0	1	1	3	0	1	122	1	0	5	67	6	0	224	
7:40 AM	0	0	5	0	3	0	3	0	1	127	0	0	7	75	2	0	223	
7:45 AM	2	1	6	0	0	1	3	0	0	121	2	0	6	116	1	0	259	
7:50 AM	5	0	4	0	3	0	0	0	6	87	8	0	11	82	2	0	208	
7:55 AM	3	1	4	0	3	1	2	0	2	90	5	0	6	78	2	0	197	
8:00 AM	3	0	11	0	1	0	2	0	3	88	0	0	3	71	3	0	185	
8:05 AM	5	0	7	0	2	0	2	0	2	89	2	0	3	85	2	0	199	
8:10 AM	4	0	5	0	3	0	1	0	0	100	2	0	5	73	2	0	195	
8:15 AM	8	0	3	0	1	0	4	0	1	96	3	0	7	65	1	0	189	
8:20 AM	2	0	9	0	1	1	1	0	1	89	3	3	8	56	1	0	175	
8:25 AM	8	2	1	0	1	0	1	0	1	90	2	0	11	101	3	0	221	
8:30 AM	5	2	7	0	1	1	2	0	0	106	2	0	6	76	0	0	208	
8:35 AM	5	0	3	0	0	0	2	0	2	97	2	1	7	103	1	0	223	
8:40 AM	8	0	5	0	1	0	1	0	1	109	4	2	3	63	3	0	200	
8:45 AM	8	1	5	0	0	0	8	0	3	95	5	0	9	82	1	0	217	
8:50 AM	14	1	11	0	1	1	1	0	2	68	7	0	4	88	1	0	199	
8:55 AM	7	0	7	0	1	0	7	0	2	65	3	0	5	70	1	1	169	

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	4	72	0	16	8	36	0	8	1480	12	0	72	1032	36	0	2824
Heavy Trucks	0	0	0		12	4	8		0	76	0		4	104	16		224
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scoters																	

Comments:

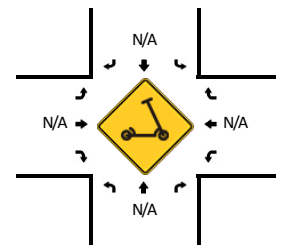
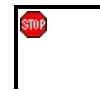
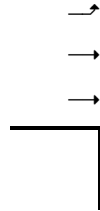
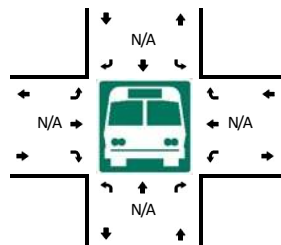
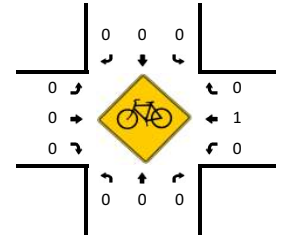
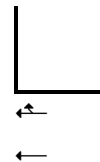
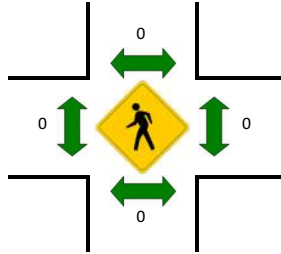
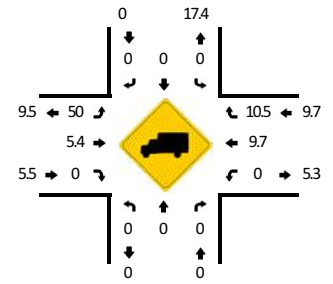
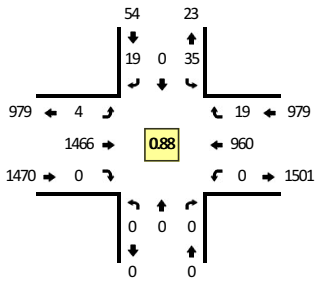
Report generated on 1/12/2022 5:50 AM

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

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

QC JOB #: 15594705
DATE: Wed, Oct 27 2021

Peak-Hour: 7:05 AM -- 8:05 AM
Peak 15-Min: 7:35 AM -- 7:50 AM



5-Min Count Period Beginning At	Vittoria Wy (Northbound)				Vittoria Wy (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		
6:00 AM	0	0	0	0	3	0	1	0	0	97	0	0	0	25	0	0	126	
6:05 AM	0	0	0	0	3	0	1	0	0	92	0	0	0	20	0	0	116	
6:10 AM	0	0	0	0	3	0	0	0	0	95	0	0	0	25	1	0	124	
6:15 AM	0	0	0	0	2	0	0	0	0	111	0	0	0	31	0	0	144	
6:20 AM	0	0	0	0	3	0	2	0	0	108	0	0	0	28	0	0	141	
6:25 AM	0	0	0	0	7	0	0	0	0	119	0	0	0	51	0	0	177	
6:30 AM	0	0	0	0	7	0	2	0	0	133	0	0	0	41	2	0	185	
6:35 AM	0	0	0	0	4	0	0	0	0	159	0	0	0	59	0	0	222	
6:40 AM	0	0	0	0	1	0	1	0	0	132	0	0	0	58	1	0	193	
6:45 AM	0	0	0	0	2	0	0	0	0	145	0	0	0	45	0	0	192	
6:50 AM	0	0	0	0	2	0	0	0	0	114	0	0	0	80	0	0	196	
6:55 AM	0	0	0	0	2	0	1	0	1	142	0	0	0	65	1	0	212	2028
7:00 AM	0	0	0	0	2	0	3	0	1	84	0	0	0	60	2	0	152	2054
7:05 AM	0	0	0	0	5	0	1	0	1	140	0	0	0	59	1	0	207	2145
7:10 AM	0	0	0	0	6	0	0	0	0	126	0	0	0	53	0	0	185	2206
7:15 AM	0	0	0	0	3	0	1	0	2	131	0	0	0	69	2	0	208	2270
7:20 AM	0	0	0	0	3	0	2	0	0	133	0	0	0	72	1	0	211	2340
7:25 AM	0	0	0	0	1	0	1	0	0	161	0	0	0	75	2	0	240	2403
7:30 AM	0	0	0	0	3	0	2	0	0	117	0	0	0	65	1	0	188	2406
7:35 AM	0	0	0	0	4	0	3	0	0	135	0	0	0	86	4	0	232	2416
7:40 AM	0	0	0	0	3	0	0	0	0	118	0	0	0	85	1	0	207	2430
7:45 AM	0	0	0	0	3	0	4	0	1	138	0	0	0	121	2	0	269	2507
7:50 AM	0	0	0	0	1	0	1	0	0	75	0	0	0	94	2	0	173	2484
7:55 AM	0	0	0	0	0	0	3	0	0	100	0	0	0	89	2	0	194	2466
8:00 AM	0	0	0	0	3	0	1	0	0	92	0	0	0	92	1	0	189	2503
8:05 AM	0	0	0	0	3	0	1	0	0	91	0	0	0	80	2	0	177	2473
8:10 AM	0	0	0	0	1	0	1	0	1	108	0	0	0	73	0	0	184	2472
8:15 AM	0	0	0	0	2	0	1	0	0	99	0	0	0	81	0	0	183	2447
8:20 AM	0	0	0	0	2	0	0	0	0	107	0	0	0	69	1	0	179	2415
8:25 AM	0	0	0	0	1	0	3	0	0	86	0	0	0	109	1	0	200	2375
8:30 AM	0	0	0	0	1	0	3	0	0	120	0	0	0	89	1	0	214	2401
8:35 AM	0	0	0	0	3	0	0	0	1	89	0	0	0	100	1	0	194	2363
8:40 AM	0	0	0	0	1	0	0	0	0	115	0	0	0	75	2	0	193	2349
8:45 AM	0	0	0	0	1	0	3	0	1	84	0	0	0	80	1	0	170	2250
8:50 AM	0	0	0	0	1	0	1	0	0	90	0	0	0	99	3	0	194	2271
8:55 AM	0	0	0	0	2	0	1	0	0	60	0	0	0	68	1	0	132	2209

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	40	0	28	0	4	1564	0	0	0	1168	28	0	2832
Heavy Trucks	0	0	0		0	0	0		4	80	0		0	140	4		228
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scoters																	

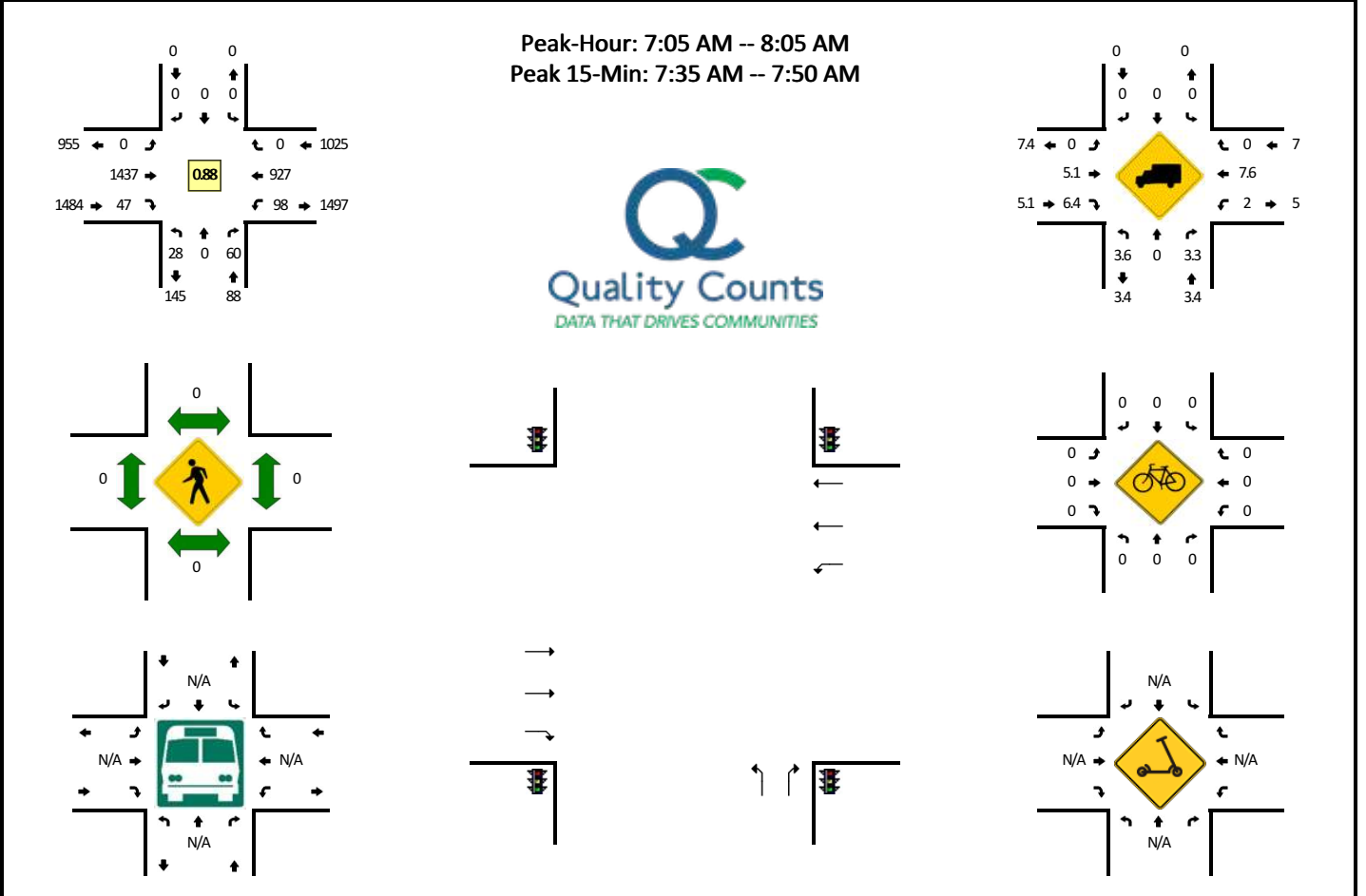
Comments:

Report generated on 1/12/2022 5:50 AM

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

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

QC JOB #: 15594707
DATE: Wed, Oct 27 2021



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		
6:00 AM	1	0	4	0	0	0	0	0	0	94	1	0	7	25	0	0	132	
6:05 AM	0	0	0	0	0	0	0	0	0	97	1	0	1	20	0	0	119	
6:10 AM	0	0	1	0	0	0	0	0	0	94	3	0	1	25	0	0	124	
6:15 AM	0	0	2	0	0	0	0	0	0	113	1	0	0	32	0	0	148	
6:20 AM	0	0	2	0	0	0	0	0	0	98	3	0	4	29	0	0	136	
6:25 AM	0	0	3	0	0	0	0	0	0	122	5	0	3	51	0	0	184	
6:30 AM	2	0	4	0	0	0	0	0	0	132	4	0	4	41	0	0	187	
6:35 AM	2	0	1	0	0	0	0	0	0	166	6	0	4	52	0	0	231	
6:40 AM	0	0	4	0	0	0	0	0	0	121	5	0	8	60	0	0	198	
6:45 AM	0	0	2	0	0	0	0	0	0	143	5	0	9	44	0	0	203	
6:50 AM	3	0	3	0	0	0	0	0	0	97	5	0	4	80	0	0	192	
6:55 AM	1	0	3	0	0	0	0	0	0	151	7	0	1	65	0	0	228	2082
7:00 AM	1	0	2	0	0	0	0	0	0	82	2	0	12	57	0	0	156	2106
7:05 AM	2	0	6	0	0	0	0	0	0	137	3	0	3	60	0	0	211	2198
7:10 AM	3	0	7	0	0	0	0	0	0	127	3	0	2	48	0	0	190	2264
7:15 AM	0	0	7	0	0	0	0	0	0	138	2	0	3	73	0	0	223	2339
7:20 AM	2	0	6	0	0	0	0	0	0	119	2	0	7	69	0	0	205	2408
7:25 AM	0	0	0	0	0	0	0	0	0	161	9	0	4	77	0	0	251	2475
7:30 AM	1	0	6	0	0	0	0	0	0	117	1	0	10	65	0	0	200	2488
7:35 AM	4	0	2	0	0	0	0	0	0	137	1	0	12	82	0	0	238	2495
7:40 AM	5	0	12	0	0	0	0	0	0	103	3	0	10	79	0	0	212	2509
7:45 AM	3	0	3	0	0	0	0	0	0	139	6	0	21	112	0	0	284	2590
7:50 AM	3	0	7	0	0	0	0	0	0	62	8	0	14	96	0	0	190	2588
7:55 AM	2	0	2	0	0	0	0	0	0	105	6	0	7	86	0	0	208	2568
8:00 AM	3	0	2	0	0	0	0	0	0	92	3	0	5	80	0	0	185	2597
8:05 AM	7	0	4	0	0	0	0	0	0	80	5	0	10	78	0	0	184	2570
8:10 AM	1	0	5	0	0	0	0	0	0	106	9	0	6	64	0	0	191	2571
8:15 AM	3	0	4	0	0	0	0	0	0	89	9	0	7	80	0	0	192	2540
8:20 AM	7	0	2	0	0	0	0	0	0	101	9	0	7	66	0	0	192	2527
8:25 AM	6	0	3	0	0	0	0	0	0	81	3	0	9	98	0	0	200	2476
8:30 AM	2	0	4	0	0	0	0	0	0	114	5	0	5	83	0	0	213	2489
8:35 AM	7	0	3	0	0	0	0	0	0	74	8	0	3	91	0	0	186	2437
8:40 AM	1	0	4	0	0	0	0	0	0	119	3	0	3	76	0	1	207	2432
8:45 AM	10	0	4	0	0	0	0	0	0	159	9	0	4	73	0	0	259	2407
8:50 AM	4	0	4	0	0	0	0	0	0	58	6	0	6	93	0	0	171	2388
8:55 AM	7	0	5	0	0	0	0	0	0	58	3	0	6	63	0	0	142	2322

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	68	0	0	0	0	0	0	1516	40	0	172	1092	0	0	2936
Heavy Trucks	0	0	4		0	0	0		0	76	4		4	92	0		180
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scoters																	

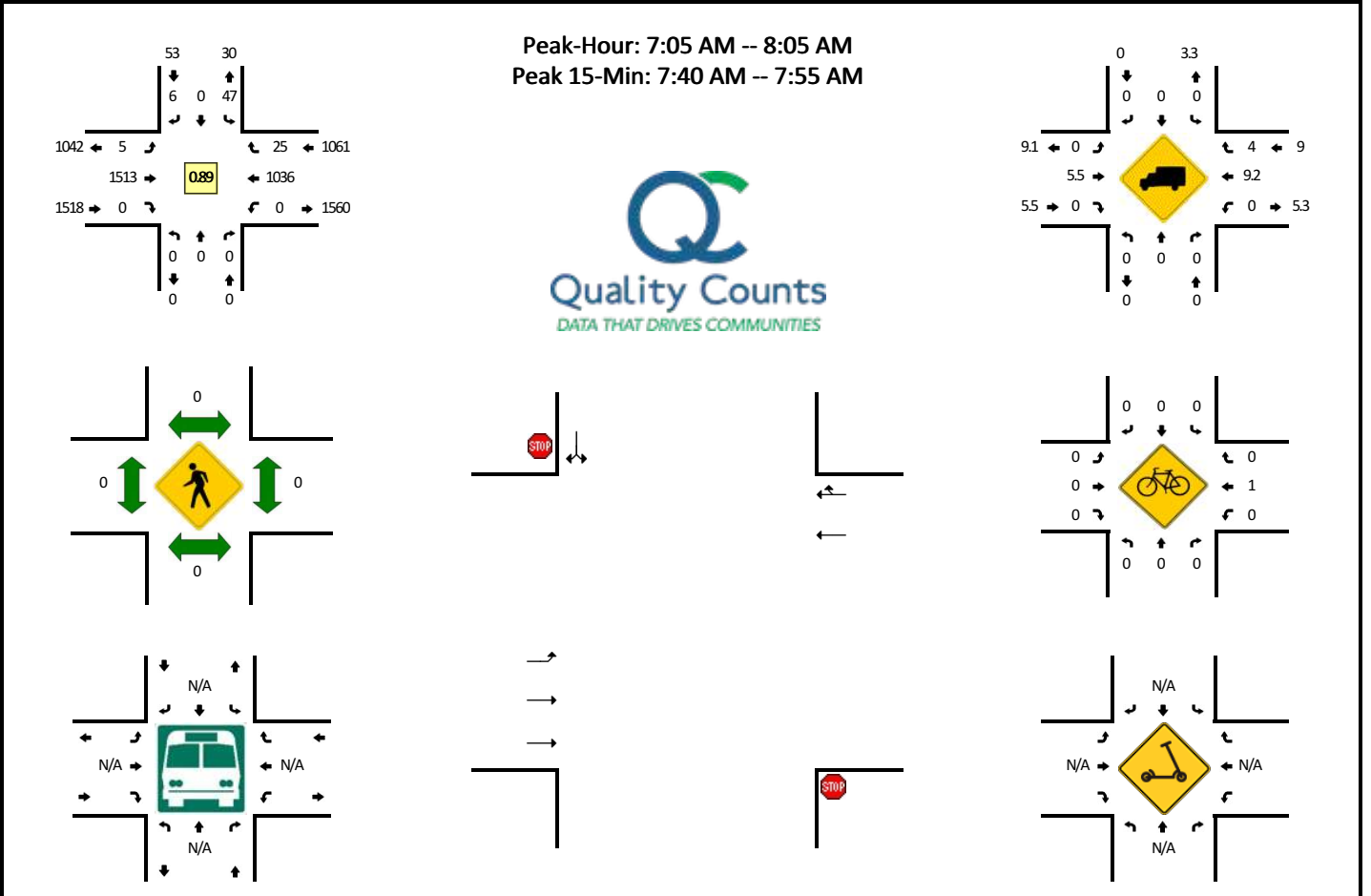
Comments:

Report generated on 1/12/2022 5:50 AM

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

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

QC JOB #: 15594709
DATE: Wed, Oct 27 2021



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		
6:00 AM	0	0	0	0	3	0	0	0	0	81	0	0	0	27	0	0	111	
6:05 AM	0	0	0	0	7	0	0	0	0	109	0	0	0	20	0	0	136	
6:10 AM	0	0	0	0	4	0	0	0	0	97	0	0	0	26	0	0	127	
6:15 AM	0	0	0	0	2	0	0	0	0	107	0	0	0	34	2	0	145	
6:20 AM	0	0	0	0	3	0	0	0	0	102	0	0	0	29	1	0	135	
6:25 AM	0	0	0	0	3	0	1	0	0	113	0	0	0	59	1	0	177	
6:30 AM	0	0	0	0	2	0	1	0	0	155	0	0	0	47	0	0	205	
6:35 AM	0	0	0	0	4	0	0	0	1	146	0	0	0	57	0	0	208	
6:40 AM	0	0	0	0	5	0	1	0	0	144	0	0	0	67	2	0	219	
6:45 AM	0	0	0	0	5	0	2	0	1	127	0	0	0	53	0	0	188	
6:50 AM	0	0	0	0	1	0	1	0	0	124	0	0	0	84	1	0	211	
6:55 AM	0	0	0	0	4	0	0	0	0	138	0	0	0	65	0	0	207	
7:00 AM	0	0	0	0	3	0	0	0	0	95	0	0	0	73	1	0	172	
7:05 AM	0	0	0	0	5	0	0	0	1	138	0	0	0	57	1	0	202	
7:10 AM	0	0	0	0	2	0	0	0	0	151	0	0	0	58	0	0	211	
7:15 AM	0	0	0	0	2	0	0	0	1	139	0	0	0	75	4	0	221	
7:20 AM	0	0	0	0	5	0	0	0	0	139	0	0	0	79	0	0	223	
7:25 AM	0	0	0	0	3	0	1	0	1	148	0	0	0	81	6	0	240	
7:30 AM	0	0	0	0	4	0	0	0	1	132	0	0	0	76	2	0	215	
7:35 AM	0	0	0	0	7	0	0	0	0	118	0	0	0	95	0	0	220	
7:40 AM	0	0	0	0	6	0	1	0	0	141	0	0	0	116	4	0	268	
7:45 AM	0	0	0	0	4	0	1	0	0	131	0	0	0	111	2	0	249	
7:50 AM	0	0	0	0	3	0	1	0	0	93	0	0	0	124	0	0	221	
7:55 AM	0	0	0	0	2	0	1	0	0	93	0	0	0	77	2	0	175	
8:00 AM	0	0	0	0	4	0	1	0	1	90	0	0	0	87	4	0	187	
8:05 AM	0	0	0	0	3	0	0	0	1	103	0	0	0	93	2	0	202	
8:10 AM	0	0	0	0	0	0	0	0	1	100	0	0	0	65	1	0	167	
8:15 AM	0	0	0	0	6	0	0	0	0	103	0	0	0	87	1	0	197	
8:20 AM	0	0	0	0	2	0	3	0	0	96	0	0	0	90	2	0	193	
8:25 AM	0	0	0	0	3	0	0	0	3	93	0	0	0	106	2	0	207	
8:30 AM	0	0	0	0	4	0	0	0	0	110	0	0	0	83	1	0	198	
8:35 AM	0	0	0	0	2	0	2	0	0	93	0	0	0	93	2	0	192	
8:40 AM	0	0	0	0	3	0	0	0	1	107	0	0	0	80	3	0	194	
8:45 AM	0	0	0	0	5	0	0	0	2	89	0	0	0	85	0	0	181	
8:50 AM	0	0	0	0	6	0	3	0	2	85	0	0	0	93	2	0	191	
8:55 AM	0	0	0	0	3	0	0	0	0	66	0	0	0	73	3	0	145	

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	52	0	12	0	0	1460	0	0	0	1404	24	0	2952
Heavy Trucks	0	0	0	0	0	0	0	0	0	76	0	0	0	108	4	0	188
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scoters																	

Comments:

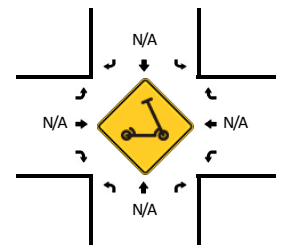
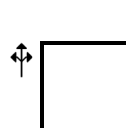
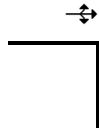
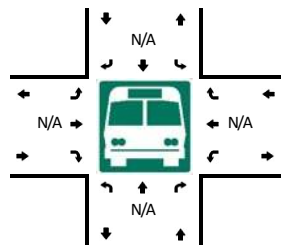
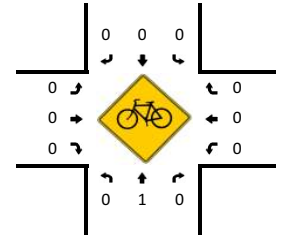
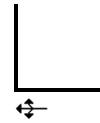
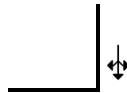
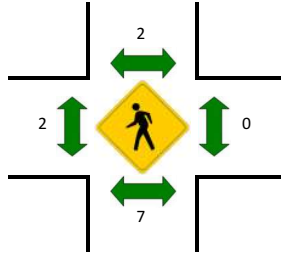
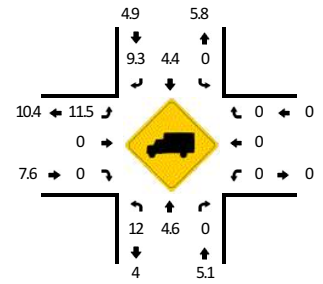
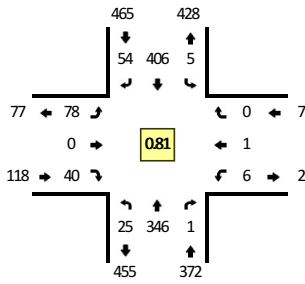
Report generated on 1/12/2022 5:50 AM

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

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

QC JOB #: 15594712
DATE: Wed, Oct 27 2021

Peak-Hour: 3:30 PM -- 4:30 PM
Peak 15-Min: 3:45 PM -- 4:00 PM



5-Min Count Period Beginning At	N Springbrook Rd (Northbound)				N Springbrook Rd (Southbound)				E Crestview Dr (Eastbound)				E Crestview Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	3	31	0	1	0	23	3	0	0	0	0	0	1	0	0	0	62	
3:05 PM	1	28	0	0	1	27	1	0	1	0	2	0	1	0	0	0	62	
3:10 PM	3	28	0	0	0	23	4	0	0	0	0	0	0	0	0	0	58	
3:15 PM	1	30	0	0	0	26	7	0	0	0	1	0	0	0	0	0	65	
3:20 PM	4	30	0	0	0	21	8	0	2	0	0	0	0	0	0	0	65	
3:25 PM	2	22	0	0	0	23	3	0	3	0	1	0	0	0	0	0	54	
3:30 PM	5	39	0	1	0	30	5	0	2	0	0	0	0	0	0	0	82	
3:35 PM	4	23	0	0	0	44	10	1	0	0	1	0	0	0	0	0	83	
3:40 PM	1	15	0	0	0	43	2	0	4	0	2	0	0	0	0	0	67	
3:45 PM	4	29	0	1	0	34	5	0	16	0	14	0	1	0	0	0	104	
3:50 PM	2	34	0	0	0	29	6	0	21	0	13	0	1	1	0	0	107	
3:55 PM	2	26	1	0	0	31	9	2	10	0	4	0	1	0	0	0	86	895
4:00 PM	0	26	0	0	0	26	3	0	9	0	4	0	0	0	0	0	68	901
4:05 PM	1	28	0	0	0	47	2	0	5	0	0	0	1	0	0	0	84	923
4:10 PM	1	35	0	0	0	39	1	0	6	0	2	0	1	0	0	0	85	950
4:15 PM	0	36	0	1	1	28	6	0	1	0	0	0	1	0	0	0	74	959
4:20 PM	1	31	0	0	0	26	2	0	2	0	0	0	0	0	0	0	62	956
4:25 PM	1	24	0	0	0	29	3	1	2	0	0	0	0	0	0	0	60	962
4:30 PM	0	31	0	3	0	24	0	0	2	0	2	0	1	0	0	0	63	943
4:35 PM	2	29	0	0	2	36	1	0	4	0	0	0	0	0	0	0	74	934
4:40 PM	0	22	0	0	0	16	2	0	4	0	1	0	0	0	0	0	45	912
4:45 PM	1	21	0	0	0	19	1	0	5	0	2	0	2	0	0	0	51	859
4:50 PM	1	26	1	0	0	29	0	0	2	0	0	0	0	0	0	0	59	811
4:55 PM	1	24	0	0	0	32	0	0	1	0	2	0	0	0	0	0	60	785
5:00 PM	3	26	1	0	1	23	3	0	1	0	3	0	0	0	1	0	62	779
5:05 PM	0	36	0	0	0	40	2	0	2	0	2	0	0	0	0	0	82	777
5:10 PM	1	22	0	0	0	26	4	0	2	0	2	0	0	0	0	0	57	749
5:15 PM	2	29	1	0	0	22	4	1	3	0	0	0	0	0	2	0	64	739
5:20 PM	0	42	1	0	0	32	4	0	0	0	0	0	0	0	1	0	80	757
5:25 PM	1	29	1	0	0	23	3	2	2	0	3	0	0	0	1	0	65	762
5:30 PM	2	28	0	0	1	24	8	0	1	0	1	0	0	0	0	0	65	764
5:35 PM	2	36	0	0	1	27	5	1	2	0	0	0	0	0	0	0	74	764
5:40 PM	1	36	1	0	0	28	6	0	3	0	0	0	1	0	0	0	76	795
5:45 PM	0	35	1	0	1	26	1	0	2	0	1	0	1	0	0	0	68	812
5:50 PM	1	27	0	0	0	26	4	0	0	0	2	0	1	0	0	0	61	814
5:55 PM	1	29	0	0	0	15	2	0	1	0	0	0	0	0	0	0	48	802

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	356	4	4	0	376	80	8	188	0	124	0	12	4	0	0	1188
Heavy Trucks	4	32	0		0	16	4		24	0	0		0	0	0		80
Buses																	
Pedestrians		20				8				8				0			36
Bicycles	0	4	0		0	0	0		0	0	0		0	0	0		4
Scoters																	

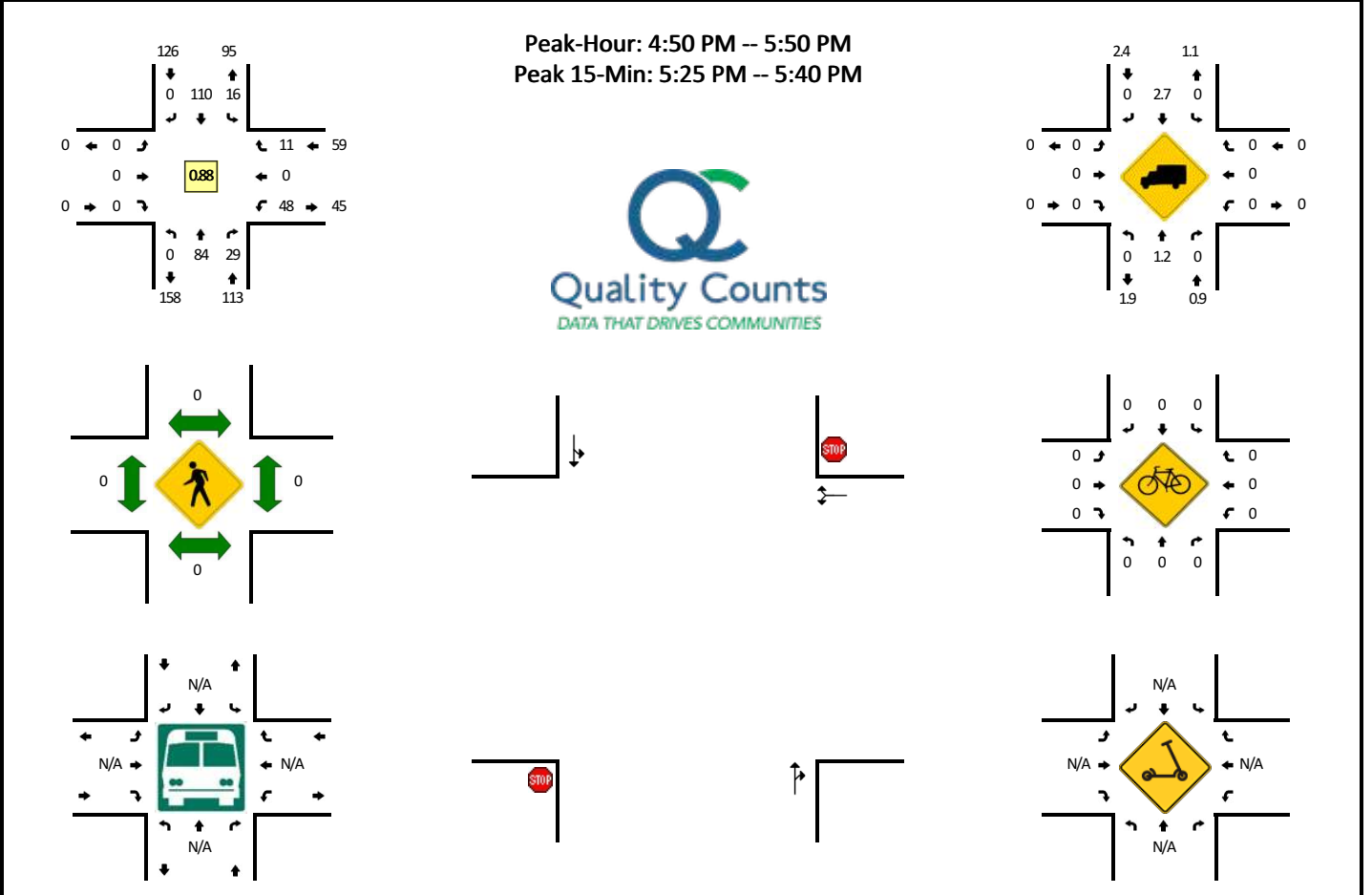
Comments:

Report generated on 11/4/2021 3:17 PM

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

LOCATION: N Springbrook Rd -- NE Benjamin Rd
CITY/STATE: Yamhill, OR

QC JOB #: 15594714
DATE: Wed, Oct 27 2021



5-Min Count Period Beginning At	N Springbrook Rd (Northbound)				N Springbrook Rd (Southbound)				NE Benjamin Rd (Eastbound)				NE Benjamin Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	0	8	0	0	0	8	0	0	0	0	0	0	4	0	1	0	21	
3:05 PM	0	9	3	0	1	7	0	0	0	0	0	0	3	0	1	0	24	
3:10 PM	0	5	4	0	1	2	0	0	0	0	0	0	2	0	1	0	15	
3:15 PM	0	9	0	0	0	10	0	0	0	0	0	0	4	0	1	0	24	
3:20 PM	0	8	3	0	0	8	0	0	0	0	0	0	2	0	0	0	21	
3:25 PM	0	6	4	0	0	4	0	0	0	0	0	0	4	0	0	0	18	
3:30 PM	0	3	3	0	2	4	0	0	0	0	0	0	3	0	0	0	15	
3:35 PM	0	6	1	0	0	7	0	0	0	0	0	0	1	0	1	0	16	
3:40 PM	0	5	5	0	0	8	0	0	0	0	0	0	5	0	1	0	24	
3:45 PM	0	8	1	0	0	9	0	0	0	0	0	0	3	0	0	0	21	
3:50 PM	0	7	3	0	0	9	0	0	0	0	0	0	2	0	0	0	21	
3:55 PM	0	8	5	0	1	11	0	0	0	0	0	0	3	0	0	0	28	248
4:00 PM	0	6	2	0	1	10	0	0	0	0	0	0	6	0	2	0	27	254
4:05 PM	0	6	7	1	0	5	0	0	0	0	0	0	1	0	2	0	22	252
4:10 PM	0	11	6	0	1	11	0	0	0	0	0	0	2	0	2	0	33	270
4:15 PM	0	8	5	0	2	3	0	0	0	0	0	0	6	0	2	0	26	272
4:20 PM	0	6	2	0	0	6	0	0	0	0	0	0	2	0	2	0	18	269
4:25 PM	0	4	4	0	2	8	0	0	0	0	0	0	3	0	1	0	22	273
4:30 PM	0	6	1	0	1	9	0	0	0	0	0	0	6	0	0	0	23	281
4:35 PM	0	7	3	0	1	8	0	0	0	0	0	0	4	0	1	0	24	289
4:40 PM	0	8	4	0	0	7	0	0	0	0	0	0	2	0	2	0	23	288
4:45 PM	0	3	4	0	0	5	0	0	0	0	0	0	5	0	1	0	18	285
4:50 PM	0	5	5	0	2	8	0	0	0	0	0	0	7	0	1	0	28	292
4:55 PM	0	3	2	0	1	5	0	0	0	0	0	0	2	0	1	0	14	278
5:00 PM	0	8	1	0	2	13	0	0	0	0	0	0	3	0	1	0	28	279
5:05 PM	0	5	3	0	1	7	0	0	0	0	0	0	6	0	0	0	22	279
5:10 PM	0	9	1	0	0	10	0	0	0	0	0	0	8	0	1	0	29	275
5:15 PM	0	6	0	0	1	12	0	0	0	0	0	0	4	0	1	0	24	273
5:20 PM	0	8	4	0	0	7	0	0	0	0	0	0	1	0	0	0	20	275
5:25 PM	0	13	3	0	4	8	0	0	0	0	0	0	5	0	1	0	34	287
5:30 PM	0	6	4	0	3	8	0	0	0	0	0	0	6	0	2	0	29	293
5:35 PM	0	9	1	0	1	7	0	0	0	0	0	0	3	0	1	0	22	291
5:40 PM	0	6	2	0	1	16	0	0	0	0	0	0	1	0	1	0	27	295
5:45 PM	0	6	3	0	0	9	0	0	0	0	0	0	2	0	1	0	21	298
5:50 PM	0	8	1	0	0	7	0	0	0	0	0	0	3	0	1	0	20	290
5:55 PM	0	4	1	0	0	8	0	0	0	0	0	0	6	0	0	0	19	295

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	112	32	0	32	92	0	0	0	0	0	0	0	56	0	16	0	340
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0			0
Buses																		
Pedestrians		0				0				0				0				0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0			0
Scoters																		

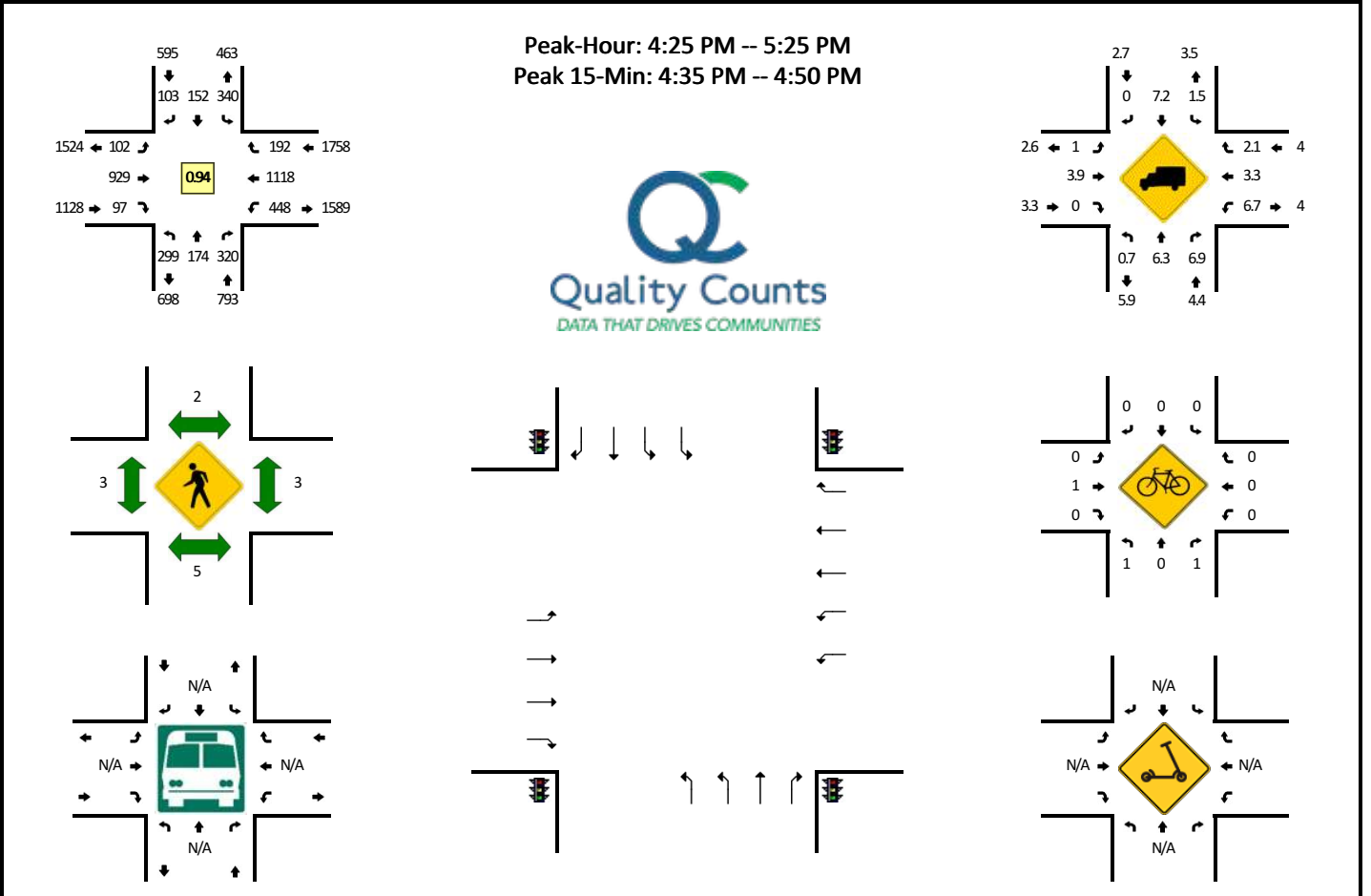
Comments:

Report generated on 11/4/2021 3:17 PM

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

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

QC JOB #: 15594702
DATE: Wed, Oct 27 2021



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		
3:00 PM	18	10	17	0	15	12	11	0	8	96	5	2	16	98	20	0	328	
3:05 PM	22	13	24	0	25	14	8	0	10	87	9	0	26	94	13	0	345	
3:10 PM	17	15	17	1	22	17	6	0	6	69	6	0	26	73	16	0	291	
3:15 PM	29	20	24	0	29	10	11	0	6	60	6	0	26	70	17	0	308	
3:20 PM	18	11	23	0	16	8	3	0	10	80	4	0	35	74	12	0	294	
3:25 PM	25	17	17	0	31	13	4	0	10	46	7	0	28	79	16	0	293	
3:30 PM	17	10	11	0	10	6	4	0	7	66	4	0	29	89	24	0	277	
3:35 PM	24	15	27	0	24	14	8	0	5	93	7	0	25	78	21	0	341	
3:40 PM	23	11	18	0	29	18	10	0	5	62	6	0	31	82	6	0	301	
3:45 PM	27	21	20	0	23	15	6	0	7	85	16	2	26	108	19	0	375	
3:50 PM	15	14	33	0	26	23	5	0	7	58	9	0	36	100	18	0	344	
3:55 PM	21	10	25	0	49	23	12	0	11	70	7	0	29	89	17	0	363	3860
4:00 PM	23	16	20	0	28	16	8	0	13	72	7	0	36	74	14	0	327	3859
4:05 PM	17	14	22	0	24	14	5	0	10	82	6	0	36	114	20	0	364	3878
4:10 PM	26	9	26	1	28	18	8	0	11	78	12	1	42	68	19	0	347	3934
4:15 PM	14	20	25	0	19	13	1	0	3	80	12	0	33	67	15	0	302	3928
4:20 PM	23	12	31	0	26	18	4	0	4	72	10	1	33	85	13	0	332	3966
4:25 PM	22	17	22	0	34	15	2	0	6	69	14	1	25	90	20	0	337	4010
4:30 PM	19	13	34	0	31	11	8	0	9	70	5	2	34	76	14	0	326	4059
4:35 PM	29	14	34	0	35	11	8	0	14	70	1	0	46	95	16	0	373	4091
4:40 PM	31	13	26	0	23	13	9	0	11	111	4	0	45	98	13	0	397	4187
4:45 PM	25	11	29	0	21	15	5	0	4	92	6	0	38	118	7	0	371	4183
4:50 PM	25	12	19	0	24	15	9	0	9	69	12	0	38	105	15	0	352	4191
4:55 PM	22	20	28	0	27	12	11	0	4	65	8	1	30	82	15	0	325	4153
5:00 PM	30	17	29	0	33	10	6	0	12	60	11	0	41	92	21	0	362	4188
5:05 PM	30	15	26	0	29	11	8	0	6	78	8	0	36	77	20	0	344	4168
5:10 PM	23	15	25	0	26	14	14	0	10	59	9	0	43	103	15	0	356	4177
5:15 PM	23	14	29	0	31	12	9	0	5	86	11	1	36	75	19	0	351	4226
5:20 PM	19	13	19	1	26	13	14	0	7	100	8	0	36	107	17	0	380	4274
5:25 PM	18	13	35	0	27	13	8	0	7	79	5	0	27	82	17	0	331	4268
5:30 PM	20	16	24	0	18	19	11	0	6	63	6	0	38	77	20	0	318	4260
5:35 PM	19	16	22	0	16	8	8	0	5	67	5	1	28	75	26	0	296	4183
5:40 PM	15	11	30	0	27	14	4	0	14	65	9	0	50	75	23	0	337	4123
5:45 PM	17	12	28	0	20	7	8	0	5	73	2	0	32	106	25	0	335	4087
5:50 PM	18	13	27	0	30	12	10	0	8	66	7	0	39	93	19	0	342	4077
5:55 PM	22	14	18	0	21	10	4	0	6	61	10	1	38	91	22	0	318	4070

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	340	152	356	0	316	156	88	0	116	1092	44	0	516	1244	144	0	4564
Heavy Trucks	0	16	16		4	12	0		0	48	0		28	44	4		172
Buses																	
Pedestrians		16				4				8				0			28
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scoters																	

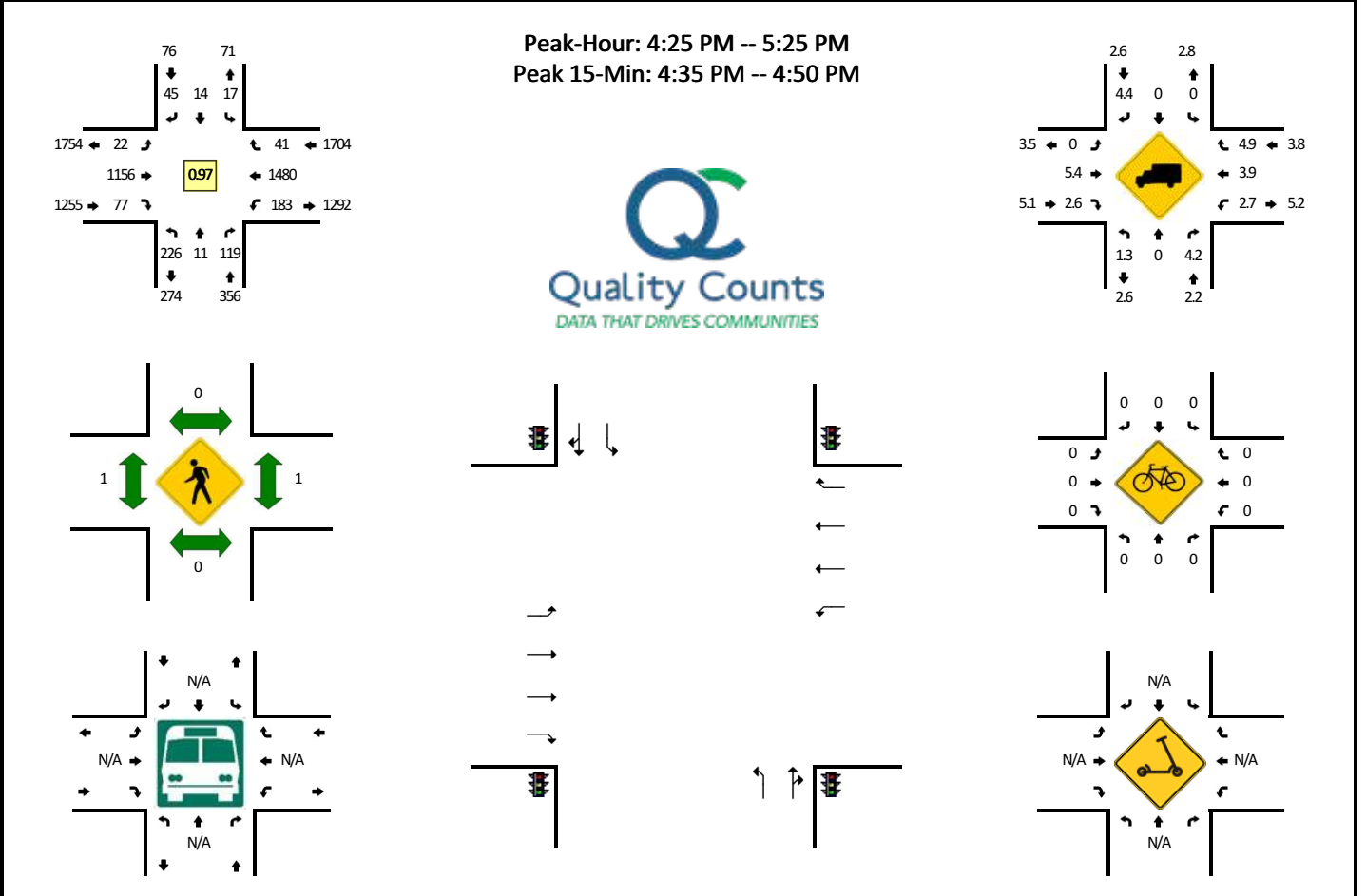
Comments:

Report generated on 1/12/2022 5:52 AM

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

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

QC JOB #: 15594704
DATE: Wed, Oct 27 2021



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		
3:00 PM	12	1	6	0	0	2	11	0	3	76	12	0	19	104	2	0	248	
3:05 PM	29	1	10	0	0	2	4	0	2	101	7	2	7	99	2	0	266	
3:10 PM	17	1	14	0	2	1	2	0	0	99	4	0	9	108	1	0	258	
3:15 PM	12	0	10	0	0	0	3	0	1	82	4	1	8	118	2	0	241	
3:20 PM	16	1	12	0	1	0	4	0	5	87	4	0	11	100	2	0	243	
3:25 PM	19	2	6	0	3	0	5	0	1	64	3	0	26	99	2	0	230	
3:30 PM	9	1	10	0	0	1	4	0	1	60	1	0	13	122	7	0	229	
3:35 PM	24	0	9	0	0	2	7	0	3	84	4	1	13	103	1	0	251	
3:40 PM	18	0	9	0	0	0	2	0	3	79	8	1	16	104	1	0	241	
3:45 PM	18	3	12	0	1	1	4	0	4	113	6	0	10	142	0	0	314	
3:50 PM	15	3	10	0	4	1	1	0	2	97	9	1	12	145	1	0	301	
3:55 PM	13	2	4	0	1	1	3	0	2	91	10	0	14	125	3	0	269	
4:00 PM	7	1	10	0	1	0	6	0	4	90	7	0	14	128	5	0	273	
4:05 PM	13	2	16	0	2	3	7	0	2	77	7	0	16	111	0	0	256	
4:10 PM	25	1	8	0	2	0	3	0	1	98	14	2	14	111	2	0	281	
4:15 PM	19	0	6	0	0	1	3	0	2	82	6	0	19	98	3	0	239	
4:20 PM	11	0	7	0	2	1	3	0	3	101	4	1	17	135	3	0	288	
4:25 PM	13	2	13	0	3	1	3	0	0	94	6	0	17	116	3	0	271	
4:30 PM	18	0	12	0	1	1	1	0	2	100	5	0	14	130	0	0	284	
4:35 PM	20	0	13	0	0	1	3	0	2	96	5	1	12	134	5	0	292	
4:40 PM	11	0	15	0	1	1	3	0	2	112	4	0	23	119	0	0	291	
4:45 PM	26	1	10	0	1	0	4	0	1	95	10	0	10	131	2	0	291	
4:50 PM	19	1	7	0	1	2	4	0	3	87	8	0	17	122	0	0	271	
4:55 PM	17	1	6	0	1	0	2	0	1	99	6	0	12	117	11	0	273	
5:00 PM	16	0	10	0	0	1	8	0	0	99	6	1	14	134	6	0	295	
5:05 PM	22	1	6	0	3	2	4	0	2	91	8	0	14	119	2	0	274	
5:10 PM	21	1	11	0	2	0	2	0	2	82	5	0	18	130	3	0	277	
5:15 PM	20	3	9	0	1	3	4	0	2	105	5	0	18	115	4	0	289	
5:20 PM	23	1	7	0	3	2	7	0	2	96	9	1	14	113	5	0	283	
5:25 PM	24	1	12	0	0	1	3	0	1	110	6	3	13	104	1	0	279	
5:30 PM	17	2	11	0	1	1	3	0	1	104	3	0	14	135	4	0	296	
5:35 PM	12	0	12	0	0	2	4	0	4	88	3	2	16	125	5	0	273	
5:40 PM	14	1	12	0	0	1	3	0	0	85	4	1	10	135	3	0	269	
5:45 PM	11	1	11	0	2	1	4	0	0	87	6	1	22	126	5	0	277	
5:50 PM	14	1	4	0	1	0	6	0	0	77	7	0	9	139	4	0	262	
5:55 PM	22	1	10	0	0	1	4	0	2	77	6	1	17	117	3	0	261	

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	228	4	152	0	8	8	40	0	20	1212	76	4	180	1536	28	0	3496
Heavy Trucks	0	0	4		0	0	0		0	64	0		12	68	0		148
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scoters																	

Comments:

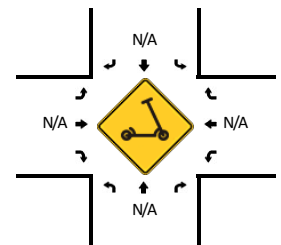
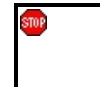
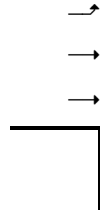
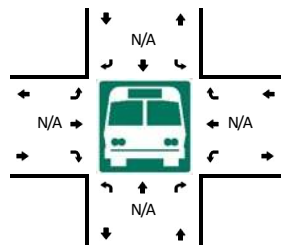
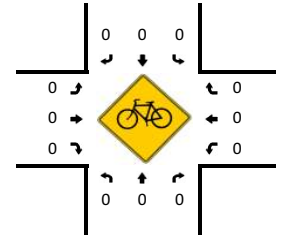
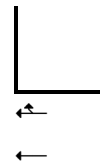
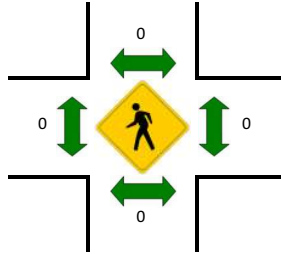
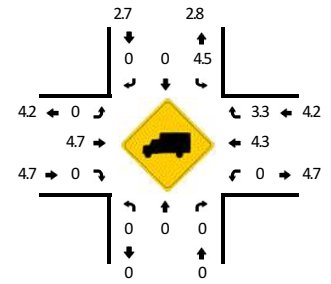
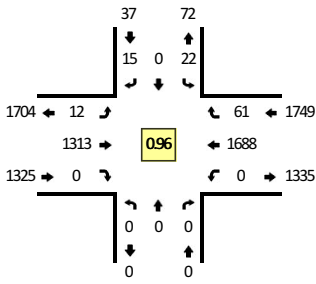
Report generated on 1/12/2022 5:52 AM

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

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

QC JOB #: 15594706
DATE: Wed, Oct 27 2021

Peak-Hour: 4:25 PM -- 5:25 PM
Peak 15-Min: 4:30 PM -- 4:45 PM



5-Min Count Period Beginning At	Vittoria Wy (Northbound)				Vittoria Wy (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		
3:00 PM	0	0	0	0	1	0	2	0	2	81	0	0	0	112	2	0	200	
3:05 PM	0	0	0	0	0	0	0	0	4	100	0	0	0	120	4	0	228	
3:10 PM	0	0	0	0	1	0	0	0	3	97	0	0	0	121	2	0	224	
3:15 PM	0	0	0	0	2	0	1	0	2	106	0	0	0	115	6	0	232	
3:20 PM	0	0	0	0	1	0	2	0	0	104	0	0	0	119	4	0	230	
3:25 PM	0	0	0	0	3	0	0	0	1	68	0	0	0	129	5	0	206	
3:30 PM	0	0	0	0	2	0	3	0	0	69	0	0	0	123	4	0	201	
3:35 PM	0	0	0	0	0	0	1	0	2	89	0	0	0	133	3	0	228	
3:40 PM	0	0	0	0	4	0	2	0	3	82	0	0	0	123	2	0	216	
3:45 PM	0	0	0	0	1	0	2	0	1	110	0	0	0	160	2	0	276	
3:50 PM	0	0	0	0	7	0	5	0	3	112	0	0	0	138	9	0	274	
3:55 PM	0	0	0	0	5	0	3	0	1	105	0	0	0	139	2	0	255	2770
4:00 PM	0	0	0	0	4	0	5	0	0	102	0	0	0	137	9	0	257	2827
4:05 PM	0	0	0	0	5	0	2	0	0	101	0	0	0	129	3	0	240	2839
4:10 PM	0	0	0	0	6	0	9	0	2	103	0	0	0	132	5	0	257	2872
4:15 PM	0	0	0	0	3	0	3	0	0	83	0	0	0	128	8	0	225	2865
4:20 PM	0	0	0	0	1	0	6	0	2	101	0	0	0	127	6	0	243	2878
4:25 PM	0	0	0	0	5	0	2	0	0	116	0	0	0	136	6	0	265	2937
4:30 PM	0	0	0	0	4	0	3	0	0	101	0	0	0	151	3	0	262	2998
4:35 PM	0	0	0	0	4	0	1	0	3	123	0	0	0	138	7	0	276	3046
4:40 PM	0	0	0	0	2	0	2	0	1	136	0	0	0	132	2	0	275	3105
4:45 PM	0	0	0	0	2	0	1	0	1	103	0	0	0	151	4	0	262	3091
4:50 PM	0	0	0	0	0	0	0	0	0	94	0	0	0	143	3	0	240	3057
4:55 PM	0	0	0	0	0	0	2	0	0	98	0	0	0	150	6	0	256	3058
5:00 PM	0	0	0	0	2	0	0	0	2	109	0	0	0	144	12	0	269	3070
5:05 PM	0	0	0	0	2	0	0	0	0	104	0	0	0	130	5	0	241	3071
5:10 PM	0	0	0	0	0	0	3	0	1	110	0	0	0	145	4	0	263	3077
5:15 PM	0	0	0	0	0	0	0	0	1	117	0	1	0	141	6	0	266	3118
5:20 PM	0	0	0	0	1	0	1	0	2	102	0	0	0	127	3	0	236	3111
5:25 PM	0	0	0	0	1	0	1	0	0	115	0	0	0	135	5	0	257	3103
5:30 PM	0	0	0	0	1	0	1	0	3	104	0	0	0	143	6	0	258	3099
5:35 PM	0	0	0	0	1	0	2	0	3	101	0	0	0	141	5	0	253	3076
5:40 PM	0	0	0	0	1	0	1	0	1	114	0	0	0	149	7	0	273	3074
5:45 PM	0	0	0	0	1	0	1	0	2	101	0	0	0	144	5	0	254	3066
5:50 PM	0	0	0	0	1	0	2	0	0	85	0	0	0	152	4	0	244	3070
5:55 PM	0	0	0	0	1	0	2	0	0	86	0	0	0	139	5	0	233	3047

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	40	0	24	0	16	1440	0	0	0	1684	48	0	3252
Heavy Trucks	0	0	0		0	0	0		0	64	0		0	96	0		160
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scoters																	

Comments:

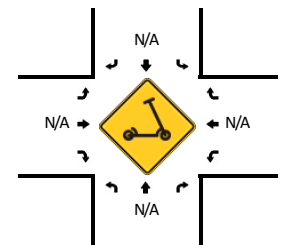
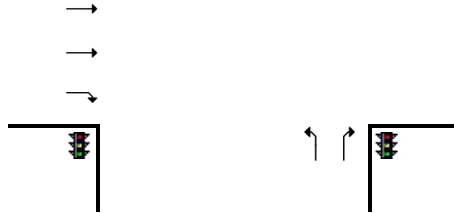
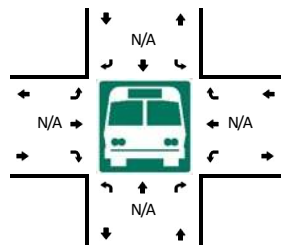
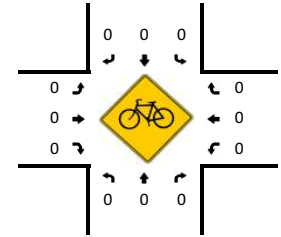
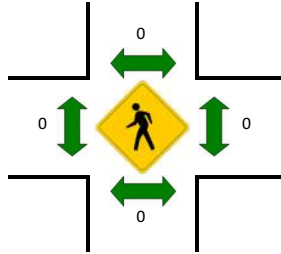
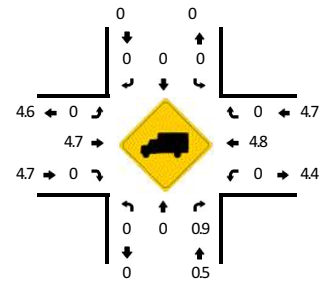
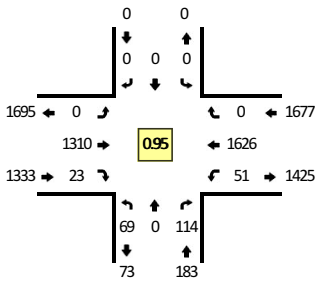
Report generated on 1/12/2022 5:52 AM

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

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

QC JOB #: 15594708
DATE: Wed, Oct 27 2021

Peak-Hour: 4:25 PM -- 5:25 PM
 Peak 15-Min: 4:35 PM -- 4:50 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		
3:00 PM	9	0	7	0	0	0	0	0	0	79	4	0	5	113	0	0	217	
3:05 PM	4	0	7	0	0	0	0	0	0	97	1	0	2	119	0	0	230	
3:10 PM	7	0	2	0	0	0	0	0	0	81	5	0	3	114	0	0	212	
3:15 PM	8	0	6	0	0	0	0	0	0	109	3	0	3	118	0	0	247	
3:20 PM	10	0	2	0	0	0	0	0	0	102	3	0	6	119	0	0	242	
3:25 PM	2	0	3	0	0	0	0	0	0	71	3	0	2	137	0	0	218	
3:30 PM	11	0	7	0	0	0	0	0	0	71	1	0	3	112	0	0	205	
3:35 PM	10	0	10	0	0	0	0	0	0	87	3	0	5	123	0	0	238	
3:40 PM	8	0	6	0	0	0	0	0	0	83	3	0	7	121	0	0	228	
3:45 PM	9	0	5	0	0	0	0	0	0	104	1	0	7	155	0	0	281	
3:50 PM	6	0	6	0	0	0	0	0	0	112	5	0	3	138	0	0	270	
3:55 PM	7	0	9	0	0	0	0	0	0	109	1	0	3	132	0	0	261	2849
4:00 PM	8	0	11	0	0	0	0	0	0	102	2	0	5	140	0	0	268	2900
4:05 PM	6	0	8	0	0	0	0	0	0	99	3	0	3	130	0	0	249	2919
4:10 PM	7	0	5	0	0	0	0	0	0	105	2	0	4	130	0	0	253	2960
4:15 PM	3	0	5	0	0	0	0	0	0	84	0	0	5	130	0	0	227	2940
4:20 PM	4	0	8	0	0	0	0	0	0	88	3	0	4	128	0	0	235	2933
4:25 PM	3	0	4	0	0	0	0	0	0	122	1	0	3	139	0	0	272	2987
4:30 PM	10	0	5	0	0	0	0	0	0	102	1	0	5	142	0	0	265	3047
4:35 PM	5	0	11	0	0	0	0	0	0	122	5	0	2	133	0	0	278	3087
4:40 PM	7	0	10	0	0	0	0	0	0	134	4	0	3	128	0	0	286	3145
4:45 PM	9	0	7	0	0	0	0	0	0	107	1	0	6	146	0	0	276	3140
4:50 PM	0	0	11	0	0	0	0	0	0	90	2	0	7	144	0	1	255	3125
4:55 PM	6	0	11	0	0	0	0	0	0	92	2	0	3	139	0	0	253	3117
5:00 PM	7	0	12	0	0	0	0	0	0	107	2	0	7	143	0	0	278	3127
5:05 PM	9	0	10	0	0	0	0	0	0	101	2	0	5	120	0	0	247	3125
5:10 PM	5	0	7	0	0	0	0	0	0	117	2	0	2	140	0	0	273	3145
5:15 PM	4	0	13	0	0	0	0	0	0	114	0	0	2	136	0	0	269	3187
5:20 PM	4	0	13	0	0	0	0	0	0	102	1	0	5	116	0	0	241	3193
5:25 PM	5	0	2	0	0	0	0	0	0	111	1	0	2	136	0	0	257	3178
5:30 PM	11	0	2	0	0	0	0	0	0	99	1	0	3	138	0	0	254	3167
5:35 PM	5	0	7	0	0	0	0	0	0	100	1	0	6	147	0	0	266	3155
5:40 PM	3	0	6	0	0	0	0	0	0	116	0	0	3	146	0	0	274	3143
5:45 PM	3	0	5	0	0	0	0	0	0	94	2	0	3	141	0	0	248	3115
5:50 PM	3	0	5	0	0	0	0	0	0	85	0	0	1	146	0	0	240	3100
5:55 PM	6	0	5	0	0	0	0	0	0	85	1	0	2	134	0	0	233	3080

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	84	0	112	0	0	0	0	0	0	1452	40	0	44	1628	0	0	3360
Heavy Trucks	0	0	4		0	0	0		0	72	0		0	84	0		160
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scoters																	

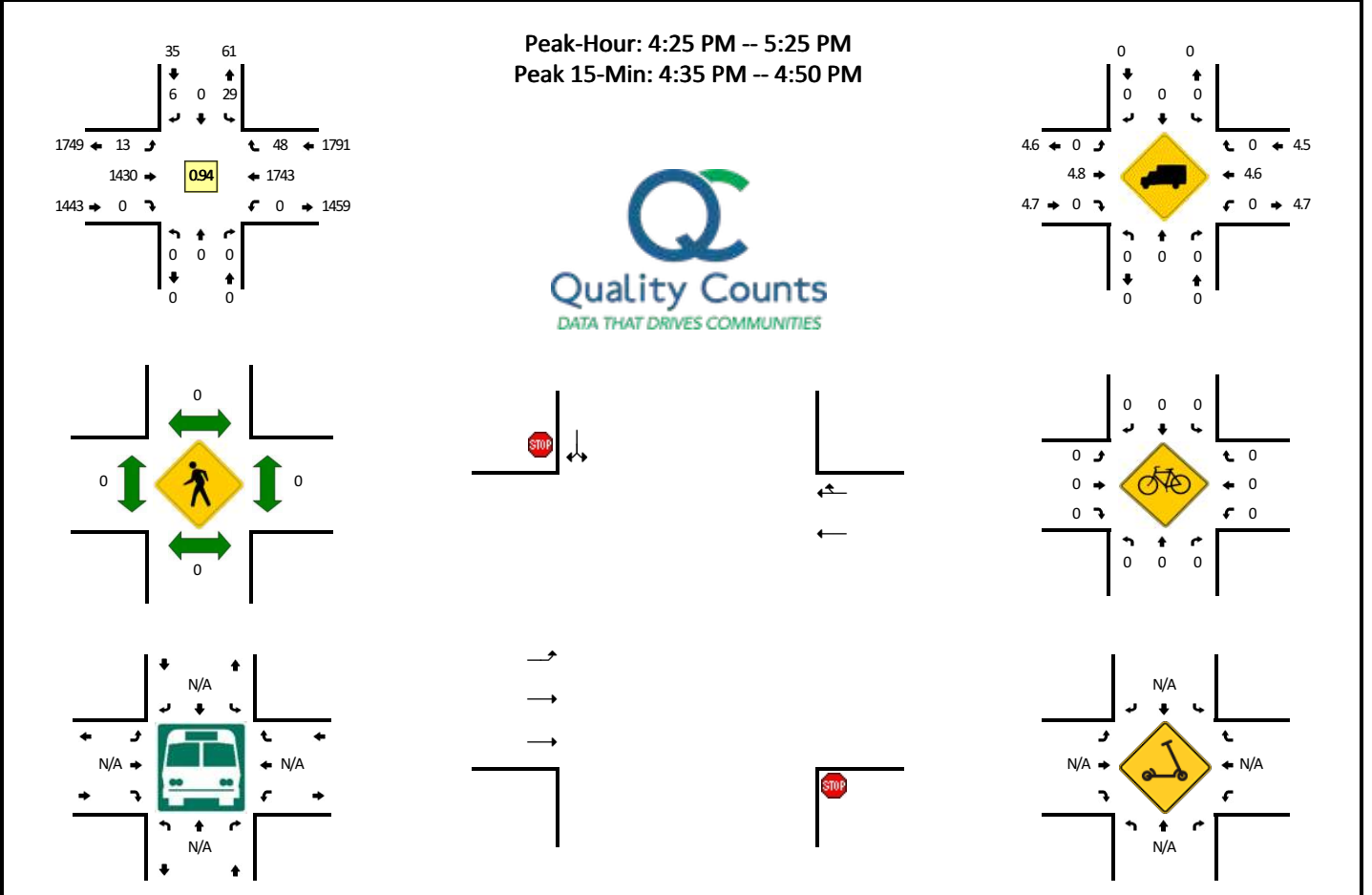
Comments:

Report generated on 1/12/2022 5:52 AM

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

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

QC JOB #: 15594710
DATE: Wed, Oct 27 2021



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		
3:00 PM	0	0	0	0	1	0	1	0	2	88	0	0	0	123	4	0	219	
3:05 PM	0	0	0	0	3	0	0	0	0	102	0	0	0	112	3	0	220	
3:10 PM	0	0	0	0	2	0	2	0	0	89	0	0	0	107	2	0	202	
3:15 PM	0	0	0	0	1	0	0	0	0	106	0	0	0	111	5	0	223	
3:20 PM	0	0	0	0	0	0	0	0	1	99	0	0	0	128	3	0	231	
3:25 PM	0	0	0	0	3	0	2	0	0	80	0	0	0	131	4	0	220	
3:30 PM	0	0	0	0	3	0	1	0	1	86	0	0	0	131	0	0	222	
3:35 PM	0	0	0	0	5	0	1	0	1	93	0	0	0	122	6	0	228	
3:40 PM	0	0	0	0	1	0	1	0	0	90	0	0	0	128	2	0	222	
3:45 PM	0	0	0	0	1	0	1	0	0	104	0	0	0	160	2	0	268	
3:50 PM	0	0	0	0	0	0	2	0	0	110	0	0	0	136	3	0	251	
3:55 PM	0	0	0	0	3	0	0	0	0	115	0	0	0	131	4	0	253	
4:00 PM	0	0	0	0	2	0	0	0	1	118	0	0	0	149	5	0	275	
4:05 PM	0	0	0	0	6	0	0	0	1	121	0	0	0	124	1	0	253	
4:10 PM	0	0	0	0	7	0	1	0	0	117	0	0	0	132	5	0	262	
4:15 PM	0	0	0	0	5	0	3	0	0	92	0	0	0	136	3	0	239	
4:20 PM	0	0	0	0	6	0	0	0	0	85	0	0	0	129	3	0	223	
4:25 PM	0	0	0	0	1	0	0	0	0	118	0	0	0	151	4	0	274	
4:30 PM	0	0	0	0	2	0	1	0	1	104	0	0	0	152	2	0	262	
4:35 PM	0	0	0	0	2	0	0	0	2	133	0	0	0	140	6	0	283	
4:40 PM	0	0	0	0	4	0	1	0	2	156	0	0	0	144	3	0	310	
4:45 PM	0	0	0	0	2	0	0	0	0	121	0	0	0	152	5	0	280	
4:50 PM	0	0	0	0	5	0	0	0	1	103	0	0	0	152	2	0	263	
4:55 PM	0	0	0	0	1	0	0	0	0	103	0	0	0	162	3	0	269	
5:00 PM	0	0	0	0	2	0	0	0	1	109	0	0	0	153	8	0	273	
5:05 PM	0	0	0	0	5	0	1	0	2	92	0	0	0	132	2	0	234	
5:10 PM	0	0	0	0	3	0	1	0	2	138	0	0	0	138	10	0	292	
5:15 PM	0	0	0	0	0	0	0	0	1	124	0	0	0	146	1	0	272	
5:20 PM	0	0	0	0	2	0	2	0	1	129	0	0	0	121	2	0	257	
5:25 PM	0	0	0	0	4	0	0	0	0	112	0	0	0	145	6	0	267	
5:30 PM	0	0	0	0	3	0	1	0	0	101	0	0	0	141	3	1	250	
5:35 PM	0	0	0	0	3	0	1	0	3	93	0	0	0	143	3	0	246	
5:40 PM	0	0	0	0	1	0	0	0	2	122	0	0	0	160	2	0	287	
5:45 PM	0	0	0	0	2	0	0	0	0	111	0	0	0	150	2	0	265	
5:50 PM	0	0	0	0	1	0	3	0	4	93	0	0	0	140	2	0	243	
5:55 PM	0	0	0	0	1	0	1	0	1	94	0	0	0	149	6	0	252	

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	32	0	4	0	16	1640	0	0	0	1744	56	0	3492
Heavy Trucks	0	0	0		0	0	0		0	92	0		0	92	0		184
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scoters																	

Comments:

Report generated on 1/12/2022 5:52 AM

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

Appendix C

Existing Conditions Level of Service Worksheets

HCS7 Roundabouts Report

General Information				Site Information			
Analyst	MRR			Intersection	Springbrook/Crestview		
Agency or Co.	KAI			E/W Street Name	Crestview Dr		
Date Performed	12/6/2021			N/S Street Name	Springbrook Rd		
Analysis Year	2023			Analysis Time Period (hrs)	0.25		
Time Analyzed	Existing AM			Peak Hour Factor	0.87		
Project Description	Crestview Green			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
Movement																
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	13	1	6	0	5	0	0	1	13	221	8	0	0	275	23
Percent Heavy Vehicles, %	0	17	100	0	0	60	0	0	0	8	7	88	0	0	6	5
Flow Rate (v _{PCE}), pc/h	0	17	2	7	0	9	0	0	1	16	272	17	0	0	335	28
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)		4.9763			4.9763			4.9763			4.9763	
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		26.00			9.00			306.00			363.00	
Entry Volume veh/h		22.53			5.63			279.06			342.70	
Circulating Flow (v _c), pc/h	345			306			19			26		
Exiting Flow (v _{ex}), pc/h	19			44			289			352		
Capacity (c _{PCE}), pc/h		970.63			1010.02			1353.51			1343.88	
Capacity (c), veh/h		841.08			631.26			1234.36			1268.74	
v/c Ratio (x)		0.03			0.01			0.23			0.27	

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		4.5			5.8			4.9			5.2	
Lane LOS		A			A			A			A	
95% Queue, veh		0.1			0.0			0.9			1.1	
Approach Delay, s/veh	4.5			5.8			4.9			5.2		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh LOS	5.1						A					

Intersection						
Int Delay, s/veh	2.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	23	8	40	38	13	46
Future Vol, veh/h	23	8	40	38	13	46
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	4	25	8	3	0	9
Mvmt Flow	27	9	47	44	15	53

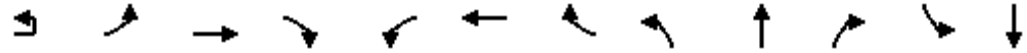
Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	152	69	0	0	91
Stage 1	69	-	-	-	-
Stage 2	83	-	-	-	-
Critical Hdwy	6.44	6.45	-	-	4.1
Critical Hdwy Stg 1	5.44	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-
Follow-up Hdwy	3.536	3.525	-	-	2.2
Pot Cap-1 Maneuver	835	933	-	-	1517
Stage 1	949	-	-	-	-
Stage 2	935	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	827	933	-	-	1517
Mov Cap-2 Maneuver	827	-	-	-	-
Stage 1	949	-	-	-	-
Stage 2	926	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	1.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	852	1517
HCM Lane V/C Ratio	-	-	0.042	0.01
HCM Control Delay (s)	-	-	9.4	7.4
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0

HCM Signalized Intersection Capacity Analysis
 3: Springbrook Rd & OR 99W

12/16/2021



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Lane Configurations		↔	↕	↗	↖	↕	↗	↖	↕	↗	↖	↕	
Traffic Volume (vph)	2	35	1067	74	257	626	116	118	111	358	295	104	
Future Volume (vph)	2	35	1067	74	257	626	116	118	111	358	295	104	
Ideal Flow (vphpl)	1900	1750	1750	1750	1750	1800	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	
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	
Frbp, ped/bikes		1.00	1.00	0.99	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	
Frt		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1614	3167	1468	2880	3167	1390	3084	1539	1357	3131	1620	
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1614	3167	1468	2880	3167	1390	3084	1539	1357	3131	1620	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Adj. Flow (vph)	2	38	1173	81	282	688	127	130	122	393	324	114	
RTOR Reduction (vph)	0	0	0	44	0	0	60	0	0	203	0	0	
Lane Group Flow (vph)	0	40	1173	37	282	688	67	130	122	190	324	114	
Confl. Peds. (#/hr)				1	1			3					
Heavy Vehicles (%)	3%	3%	5%	0%	12%	8%	7%	3%	12%	8%	3%	8%	
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	5	2		1	6		3	8		7	4	
Permitted Phases				2			6			8			
Actuated Green, G (s)		6.8	54.3	54.3	15.6	63.1	63.1	20.0	18.4	18.4	15.2	13.6	
Effective Green, g (s)		6.8	54.3	54.3	15.6	63.1	63.1	20.0	18.4	18.4	15.2	13.6	
Actuated g/C Ratio		0.06	0.45	0.45	0.13	0.53	0.53	0.17	0.15	0.15	0.13	0.11	
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	
Vehicle Extension (s)		2.3	4.0	4.0	2.3	4.0	4.0	2.3	2.3	2.3	2.3	2.3	
Lane Grp Cap (vph)		91	1433	664	374	1665	730	514	235	208	396	183	
v/s Ratio Prot		0.02	c0.37		c0.10	0.22		0.04	0.08		c0.10	0.07	
v/s Ratio Perm				0.02			0.05			c0.14			
v/c Ratio		0.44	0.82	0.06	0.75	0.41	0.09	0.25	0.52	0.91	0.82	0.62	
Uniform Delay, d1		54.8	28.6	18.4	50.3	17.2	14.2	43.5	46.7	50.0	51.1	50.8	
Progression Factor		1.00	1.00	1.00	0.90	0.83	1.49	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		2.0	5.3	0.2	7.2	0.7	0.2	0.2	1.2	38.7	12.0	5.2	
Delay (s)		56.7	33.9	18.6	52.7	15.0	21.4	43.7	47.9	88.7	63.0	56.0	
Level of Service		E	C	B	D	B	C	D	D	F	E	E	
Approach Delay (s)			33.6			25.4			71.9			59.1	
Approach LOS			C			C			E			E	
Intersection Summary													
HCM 2000 Control Delay			41.8									HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.83										
Actuated Cycle Length (s)			120.0									Sum of lost time (s)	16.5
Intersection Capacity Utilization			75.6%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis

3: Springbrook Rd & OR 99W

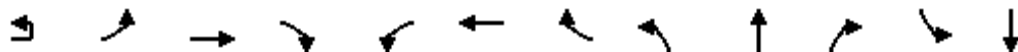
12/16/2021

Movement	SBR
Lane Configurations	7
Traffic Volume (vph)	70
Future Volume (vph)	70
Ideal Flow (vphpl)	1750
Grade (%)	
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Frbp, ped/bikes	0.98
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1382
Flt Permitted	1.00
Satd. Flow (perm)	1382
Peak-hour factor, PHF	0.91
Adj. Flow (vph)	77
RTOR Reduction (vph)	68
Lane Group Flow (vph)	9
Confl. Peds. (#/hr)	3
Heavy Vehicles (%)	6%
Turn Type	Perm
Protected Phases	
Permitted Phases	4
Actuated Green, G (s)	13.6
Effective Green, g (s)	13.6
Actuated g/C Ratio	0.11
Clearance Time (s)	4.0
Vehicle Extension (s)	2.3
Lane Grp Cap (vph)	156
v/s Ratio Prot	
v/s Ratio Perm	0.01
v/c Ratio	0.06
Uniform Delay, d1	47.5
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	47.6
Level of Service	D
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM 6th Signalized Intersection Summary

3: Springbrook Rd & OR 99W

12/16/2021



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↔	↕	↗	↖	↕	↗	↖	↕	↗	↖	↕
Traffic Volume (veh/h)	2	35	1067	74	257	626	116	118	111	358	295	104
Future Volume (veh/h)	2	35	1067	74	257	626	116	118	111	358	295	104
Initial Q (Qb), veh		0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach			No			No			No			No
Adj Sat Flow, veh/h/ln		1709	1682	1750	1586	1688	1654	1660	1537	1592	1709	1641
Adj Flow Rate, veh/h		38	1173	0	282	688	0	130	122	228	324	114
Peak Hour Factor		0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %		3	5	0	12	8	7	3	12	8	3	8
Cap, veh/h		47	1345		421	1731		606	269	235	375	158
Arrive On Green		0.03	0.42	0.00	0.10	0.36	0.00	0.20	0.17	0.17	0.12	0.10
Sat Flow, veh/h		1628	3195	1483	2931	3207	1402	3067	1537	1342	3158	1641
Grp Volume(v), veh/h		38	1173	0	282	688	0	130	122	228	324	114
Grp Sat Flow(s),veh/h/ln		1628	1598	1483	1465	1603	1402	1534	1537	1342	1579	1641
Q Serve(g_s), s		2.8	40.3	0.0	11.2	19.2	0.0	4.3	8.5	20.3	12.1	8.1
Cycle Q Clear(g_c), s		2.8	40.3	0.0	11.2	19.2	0.0	4.3	8.5	20.3	12.1	8.1
Prop In Lane		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h		47	1345		421	1731		606	269	235	375	158
V/C Ratio(X)		0.81	0.87		0.67	0.40		0.21	0.45	0.97	0.86	0.72
Avail Cap(c_a), veh/h		149	1345		421	1731		606	269	235	421	287
HCM Platoon Ratio		1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)		1.00	1.00	0.00	0.90	0.90	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh		58.0	31.8	0.0	51.5	23.7	0.0	40.3	44.4	49.2	51.9	52.7
Incr Delay (d2), s/veh		18.1	8.0	0.0	3.3	0.6	0.0	0.1	0.7	50.2	14.7	3.8
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln		2.4	22.7	0.0	7.6	12.1	0.0	3.0	6.0	15.3	9.5	6.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh		76.1	39.8	0.0	54.7	24.4	0.0	40.5	45.1	99.4	66.6	56.4
LnGrp LOS		E	D		D	C		D	D	F	E	E
Approach Vol, veh/h			1211	A		970	A		480			515
Approach Delay, s/veh			41.0			33.2			69.6			60.9
Approach LOS			D			C			E			E
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	21.7	55.0	27.7	15.6	7.4	69.3	18.3	25.0				
Change Period (Y+Rc), s	4.5	* 4.5	4.0	4.0	4.0	4.5	4.0	4.0				
Max Green Setting (Gmax), s	16.0	* 51	16.0	21.0	11.0	55.5	16.0	21.0				
Max Q Clear Time (g_c+I1), s	13.2	42.3	6.3	10.1	4.8	21.2	14.1	22.3				
Green Ext Time (p_c), s	0.2	5.5	0.2	0.4	0.0	7.0	0.2	0.0				

Intersection Summary

HCM 6th Ctrl Delay	46.2
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
 3: Springbrook Rd & OR 99W

12/16/2021

Movement	SBR
Lane Configurations	7
Traffic Volume (veh/h)	70
Future Volume (veh/h)	70
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	0.99
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1668
Adj Flow Rate, veh/h	77
Peak Hour Factor	0.91
Percent Heavy Veh, %	6
Cap, veh/h	135
Arrive On Green	0.10
Sat Flow, veh/h	1400
Grp Volume(v), veh/h	77
Grp Sat Flow(s),veh/h/ln	1400
Q Serve(g_s), s	5.6
Cycle Q Clear(g_c), s	5.6
Prop In Lane	1.00
Lane Grp Cap(c), veh/h	135
V/C Ratio(X)	0.57
Avail Cap(c_a), veh/h	245
HCM Platoon Ratio	1.00
Upstream Filter(l)	1.00
Uniform Delay (d), s/veh	41.5
Incr Delay (d2), s/veh	2.3
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(95%),veh/ln	3.7
Unsig. Movement Delay, s/veh	
LnGrp Delay(d),s/veh	43.8
LnGrp LOS	D
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	
Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.	

HCM Signalized Intersection Capacity Analysis

4: Brutscher St & OR 99W

12/16/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↗	↘	↑↑	↗	↘	↗		↘	↗	
Traffic Volume (vph)	25	1598	41	68	957	28	49	4	92	21	6	27
Future Volume (vph)	25	1598	41	68	957	28	49	4	92	21	6	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	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.86		1.00	0.88	
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)	1372	3135	1364	1583	3079	1171	1599	1403		1411	1235	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.73	1.00		0.50	1.00	
Satd. Flow (perm)	1372	3135	1364	1583	3079	1171	1233	1403		739	1235	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	27	1756	45	75	1052	31	54	4	101	23	7	30
RTOR Reduction (vph)	0	0	12	0	0	7	0	92	0	0	27	0
Lane Group Flow (vph)	27	1756	33	75	1052	24	54	13	0	23	10	0
Heavy Vehicles (%)	20%	5%	8%	5%	8%	27%	4%	0%	7%	19%	33%	24%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	D.Pm	NA		D.Pm	NA	
Protected Phases	5	2		1	6			8				4
Permitted Phases			2			6	4			8		
Actuated Green, G (s)	5.1	88.2	88.2	9.2	92.3	92.3	10.1	10.1		10.1	10.1	
Effective Green, g (s)	5.1	88.2	88.2	9.2	92.3	92.3	10.1	10.1		10.1	10.1	
Actuated g/C Ratio	0.04	0.74	0.74	0.08	0.77	0.77	0.08	0.08		0.08	0.08	
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)	58	2304	1002	121	2368	900	103	118		62	103	
v/s Ratio Prot	0.02	c0.56		c0.05	0.34			0.01				0.01
v/s Ratio Perm			0.02			0.02	c0.04			0.03		
v/c Ratio	0.47	0.76	0.03	0.62	0.44	0.03	0.52	0.11		0.37	0.09	
Uniform Delay, d1	56.1	9.6	4.3	53.7	4.9	3.3	52.6	50.8		51.9	50.7	
Progression Factor	0.82	0.75	1.65	0.96	0.97	0.99	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.9	1.3	0.0	6.7	0.6	0.0	3.6	0.3		2.7	0.3	
Delay (s)	48.0	8.5	7.1	58.2	5.3	3.3	56.3	51.1		54.7	51.0	
Level of Service	D	A	A	E	A	A	E	D		D	D	
Approach Delay (s)		9.1			8.7			52.8			52.4	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay	11.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary

4: Brutscher St & OR 99W

12/16/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (veh/h)	25	1598	41	68	957	28	49	4	92	21	6	27
Future Volume (veh/h)	25	1598	41	68	957	28	49	4	92	21	6	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1455	1660	1619	1682	1641	1381	1695	1750	1750	1560	1366	1366
Adj Flow Rate, veh/h	27	1756	45	75	1052	31	54	4	101	23	7	30
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	20	5	8	5	8	27	4	0	0	19	33	33
Cap, veh/h	30	2158	939	93	2247	844	145	5	126	108	15	65
Arrive On Green	0.04	1.00	1.00	0.06	0.72	0.72	0.05	0.09	0.09	0.03	0.07	0.07
Sat Flow, veh/h	1386	3154	1372	1602	3118	1171	1615	57	1435	1486	226	967
Grp Volume(v), veh/h	27	1756	45	75	1052	31	54	0	105	23	0	37
Grp Sat Flow(s),veh/h/ln	1386	1577	1372	1602	1559	1171	1615	0	1492	1486	0	1192
Q Serve(g_s), s	2.3	0.0	0.0	5.6	17.1	0.9	4.3	0.0	8.3	2.0	0.0	3.6
Cycle Q Clear(g_c), s	2.3	0.0	0.0	5.6	17.1	0.9	4.3	0.0	8.3	2.0	0.0	3.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.96	1.00		0.81
Lane Grp Cap(c), veh/h	30	2158	939	93	2247	844	0	0	131	0	0	80
V/C Ratio(X)	0.91	0.81	0.05	0.81	0.47	0.04	0.00	0.00	0.80	0.00	0.00	0.46
Avail Cap(c_a), veh/h	127	2158	939	187	2247	844	0	0	224	0	0	179
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.43	0.43	0.43	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	57.3	0.0	0.0	55.8	7.1	4.8	0.0	0.0	53.7	0.0	0.0	53.8
Incr Delay (d2), s/veh	22.2	1.5	0.0	9.6	0.7	0.1	0.0	0.0	8.3	0.0	0.0	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.7	0.8	0.0	4.4	8.4	0.4	0.0	0.0	6.2	0.0	0.0	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	79.5	1.5	0.0	65.4	7.8	4.9	0.0	0.0	62.0	0.0	0.0	56.9
LnGrp LOS	E	A	A	E	A	A	A	A	E	A	A	E
Approach Vol, veh/h		1828			1158			159				60
Approach Delay, s/veh		2.7			11.4			40.9				35.1
Approach LOS		A			B			D				D
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.0	86.6	10.3	12.1	6.6	91.0	7.9	14.5				
Change Period (Y+Rc), s	4.0	4.5	4.0	4.0	4.0	4.5	4.0	4.0				
Max Green Setting (Gmax), s	14.0	75.5	18.0	18.0	11.0	78.5	18.0	18.0				
Max Q Clear Time (g_c+I1), s	7.6	2.0	6.3	5.6	4.3	19.1	4.0	10.3				
Green Ext Time (p_c), s	0.0	47.0	0.0	0.1	0.0	18.8	0.0	0.2				

Intersection Summary

HCM 6th Ctrl Delay	8.3
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑↑	↑↑		↘	
Traffic Vol, veh/h	4	1674	1096	21	38	21
Future Vol, veh/h	4	1674	1096	21	38	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-2	2	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	50	5	10	11	0	0
Mvmt Flow	5	1902	1245	24	43	24

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	1269	0	-	0	2218 635
Stage 1	-	-	-	-	1257 -
Stage 2	-	-	-	-	961 -
Critical Hdwy	5.1	-	-	-	6.8 6.9
Critical Hdwy Stg 1	-	-	-	-	5.8 -
Critical Hdwy Stg 2	-	-	-	-	5.8 -
Follow-up Hdwy	2.7	-	-	-	3.5 3.3
Pot Cap-1 Maneuver	342	-	-	-	~ 38 426
Stage 1	-	-	-	-	235 -
Stage 2	-	-	-	-	337 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	342	-	-	-	~ 37 426
Mov Cap-2 Maneuver	-	-	-	-	141 -
Stage 1	-	-	-	-	231 -
Stage 2	-	-	-	-	337 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	35.1
HCM LOS			E

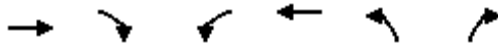
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	342	-	-	-	185
HCM Lane V/C Ratio	0.013	-	-	-	0.362
HCM Control Delay (s)	15.7	-	-	-	35.1
HCM Lane LOS	C	-	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	1.5

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

HCM Signalized Intersection Capacity Analysis

6: Providence Dr & OR 99W

12/16/2021



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↓	↑↑	↓	↓
Traffic Volume (vph)	1659	52	98	1085	31	60
Future Volume (vph)	1659	52	98	1085	31	60
Ideal Flow (vphpl)	1750	1750	1750	1800	1750	1750
Grade (%)	-3%			2%	3%	
Total Lost time (s)	6.0	6.0	4.5	6.0	4.5	4.5
Lane Util. Factor	0.95	1.00	1.00	0.95	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)	3214	1424	1614	3135	1575	1423
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3214	1424	1614	3135	1575	1423
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	1885	59	111	1233	35	68
RTOR Reduction (vph)	0	6	0	0	0	64
Lane Group Flow (vph)	1885	53	111	1233	35	4
Heavy Vehicles (%)	5%	6%	2%	8%	4%	3%
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	85.3	85.3	13.0	102.8	6.7	6.7
Effective Green, g (s)	85.3	85.3	13.0	102.8	6.7	6.7
Actuated g/C Ratio	0.71	0.71	0.11	0.86	0.06	0.06
Clearance Time (s)	6.0	6.0	4.5	6.0	4.5	4.5
Vehicle Extension (s)	4.8	4.8	2.5	4.8	2.5	2.5
Lane Grp Cap (vph)	2284	1012	174	2685	87	79
v/s Ratio Prot	c0.59		c0.07	0.39	c0.02	
v/s Ratio Perm		0.04				0.00
v/c Ratio	0.83	0.05	0.64	0.46	0.40	0.05
Uniform Delay, d1	12.1	5.2	51.2	2.0	54.7	53.6
Progression Factor	1.05	0.73	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.5	0.1	6.6	0.6	2.2	0.2
Delay (s)	15.2	3.9	57.8	2.6	56.9	53.8
Level of Service	B	A	E	A	E	D
Approach Delay (s)	14.9			7.2	54.9	
Approach LOS	B			A	D	

Intersection Summary

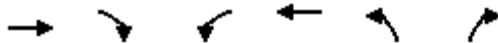
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary

6: Providence Dr & OR 99W

12/16/2021



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↓	↑↑	↓	↑
Traffic Volume (veh/h)	1659	52	98	1085	31	60
Future Volume (veh/h)	1659	52	98	1085	31	60
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1790	1776	1701	1665	1647	1660
Adj Flow Rate, veh/h	1885	59	111	1233	35	68
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	5	6	2	8	4	3
Cap, veh/h	2479	1097	134	2687	99	89
Arrive On Green	0.97	0.97	0.08	0.85	0.06	0.06
Sat Flow, veh/h	3490	1505	1620	3247	1568	1407
Grp Volume(v), veh/h	1885	59	111	1233	35	68
Grp Sat Flow(s),veh/h/ln	1700	1505	1620	1582	1568	1407
Q Serve(g_s), s	7.7	0.2	8.1	11.6	2.6	5.7
Cycle Q Clear(g_c), s	7.7	0.2	8.1	11.6	2.6	5.7
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2479	1097	134	2687	99	89
V/C Ratio(X)	0.76	0.05	0.83	0.46	0.35	0.76
Avail Cap(c_a), veh/h	2479	1097	209	2687	268	240
HCM Platoon Ratio	1.33	1.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.6	0.5	54.2	2.2	53.8	55.3
Incr Delay (d2), s/veh	2.3	0.1	11.9	0.6	1.6	9.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.5	0.1	6.6	3.1	1.9	4.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	2.9	0.6	66.1	2.8	55.4	64.9
LnGrp LOS	A	A	E	A	E	E
Approach Vol, veh/h	1944			1344	103	
Approach Delay, s/veh	2.8			8.0	61.7	
Approach LOS	A			A	E	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	14.4	93.5			107.9	12.1
Change Period (Y+Rc), s	4.5	6.0			6.0	4.5
Max Green Setting (Gmax), s	15.5	69.0			89.0	20.5
Max Q Clear Time (g_c+I1), s	10.1	9.7			13.6	7.7
Green Ext Time (p_c), s	0.1	44.6			25.4	0.1

Intersection Summary

HCM 6th Ctrl Delay	6.7
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↙	↑↑	↑↑		↘	
Traffic Vol, veh/h	5	1728	1183	27	51	6
Future Vol, veh/h	5	1728	1183	27	51	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	89	89	89	89	89	89
Heavy Vehicles, %	0	5	9	4	0	0
Mvmt Flow	6	1942	1329	30	57	7

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	1359	0	-	0	2327 680
Stage 1	-	-	-	-	1344 -
Stage 2	-	-	-	-	983 -
Critical Hdwy	4.1	-	-	-	6.4 6.7
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	2.2	-	-	-	3.5 3.3
Pot Cap-1 Maneuver	512	-	-	-	~ 41 414
Stage 1	-	-	-	-	245 -
Stage 2	-	-	-	-	366 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	512	-	-	-	~ 41 414
Mov Cap-2 Maneuver	-	-	-	-	151 -
Stage 1	-	-	-	-	242 -
Stage 2	-	-	-	-	366 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	41
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	512	-	-	-	162
HCM Lane V/C Ratio	0.011	-	-	-	0.395
HCM Control Delay (s)	12.1	-	-	-	41
HCM Lane LOS	B	-	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	1.7

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

HCS7 Roundabouts Report

General Information				Site Information			
Analyst	MRR			Intersection	Springbrook/Crestview		
Agency or Co.	KAI			E/W Street Name	Crestview Dr		
Date Performed	12/6/2021			N/S Street Name	Springbrook Rd		
Analysis Year	2021			Analysis Time Period (hrs)	0.25		
Time Analyzed	Existing PM			Peak Hour Factor	0.81		
Project Description	Crestview Green			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
Movement																
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	78	0	40	0	6	1	0	3	22	374	1	4	1	439	54
Percent Heavy Vehicles, %	0	12	0	0	0	0	0	0	0	12	5	0	0	0	4	9
Flow Rate (v _{PCE}), pc/h	0	108	0	49	0	7	1	0	4	30	485	1	5	1	564	73
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				2				2				7			

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)		4.9763			4.9763			4.9763			4.9763	
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		157.00			8.00			520.00			643.00	
Entry Volume veh/h		145.43			8.00			493.69			615.28	
Circulating Flow (v _c), pc/h	581			632			114			42		
Exiting Flow (v _{ex}), pc/h	2			104			598			624		
Capacity (c _{PCE}), pc/h		762.97			724.30			1228.51			1322.13	
Capacity (c), veh/h		706.74			724.10			1166.04			1263.92	
v/c Ratio (x)		0.21			0.01			0.42			0.49	

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		7.4			5.1			7.5			8.0	
Lane LOS		A			A			A			A	
95% Queue, veh		0.8			0.0			2.1			2.8	
Approach Delay, s/veh	7.4			5.1			7.5			8.0		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh LOS	7.7						A					

HCM 6th TWSC
 2: N Springbrook Rd & NE Benjamin Rd

12/16/2021

Intersection						
Int Delay, s/veh	2.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	48	11	84	29	16	110
Future Vol, veh/h	48	11	84	29	16	110
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	0	1	0	0	3
Mvmt Flow	55	13	95	33	18	125

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	273	112	0	0	128	0
Stage 1	112	-	-	-	-	-
Stage 2	161	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	721	947	-	-	1470	-
Stage 1	918	-	-	-	-	-
Stage 2	873	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	712	947	-	-	1470	-
Mov Cap-2 Maneuver	712	-	-	-	-	-
Stage 1	918	-	-	-	-	-
Stage 2	862	-	-	-	-	-

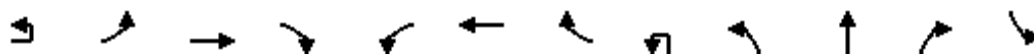
Approach	WB	NB	SB
HCM Control Delay, s	10.3	0	0.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	747	1470
HCM Lane V/C Ratio	-	-	0.09	0.012
HCM Control Delay (s)	-	-	10.3	7.5
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.3	0

HCM Signalized Intersection Capacity Analysis

3: Springbrook Rd & OR 99W

12/16/2021



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL
Lane Configurations		↔	↕	↗	↖	↕	↗		↖	↕	↗	↖
Traffic Volume (vph)	5	105	1060	105	448	1277	208	1	322	188	320	368
Future Volume (vph)	5	105	1060	105	448	1277	208	1	322	188	320	368
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1800	1750	1750	1750	1750	1750	1750
Grade (%)			0%			0%				3%		
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	0.97	0.95	1.00		0.97	1.00	1.00	0.97
Frbp, ped/bikes		1.00	1.00	0.99	1.00	1.00	0.97		1.00	1.00	0.98	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85	1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	0.95
Satd. Flow (prot)		1646	3197	1466	3014	3320	1414		3145	1626	1348	3193
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	0.95
Satd. Flow (perm)		1646	3197	1466	3014	3320	1414		3145	1626	1348	3193
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)	5	112	1128	112	477	1359	221	1	343	200	340	391
RTOR Reduction (vph)	0	0	0	61	0	0	100	0	0	0	252	0
Lane Group Flow (vph)	0	117	1128	51	477	1359	121	0	344	200	88	391
Confl. Peds. (#/hr)		5		2	2		5		3		3	3
Confl. Bikes (#/hr)				1								
Heavy Vehicles (%)	1%	1%	4%	0%	7%	3%	2%	1%	1%	6%	7%	1%
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot
Protected Phases	5	5	2		1	6		3	3	8		7
Permitted Phases				2			6				8	
Actuated Green, G (s)		12.8	63.7	63.7	25.8	76.7	76.7		19.0	18.0	18.0	16.0
Effective Green, g (s)		12.8	63.7	63.7	25.8	76.7	76.7		19.0	18.0	18.0	16.0
Actuated g/C Ratio		0.09	0.46	0.46	0.18	0.55	0.55		0.14	0.13	0.13	0.11
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	4.0	4.0	2.3	4.0	4.0		2.3	2.3	2.3	2.3
Lane Grp Cap (vph)		150	1454	667	555	1818	774		426	209	173	364
v/s Ratio Prot		0.07	0.35		c0.16	c0.41			c0.11	c0.12		c0.12
v/s Ratio Perm				0.03			0.09				0.07	
v/c Ratio		0.78	0.78	0.08	0.86	0.75	0.16		0.81	0.96	0.51	1.07
Uniform Delay, d1		62.2	32.1	21.5	55.3	24.2	15.7		58.7	60.6	56.9	62.0
Progression Factor		1.00	1.00	1.00	0.87	1.21	2.57		1.00	1.00	1.00	1.00
Incremental Delay, d2		21.6	4.1	0.2	7.5	1.6	0.2		10.3	49.4	1.4	68.4
Delay (s)		83.8	36.3	21.8	55.4	30.9	40.5		69.1	110.0	58.3	130.4
Level of Service		F	D	C	E	C	D		E	F	E	F
Approach Delay (s)			39.2			37.6				74.2		
Approach LOS			D			D				E		

Intersection Summary

HCM 2000 Control Delay	55.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	83.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: Springbrook Rd & OR 99W

12/16/2021

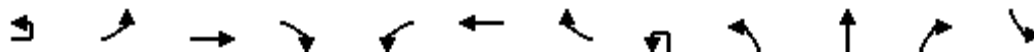


Movement	SBT	SBR
Lane Configurations	↑	↗
Traffic Volume (vph)	164	103
Future Volume (vph)	164	103
Ideal Flow (vphpl)	1750	1750
Grade (%)	0%	
Total Lost time (s)	4.0	4.0
Lane Util. Factor	1.00	1.00
Frpb, ped/bikes	1.00	0.98
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	1636	1464
Flt Permitted	1.00	1.00
Satd. Flow (perm)	1636	1464
Peak-hour factor, PHF	0.94	0.94
Adj. Flow (vph)	174	110
RTOR Reduction (vph)	0	98
Lane Group Flow (vph)	174	12
Confl. Peds. (#/hr)		3
Confl. Bikes (#/hr)		
Heavy Vehicles (%)	7%	0%
Turn Type	NA	Perm
Protected Phases	4	
Permitted Phases		4
Actuated Green, G (s)	15.0	15.0
Effective Green, g (s)	15.0	15.0
Actuated g/C Ratio	0.11	0.11
Clearance Time (s)	4.0	4.0
Vehicle Extension (s)	2.3	2.3
Lane Grp Cap (vph)	175	156
v/s Ratio Prot	0.11	
v/s Ratio Perm		0.01
v/c Ratio	0.99	0.08
Uniform Delay, d1	62.5	56.3
Progression Factor	1.00	1.00
Incremental Delay, d2	66.0	0.1
Delay (s)	128.5	56.4
Level of Service	F	E
Approach Delay (s)	117.8	
Approach LOS	F	
Intersection Summary		

HCM 6th Signalized Intersection Summary

3: Springbrook Rd & OR 99W

12/16/2021



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL
Lane Configurations		↔	↕	↗	↖	↕	↗		↖	↕	↗	↖
Traffic Volume (veh/h)	5	105	1060	105	448	1277	208	1	322	188	320	368
Future Volume (veh/h)	5	105	1060	105	448	1277	208	1	322	188	320	368
Initial Q (Qb), veh		0	0	0	0	0	0		0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		1.00	1.00		1.00		1.00		0.99	1.00
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Work Zone On Approach			No			No				No		
Adj Sat Flow, veh/h/ln		1736	1695	1750	1654	1758	1723		1688	1619	1606	1736
Adj Flow Rate, veh/h		112	1128	0	477	1359	0		343	200	170	391
Peak Hour Factor		0.94	0.94	0.94	0.94	0.94	0.94		0.94	0.94	0.94	0.94
Percent Heavy Veh, %		1	4	0	7	3	2		1	6	7	1
Cap, veh/h		133	1500		531	1867			423	208	174	367
Arrive On Green		0.08	0.47	0.00	0.06	0.18	0.00		0.14	0.13	0.13	0.11
Sat Flow, veh/h		1654	3221	1483	3057	3340	1460		3118	1619	1351	3208
Grp Volume(v), veh/h		112	1128	0	477	1359	0		343	200	170	391
Grp Sat Flow(s),veh/h/ln		1654	1611	1483	1528	1670	1460		1559	1619	1351	1604
Q Serve(g_s), s		9.4	40.3	0.0	21.7	53.7	0.0		15.0	17.2	12.9	16.0
Cycle Q Clear(g_c), s		9.4	40.3	0.0	21.7	53.7	0.0		15.0	17.2	12.9	16.0
Prop In Lane		1.00		1.00	1.00		1.00		1.00		1.00	1.00
Lane Grp Cap(c), veh/h		133	1500		531	1867			423	208	174	367
V/C Ratio(X)		0.84	0.75		0.90	0.73			0.81	0.96	0.98	1.07
Avail Cap(c_a), veh/h		165	1500		633	1867			423	208	174	367
HCM Platoon Ratio		1.00	1.00	1.00	0.33	0.33	0.33		1.00	1.00	1.00	1.00
Upstream Filter(I)		1.00	1.00	0.00	0.45	0.45	0.00		1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh		63.5	30.8	0.0	64.8	47.1	0.0		58.8	60.6	32.9	62.0
Incr Delay (d2), s/veh		23.9	3.5	0.0	6.7	1.1	0.0		10.8	50.8	61.6	65.7
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln		8.3	22.2	0.0	12.8	29.7	0.0		10.8	15.3	11.7	15.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh		87.5	34.3	0.0	71.5	48.2	0.0		69.6	111.5	94.5	127.7
LnGrp LOS		F	C		E	D			E	F	F	F
Approach Vol, veh/h			1240	A		1836	A			713		
Approach Delay, s/veh			39.1			54.3				87.3		
Approach LOS			D			D				F		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	28.3	69.7	23.0	19.0	15.2	82.8	20.0	22.0				
Change Period (Y+Rc), s	4.0	4.5	4.0	4.0	4.0	4.5	4.0	4.0				
Max Green Setting (Gmax), s	29.0	60.5	19.0	15.0	14.0	75.5	16.0	18.0				
Max Q Clear Time (g_c+I1), s	23.7	42.3	17.0	16.7	11.4	55.7	18.0	19.2				
Green Ext Time (p_c), s	0.6	9.5	0.2	0.0	0.0	12.2	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay	64.5
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

User approved ignoring U-Turning movement.

Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
 3: Springbrook Rd & OR 99W

12/16/2021

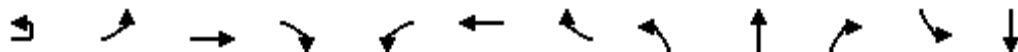


Movement	SBT	SBR
Lane Configurations	↑	↑
Traffic Volume (veh/h)	164	103
Future Volume (veh/h)	164	103
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		0.99
Parking Bus, Adj	1.00	1.00
Work Zone On Approach	No	
Adj Sat Flow, veh/h/ln	1654	1750
Adj Flow Rate, veh/h	174	57
Peak Hour Factor	0.94	0.94
Percent Heavy Veh, %	7	0
Cap, veh/h	177	158
Arrive On Green	0.11	0.11
Sat Flow, veh/h	1654	1471
Grp Volume(v), veh/h	174	57
Grp Sat Flow(s),veh/h/ln	1654	1471
Q Serve(g_s), s	14.7	4.3
Cycle Q Clear(g_c), s	14.7	4.3
Prop In Lane		1.00
Lane Grp Cap(c), veh/h	177	158
V/C Ratio(X)	0.98	0.36
Avail Cap(c_a), veh/h	177	158
HCM Platoon Ratio	1.00	1.00
Upstream Filter(l)	1.00	1.00
Uniform Delay (d), s/veh	62.4	41.6
Incr Delay (d2), s/veh	61.9	0.9
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(95%),veh/ln	14.3	3.5
Unsig. Movement Delay, s/veh		
LnGrp Delay(d),s/veh	124.2	42.4
LnGrp LOS	F	D
Approach Vol, veh/h	622	
Approach Delay, s/veh	118.9	
Approach LOS	F	
Timer - Assigned Phs		

HCM Signalized Intersection Capacity Analysis

4: Brutscher St & OR 99W

12/16/2021



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↔	↕	↗	↖	↕	↗	↖	↕		↖	↗
Traffic Volume (vph)	3	21	1221	83	198	1690	41	244	12	129	18	14
Future Volume (vph)	3	21	1221	83	198	1690	41	244	12	129	18	14
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	1.00	1.00	1.00	1.00	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	0.86		1.00	0.88
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	3135	1430	1614	3197	1417	1644	1438		1677	1496
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00	0.71	1.00		0.54	1.00
Satd. Flow (perm)		1646	3135	1430	1614	3197	1417	1232	1438		955	1496
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	3	22	1259	86	204	1742	42	252	12	133	19	14
RTOR Reduction (vph)	0	0	0	30	0	0	13	0	104	0	0	40
Lane Group Flow (vph)	0	25	1259	56	204	1742	29	252	41	0	19	25
Confl. Peds. (#/hr)								1		1	1	
Heavy Vehicles (%)	0%	0%	5%	3%	3%	4%	5%	1%	0%	4%	0%	0%
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA
Protected Phases	5	5	2		1	6			4			8
Permitted Phases				2			6	4				8
Actuated Green, G (s)		4.9	75.8	75.8	21.5	92.4	92.4	30.2	30.2		30.2	30.2
Effective Green, g (s)		4.9	75.8	75.8	21.5	92.4	92.4	30.2	30.2		30.2	30.2
Actuated g/C Ratio		0.04	0.54	0.54	0.15	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)		57	1697	774	247	2110	935	265	310		206	322
v/s Ratio Prot		0.02	c0.40		0.13	c0.54			0.03			0.02
v/s Ratio Perm				0.04			0.02	c0.20			0.02	
v/c Ratio		0.44	0.74	0.07	0.83	0.83	0.03	0.95	0.13		0.09	0.08
Uniform Delay, d1		66.2	24.6	15.3	57.4	17.8	8.3	54.2	44.3		43.9	43.8
Progression Factor		0.96	0.80	0.53	0.92	0.76	0.70	1.00	1.00		1.00	1.00
Incremental Delay, d2		1.6	1.5	0.1	13.8	2.7	0.0	41.8	0.1		0.1	0.1
Delay (s)		65.0	21.1	8.2	66.8	16.2	5.8	96.0	44.5		44.1	43.9
Level of Service		E	C	A	E	B	A	F	D		D	D
Approach Delay (s)			21.1			21.2			77.2			43.9
Approach LOS			C			C			E			D
Intersection Summary												
HCM 2000 Control Delay			27.5			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			12.5			
Intersection Capacity Utilization			86.0%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Brutscher St & OR 99W

12/16/2021

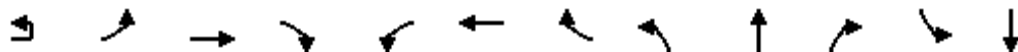


Movement	SBR
Lane Configurations	
Traffic Volume (vph)	49
Future Volume (vph)	49
Ideal Flow (vphpl)	1750
Grade (%)	
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.97
Adj. Flow (vph)	51
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	1
Heavy Vehicles (%)	4%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM 6th Signalized Intersection Summary

4: Brutscher St & OR 99W

12/16/2021



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↔	↕	↗	↖	↕	↗	↖	↕		↖	↗
Traffic Volume (veh/h)	3	21	1221	83	198	1690	41	244	12	129	18	14
Future Volume (veh/h)	3	21	1221	83	198	1690	41	244	12	129	18	14
Initial Q (Qb), veh		0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach			No			No			No			No
Adj Sat Flow, veh/h/ln		1728	1660	1687	1709	1695	1682	1736	1750	1750	1822	1822
Adj Flow Rate, veh/h		22	1259	86	204	1742	42	252	12	81	19	14
Peak Hour Factor		0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %		0	5	3	3	4	5	1	0	0	0	0
Cap, veh/h		27	1701	771	238	2167	959	305	43	291	286	76
Arrive On Green		0.02	0.54	0.54	0.29	1.00	1.00	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h		1646	3154	1430	1628	3221	1425	1346	195	1316	1377	344
Grp Volume(v), veh/h		22	1259	86	204	1742	42	252	0	93	19	0
Grp Sat Flow(s),veh/h/ln		1646	1577	1430	1628	1611	1425	1346	0	1511	1377	0
Q Serve(g_s), s		1.9	42.9	4.1	16.6	0.0	0.0	26.2	0.0	7.1	1.6	0.0
Cycle Q Clear(g_c), s		1.9	42.9	4.1	16.6	0.0	0.0	30.8	0.0	7.1	8.8	0.0
Prop In Lane		1.00		1.00	1.00		1.00	1.00		0.87	1.00	
Lane Grp Cap(c), veh/h		27	1701	771	238	2167	959	305	0	335	286	0
V/C Ratio(X)		0.81	0.74	0.11	0.86	0.80	0.04	0.83	0.00	0.28	0.07	0.00
Avail Cap(c_a), veh/h		129	1701	771	244	2167	959	305	0	335	286	0
HCM Platoon Ratio		1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)		0.42	0.42	0.42	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh		68.6	24.7	15.8	48.1	0.0	0.0	56.7	0.0	45.2	48.9	0.0
Incr Delay (d2), s/veh		13.8	1.3	0.1	23.5	3.3	0.1	16.5	0.0	0.3	0.1	0.0
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln		1.6	19.5	2.4	11.5	1.8	0.0	15.6	0.0	5.0	1.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh		82.5	26.0	15.9	71.6	3.3	0.1	73.2	0.0	45.5	48.9	0.0
LnGrp LOS		F	C	B	E	A	A	E	A	D	D	A
Approach Vol, veh/h			1367			1988			345			84
Approach Delay, s/veh			26.3			10.2			65.7			45.4
Approach LOS			C			B			E			D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	25.0	80.0		35.0	6.3	98.7		35.0				
Change Period (Y+Rc), s	4.5	* 4.5		4.0	4.0	4.5		4.0				
Max Green Setting (Gmax), s	21.0	* 76		31.0	11.0	85.5		31.0				
Max Q Clear Time (g_c+I1), s	18.6	44.9		32.8	3.9	2.0		10.8				
Green Ext Time (p_c), s	0.1	18.4		0.0	0.0	49.9		0.3				

Intersection Summary

HCM 6th Ctrl Delay	21.9
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

4: Brutscher St & OR 99W

12/16/2021



Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	49
Future Volume (veh/h)	49
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1822
Adj Flow Rate, veh/h	51
Peak Hour Factor	0.97
Percent Heavy Veh, %	0
Cap, veh/h	277
Arrive On Green	0.22
Sat Flow, veh/h	1252
Grp Volume(v), veh/h	65
Grp Sat Flow(s),veh/h/ln	1595
Q Serve(g_s), s	4.6
Cycle Q Clear(g_c), s	4.6
Prop In Lane	0.78
Lane Grp Cap(c), veh/h	353
V/C Ratio(X)	0.18
Avail Cap(c_a), veh/h	353
HCM Platoon Ratio	1.00
Upstream Filter(l)	1.00
Uniform Delay (d), s/veh	44.2
Incr Delay (d2), s/veh	0.2
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(95%),veh/ln	3.4
Unsig. Movement Delay, s/veh	
LnGrp Delay(d),s/veh	44.4
LnGrp LOS	D
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	

Intersection							
Int Delay, s/veh	1						
Movement	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↕↕	↕↕		↕↕	
Traffic Vol, veh/h	1	12	1387	1927	66	24	16
Future Vol, veh/h	1	12	1387	1927	66	24	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	None	-	None
Storage Length	-	100	-	-	-	0	-
Veh in Median Storage, #	-	-	0	0	-	0	-
Grade, %	-	-	-2	2	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	5	4	3	5	0
Mvmt Flow	1	13	1445	2007	69	25	17
Major/Minor	Major1		Major2		Minor2		
Conflicting Flow All	2076	2076	0	-	0	2793	1038
Stage 1	-	-	-	-	-	2042	-
Stage 2	-	-	-	-	-	751	-
Critical Hdwy	6.4	4.1	-	-	-	6.9	6.9
Critical Hdwy Stg 1	-	-	-	-	-	5.9	-
Critical Hdwy Stg 2	-	-	-	-	-	5.9	-
Follow-up Hdwy	2.5	2.2	-	-	-	3.55	3.3
Pot Cap-1 Maneuver	68	272	-	-	-	~ 14	231
Stage 1	-	-	-	-	-	83	-
Stage 2	-	-	-	-	-	419	-
Platoon blocked, %			-	-	-		
Mov Cap-1 Maneuver	217	217	-	-	-	~ 13	231
Mov Cap-2 Maneuver	-	-	-	-	-	63	-
Stage 1	-	-	-	-	-	78	-
Stage 2	-	-	-	-	-	419	-
Approach	EB		WB		SB		
HCM Control Delay, s	0.2		0		76.9		
HCM LOS					F		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1		
Capacity (veh/h)	217	-	-	-	89		
HCM Lane V/C Ratio	0.062	-	-	-	0.468		
HCM Control Delay (s)	22.7	-	-	-	76.9		
HCM Lane LOS	C	-	-	-	F		
HCM 95th %tile Q(veh)	0.2	-	-	-	2		
Notes							
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon							

HCM Signalized Intersection Capacity Analysis

6: Providence Dr & OR 99W

12/16/2021



Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↓	↑↑	↓	↑
Traffic Volume (vph)	1387	23	1	54	1916	77	114
Future Volume (vph)	1387	23	1	54	1916	77	114
Ideal Flow (vphpl)	1750	1750	1750	1750	1800	1750	1750
Grade (%)	-3%				2%	3%	
Total Lost time (s)	6.0	6.0		4.5	6.0	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	1510		1646	3225	1638	1451
Fl _t Permitted	1.00	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3214	1510		1646	3225	1638	1451
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1460	24	1	57	2017	81	120
RTOR Reduction (vph)	0	2	0	0	0	0	110
Lane Group Flow (vph)	1460	22	0	58	2017	81	10
Heavy Vehicles (%)	5%	0%	0%	0%	5%	0%	1%
Turn Type	NA	Perm	Prot	Prot	NA	Prot	Perm
Protected Phases	2		1	1	6	8	
Permitted Phases		2					8
Actuated Green, G (s)	104.5	104.5		8.7	117.7	11.8	11.8
Effective Green, g (s)	104.5	104.5		8.7	117.7	11.8	11.8
Actuated g/C Ratio	0.75	0.75		0.06	0.84	0.08	0.08
Clearance Time (s)	6.0	6.0		4.5	6.0	4.5	4.5
Vehicle Extension (s)	4.8	4.8		2.5	4.8	2.5	2.5
Lane Grp Cap (vph)	2399	1127		102	2711	138	122
v/s Ratio Prot	0.45			0.04	c0.63	c0.05	
v/s Ratio Perm		0.01					0.01
v/c Ratio	0.61	0.02		0.57	0.74	0.59	0.08
Uniform Delay, d ₁	8.2	4.6		63.8	4.7	61.8	59.1
Progression Factor	0.12	0.07		1.00	1.00	1.00	1.00
Incremental Delay, d ₂	0.9	0.0		5.8	1.9	5.2	0.2
Delay (s)	1.9	0.3		69.6	6.6	66.9	59.3
Level of Service	A	A		E	A	E	E
Approach Delay (s)	1.9				8.4	62.4	
Approach LOS	A				A	E	

Intersection Summary

HCM 2000 Control Delay	8.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary

6: Providence Dr & OR 99W

12/16/2021



Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↓	↑↑	↓	↑
Traffic Volume (veh/h)	1387	23	1	54	1916	77	114
Future Volume (veh/h)	1387	23	1	54	1916	77	114
Initial Q (Qb), veh	0	0		0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00		1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No		
Adj Sat Flow, veh/h/ln	1790	1859		1728	1707	1701	1688
Adj Flow Rate, veh/h	1460	24		57	2017	81	67
Peak Hour Factor	0.95	0.95		0.95	0.95	0.95	0.95
Percent Heavy Veh, %	5	0		0	5	0	1
Cap, veh/h	2665	1235		72	2789	106	94
Arrive On Green	1.00	1.00		0.04	0.86	0.07	0.07
Sat Flow, veh/h	3490	1575		1646	3330	1620	1430
Grp Volume(v), veh/h	1460	24		57	2017	81	67
Grp Sat Flow(s),veh/h/ln	1700	1575		1646	1622	1620	1430
Q Serve(g_s), s	0.0	0.0		4.8	32.3	6.9	6.4
Cycle Q Clear(g_c), s	0.0	0.0		4.8	32.3	6.9	6.4
Prop In Lane		1.00		1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2665	1235		72	2789	106	94
V/C Ratio(X)	0.55	0.02		0.79	0.72	0.76	0.72
Avail Cap(c_a), veh/h	2665	1235		241	2789	353	312
HCM Platoon Ratio	2.00	2.00		1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00		1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0		66.3	3.6	64.4	64.2
Incr Delay (d2), s/veh	0.8	0.0		13.5	1.7	8.2	7.4
Initial Q Delay(d3),s/veh	0.0	0.0		0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.5	0.0		4.0	8.1	5.6	4.6
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	0.8	0.0		79.8	5.3	72.6	71.5
LnGrp LOS	A	A		E	A	E	E
Approach Vol, veh/h	1484				2074	148	
Approach Delay, s/veh	0.8				7.4	72.1	
Approach LOS	A				A	E	
Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	10.6	115.7				126.3	13.7
Change Period (Y+Rc), s	4.5	6.0				6.0	4.5
Max Green Setting (Gmax), s	20.5	74.0				99.0	30.5
Max Q Clear Time (g_c+I1), s	6.8	2.0				34.3	8.9
Green Ext Time (p_c), s	0.1	34.1				49.0	0.3

Intersection Summary

HCM 6th Ctrl Delay	7.3
HCM 6th LOS	A

Notes

User approved ignoring U-Turning movement.

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑↑	↑↑		↘	
Traffic Vol, veh/h	14	1510	1990	52	31	6
Future Vol, veh/h	14	1510	1990	52	31	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	94	94	94	94	94	94
Heavy Vehicles, %	0	5	5	0	0	0
Mvmt Flow	15	1606	2117	55	33	6

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	2172	0	-	0	2978 1086
Stage 1	-	-	-	-	2145 -
Stage 2	-	-	-	-	833 -
Critical Hdwy	4.1	-	-	-	6.4 6.7
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	2.2	-	-	-	3.5 3.3
Pot Cap-1 Maneuver	249	-	-	-	~ 16 228
Stage 1	-	-	-	-	98 -
Stage 2	-	-	-	-	430 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	249	-	-	-	~ 15 228
Mov Cap-2 Maneuver	-	-	-	-	73 -
Stage 1	-	-	-	-	92 -
Stage 2	-	-	-	-	430 -

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	84.1
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	249	-	-	-	82
HCM Lane V/C Ratio	0.06	-	-	-	0.48
HCM Control Delay (s)	20.4	-	-	-	84.1
HCM Lane LOS	C	-	-	-	F
HCM 95th %tile Q(veh)	0.2	-	-	-	2

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

Appendix D

ODOT Crash Data

Zachary Bugg

From: RICO Jonathan <Jonathan.RICO@odot.state.or.us>
Sent: Wednesday, October 20, 2021 11:10 AM
To: Zachary Bugg
Cc: ODOT TDS Crash Request Group
Subject: RE: Crash Data Request - Newberg, OR -- 20210223
Attachments: jr.Bugg_ISECT_NESpringbrookRd_&_NEBenjaminRd_CDS150.pdf;
jr.Bugg_ISECT_NESpringbrookRd_&_NEBenjaminRd_CDS380.pdf

Good Morning, Zach,

Please find attached crash history reports for the intersection of NE Springbrook Rd & NE Benjamin Rd in Yamhill County. There were no crashes reported at the intersection of NE Springbrook Rd & NE Crestview Dr in the time period requested, so no report was generated.

A link to the CAR Unit's webpage is included below my contact information, there you can find a link to our crash data system code manual and crash data disclaimers. Take a second to review the disclaimers as these apply to all crash data requests.

Please let me know if you have questions or need anything further.

Have a great day!

Jonathan Rico

Crash Reporting Technician
Crash Analysis and Reporting Unit
ODOT Policy, Data & Analysis Division (formerly TDD)
555 13th Street NE, Suite 2
Salem, Oregon 97301-4178
ph: (503) 986-3198
emailto: jonathan.rico@odot.state.or.us
[Crash Analysis and Reporting Unit web page](#)

From: RICO Jonathan <Jonathan.RICO@odot.state.or.us>
Sent: Monday, October 18, 2021 1:43 PM
To: Zachary Bugg <zbugg@kittelton.com>
Cc: ODOT TDS Crash Request Group <ODOTTDSCrashRequestGroup@odot.state.or.us>
Subject: RE: Crash Data Request - Newberg, OR -- 20210223

Hi Zach,

Sure, although this will be considered a 'new' request and subject to standard two week completion timeline.

Best,

Jonathan Rico

Crash Reporting Technician
Crash Analysis and Reporting Unit
ODOT Policy, Data & Analysis Division (formerly TDD)
555 13th Street NE, Suite 2
Salem, Oregon 97301-4178

OREGON DEPARTMENT OF TRANSPORTATION - POLICY, DATA AND ANALYSIS DIVISION
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
 COUNTY ROAD CRASH LISTING

YAMHILL COUNTY
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Intersectional Crashes at NE Springbrook Rd & NE Benjamin Rd in Yamhill County, OR
 January 1, 2015 through December 31, 2019

SER#	E A / C O DATE	MILEPNT	COUNTY ROADS	RD CHAR	INT-TYP	INT-REL	OFF-RD	WTHR	CRASH TYP	SPCL	MOVE	A S	ACTN	EVENT	CAUSE	
INVEST	E L M H R DAY/TIME	DIST FROM	FIRST STREET	DIRECT	(MEDIAN)	TRAF-	RNDBT	SURF	COLL TYP	USE	FROM	G E LICNS PED				
UNLOC?	D C J L K LAT/LONG	INTERSECT	SECOND STREET	LOCTN	(#LANES)	CONTL	DRVWY	LIGHT	SVRTY	TRLR QTY	TO	P# TYPE SVRTY	E X RES	LOC	ERROR	
00276	N N N N N 3/19/2015	1.14	BENJAMIN RD	INTER	3-LEG	N	N	CLD	ANGL-OTH	01 NONE	0 STRGHT				02	
COUNTY	N Thu 5P			CN		STOP SIGN	N	DRY	TURN	PRVTE	S N				000	00
No	45 19 14.54 -122 56 25.92			02	0		N	DAY	INJ	PSNGR CAR		01 DRVR INJC	34 F OR-Y	000	000	00
												02 PSNG NO<5	01 M	000	000	00
										02 NONE	0 TURN-L					
										PRVTE	E S				015	00
										PSNGR CAR		01 DRVR NONE	54 F OR-Y	028	000	02
													OR<25			

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

039 SALMON RIVER Intersectional Crashes* at N Springbrook Rd / Salmon River Hwy (#039) & Portland Rd, Pacific Hwy West (#091) in Newberg, OR
* Includes crashes at turn legs. January 1, 2015 through December 31, 2019

Table with columns: SER#, INVEST, UNLOC?, E, A, L, M, D, C, J, H, L, K, O, DATE, COUNTY, CITY, URBAN AREA, RD#, FC, CMPT/MLG, MILEPNT, LRS, CONN #, INTERSECTION SEQ#, RD CHAR, DIRECT, LOCTN, INT-TYP, INT-REL, TRAF-CNTL, OFFRD, RND, WTHR, SURF, COLL TYP, CRASH TYP, SVRTY, SPCL USE, V#, VEH TYPE, TRLR QTY, MOVE, FROM, P#, TYPE, SVRTY, A, S, G, E, LICNS, PED, RES, LOC, ERROR, ACTN EVENT, CAUSE.

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

091 PACIFIC HIGHWAY WEST Intersectional Crashes* at N Springbrook Rd / Salmon River Hwy (#039) & Portland Rd, Pacific Hwy West (#091) in Newberg, OR
 * Includes crashes at turn legs. January 1, 2015 through December 31, 2019

SER#	E A / C O DATE	COUNTY	RD# FC CONN #	INT-TYP	SPCL USE	MOVE	A S	PED	ACTN	EVENT	CAUSE
INVEST	E L M H R DAY/TIME	CITY	RD CHAR (MEDIAN)	INT-REL	TRLR QTY	FROM	G E LICNS	LOC			
UNLOC?	D C J L K LAT/LONG	URBAN AREA	MILEPNT SECOND STREET INTERSECTION SEQ#	OFFRD WTHR CRASH TYP	OWNER	PRTC INJ	RES	ERROR			
				RND BT SURF COLL TYP	VEH TYPE	SVR TY					
01167	N N N 11/21/2019	YAMHILL	1 14	INTER	01 NONE	STRGHT					29,27
CITY	N Thu 1P	NEWBERG	MN 0 PACIFIC HY 99W	E	PRVTE	E W				000	00
		NEWBERG UA	22.03 SPRINGBROOK RD	06	PSNGR CAR					000	29,27
No	45 18 23.72 -122 56 47.20		009100100S00 1	N DAY INJ			01 DRVR INJB 78 F OR-Y	026		000	OR<25
					02 NONE	STOP				012	00
					PRVTE	E W					
					PSNGR CAR		01 DRVR NONE 71 M OR-Y	000		000	00
							02 PSNG INJC 67 F	000		000	00
00042	Y N N N N 01/10/2016	YAMHILL	1 14	STRGHT	01 NONE	9 STRGHT					01,22
CITY	N Sun 3P	NEWBERG	MN 0 PACIFIC HY 99W	NE	N/A	NE SW				000	00
		NEWBERG UA	22.04 SPRINGBROOK RD	06	PSNGR CAR					000	00
No	45 18 23.40 -122 56 48.08		009100100S00 1	N DAY PDO			01 DRVR NONE 00 U UNK	000		000	00
					02 NONE	STOP				011	00
					N/A	NE SW					
					PSNGR CAR		01 DRVR NONE 00 U UNK	000		000	00
00396	N N N N N 05/01/2019	YAMHILL	1 14	INTER	01 NONE	9 TURN-L					07
CITY	N Wed 9P	NEWBERG	MN 0 PACIFIC HY 99W	CN	N/A	NE S				000	00
		NEWBERG UA	22.04 SPRINGBROOK RD	04	PSNGR CAR					000	00
No	45 18 23.35 -122 56 48.31		009100100S00 1	N DLIT PDO			01 DRVR NONE 00 U UNK	000		000	00
					02 NONE	TURN-L				013	00
					N/A	NE S					
					PSNGR CAR		01 DRVR NONE 00 U UNK	000		000	00
85544	N N N 10/22/2019	YAMHILL	1 14	INTER	01 NONE	9 TURN-R					08
NONE	N Tue 7A	NEWBERG	MN 0 PACIFIC HY 99W	N	N/A	N SW				000	00
		NEWBERG UA	22.05 SPRINGBROOK RD	06	SEMI TOW					000	00
No	45 18 23.12 -122 56 48.94		009100100S00 1	N DAY PDO			01 DRVR NONE 00 U UNK	000		000	00
					02 NONE	STOP				011	00
					N/A	N S					
					PSNGR CAR		01 DRVR NONE 00 U UNK	000		000	00
01136	N N N 11/05/2018	YAMHILL	1 14	INTER	01 NONE	TURN-R					02
CITY	N Mon 5P	NEWBERG	MN 0 PACIFIC HY 99W	NE	PRVTE	S NE				000	00
		NEWBERG UA	22.05 SPRINGBROOK RD	05	PSNGR CAR					000	02
No	45 18 23.13 -122 56 48.94		009100100S00 1	N DLIT INJ			01 DRVR NONE 25 F OR-Y	029		000	OR<25
							STRGHT 01 CONV INJB 16 M	01 000		035	00
							S N				

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

091 PACIFIC HIGHWAY WEST

Intersectional Crashes* at N Springbrook Rd / Salmon River Hwy (#039) & Portland Rd, Pacific Hwy West (#091) in Newberg, OR

* Includes crashes at turn legs. January 1, 2015 through December 31, 2019

SER#	E A / C O DATE	COUNTY	RD#	FC	CONN #	INT-TYP	SPCL USE	MOVE	A S	ACTN	EVENT	CAUSE							
INVEST	E L M H R DAY/TIME	CITY	CMPT/MLG	FIRST STREET	RD CHAR	(MEDIAN)	TRLR QTY	OWNER	FROM	PRTC	INJ	G E LICNS	PED						
UNLOC?	D C J L K LAT/LONG	URBAN AREA	MILEPNT	SECOND STREET	DIRECT	LEGS TRAF-	RND BT SURF	COLL TYP	VEH TYPE	#	TYPE	SVR TY	E X RES	LOC	ERROR				
							02 NONE	STOP											
							PRVTE	NE SW									012	013	00
							PSNGR CAR			01	DRVR	INJC	47 F	OR-Y	000		000		00
													OR<25						
							03 NONE	STOP											
							PRVTE	NE SW									012	013	00
							PSNGR CAR			01	DRVR	INJC	34 F	OR-Y	000		000		00
													OR>25						
							04 NONE	STOP											
							PRVTE	NE SW									012		00
							PSNGR CAR			01	DRVR	NONE	28 M	OTH-Y	000		000		00
													OR>25						
00010	N N N Y 01/04/2017	YAMHILL	1	14		INTER	01 NONE	9 TURN-R											29
NONE	N Wed 5P	NEWBERG	MN	0	PACIFIC HY 99W	NE	N/A	NE N											00
		NEWBERG UA		22.05	SPRINGBROOK RD	09													00
No	45 18 23.12 -122 56 48.94		009100100S00			1				01	DRVR	NONE	00 U	UNK	000		000		00
													UNK						
							02 NONE	9 STOP											
							N/A	NE N									011		00
							PSNGR CAR			01	DRVR	NONE	00 U	UNK	000		000		00
													UNK						
00214	N N N N N 02/28/2015	YAMHILL	1	14		INTER	01 NONE	0 STRGHT											07
CITY	N Sat 5P	NEWBERG	MN	0	PACIFIC HY 99W	SW	PRVTE	SW NE											00
		NEWBERG UA		22.05	SPRINGBROOK RD	06													07
No	45 18 23.12 -122 56 48.94		009100100S00			1				01	DRVR	NONE	52 M	OR-Y	043		000		07
													OR<25						
							02 NONE	0 STRGHT											
							PRVTE	SW NE									006		00
							PSNGR CAR			01	DRVR	INJC	32 M	OR-Y	000		000		00
													OR<25						
00379	N N N N N 04/23/2015	YAMHILL	1	14		INTER	01 NONE	0 STRGHT											32,29
CITY	N Thu 11A	NEWBERG	MN	0	PACIFIC HY 99W	SW	PRVTE	SW NE											00
		NEWBERG UA		22.05	SPRINGBROOK RD	06													00
No	45 18 23.12 -122 56 48.94		009100100S00			1				01	DRVR	NONE	22 F	OR-Y	052,026		000		32,29
													OR<25						
							02 NONE	0 STOP											
							PRVTE	SW NE									011		00
							PSNGR CAR			01	DRVR	NONE	66 M	OR-Y	000		000		00
													OR<25						

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

091 PACIFIC HIGHWAY WEST Intersectional Crashes* at N Springbrook Rd / Salmon River Hwy (#039) & Portland Rd, Pacific Hwy West (#091) in Newberg, OR

* Includes crashes at turn legs. January 1, 2015 through December 31, 2019

SER#	E A / C O DATE	COUNTY	RD#	FC	CONN #	INT-TYP	SPCL USE	MOVE	A S	ACTN	EVENT	CAUSE		
UNLOC?	D C J L K LAT/LONG	URBAN AREA	CMPT/MLG	FIRST STREET	RD CHAR	(MEDIAN)	TRLR QTY	FROM	G E					
INVEST	E L M H R DAY/TIME	CITY	MILEPNT	SECOND STREET	DIRECT	LEGS	OWNER	PRTC	INJ	LICNS	PED			
			LRS	INTERSECTION SEQ#	LOCTN	(#LANES)	V#	VEH TYPE	E X	RES	LOC	ERROR		
00907	N N N 09/05/2018	YAMHILL	1	14		INTER	01	NONE						
NONE	N Wed 12P	NEWBERG	MN	0	PACIFIC HY 99W	SW	01	PRVTE				000		
		NEWBERG UA	22.05	0	SPRINGBROOK RD	06		PSNGR CAR				026,014		
No	45 18 23.12 -122 56 48.94		009100100S00	1					01	DRVR	NONE	24 M OR-Y	000	07,29
												OR<25	000	00
												000	000	00
												000	000	00
00140	N N N Y 02/15/2017	YAMHILL	1	14		INTER	01	NONE						
CITY	N Wed 5A	NEWBERG	MN	0	PACIFIC HY 99W	CN	01	PRVTE				000		
		NEWBERG UA	22.05	2	SPRINGBROOK RD	01		PSNGR CAR				020		
No	45 18 23.12 -122 56 48.94		009100100S00	1					01	DRVR	NONE	46 M OR-Y	000	04
												OR<25	000	00
												000	000	00
												000	000	00
00608	N N N 06/17/2018	YAMHILL	1	14		INTER	01	NONE						
NO RPT	N Sun 6A	NEWBERG	MN	0	PACIFIC HY 99W	CN	01	PRVTE				000		
		NEWBERG UA	22.05	2	SPRINGBROOK RD	01		PSNGR CAR				000		
No	45 18 23.12 -122 56 48.94		009100100S00	1					01	DRVR	INJC	49 M OR-Y	000	00
												OR<25	000	00
												000	000	00
												000	000	00
												000	000	00
00303	N N N 04/05/2019	YAMHILL	1	14		INTER	01	NONE						
CITY	N Fri 10P	NEWBERG	MN	0	PACIFIC HY 99W	CN	01	PRVTE				000		
		NEWBERG UA	22.05	2	SPRINGBROOK RD	01		PSNGR CAR				029,052		
No	45 18 23.12 -122 56 48.94		009100100S00	1					01	DRVR	NONE	19 M OR-Y	000	02,32
												OR<25	000	00
												000	000	00
												000	000	00
00683	N N N N N 07/10/2015	YAMHILL	1	14		INTER	01	NONE						
CITY	N Fri 11P	NEWBERG	MN	0	PACIFIC HY 99W	CN	01	PRVTE				000		
		NEWBERG UA	22.05	2	SPRINGBROOK RD	03		PSNGR CAR				020		
No	45 18 23.12 -122 56 48.94		009100100S00	1					01	DRVR	NONE	23 M OR-Y	000	04
												OR<25	000	00

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

091 PACIFIC HIGHWAY WEST
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Intersectional Crashes at Pacific Hwy West (#091) & N Brutscher St in Newberg, OR
 January 1, 2015 through December 31, 2019

SER#	E A / C O DATE	COUNTY	RD# FC	CONN #	INT-TYP	SPCL USE	MOVE	A S												
INVEST	E L M H R DAY/TIME	CITY	CMPT/MLG	FIRST STREET	RD CHAR	(MEDIAN)	INT-REL	OFFRD WTHR	CRASH TYP	TRLR QTY	OWNER	FROM	PRTC INJ	G E	LICNS	PED				
UNLOC?	D C J L K LAT/LONG	URBAN AREA	MILEPNT	SECOND STREET	DIRECT	LEGS	TRAF-	RNDBT SURF	COLL TYP	VEH TYPE	VEH TYPE	TO	F# TYPE SVRVTY	E X	RES	LOC	ERROR	ACTN EVENT	CAUSE	
00016	N N N N N 01/06/2017	YAMHILL	1 14		INTER	3-LEG	N	N CLD	ANGL-OTH	01 NONE	0	TURN-R							02	
CITY	N Fri 6A	NEWBERG	MN 0	BRUTSCHER ST	NE			N DRY	TURN	PRVTE		SE NE						000	00	
		NEWBERG UA	21.80	PACIFIC HY 99W	05	0		N DARK	INJ	PSNGR CAR			01 DRVR NONE	22	M	OR-Y	028	000	02	
No	45 18 28.53 -122 56 31.38		009100100S00		1														OR>25	
										02 NONE	0	STRGHT							000	00
										PRVTE		SW NE							000	00
										PSNGR CAR			01 DRVR NONE	64	M	OR-Y	000	000	000	00
													02 PSNG INJC	74	F	OR<25	000	000	000	00
00441	N N N 05/08/2015	YAMHILL	1 14		INTER	3-LEG	N	N CLR	S-1STOP	01 NONE	0	STRGHT							29	
NONE	N Fri UNK	NEWBERG	MN 0	BRUTSCHER ST	NE			N DRY	REAR	UNKN		NE SW						000	00	
		NEWBERG UA	21.80	PACIFIC HY 99W	06	0		N DAY	PDO	UNKNOWN			01 DRVR NONE	00	U	UNK	026	000	000	29
No	45 18 28.53 -122 56 31.38		009100100S00		1														UNK	
										02 NONE	0	STOP							011	00
										PRVTE		NE SW							000	00
										PSNGR CAR			01 DRVR NONE	78	M	OR-Y	000	000	000	00
																			OR<25	
01494	N N N 12/08/2016	YAMHILL	1 14		INTER	3-LEG	N	N SNOW	S-1STOP	01 NONE	9	STRGHT							29	
NONE	N Thu 11A	NEWBERG	MN 0	BRUTSCHER ST	NE			N ICE	REAR	N/A		NE SW						000	00	
		NEWBERG UA	21.80	PACIFIC HY 99W	06	0		N DAY	PDO	PSNGR CAR			01 DRVR NONE	00	U	UNK	000	000	000	00
No	45 18 28.53 -122 56 31.38		009100100S00		1														UNK	
										02 NONE	9	STOP							011	00
										N/A		NE SW							000	00
										PSNGR CAR			01 DRVR NONE	00	U	UNK	000	000	000	00
																			UNK	
00522	N N N 05/29/2019	YAMHILL	1 14		INTER	3-LEG	N	N CLR	S-1STOP	01 NONE		STRGHT							29,07	
NONE	N Wed 6P	NEWBERG	MN 0	BRUTSCHER ST	NE			N DRY	REAR	PRVTE		NE SW						000	00	
		NEWBERG UA	21.80	PACIFIC HY 99W	06	0		N DAY	INJ	PSNGR CAR			01 DRVR NONE	33	M	OR-Y	026	000	000	29,07
No	45 18 28.53 -122 56 31.38		009100100S00		1														OR<25	
										02 NONE		STOP							012	00
										PRVTE		NE SW							000	00
										PSNGR CAR			01 DRVR INJC	30	F	OR-Y	000	000	000	00
																			OR<25	
00024	N N N 01/09/2019	YAMHILL	1 14		INTER	3-LEG	N	N UNK	S-1STOP	01 NONE		STRGHT							29	
NO RPT	N Wed 6P	NEWBERG	MN 0	BRUTSCHER ST	S			N WET	REAR	PRVTE		S N						088	00	
		NEWBERG UA	21.80	PACIFIC HY 99W	06	0		N DLIT	INJ	PSNGR CAR			01 DRVR INJC	67	M	OR-Y	026	088	088	29
No	45 18 28.53 -122 56 31.38		009100100S00		1														OR<25	

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

091 PACIFIC HIGHWAY WEST

Intersectional Crashes at Pacific Hwy West (#091) & Providence Dr in Newberg, OR
January 1, 2015 through December 31, 2019

Table with columns: SER#, INVEST, UNLOC?, E A / C O DATE, COUNTY, RD#, FC, CONN #, INT-TYP, RD CHAR, INT-REL, OFFRD WTHR, CRASH TYP, SPCL USE, MOVE, A S, LICNS, PED, ACTN EVENT, CAUSE. Rows include crash details for 00658, 01343, 01096, 00699, and 01050.

ACTION CODE TRANSLATION LIST

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

ACTION CODE TRANSLATION LIST

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

CAUSE CODE TRANSLATION LIST

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

COLLISION TYPE CODE TRANSLATION LIST

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

CRASH TYPE CODE TRANSLATION LIST

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

DRIVER LICENSE CODE TRANSLATION LIST

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

DRIVER RESIDENCE CODE TRANSLATION LIST

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

ERROR CODE TRANSLATION LIST

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

ERROR CODE TRANSLATION LIST

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

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
001	FEL/JUMP	OCCUPANT FELL, JUMPED OR WAS EJECTED FROM MOVING VEHICLE
002	INTERFER	PASSENGER INTERFERED WITH DRIVER
003	BUG INTF	ANIMAL OR INSECT IN VEHICLE INTERFERED WITH DRIVER
004	INDRCT PED	PEDESTRIAN INDIRECTLY INVOLVED (NOT STRUCK)
005	SUB-PED	"SUB-PED": PEDESTRIAN INJURED SUBSEQUENT TO COLLISION, ETC.
006	INDRCT BIK	PEDALCYCLIST INDIRECTLY INVOLVED (NOT STRUCK)
007	HITCHIKR	HITCHHIKER (SOLICITING A RIDE)
008	PSNGR TOW	PASSENGER OR NON-MOTORIST BEING TOWED OR PUSHED ON CONVEYANCE
009	ON/OFF V	GETTING ON/OFF STOPPED/PARKED VEHICLE (OCCUPANTS ONLY; MUST HAVE PHYSICAL CONTACT W/ VEHICLE)
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

EVENT CODE TRANSLATION LIST

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

EVENT CODE TRANSLATION LIST

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

FUNCTIONAL CLASSIFICATION TRANSLATION LIST

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

HIGHWAY COMPONENT TRANSLATION LIST

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

INJURY SEVERITY CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
1	KILL	FATAL INJURY (K)
2	INJA	SUSPECTED SERIOUS INJURY (A)
3	INJB	SUSPECTED MINOR INJURY (B)
4	INJC	POSSIBLE INJURY (C)
5	PRI	DIED PRIOR TO CRASH
7	NO<5	NO INJURY - 0 TO 4 YEARS OF AGE
9	NONE	NO APPARENT INJURY (O)

LIGHT CONDITION CODE TRANSLATION LIST

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

MEDIAN TYPE CODE TRANSLATION LIST

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

MILEAGE TYPE CODE TRANSLATION LIST

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

MOVEMENT TYPE CODE TRANSLATION LIST

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

NON-MOTORIST LOCATION CODE TRANSLATION LIST

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

ROAD CHARACTER CODE TRANSLATION LIST

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

PARTICIPANT TYPE CODE TRANSLATION LIST

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

TRAFFIC CONTROL DEVICE CODE TRANSLATION LIST

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

Year 2026 Background Conditions Level of Service Worksheets

HCS7 Roundabouts Report

General Information				Site Information			
Analyst	MRR			Intersection	Springbrook/Crestview		
Agency or Co.	KAI			E/W Street Name	Crestview Dr		
Date Performed	12/6/2021			N/S Street Name	Springbrook Rd		
Analysis Year	2026			Analysis Time Period (hrs)	0.25		
Time Analyzed	Background AM			Peak Hour Factor	0.87		
Project Description	Crestview Green			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	13	10	3	0	20	19	88	1	10	149	12	0	221	59	23
Percent Heavy Vehicles, %	0	17	100	0	0	60	0	0	0	8	7	88	0	0	6	5
Flow Rate (v _{pc}), pc/h	0	17	23	3	0	37	22	101	1	12	183	26	0	254	72	28
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)		4.9763			4.9763			4.9763			4.9763	
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		43			160			222			354	
Entry Volume veh/h		29			146			197			349	
Circulating Flow (v _c), pc/h	364			213			294			72		
Exiting Flow (v _{ex}), pc/h	303			62			301			113		
Capacity (c _{pc}), pc/h		952			1111			1022			1282	
Capacity (c), veh/h		643			1014			907			1263	
v/c Ratio (x)		0.05			0.14			0.22			0.28	

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		6.1			4.9			6.2			5.3	
Lane LOS		A			A			A			A	
95% Queue, veh		0.1			0.5			0.8			1.1	
Approach Delay, s/veh	6.1			4.9			6.2			5.3		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh LOS	5.5						A					

HCM 6th TWSC
2: N Sprinbrook Rd & NE Benjamin Rd

12/16/2021

Intersection						
Int Delay, s/veh	2.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	23	8	45	38	13	47
Future Vol, veh/h	23	8	45	38	13	47
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	4	25	8	3	0	9
Mvmt Flow	27	9	52	44	15	55

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	159	74	0	0	96
Stage 1	74	-	-	-	-
Stage 2	85	-	-	-	-
Critical Hdwy	6.44	6.45	-	-	4.1
Critical Hdwy Stg 1	5.44	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-
Follow-up Hdwy	3.536	3.525	-	-	2.2
Pot Cap-1 Maneuver	827	927	-	-	1510
Stage 1	944	-	-	-	-
Stage 2	933	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	819	927	-	-	1510
Mov Cap-2 Maneuver	819	-	-	-	-
Stage 1	944	-	-	-	-
Stage 2	924	-	-	-	-

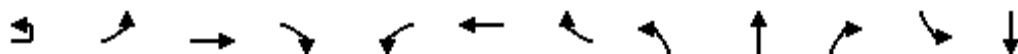
Approach	WB	NB	SB
HCM Control Delay, s	9.5	0	1.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	844	1510
HCM Lane V/C Ratio	-	-	0.043	0.01
HCM Control Delay (s)	-	-	9.5	7.4
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0

HCM Signalized Intersection Capacity Analysis

3: Springbrook Rd & OR 99W

12/16/2021



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↔	↕	↗	↖	↕	↗	↖	↕	↗	↖	↕
Traffic Volume (vph)	2	34	1185	74	265	722	57	118	111	361	81	104
Future Volume (vph)	2	34	1185	74	265	722	57	118	111	361	81	104
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1800	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
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
Frbp, ped/bikes		1.00	1.00	0.99	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
Frt		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1614	3167	1468	2880	3167	1390	3084	1539	1357	3131	1620
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)		1614	3167	1468	2880	3167	1390	3084	1539	1357	3131	1620
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	2	37	1302	81	291	793	63	130	122	397	89	114
RTOR Reduction (vph)	0	0	0	39	0	0	24	0	0	280	0	0
Lane Group Flow (vph)	0	39	1302	42	291	793	39	130	122	117	89	114
Confl. Peds. (#/hr)				1	1			3				
Heavy Vehicles (%)	3%	3%	5%	0%	12%	8%	7%	3%	12%	8%	3%	8%
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA
Protected Phases	5	5	2		1	6		3	8		7	4
Permitted Phases				2			6			8		
Actuated Green, G (s)		5.5	62.8	62.8	16.6	73.9	73.9	10.5	15.2	15.2	8.9	13.6
Effective Green, g (s)		5.5	62.8	62.8	16.6	73.9	73.9	10.5	15.2	15.2	8.9	13.6
Actuated g/C Ratio		0.05	0.52	0.52	0.14	0.62	0.62	0.09	0.13	0.13	0.07	0.11
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
Vehicle Extension (s)		2.3	4.0	4.0	2.3	4.0	4.0	2.3	2.3	2.3	2.3	2.3
Lane Grp Cap (vph)		73	1657	768	398	1950	856	269	194	171	232	183
v/s Ratio Prot		0.02	c0.41		c0.10	0.25		c0.04	0.08		0.03	0.07
v/s Ratio Perm				0.03			0.03			c0.09		
v/c Ratio		0.53	0.79	0.06	0.73	0.41	0.05	0.48	0.63	0.68	0.38	0.62
Uniform Delay, d1		56.0	23.2	14.0	49.6	11.8	9.1	52.2	49.7	50.1	52.9	50.8
Progression Factor		1.00	1.00	1.00	0.99	0.62	0.85	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		4.9	3.8	0.1	5.6	0.6	0.1	0.8	5.1	9.3	0.6	5.2
Delay (s)		60.9	27.0	14.2	54.5	7.9	7.9	53.0	54.8	59.4	53.6	56.0
Level of Service		E	C	B	D	A	A	D	D	E	D	E
Approach Delay (s)			27.2			19.7			57.3			52.9
Approach LOS			C			B			E			D
Intersection Summary												
HCM 2000 Control Delay			32.4			HCM 2000 Level of Service					C	
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)					16.5	
Intersection Capacity Utilization			73.6%			ICU Level of Service					D	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

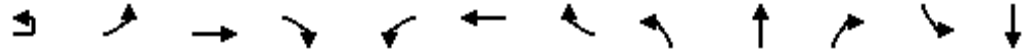
3: Springbrook Rd & OR 99W

12/16/2021

Movement	SBR
Lane Configurations	7
Traffic Volume (vph)	69
Future Volume (vph)	69
Ideal Flow (vphpl)	1750
Grade (%)	
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Frbp, ped/bikes	0.98
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1382
Flt Permitted	1.00
Satd. Flow (perm)	1382
Peak-hour factor, PHF	0.91
Adj. Flow (vph)	76
RTOR Reduction (vph)	67
Lane Group Flow (vph)	9
Confl. Peds. (#/hr)	3
Heavy Vehicles (%)	6%
Turn Type	Perm
Protected Phases	
Permitted Phases	4
Actuated Green, G (s)	13.6
Effective Green, g (s)	13.6
Actuated g/C Ratio	0.11
Clearance Time (s)	4.0
Vehicle Extension (s)	2.3
Lane Grp Cap (vph)	156
v/s Ratio Prot	
v/s Ratio Perm	0.01
v/c Ratio	0.06
Uniform Delay, d1	47.5
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	47.6
Level of Service	D
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM 6th Signalized Intersection Summary
 3: Springbrook Rd & OR 99W

12/16/2021



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↔	↕	↗	↖	↕	↗	↖	↕	↗	↖	↕
Traffic Volume (veh/h)	2	34	1185	74	265	722	57	118	111	361	81	104
Future Volume (veh/h)	2	34	1185	74	265	722	57	118	111	361	81	104
Initial Q (Qb), veh		0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach			No			No			No			No
Adj Sat Flow, veh/h/ln		1709	1682	1750	1586	1688	1654	1660	1537	1592	1709	1641
Adj Flow Rate, veh/h		37	1302	0	291	793	0	130	122	232	89	114
Peak Hour Factor		0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %		3	5	0	12	8	7	3	12	8	3	8
Cap, veh/h		45	1345		643	1977		373	269	235	136	158
Arrive On Green		0.03	0.42	0.00	0.22	0.62	0.00	0.12	0.17	0.17	0.04	0.10
Sat Flow, veh/h		1628	3195	1483	2931	3207	1402	3067	1537	1342	3158	1641
Grp Volume(v), veh/h		37	1302	0	291	793	0	130	122	232	89	114
Grp Sat Flow(s),veh/h/ln		1628	1598	1483	1465	1603	1402	1534	1537	1342	1579	1641
Q Serve(g_s), s		2.7	47.8	0.0	10.3	15.1	0.0	4.7	8.5	20.7	3.3	8.1
Cycle Q Clear(g_c), s		2.7	47.8	0.0	10.3	15.1	0.0	4.7	8.5	20.7	3.3	8.1
Prop In Lane		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h		45	1345		643	1977		373	269	235	136	158
V/C Ratio(X)		0.81	0.97		0.45	0.40		0.35	0.45	0.99	0.66	0.72
Avail Cap(c_a), veh/h		149	1345		643	1977		409	269	235	421	287
HCM Platoon Ratio		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)		1.00	1.00	0.00	0.88	0.88	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh		58.0	34.0	0.0	40.6	11.7	0.0	48.3	44.4	49.4	56.5	52.7
Incr Delay (d2), s/veh		18.7	18.0	0.0	0.3	0.5	0.0	0.3	0.7	55.0	3.3	3.8
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln		2.4	28.1	0.0	6.6	8.5	0.0	3.3	6.0	15.9	2.5	6.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh		76.8	52.0	0.0	40.8	12.3	0.0	48.7	45.1	104.4	59.8	56.4
LnGrp LOS		E	D		D	B		D	D	F	E	E
Approach Vol, veh/h			1339	A		1084	A		484			279
Approach Delay, s/veh			52.7			19.9			74.5			54.1
Approach LOS			D			B			E			D
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	30.8	55.0	18.6	15.6	7.3	78.5	9.2	25.0				
Change Period (Y+Rc), s	4.5	* 4.5	4.0	4.0	4.0	4.5	4.0	4.0				
Max Green Setting (Gmax), s	16.0	* 51	16.0	21.0	11.0	55.5	16.0	21.0				
Max Q Clear Time (g_c+I1), s	12.3	49.8	6.7	10.1	4.7	17.1	5.3	22.7				
Green Ext Time (p_c), s	0.2	0.6	0.2	0.4	0.0	8.5	0.1	0.0				

Intersection Summary

HCM 6th Ctrl Delay	45.0
HCM 6th LOS	D

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved ignoring U-Turning movement.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

3: Springbrook Rd & OR 99W

12/16/2021

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	69
Future Volume (veh/h)	69
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	0.99
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1668
Adj Flow Rate, veh/h	76
Peak Hour Factor	0.91
Percent Heavy Veh, %	6
Cap, veh/h	135
Arrive On Green	0.10
Sat Flow, veh/h	1400
Grp Volume(v), veh/h	76
Grp Sat Flow(s),veh/h/ln	1400
Q Serve(g_s), s	5.6
Cycle Q Clear(g_c), s	5.6
Prop In Lane	1.00
Lane Grp Cap(c), veh/h	135
V/C Ratio(X)	0.56
Avail Cap(c_a), veh/h	245
HCM Platoon Ratio	1.00
Upstream Filter(l)	1.00
Uniform Delay (d), s/veh	41.5
Incr Delay (d2), s/veh	2.2
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(95%),veh/ln	3.7
Unsig. Movement Delay, s/veh	
LnGrp Delay(d),s/veh	43.8
LnGrp LOS	D
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	
Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.	

HCM Signalized Intersection Capacity Analysis

4: Brutscher St & OR 99W

12/16/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	1559	41	84	1034	28	49	4	97	21	6	27
Future Volume (vph)	25	1559	41	84	1034	28	49	4	97	21	6	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	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.86		1.00	0.88	
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)	1372	3135	1364	1583	3079	1171	1599	1402		1411	1235	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.73	1.00		0.47	1.00	
Satd. Flow (perm)	1372	3135	1364	1583	3079	1171	1233	1402		693	1235	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	27	1713	45	92	1136	31	54	4	107	23	7	30
RTOR Reduction (vph)	0	0	13	0	0	7	0	98	0	0	27	0
Lane Group Flow (vph)	27	1713	32	92	1136	24	54	13	0	23	10	0
Heavy Vehicles (%)	20%	5%	8%	5%	8%	27%	4%	0%	7%	19%	33%	24%
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)	5.1	85.8	85.8	11.6	92.3	92.3	10.1	10.1		10.1	10.1	
Effective Green, g (s)	5.1	85.8	85.8	11.6	92.3	92.3	10.1	10.1		10.1	10.1	
Actuated g/C Ratio	0.04	0.71	0.71	0.10	0.77	0.77	0.08	0.08		0.08	0.08	
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)	58	2241	975	153	2368	900	103	118		58	103	
v/s Ratio Prot	0.02	c0.55		c0.06	0.37			0.01				0.01
v/s Ratio Perm			0.02			0.02	c0.04			0.03		
v/c Ratio	0.47	0.76	0.03	0.60	0.48	0.03	0.52	0.11		0.40	0.09	
Uniform Delay, d1	56.1	10.7	5.0	52.0	5.1	3.3	52.6	50.8		52.1	50.7	
Progression Factor	0.80	0.87	1.67	1.45	0.07	0.01	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.2	1.7	0.0	4.1	0.6	0.0	3.6	0.3		3.2	0.3	
Delay (s)	47.2	11.0	8.4	79.7	0.9	0.1	56.3	51.1		55.3	51.0	
Level of Service	D	B	A	E	A	A	E	D		E	D	
Approach Delay (s)		11.5			6.7			52.8			52.6	
Approach LOS		B			A			D			D	

Intersection Summary

HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary

4: Brutscher St & OR 99W

12/16/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (veh/h)	25	1559	41	84	1034	28	49	4	97	21	6	27
Future Volume (veh/h)	25	1559	41	84	1034	28	49	4	97	21	6	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1455	1660	1619	1682	1641	1381	1695	1750	1750	1560	1366	1366
Adj Flow Rate, veh/h	27	1713	45	92	1136	31	54	4	107	23	7	30
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	20	5	8	5	8	27	4	0	0	19	33	33
Cap, veh/h	30	2265	985	111	2388	897	168	6	156	102	24	105
Arrive On Green	0.03	0.95	0.95	0.14	1.00	1.00	0.11	0.11	0.11	0.11	0.11	0.11
Sat Flow, veh/h	1386	3154	1372	1602	3118	1171	1349	54	1438	1161	226	967
Grp Volume(v), veh/h	27	1713	45	92	1136	31	54	0	111	23	0	37
Grp Sat Flow(s),veh/h/ln	1386	1577	1372	1602	1559	1171	1349	0	1491	1161	0	1192
Q Serve(g_s), s	2.3	10.6	0.2	6.7	0.0	0.0	4.6	0.0	8.6	2.3	0.0	3.4
Cycle Q Clear(g_c), s	2.3	10.6	0.2	6.7	0.0	0.0	8.0	0.0	8.6	10.9	0.0	3.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.96	1.00		0.81
Lane Grp Cap(c), veh/h	30	2265	985	111	2388	897	168	0	161	102	0	129
V/C Ratio(X)	0.91	0.76	0.05	0.83	0.48	0.03	0.32	0.00	0.69	0.22	0.00	0.29
Avail Cap(c_a), veh/h	127	2265	985	187	2388	897	224	0	224	151	0	179
HCM Platoon Ratio	1.33	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.55	0.55	0.55	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	58.2	1.0	0.8	50.9	0.0	0.0	52.9	0.0	51.5	56.8	0.0	49.2
Incr Delay (d2), s/veh	26.4	1.3	0.0	9.1	0.7	0.1	0.8	0.0	3.8	0.8	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.8	2.3	0.1	4.9	0.4	0.0	2.9	0.0	6.2	1.3	0.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	84.6	2.3	0.8	60.0	0.7	0.1	53.7	0.0	55.4	57.6	0.0	50.1
LnGrp LOS	F	A	A	E	A	A	D	A	E	E	A	D
Approach Vol, veh/h		1785			1259			165				60
Approach Delay, s/veh		3.5			5.0			54.8				53.0
Approach LOS		A			A			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.3	90.7		17.0	6.6	96.4		17.0				
Change Period (Y+Rc), s	4.0	4.5		4.0	4.0	4.5		4.0				
Max Green Setting (Gmax), s	14.0	75.5		18.0	11.0	78.5		18.0				
Max Q Clear Time (g_c+I1), s	8.7	12.6		10.6	4.3	2.0		12.9				
Green Ext Time (p_c), s	0.0	41.1		0.3	0.0	22.6		0.1				

Intersection Summary

HCM 6th Ctrl Delay	7.6
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↙	↑↑	↑↑		↘	
Traffic Vol, veh/h	4	1647	1204	21	38	21
Future Vol, veh/h	4	1647	1204	21	38	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-2	2	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	50	5	10	11	0	0
Mvmt Flow	5	1872	1368	24	43	24

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	1392	0	-	0	2326 696
Stage 1	-	-	-	-	1380 -
Stage 2	-	-	-	-	946 -
Critical Hdwy	5.1	-	-	-	6.8 6.9
Critical Hdwy Stg 1	-	-	-	-	5.8 -
Critical Hdwy Stg 2	-	-	-	-	5.8 -
Follow-up Hdwy	2.7	-	-	-	3.5 3.3
Pot Cap-1 Maneuver	299	-	-	-	~ 32 389
Stage 1	-	-	-	-	202 -
Stage 2	-	-	-	-	343 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	299	-	-	-	~ 31 389
Mov Cap-2 Maneuver	-	-	-	-	128 -
Stage 1	-	-	-	-	199 -
Stage 2	-	-	-	-	343 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	40
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	299	-	-	-	168
HCM Lane V/C Ratio	0.015	-	-	-	0.399
HCM Control Delay (s)	17.2	-	-	-	40
HCM Lane LOS	C	-	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	1.8

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

HCM Signalized Intersection Capacity Analysis

6: Providence Dr/Crestview Dr & OR 99W

12/16/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	1613	47	98	1127	77	25	11	60	238	21	73
Future Volume (vph)	25	1613	47	98	1127	77	25	11	60	238	21	73
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)	1687	3214	1424	1614	3135	1473	1575	1724	1423	1646	1732	1473
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)	1687	3214	1424	1614	3135	1473	1229	1724	1423	1298	1732	1473
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	28	1833	53	111	1281	88	28	12	68	270	24	83
RTOR Reduction (vph)	0	0	24	0	0	34	0	0	52	0	0	63
Lane Group Flow (vph)	28	1833	29	111	1281	54	28	13	16	270	24	20
Heavy Vehicles (%)	0%	5%	6%	2%	8%	0%	4%	0%	3%	0%	0%	0%
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	66.4	66.4	10.4	73.2	73.2	28.2	28.2	28.2	28.2	28.2	28.2
Effective Green, g (s)	3.6	66.4	66.4	10.4	73.2	73.2	28.2	28.2	28.2	28.2	28.2	28.2
Actuated g/C Ratio	0.03	0.55	0.55	0.09	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)	50	1778	787	139	1912	898	288	405	334	305	407	346
v/s Ratio Prot	0.02	c0.57		c0.07	0.41			0.01			0.01	
v/s Ratio Perm			0.02			0.04	0.02		0.01	c0.21		0.01
v/c Ratio	0.56	1.03	0.04	0.80	0.67	0.06	0.10	0.03	0.05	0.89	0.06	0.06
Uniform Delay, d1	57.4	26.8	12.2	53.8	15.4	9.5	35.9	35.4	35.5	44.3	35.6	35.6
Progression Factor	0.97	1.31	2.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.6	26.3	0.1	27.7	1.9	0.1	0.2	0.0	0.1	25.4	0.1	0.1
Delay (s)	67.5	61.5	36.5	81.5	17.3	9.6	36.1	35.4	35.6	69.7	35.7	35.7
Level of Service	E	E	D	F	B	A	D	D	D	E	D	D
Approach Delay (s)		60.9			21.7			35.7			60.1	
Approach LOS		E			C			D			E	

Intersection Summary

HCM 2000 Control Delay	45.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
6: Providence Dr/Crestview Dr & OR 99W

12/16/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (veh/h)	25	1613	47	98	1127	77	25	11	60	238	21	73
Future Volume (veh/h)	25	1613	47	98	1127	77	25	11	60	238	21	73
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1859	1790	1776	1701	1665	1728	1647	1701	1660	1728	1728	1728
Adj Flow Rate, veh/h	28	1833	53	111	1281	88	28	12	68	270	24	83
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	0	5	6	2	8	0	4	0	3	0	0	0
Cap, veh/h	45	1931	855	128	1928	893	327	388	320	354	394	334
Arrive On Green	0.02	0.38	0.38	0.08	0.61	0.61	0.23	0.23	0.23	0.23	0.23	0.23
Sat Flow, veh/h	1770	3400	1505	1620	3164	1465	1230	1701	1407	1323	1728	1465
Grp Volume(v), veh/h	28	1833	53	111	1281	88	28	12	68	270	24	83
Grp Sat Flow(s),veh/h/ln	1770	1700	1505	1620	1582	1465	1230	1701	1407	1323	1728	1465
Q Serve(g_s), s	1.9	62.7	2.7	8.1	31.9	3.0	2.2	0.7	4.7	23.9	1.3	5.6
Cycle Q Clear(g_c), s	1.9	62.7	2.7	8.1	31.9	3.0	3.5	0.7	4.7	24.6	1.3	5.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	45	1931	855	128	1928	893	327	388	320	354	394	334
V/C Ratio(X)	0.63	0.95	0.06	0.87	0.66	0.10	0.09	0.03	0.21	0.76	0.06	0.25
Avail Cap(c_a), veh/h	89	1931	855	128	1928	893	359	432	358	389	439	372
HCM Platoon Ratio	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.4	35.5	16.9	54.6	15.4	9.7	37.7	36.0	37.6	45.6	36.3	37.9
Incr Delay (d2), s/veh	18.6	11.5	0.1	43.0	1.8	0.2	0.2	0.0	0.5	8.7	0.1	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.9	38.2	1.6	8.3	15.4	1.6	1.2	0.5	3.0	13.6	1.0	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	77.1	47.0	17.0	97.6	17.2	10.0	37.8	36.1	38.1	54.3	36.4	38.5
LnGrp LOS	E	D	B	F	B	A	D	D	D	D	D	D
Approach Vol, veh/h		1914			1480			108			377	
Approach Delay, s/veh		46.6			22.8			37.8			49.7	
Approach LOS		D			C			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	14.0	74.2		31.8	9.0	79.1		31.8				
Change Period (Y+Rc), s	4.5	6.0		4.5	6.0	* 6		4.5				
Max Green Setting (Gmax), s	9.5	65.0		30.5	6.0	* 69		30.5				
Max Q Clear Time (g_c+I1), s	10.1	64.7		26.6	3.9	33.9		6.7				
Green Ext Time (p_c), s	0.0	0.3		0.7	0.0	15.6		0.5				

Intersection Summary

HCM 6th Ctrl Delay	37.6
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑↑	↑↑		↘	
Traffic Vol, veh/h	5	1924	1309	27	51	6
Future Vol, veh/h	5	1924	1309	27	51	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	89	89	89	89	89	89
Heavy Vehicles, %	0	5	9	4	0	0
Mvmt Flow	6	2162	1471	30	57	7

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	1501	0	-	0	2579 751
Stage 1	-	-	-	-	1486 -
Stage 2	-	-	-	-	1093 -
Critical Hdwy	4.1	-	-	-	6.4 6.7
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	2.2	-	-	-	3.5 3.3
Pot Cap-1 Maneuver	452	-	-	-	~ 29 373
Stage 1	-	-	-	-	209 -
Stage 2	-	-	-	-	324 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	452	-	-	-	~ 29 373
Mov Cap-2 Maneuver	-	-	-	-	127 -
Stage 1	-	-	-	-	206 -
Stage 2	-	-	-	-	324 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	53.1
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	452	-	-	-	136
HCM Lane V/C Ratio	0.012	-	-	-	0.471
HCM Control Delay (s)	13.1	-	-	-	53.1
HCM Lane LOS	B	-	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	2.2

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

HCS7 Roundabouts Report

General Information				Site Information			
Analyst	ZHB			Intersection	Crestview Dr/Jory Rd		
Agency or Co.	KAI			E/W Street Name	Jory Rd		
Date Performed	10/21/2021			N/S Street Name	Crestview Dr		
Analysis Year	2026			Analysis Time Period (hrs)	0.25		
Time Analyzed	Background AM			Peak Hour Factor	0.88		
Project Description	Crestview Green			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
Movement																
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	90	13	0	5	261	5
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	16	0	36	0	44	0	19	0	12	104	15	0	6	303	6
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)		4.9763			4.9763			4.9763			4.9763	
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		52			63			131			315	
Entry Volume veh/h		52			63			129			309	
Circulating Flow (v _c), pc/h	353			132			22			56		
Exiting Flow (v _{ex}), pc/h	21			18			139			383		
Capacity (C _{PCE}), pc/h		963			1206			1349			1303	
Capacity (C), veh/h		963			1206			1328			1279	
v/c Ratio (x)		0.05			0.05			0.10			0.24	

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		4.2			3.4			3.5			4.9	
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			4.9		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh LOS	4.3						A					

HCS7 Roundabouts Report

General Information				Site Information			
Analyst	MRR			Intersection	Springbrook/Crestview		
Agency or Co.	KAI			E/W Street Name	Crestview Dr		
Date Performed	12/6/2021			N/S Street Name	Springbrook Rd		
Analysis Year	2026			Analysis Time Period (hrs)	0.25		
Time Analyzed	Background PM			Peak Hour Factor	0.81		
Project Description	Crestview Green			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	78	18	40	0	15	12	160	3	22	224	13	4	193	265	54
Percent Heavy Vehicles, %	0	12	0	0	0	0	0	0	0	12	5	0	0	0	4	9
Flow Rate (v _{pc}), pc/h	0	108	22	49	0	19	15	198	4	30	290	16	5	238	340	73
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				2				2				7			

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)		4.9763			4.9763			4.9763			4.9763	
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		179			232			340			656	
Entry Volume veh/h		167			232			323			637	
Circulating Flow (v _c), pc/h	606			437			373			68		
Exiting Flow (v _{ex}), pc/h	276			118			601			412		
Capacity (c _{pc}), pc/h		744			884			943			1288	
Capacity (c), veh/h		696			883			896			1249	
v/c Ratio (x)		0.24			0.26			0.36			0.51	

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		8.0			6.8			8.1			8.4	
Lane LOS		A			A			A			A	
95% Queue, veh		0.9			1.1			1.7			3.0	
Approach Delay, s/veh	8.0			6.8			8.1			8.4		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh LOS	8.0						A					

HCM 6th TWSC
2: N Springbrook Rd & NE Benjamin Rd

12/16/2021

Intersection						
Int Delay, s/veh	2.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	48	11	84	29	16	110
Future Vol, veh/h	48	11	84	29	16	110
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	0	1	0	0	3
Mvmt Flow	55	13	95	33	18	125

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	273	112	0	0	128	0
Stage 1	112	-	-	-	-	-
Stage 2	161	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	721	947	-	-	1470	-
Stage 1	918	-	-	-	-	-
Stage 2	873	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	712	947	-	-	1470	-
Mov Cap-2 Maneuver	712	-	-	-	-	-
Stage 1	918	-	-	-	-	-
Stage 2	862	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.3	0	0.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	747	1470
HCM Lane V/C Ratio	-	-	0.09	0.012
HCM Control Delay (s)	-	-	10.3	7.5
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.3	0

HCM Signalized Intersection Capacity Analysis

3: Springbrook Rd & OR 99W

12/16/2021



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	
Lane Configurations		↔	↕	↗	↖	↕	↗		↖	↕	↗	↖	
Traffic Volume (vph)	5	99	1210	105	458	1426	63	1	322	188	338	201	
Future Volume (vph)	5	99	1210	105	458	1426	63	1	322	188	338	201	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1800	1750	1750	1750	1750	1750	1750	
Grade (%)			0%			0%				3%			
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	0.97	0.95	1.00		0.97	1.00	1.00	0.97	
Frbp, ped/bikes		1.00	1.00	0.99	1.00	1.00	0.97		1.00	1.00	0.98	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85	1.00	
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	0.95	
Satd. Flow (prot)		1646	3197	1466	3014	3320	1414		3145	1626	1348	3193	
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	0.95	
Satd. Flow (perm)		1646	3197	1466	3014	3320	1414		3145	1626	1348	3193	
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)	5	105	1287	112	487	1517	67	1	343	200	360	214	
RTOR Reduction (vph)	0	0	0	60	0	0	30	0	0	0	256	0	
Lane Group Flow (vph)	0	110	1287	52	487	1517	37	0	344	200	104	214	
Confl. Peds. (#/hr)		5		2	2		5		3		3	3	
Confl. Bikes (#/hr)				1									
Heavy Vehicles (%)	1%	1%	4%	0%	7%	3%	2%	1%	1%	6%	7%	1%	
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot	
Protected Phases	5	5	2		1	6		3	3	8		7	
Permitted Phases				2			6				8		
Actuated Green, G (s)		12.5	64.4	64.4	26.1	78.0	78.0		18.0	18.0	18.0	15.0	
Effective Green, g (s)		12.5	64.4	64.4	26.1	78.0	78.0		18.0	18.0	18.0	15.0	
Actuated g/C Ratio		0.09	0.46	0.46	0.19	0.56	0.56		0.13	0.13	0.13	0.11	
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	4.0	4.0	2.3	4.0	4.0		2.3	2.3	2.3	2.3	
Lane Grp Cap (vph)		146	1470	674	561	1849	787		404	209	173	342	
v/s Ratio Prot		0.07	c0.40		c0.16	0.46			c0.11	c0.12		0.07	
v/s Ratio Perm				0.04			0.03				0.08		
v/c Ratio		0.75	0.88	0.08	0.87	0.82	0.05		0.85	0.96	0.60	0.63	
Uniform Delay, d1		62.2	34.2	21.2	55.3	25.3	14.1		59.7	60.6	57.6	59.8	
Progression Factor		1.00	1.00	1.00	1.05	0.87	2.07		1.00	1.00	1.00	1.00	
Incremental Delay, d2		18.2	7.6	0.2	7.5	2.3	0.1		15.4	49.4	4.5	2.9	
Delay (s)		80.5	41.8	21.4	65.5	24.2	29.2		75.1	110.0	62.1	62.7	
Level of Service		F	D	C	E	C	C		E	F	E	E	
Approach Delay (s)			43.1			34.1				77.6			
Approach LOS			D			C				E			
Intersection Summary													
HCM 2000 Control Delay			49.7		HCM 2000 Level of Service					D			
HCM 2000 Volume to Capacity ratio			0.89										
Actuated Cycle Length (s)			140.0		Sum of lost time (s)					16.5			
Intersection Capacity Utilization			85.1%		ICU Level of Service					E			
Analysis Period (min)			15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: Springbrook Rd & OR 99W

12/16/2021

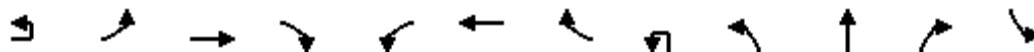


Movement	SBT	SBR
Lane Configurations	↑	↗
Traffic Volume (vph)	164	101
Future Volume (vph)	164	101
Ideal Flow (vphpl)	1750	1750
Grade (%)	0%	
Total Lost time (s)	4.0	4.0
Lane Util. Factor	1.00	1.00
Frpb, ped/bikes	1.00	0.98
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	1636	1464
Flt Permitted	1.00	1.00
Satd. Flow (perm)	1636	1464
Peak-hour factor, PHF	0.94	0.94
Adj. Flow (vph)	174	107
RTOR Reduction (vph)	0	96
Lane Group Flow (vph)	174	11
Confl. Peds. (#/hr)		3
Confl. Bikes (#/hr)		
Heavy Vehicles (%)	7%	0%
Turn Type	NA	Perm
Protected Phases	4	
Permitted Phases		4
Actuated Green, G (s)	15.0	15.0
Effective Green, g (s)	15.0	15.0
Actuated g/C Ratio	0.11	0.11
Clearance Time (s)	4.0	4.0
Vehicle Extension (s)	2.3	2.3
Lane Grp Cap (vph)	175	156
v/s Ratio Prot	0.11	
v/s Ratio Perm		0.01
v/c Ratio	0.99	0.07
Uniform Delay, d1	62.5	56.2
Progression Factor	1.00	1.00
Incremental Delay, d2	66.0	0.1
Delay (s)	128.5	56.4
Level of Service	F	E
Approach Delay (s)	84.4	
Approach LOS	F	
Intersection Summary		

HCM 6th Signalized Intersection Summary

3: Springbrook Rd & OR 99W

12/16/2021



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL
Lane Configurations		↔	↕	↗	↖	↕	↗		↖	↕	↗	↖
Traffic Volume (veh/h)	5	99	1210	105	458	1426	63	1	322	188	338	201
Future Volume (veh/h)	5	99	1210	105	458	1426	63	1	322	188	338	201
Initial Q (Qb), veh		0	0	0	0	0	0		0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		1.00	1.00		1.00		1.00		0.99	1.00
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Work Zone On Approach			No			No				No		
Adj Sat Flow, veh/h/ln		1736	1695	1750	1654	1758	1723		1688	1619	1606	1736
Adj Flow Rate, veh/h		105	1287	0	487	1517	0		343	200	190	214
Peak Hour Factor		0.94	0.94	0.94	0.94	0.94	0.94		0.94	0.94	0.94	0.94
Percent Heavy Veh, %		1	4	0	7	3	2		1	6	7	1
Cap, veh/h		126	1543		526	1921			386	208	174	329
Arrive On Green		0.08	0.48	0.00	0.34	1.00	0.00		0.12	0.13	0.13	0.10
Sat Flow, veh/h		1654	3221	1483	3057	3340	1460		3118	1619	1351	3208
Grp Volume(v), veh/h		105	1287	0	487	1517	0		343	200	190	214
Grp Sat Flow(s),veh/h/ln		1654	1611	1483	1528	1670	1460		1559	1619	1351	1604
Q Serve(g_s), s		8.8	48.5	0.0	21.5	0.0	0.0		15.2	17.2	13.3	9.0
Cycle Q Clear(g_c), s		8.8	48.5	0.0	21.5	0.0	0.0		15.2	17.2	13.3	9.0
Prop In Lane		1.00		1.00	1.00		1.00		1.00		1.00	1.00
Lane Grp Cap(c), veh/h		126	1543		526	1921			386	208	174	329
V/C Ratio(X)		0.84	0.83		0.93	0.79			0.89	0.96	1.09	0.65
Avail Cap(c_a), veh/h		165	1543		633	1921			423	208	174	367
HCM Platoon Ratio		1.00	1.00	1.00	2.00	2.00	2.00		1.00	1.00	1.00	1.00
Upstream Filter(I)		1.00	1.00	0.00	0.41	0.41	0.00		1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh		63.8	31.7	0.0	45.0	0.0	0.0		60.4	60.6	33.1	60.4
Incr Delay (d2), s/veh		20.9	5.5	0.0	8.3	1.4	0.0		18.2	50.8	95.5	2.8
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln		7.8	26.2	0.0	10.0	0.7	0.0		11.4	15.3	14.5	6.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh		84.7	37.1	0.0	53.4	1.4	0.0		78.6	111.5	128.7	63.2
LnGrp LOS		F	D		D	A			E	F	F	E
Approach Vol, veh/h			1392	A		2004	A			733		
Approach Delay, s/veh			40.7			14.0				100.5		
Approach LOS			D			B				F		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	28.1	71.5	21.3	19.0	14.6	85.0	18.3	22.0				
Change Period (Y+Rc), s	4.0	4.5	4.0	4.0	4.0	4.5	4.0	4.0				
Max Green Setting (Gmax), s	29.0	60.5	19.0	15.0	14.0	75.5	16.0	18.0				
Max Q Clear Time (g_c+I1), s	23.5	50.5	17.2	16.7	10.8	2.0	11.0	19.2				
Green Ext Time (p_c), s	0.6	6.9	0.2	0.0	0.0	27.2	0.2	0.0				

Intersection Summary

HCM 6th Ctrl Delay	42.9
HCM 6th LOS	D

Notes

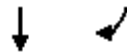
User approved pedestrian interval to be less than phase max green.

User approved ignoring U-Turning movement.

Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
 3: Springbrook Rd & OR 99W

12/16/2021

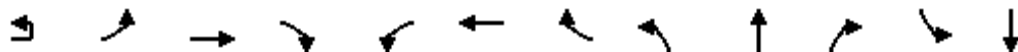


Movement	SBT	SBR
Lane Configurations	↑	↑
Traffic Volume (veh/h)	164	101
Future Volume (veh/h)	164	101
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		0.99
Parking Bus, Adj	1.00	1.00
Work Zone On Approach	No	
Adj Sat Flow, veh/h/ln	1654	1750
Adj Flow Rate, veh/h	174	54
Peak Hour Factor	0.94	0.94
Percent Heavy Veh, %	7	0
Cap, veh/h	177	158
Arrive On Green	0.11	0.11
Sat Flow, veh/h	1654	1471
Grp Volume(v), veh/h	174	54
Grp Sat Flow(s),veh/h/ln	1654	1471
Q Serve(g_s), s	14.7	4.1
Cycle Q Clear(g_c), s	14.7	4.1
Prop In Lane		1.00
Lane Grp Cap(c), veh/h	177	158
V/C Ratio(X)	0.98	0.34
Avail Cap(c_a), veh/h	177	158
HCM Platoon Ratio	1.00	1.00
Upstream Filter(l)	1.00	1.00
Uniform Delay (d), s/veh	62.4	42.0
Incr Delay (d2), s/veh	61.9	0.8
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(95%),veh/ln	14.3	3.3
Unsig. Movement Delay, s/veh		
LnGrp Delay(d),s/veh	124.2	42.7
LnGrp LOS	F	D
Approach Vol, veh/h	442	
Approach Delay, s/veh	84.7	
Approach LOS	F	
Timer - Assigned Phs		

HCM Signalized Intersection Capacity Analysis

4: Brutscher St & OR 99W

12/16/2021



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↔	↕	↗	↖	↕	↗	↖	↕		↖	↗
Traffic Volume (vph)	3	21	1238	83	209	1746	41	244	12	147	18	14
Future Volume (vph)	3	21	1238	83	209	1746	41	244	12	147	18	14
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	1.00	1.00	1.00	1.00	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	0.86		1.00	0.88
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	3135	1430	1614	3197	1417	1644	1435		1678	1496
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00	0.71	1.00		0.50	1.00
Satd. Flow (perm)		1646	3135	1430	1614	3197	1417	1232	1435		885	1496
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	3	22	1276	86	215	1800	42	252	12	152	19	14
RTOR Reduction (vph)	0	0	0	29	0	0	13	0	119	0	0	40
Lane Group Flow (vph)	0	25	1276	57	215	1800	29	252	45	0	19	25
Confl. Peds. (#/hr)								1		1	1	
Heavy Vehicles (%)	0%	0%	5%	3%	3%	4%	5%	1%	0%	4%	0%	0%
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA
Protected Phases	5	5	2		1	6			4			8
Permitted Phases				2			6	4				8
Actuated Green, G (s)		4.9	75.5	75.5	21.9	92.5	92.5	30.1	30.1		30.1	30.1
Effective Green, g (s)		4.9	75.5	75.5	21.9	92.5	92.5	30.1	30.1		30.1	30.1
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)		57	1690	771	252	2112	936	264	308		190	321
v/s Ratio Prot		0.02	c0.41		0.13	c0.56			0.03			0.02
v/s Ratio Perm				0.04			0.02	c0.20			0.02	
v/c Ratio		0.44	0.76	0.07	0.85	0.85	0.03	0.95	0.15		0.10	0.08
Uniform Delay, d1		66.2	25.1	15.5	57.5	18.4	8.2	54.3	44.5		44.1	43.9
Progression Factor		1.05	0.80	1.39	1.35	2.02	2.58	1.00	1.00		1.00	1.00
Incremental Delay, d2		1.6	1.7	0.1	7.9	1.4	0.0	42.7	0.2		0.2	0.1
Delay (s)		70.8	21.7	21.5	85.5	38.6	21.3	97.0	44.7		44.3	43.9
Level of Service		E	C	C	F	D	C	F	D		D	D
Approach Delay (s)			22.6			43.1			76.3			44.0
Approach LOS			C			D			E			D
Intersection Summary												
HCM 2000 Control Delay			39.4			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)			12.5			
Intersection Capacity Utilization			87.7%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 4: Brutscher St & OR 99W

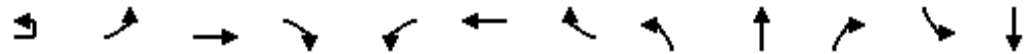
12/16/2021

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	49
Future Volume (vph)	49
Ideal Flow (vphpl)	1750
Grade (%)	
Total Lost time (s)	
Lane Util. Factor	
Frbp, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.97
Adj. Flow (vph)	51
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	1
Heavy Vehicles (%)	4%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM 6th Signalized Intersection Summary

4: Brutscher St & OR 99W

12/16/2021



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↔	↕	↗	↖	↕	↗	↖	↕		↖	↗
Traffic Volume (veh/h)	3	21	1238	83	209	1746	41	244	12	147	18	14
Future Volume (veh/h)	3	21	1238	83	209	1746	41	244	12	147	18	14
Initial Q (Qb), veh		0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach			No			No			No			No
Adj Sat Flow, veh/h/ln		1728	1660	1687	1709	1695	1682	1736	1750	1750	1822	1822
Adj Flow Rate, veh/h		22	1276	86	215	1800	42	252	12	100	19	14
Peak Hour Factor		0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %		0	5	3	3	4	5	1	0	0	0	0
Cap, veh/h		27	1701	771	238	2167	959	305	36	298	266	76
Arrive On Green		0.03	1.00	1.00	0.10	0.45	0.45	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h		1646	3154	1430	1628	3221	1425	1346	161	1344	1354	344
Grp Volume(v), veh/h		22	1276	86	215	1800	42	252	0	112	19	0
Grp Sat Flow(s),veh/h/ln		1646	1577	1430	1628	1611	1425	1346	0	1506	1354	0
Q Serve(g_s), s		1.9	0.0	0.0	18.3	68.7	2.3	26.2	0.0	8.8	1.7	0.0
Cycle Q Clear(g_c), s		1.9	0.0	0.0	18.3	68.7	2.3	30.8	0.0	8.8	10.4	0.0
Prop In Lane		1.00		1.00	1.00		1.00	1.00		0.89	1.00	
Lane Grp Cap(c), veh/h		27	1701	771	238	2167	959	305	0	333	266	0
V/C Ratio(X)		0.81	0.75	0.11	0.90	0.83	0.04	0.83	0.00	0.34	0.07	0.00
Avail Cap(c_a), veh/h		129	1701	771	244	2167	959	305	0	333	266	0
HCM Platoon Ratio		2.00	2.00	2.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)		0.43	0.43	0.43	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh		67.5	0.0	0.0	62.1	31.4	13.2	56.7	0.0	45.8	50.2	0.0
Incr Delay (d2), s/veh		14.1	1.4	0.1	32.0	3.9	0.1	16.5	0.0	0.4	0.1	0.0
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln		1.6	0.6	0.0	15.0	37.2	1.3	15.6	0.0	6.1	1.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh		81.6	1.4	0.1	94.1	35.3	13.3	73.2	0.0	46.3	50.3	0.0
LnGrp LOS		F	A	A	F	D	B	E	A	D	D	A
Approach Vol, veh/h			1384			2057			364			84
Approach Delay, s/veh			2.5			41.0			64.9			45.8
Approach LOS			A			D			E			D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	25.0	80.0		35.0	6.3	98.7		35.0				
Change Period (Y+Rc), s	4.5	* 4.5		4.0	4.0	4.5		4.0				
Max Green Setting (Gmax), s	21.0	* 76		31.0	11.0	85.5		31.0				
Max Q Clear Time (g_c+I1), s	20.3	2.0		32.8	3.9	70.7		12.4				
Green Ext Time (p_c), s	0.0	28.4		0.0	0.0	13.2		0.3				

Intersection Summary

HCM 6th Ctrl Delay	29.7
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
 4: Brutscher St & OR 99W

12/16/2021

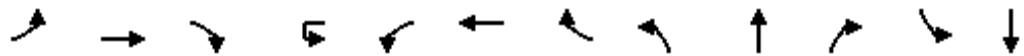
Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	49
Future Volume (veh/h)	49
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1822
Adj Flow Rate, veh/h	51
Peak Hour Factor	0.97
Percent Heavy Veh, %	0
Cap, veh/h	277
Arrive On Green	0.22
Sat Flow, veh/h	1252
Grp Volume(v), veh/h	65
Grp Sat Flow(s),veh/h/ln	1595
Q Serve(g_s), s	4.6
Cycle Q Clear(g_c), s	4.6
Prop In Lane	0.78
Lane Grp Cap(c), veh/h	353
V/C Ratio(X)	0.18
Avail Cap(c_a), veh/h	353
HCM Platoon Ratio	1.00
Upstream Filter(l)	1.00
Uniform Delay (d), s/veh	44.2
Incr Delay (d2), s/veh	0.2
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(95%),veh/ln	3.4
Unsig. Movement Delay, s/veh	
LnGrp Delay(d),s/veh	44.4
LnGrp LOS	D
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	

Intersection							
Int Delay, s/veh	1.1						
Movement	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↕↕	↕↕		↕↕	
Traffic Vol, veh/h	1	12	1439	2018	66	24	16
Future Vol, veh/h	1	12	1439	2018	66	24	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	None	-	None
Storage Length	-	100	-	-	-	0	-
Veh in Median Storage, #	-	-	0	0	-	0	-
Grade, %	-	-	-2	2	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	5	4	3	5	0
Mvmt Flow	1	13	1499	2102	69	25	17
Major/Minor	Major1		Major2		Minor2		
Conflicting Flow All	2171	2171	0	-	0	2915	1086
Stage 1	-	-	-	-	-	2137	-
Stage 2	-	-	-	-	-	778	-
Critical Hdwy	6.4	4.1	-	-	-	6.9	6.9
Critical Hdwy Stg 1	-	-	-	-	-	5.9	-
Critical Hdwy Stg 2	-	-	-	-	-	5.9	-
Follow-up Hdwy	2.5	2.2	-	-	-	3.55	3.3
Pot Cap-1 Maneuver	59	249	-	-	-	~ 12	215
Stage 1	-	-	-	-	-	73	-
Stage 2	-	-	-	-	-	406	-
Platoon blocked, %			-	-	-		
Mov Cap-1 Maneuver	196	196	-	-	-	~ 11	215
Mov Cap-2 Maneuver	-	-	-	-	-	56	-
Stage 1	-	-	-	-	-	68	-
Stage 2	-	-	-	-	-	406	-
Approach	EB		WB		SB		
HCM Control Delay, s	0.2		0		91.1		
HCM LOS					F		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1		
Capacity (veh/h)	196	-	-	-	80		
HCM Lane V/C Ratio	0.069	-	-	-	0.521		
HCM Control Delay (s)	24.7	-	-	-	91.1		
HCM Lane LOS	C	-	-	-	F		
HCM 95th %tile Q(veh)	0.2	-	-	-	2.2		
Notes							
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon							

HCM Signalized Intersection Capacity Analysis

6: Providence Dr/Crestview Dr & OR 99W

12/16/2021



Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	87	1353	23	1	54	1969	167	67	28	114	190	11
Future Volume (vph)	87	1353	23	1	54	1969	167	67	28	114	190	11
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1800	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
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
Frt	1.00	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1687	3214	1510		1646	3225	1473	1638	1724	1451	1646	1732
Flt Permitted	0.95	1.00	1.00		0.95	1.00	1.00	0.75	1.00	1.00	0.74	1.00
Satd. Flow (perm)	1687	3214	1510		1646	3225	1473	1292	1724	1451	1279	1732
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	92	1424	24	1	57	2073	176	71	29	120	200	12
RTOR Reduction (vph)	0	0	9	0	0	0	40	0	0	97	0	0
Lane Group Flow (vph)	92	1424	15	0	58	2073	136	71	29	23	200	12
Heavy Vehicles (%)	0%	5%	0%	0%	0%	5%	0%	0%	0%	1%	0%	0%
Turn Type	Prot	NA	Perm	Prot	Prot	NA	Perm	Perm	NA	Perm	Perm	NA
Protected Phases	5	2		1	1	6			8			4
Permitted Phases			2				6	8		8	4	
Actuated Green, G (s)	10.6	89.8	89.8		8.8	88.0	88.0	26.4	26.4	26.4	26.4	26.4
Effective Green, g (s)	10.6	89.8	89.8		8.8	88.0	88.0	26.4	26.4	26.4	26.4	26.4
Actuated g/C Ratio	0.08	0.64	0.64		0.06	0.63	0.63	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
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
Lane Grp Cap (vph)	127	2061	968		103	2027	925	243	325	273	241	326
v/s Ratio Prot	c0.05	c0.44			0.04	c0.64			0.02			0.01
v/s Ratio Perm			0.01				0.09	0.05		0.02	c0.16	
v/c Ratio	0.72	0.69	0.02		0.56	1.02	0.15	0.29	0.09	0.08	0.83	0.04
Uniform Delay, d1	63.3	16.2	9.1		63.7	26.0	10.6	48.8	46.9	46.8	54.6	46.4
Progression Factor	1.04	1.45	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.3	1.5	0.0		8.3	26.0	0.3	0.9	0.2	0.2	21.3	0.1
Delay (s)	81.0	25.0	9.1		72.0	52.0	11.0	49.7	47.0	47.0	76.0	46.5
Level of Service	F	C	A		E	D	B	D	D	D	E	D
Approach Delay (s)		28.1				49.3			47.9			68.9
Approach LOS		C				D			D			E

Intersection Summary

HCM 2000 Control Delay	42.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

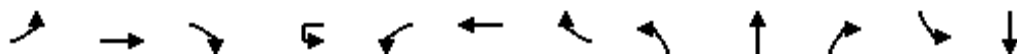
HCM Signalized Intersection Capacity Analysis
 6: Providence Dr/Crestview Dr & OR 99W

12/16/2021

Movement	SBR
Lane Configurations	7
Traffic Volume (vph)	48
Future Volume (vph)	48
Ideal Flow (vphpl)	1750
Grade (%)	
Total Lost time (s)	4.5
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1473
Flt Permitted	1.00
Satd. Flow (perm)	1473
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	51
RTOR Reduction (vph)	41
Lane Group Flow (vph)	10
Heavy Vehicles (%)	0%
Turn Type	Perm
Protected Phases	
Permitted Phases	4
Actuated Green, G (s)	26.4
Effective Green, g (s)	26.4
Actuated g/C Ratio	0.19
Clearance Time (s)	4.5
Vehicle Extension (s)	4.0
Lane Grp Cap (vph)	277
v/s Ratio Prot	
v/s Ratio Perm	0.01
v/c Ratio	0.03
Uniform Delay, d1	46.4
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	46.5
Level of Service	D
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM 6th Signalized Intersection Summary
6: Providence Dr/Crestview Dr & OR 99W

12/16/2021



Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	87	1353	23	1	54	1969	167	67	28	114	190	11
Future Volume (veh/h)	87	1353	23	1	54	1969	167	67	28	114	190	11
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00		1.00		1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No				No
Adj Sat Flow, veh/h/ln	1859	1790	1859		1728	1707	1728	1701	1701	1688	1728	1728
Adj Flow Rate, veh/h	92	1424	24		57	2073	123	71	29	67	200	12
Peak Hour Factor	0.95	0.95	0.95		0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	5	0		0	5	0	0	0	1	0	0
Cap, veh/h	113	2264	1049		72	2059	930	286	312	262	272	317
Arrive On Green	0.04	0.45	0.45		0.04	0.63	0.63	0.18	0.18	0.18	0.18	0.18
Sat Flow, veh/h	1770	3400	1575		1646	3244	1465	1322	1701	1430	1304	1728
Grp Volume(v), veh/h	92	1424	24		57	2073	123	71	29	67	200	12
Grp Sat Flow(s),veh/h/ln	1770	1700	1575		1646	1622	1465	1322	1701	1430	1304	1728
Q Serve(g_s), s	7.2	45.1	1.2		4.8	88.9	4.7	6.5	2.0	5.6	21.1	0.8
Cycle Q Clear(g_c), s	7.2	45.1	1.2		4.8	88.9	4.7	7.3	2.0	5.6	23.1	0.8
Prop In Lane	1.00		1.00		1.00		1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	113	2264	1049		72	2059	930	286	312	262	272	317
V/C Ratio(X)	0.81	0.63	0.02		0.79	1.01	0.13	0.25	0.09	0.26	0.74	0.04
Avail Cap(c_a), veh/h	114	2264	1049		135	2059	930	332	371	312	317	377
HCM Platoon Ratio	0.67	0.67	0.67		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.2	25.5	13.3		66.3	25.6	10.2	50.0	47.5	49.0	57.1	47.0
Incr Delay (d2), s/veh	35.6	1.3	0.0		23.7	21.4	0.3	0.6	0.2	0.7	8.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.8	26.6	0.7		4.4	44.9	2.6	4.0	1.6	3.8	12.2	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	101.7	26.8	13.3		90.0	47.0	10.5	50.7	47.7	49.7	65.5	47.1
LnGrp LOS	F	C	B		F	F	B	D	D	D	E	D
Approach Vol, veh/h		1540				2253			167			263
Approach Delay, s/veh		31.1				46.1			49.8			61.4
Approach LOS		C				D			D			E
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.6	99.2		30.2	15.0	94.9		30.2				
Change Period (Y+Rc), s	4.5	6.0		4.5	6.0	* 6		4.5				
Max Green Setting (Gmax), s	11.5	83.0		30.5	9.0	* 86		30.5				
Max Q Clear Time (g_c+I1), s	6.8	47.1		25.1	9.2	90.9		9.3				
Green Ext Time (p_c), s	0.0	23.5		0.6	0.0	0.0		0.8				

Intersection Summary

HCM 6th Ctrl Delay	41.7
HCM 6th LOS	D

Notes

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
 6: Providence Dr/Crestview Dr & OR 99W

12/16/2021

Movement	SBR
Lane Configurations	7
Traffic Volume (veh/h)	48
Future Volume (veh/h)	48
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1728
Adj Flow Rate, veh/h	51
Peak Hour Factor	0.95
Percent Heavy Veh, %	0
Cap, veh/h	269
Arrive On Green	0.18
Sat Flow, veh/h	1465
Grp Volume(v), veh/h	51
Grp Sat Flow(s),veh/h/ln	1465
Q Serve(g_s), s	4.1
Cycle Q Clear(g_c), s	4.1
Prop In Lane	1.00
Lane Grp Cap(c), veh/h	269
V/C Ratio(X)	0.19
Avail Cap(c_a), veh/h	319
HCM Platoon Ratio	1.00
Upstream Filter(l)	1.00
Uniform Delay (d), s/veh	48.4
Incr Delay (d2), s/veh	0.5
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(95%),veh/ln	2.8
Unsig. Movement Delay, s/veh	
LnGrp Delay(d),s/veh	48.9
LnGrp LOS	D
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	

Intersection						
Int Delay, s/veh	1.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↖		↗	
Traffic Vol, veh/h	14	1677	2215	52	31	6
Future Vol, veh/h	14	1677	2215	52	31	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	94	94	94	94	94	94
Heavy Vehicles, %	0	5	5	0	0	0
Mvmt Flow	15	1784	2356	55	33	6

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	2411	0	-	0	3306 1206
Stage 1	-	-	-	-	2384 -
Stage 2	-	-	-	-	922 -
Critical Hdwy	4.1	-	-	-	6.4 6.7
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	2.2	-	-	-	3.5 3.3
Pot Cap-1 Maneuver	201	-	-	-	~10 191
Stage 1	-	-	-	-	74 -
Stage 2	-	-	-	-	391 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	201	-	-	-	~9 191
Mov Cap-2 Maneuver	-	-	-	-	55 -
Stage 1	-	-	-	-	68 -
Stage 2	-	-	-	-	391 -

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	133.7
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	201	-	-	-	62
HCM Lane V/C Ratio	0.074	-	-	-	0.635
HCM Control Delay (s)	24.3	-	-	-	133.7
HCM Lane LOS	C	-	-	-	F
HCM 95th %tile Q(veh)	0.2	-	-	-	2.7

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

HCS7 Roundabouts Report

General Information				Site Information			
Analyst	MRR			Intersection	Crestview Dr/Jory Rd		
Agency or Co.	KAI			E/W Street Name	Jory Rd		
Date Performed	12/06/2021			N/S Street Name	Crestview Dr		
Analysis Year	2026			Analysis Time Period (hrs)	0.25		
Time Analyzed	Background PM			Peak Hour Factor	0.95		
Project Description	Crestview Green			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
Movement																
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	203	43	0	19	203	15
Percent Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0
Flow Rate (v _{pc}), pc/h	0	9	0	22	0	26	0	12	0	38	218	45	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)		4.9763			4.9763			4.9763			4.9763	
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		31			38			301			254	
Entry Volume veh/h		31			38			297			250	
Circulating Flow (v _c), pc/h	264			265			29			64		
Exiting Flow (v _{ex}), pc/h	65			54			239			266		
Capacity (c _{pc}), pc/h		1054			1053			1340			1293	
Capacity (c), veh/h		1054			1053			1321			1271	
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 F

Year 2026 Total Conditions Level of Service Worksheets

HCS7 Roundabouts Report

General Information				Site Information			
Analyst	MRR			Intersection	Springbrook/Crestview		
Agency or Co.	KAI			E/W Street Name	Crestview Dr		
Date Performed	12/6/2021			N/S Street Name	Springbrook Rd		
Analysis Year	2026			Analysis Time Period (hrs)	0.25		
Time Analyzed	Total AM			Peak Hour Factor	0.87		
Project Description	Crestview Green			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				
Volume (V), veh/h	0	13	11	3	0	25	24	93	1	10	149	13	0	223	59	23
Percent Heavy Vehicles, %	0	17	100	0	0	60	0	0	0	8	7	88	0	0	6	5
Flow Rate (v_{pc}), pc/h	0	17	25	3	0	46	28	107	1	12	183	28	0	256	72	28
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)		4.9763			4.9763			4.9763			4.9763		
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		45			181			224			356		
Entry Volume veh/h		30			164			198			351		
Circulating Flow (v_c), pc/h	375			213			298			87			
Exiting Flow (v_{ex}), pc/h	309			68			307			122			
Capacity (C_{pc}), pc/h		941			1111			1018			1263		
Capacity (c), veh/h		628			1005			900			1244		
v/c Ratio (x)		0.05			0.16			0.22			0.28		

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		6.3			5.1			6.2			5.4		
Lane LOS		A			A			A			A		
95% Queue, veh		0.2			0.6			0.8			1.2		
Approach Delay, s/veh	6.3			5.1			6.2			5.4			
Approach LOS	A			A			A			A			
Intersection Delay, s/veh LOS	5.6						A						

HCM 6th TWSC
 2: N Springbrook Rd & NE Benjamin Rd

01/12/2022

Intersection						
Int Delay, s/veh	2.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	24	8	45	39	13	47
Future Vol, veh/h	24	8	45	39	13	47
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	4	25	8	3	0	9
Mvmt Flow	28	9	52	45	15	55

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	160	75	0	0	97	0
Stage 1	75	-	-	-	-	-
Stage 2	85	-	-	-	-	-
Critical Hdwy	6.44	6.45	-	-	4.1	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.525	-	-	2.2	-
Pot Cap-1 Maneuver	826	926	-	-	1509	-
Stage 1	943	-	-	-	-	-
Stage 2	933	-	-	-	-	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	818	926	-	-	1509	-
Mov Cap-2 Maneuver	818	-	-	-	-	-
Stage 1	943	-	-	-	-	-
Stage 2	924	-	-	-	-	-

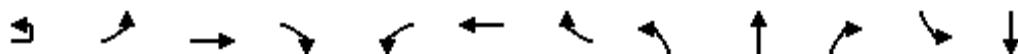
Approach	WB	NB	SB
HCM Control Delay, s	9.5	0	1.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	843	1509
HCM Lane V/C Ratio	-	-	0.044	0.01
HCM Control Delay (s)	-	-	9.5	7.4
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0

HCM Signalized Intersection Capacity Analysis

3: Springbrook Rd & OR 99W

01/12/2022



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↔	↕	↗	↖	↕	↗	↖	↕	↗	↖	↕
Traffic Volume (vph)	2	34	1187	74	272	728	63	118	111	363	83	104
Future Volume (vph)	2	34	1187	74	272	728	63	118	111	363	83	104
Ideal Flow (vphpl)	1900	1750	1750	1750	1750	1800	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
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
Frbp, ped/bikes		1.00	1.00	0.99	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
Frt		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1614	3167	1468	2880	3167	1390	3084	1539	1357	3131	1620
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)		1614	3167	1468	2880	3167	1390	3084	1539	1357	3131	1620
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	2	37	1304	81	299	800	69	130	122	399	91	114
RTOR Reduction (vph)	0	0	0	39	0	0	27	0	0	278	0	0
Lane Group Flow (vph)	0	39	1304	42	299	800	42	130	122	121	91	114
Confl. Peds. (#/hr)				1	1			3				
Heavy Vehicles (%)	3%	3%	5%	0%	12%	8%	7%	3%	12%	8%	3%	8%
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA
Protected Phases	5	5	2		1	6		3	8		7	4
Permitted Phases				2			6			8		
Actuated Green, G (s)		5.5	62.5	62.5	16.8	73.8	73.8	10.6	15.4	15.4	8.8	13.6
Effective Green, g (s)		5.5	62.5	62.5	16.8	73.8	73.8	10.6	15.4	15.4	8.8	13.6
Actuated g/C Ratio		0.05	0.52	0.52	0.14	0.61	0.61	0.09	0.13	0.13	0.07	0.11
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
Vehicle Extension (s)		2.3	4.0	4.0	2.3	4.0	4.0	2.3	2.3	2.3	2.3	2.3
Lane Grp Cap (vph)		73	1649	764	403	1947	854	272	197	174	229	183
v/s Ratio Prot		0.02	c0.41		c0.10	0.25		c0.04	0.08		0.03	0.07
v/s Ratio Perm				0.03			0.03			c0.09		
v/c Ratio		0.53	0.79	0.06	0.74	0.41	0.05	0.48	0.62	0.70	0.40	0.62
Uniform Delay, d1		56.0	23.4	14.2	49.5	11.9	9.2	52.1	49.5	50.1	53.1	50.8
Progression Factor		1.00	1.00	1.00	0.95	0.58	0.73	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		4.9	4.0	0.1	6.0	0.6	0.1	0.8	4.5	10.1	0.7	5.2
Delay (s)		60.9	27.4	14.3	53.2	7.5	6.8	52.8	54.1	60.1	53.7	56.0
Level of Service		E	C	B	D	A	A	D	D	E	D	E
Approach Delay (s)			27.6			19.2			57.5			53.0
Approach LOS			C			B			E			D
Intersection Summary												
HCM 2000 Control Delay			32.3			HCM 2000 Level of Service					C	
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)					16.5	
Intersection Capacity Utilization			73.8%			ICU Level of Service					D	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Springbrook Rd & OR 99W

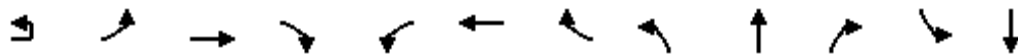
01/12/2022

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	69
Future Volume (vph)	69
Ideal Flow (vphpl)	1750
Grade (%)	
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Frbp, ped/bikes	0.98
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1382
Flt Permitted	1.00
Satd. Flow (perm)	1382
Peak-hour factor, PHF	0.91
Adj. Flow (vph)	76
RTOR Reduction (vph)	67
Lane Group Flow (vph)	9
Confl. Peds. (#/hr)	3
Heavy Vehicles (%)	6%
Turn Type	Perm
Protected Phases	
Permitted Phases	4
Actuated Green, G (s)	13.6
Effective Green, g (s)	13.6
Actuated g/C Ratio	0.11
Clearance Time (s)	4.0
Vehicle Extension (s)	2.3
Lane Grp Cap (vph)	156
v/s Ratio Prot	
v/s Ratio Perm	0.01
v/c Ratio	0.06
Uniform Delay, d1	47.5
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	47.6
Level of Service	D
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM 6th Signalized Intersection Summary

3: Springbrook Rd & OR 99W

01/12/2022



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↔	↕	↗	↖	↕	↗	↖	↕	↗	↖	↕
Traffic Volume (veh/h)	2	34	1187	74	272	728	63	118	111	363	83	104
Future Volume (veh/h)	2	34	1187	74	272	728	63	118	111	363	83	104
Initial Q (Qb), veh		0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach			No			No			No			No
Adj Sat Flow, veh/h/ln		1709	1682	1750	1586	1688	1654	1660	1537	1592	1709	1641
Adj Flow Rate, veh/h		37	1304	0	299	800	0	130	122	234	91	114
Peak Hour Factor		0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %		3	5	0	12	8	7	3	12	8	3	8
Cap, veh/h		45	1345		641	1975		376	269	235	138	158
Arrive On Green		0.03	0.42	0.00	0.22	0.62	0.00	0.12	0.17	0.17	0.04	0.10
Sat Flow, veh/h		1628	3195	1483	2931	3207	1402	3067	1537	1342	3158	1641
Grp Volume(v), veh/h		37	1304	0	299	800	0	130	122	234	91	114
Grp Sat Flow(s),veh/h/ln		1628	1598	1483	1465	1603	1402	1534	1537	1342	1579	1641
Q Serve(g_s), s		2.7	47.9	0.0	10.7	15.3	0.0	4.7	8.5	20.9	3.4	8.1
Cycle Q Clear(g_c), s		2.7	47.9	0.0	10.7	15.3	0.0	4.7	8.5	20.9	3.4	8.1
Prop In Lane		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h		45	1345		641	1975		376	269	235	138	158
V/C Ratio(X)		0.81	0.97		0.47	0.41		0.35	0.45	1.00	0.66	0.72
Avail Cap(c_a), veh/h		149	1345		641	1975		409	269	235	421	287
HCM Platoon Ratio		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)		1.00	1.00	0.00	0.87	0.87	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh		58.0	34.0	0.0	40.8	11.8	0.0	48.3	44.4	49.5	56.5	52.7
Incr Delay (d2), s/veh		18.7	18.3	0.0	0.3	0.5	0.0	0.3	0.7	57.6	3.3	3.8
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln		2.4	28.2	0.0	6.7	8.5	0.0	3.3	6.0	16.2	2.6	6.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh		76.8	52.3	0.0	41.1	12.3	0.0	48.6	45.1	107.0	59.7	56.4
LnGrp LOS		E	D		D	B		D	D	F	E	E
Approach Vol, veh/h			1341	A		1099	A		486			281
Approach Delay, s/veh			53.0			20.2			75.9			54.1
Approach LOS			D			C			E			D
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	30.8	55.0	18.7	15.6	7.3	78.4	9.2	25.0				
Change Period (Y+Rc), s	4.5	* 4.5	4.0	4.0	4.0	4.5	4.0	4.0				
Max Green Setting (Gmax), s	16.0	* 51	16.0	21.0	11.0	55.5	16.0	21.0				
Max Q Clear Time (g_c+I1), s	12.7	49.9	6.7	10.1	4.7	17.3	5.4	22.9				
Green Ext Time (p_c), s	0.2	0.5	0.2	0.4	0.0	8.6	0.1	0.0				

Intersection Summary

HCM 6th Ctrl Delay	45.3
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
 3: Springbrook Rd & OR 99W

01/12/2022



Movement	SBR
Lane Configurations	7
Traffic Volume (veh/h)	69
Future Volume (veh/h)	69
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	0.99
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1668
Adj Flow Rate, veh/h	76
Peak Hour Factor	0.91
Percent Heavy Veh, %	6
Cap, veh/h	135
Arrive On Green	0.10
Sat Flow, veh/h	1400
Grp Volume(v), veh/h	76
Grp Sat Flow(s),veh/h/ln	1400
Q Serve(g_s), s	5.6
Cycle Q Clear(g_c), s	5.6
Prop In Lane	1.00
Lane Grp Cap(c), veh/h	135
V/C Ratio(X)	0.56
Avail Cap(c_a), veh/h	245
HCM Platoon Ratio	1.00
Upstream Filter(l)	1.00
Uniform Delay (d), s/veh	41.5
Incr Delay (d2), s/veh	2.2
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(95%),veh/ln	3.7
Unsig. Movement Delay, s/veh	
LnGrp Delay(d),s/veh	43.8
LnGrp LOS	D
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	
Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.	

HCM Signalized Intersection Capacity Analysis

4: Brutscher St & OR 99W

01/12/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↗↗	↘	↘	↗↗	↘	↘	↗		↘	↗	
Traffic Volume (vph)	25	1565	41	90	1053	28	49	4	99	21	6	27
Future Volume (vph)	25	1565	41	90	1053	28	49	4	99	21	6	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	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.86		1.00	0.88	
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)	1372	3135	1364	1583	3079	1171	1599	1402		1411	1235	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.73	1.00		0.46	1.00	
Satd. Flow (perm)	1372	3135	1364	1583	3079	1171	1233	1402		678	1235	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	27	1720	45	99	1157	31	54	4	109	23	7	30
RTOR Reduction (vph)	0	0	13	0	0	7	0	100	0	0	27	0
Lane Group Flow (vph)	27	1720	32	99	1157	24	54	13	0	23	10	0
Heavy Vehicles (%)	20%	5%	8%	5%	8%	27%	4%	0%	7%	19%	33%	24%
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)	5.1	85.4	85.4	12.0	92.3	92.3	10.1	10.1		10.1	10.1	
Effective Green, g (s)	5.1	85.4	85.4	12.0	92.3	92.3	10.1	10.1		10.1	10.1	
Actuated g/C Ratio	0.04	0.71	0.71	0.10	0.77	0.77	0.08	0.08		0.08	0.08	
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)	58	2231	970	158	2368	900	103	118		57	103	
v/s Ratio Prot	0.02	c0.55		c0.06	0.38			0.01			0.01	
v/s Ratio Perm			0.02			0.02	c0.04			0.03		
v/c Ratio	0.47	0.77	0.03	0.63	0.49	0.03	0.52	0.11		0.40	0.09	
Uniform Delay, d1	56.1	11.1	5.1	51.8	5.1	3.3	52.6	50.8		52.1	50.7	
Progression Factor	0.80	0.86	1.66	1.46	0.09	0.01	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.2	1.7	0.0	4.8	0.6	0.0	3.6	0.3		3.4	0.3	
Delay (s)	47.4	11.2	8.5	80.5	1.0	0.1	56.3	51.1		55.5	51.0	
Level of Service	D	B	A	F	A	A	E	D		E	D	
Approach Delay (s)		11.7			7.1			52.8			52.7	
Approach LOS		B			A			D			D	

Intersection Summary

HCM 2000 Control Delay	12.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary

4: Brutscher St & OR 99W

01/12/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (veh/h)	25	1565	41	90	1053	28	49	4	99	21	6	27
Future Volume (veh/h)	25	1565	41	90	1053	28	49	4	99	21	6	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1455	1660	1619	1682	1641	1381	1695	1750	1750	1560	1366	1366
Adj Flow Rate, veh/h	27	1720	45	99	1157	31	54	4	109	23	7	30
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	20	5	8	5	8	27	4	0	0	19	33	33
Cap, veh/h	30	2241	975	119	2379	894	163	6	160	101	25	107
Arrive On Green	0.03	0.94	0.94	0.15	1.00	1.00	0.11	0.11	0.11	0.11	0.11	0.11
Sat Flow, veh/h	1386	3154	1372	1602	3118	1171	1243	53	1438	1067	226	967
Grp Volume(v), veh/h	27	1720	45	99	1157	31	54	0	113	23	0	37
Grp Sat Flow(s),veh/h/ln	1386	1577	1372	1602	1559	1171	1243	0	1491	1067	0	1192
Q Serve(g_s), s	2.3	13.1	0.2	7.2	0.0	0.0	5.0	0.0	8.7	2.5	0.0	3.4
Cycle Q Clear(g_c), s	2.3	13.1	0.2	7.2	0.0	0.0	8.4	0.0	8.7	11.3	0.0	3.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.96	1.00		0.81
Lane Grp Cap(c), veh/h	30	2241	975	119	2379	894	163	0	166	101	0	133
V/C Ratio(X)	0.91	0.77	0.05	0.83	0.49	0.03	0.33	0.00	0.68	0.23	0.00	0.28
Avail Cap(c_a), veh/h	127	2241	975	187	2379	894	211	0	224	142	0	179
HCM Platoon Ratio	1.33	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.54	0.54	0.54	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	58.2	1.3	1.0	50.4	0.0	0.0	52.8	0.0	51.3	56.7	0.0	48.9
Incr Delay (d2), s/veh	26.1	1.4	0.0	11.9	0.7	0.1	0.9	0.0	3.8	0.8	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.8	2.8	0.1	5.4	0.4	0.0	2.9	0.0	6.2	1.3	0.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	84.2	2.7	1.0	62.3	0.7	0.1	53.7	0.0	55.1	57.6	0.0	49.8
LnGrp LOS	F	A	A	E	A	A	D	A	E	E	A	D
Approach Vol, veh/h		1792			1287			167				60
Approach Delay, s/veh		3.9			5.4			54.6				52.8
Approach LOS		A			A			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.9	89.7		17.3	6.6	96.1		17.3				
Change Period (Y+Rc), s	4.0	4.5		4.0	4.0	4.5		4.0				
Max Green Setting (Gmax), s	14.0	75.5		18.0	11.0	78.5		18.0				
Max Q Clear Time (g_c+I1), s	9.2	15.1		10.7	4.3	2.0		13.3				
Green Ext Time (p_c), s	0.0	40.2		0.4	0.0	23.3		0.1				

Intersection Summary

HCM 6th Ctrl Delay	8.0
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑↑	↑↑		↘	
Traffic Vol, veh/h	4	1655	1229	21	38	21
Future Vol, veh/h	4	1655	1229	21	38	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-2	2	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	50	5	10	11	0	0
Mvmt Flow	5	1881	1397	24	43	24

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	1421	0	-	0	2360 711
Stage 1	-	-	-	-	1409 -
Stage 2	-	-	-	-	951 -
Critical Hdwy	5.1	-	-	-	6.8 6.9
Critical Hdwy Stg 1	-	-	-	-	5.8 -
Critical Hdwy Stg 2	-	-	-	-	5.8 -
Follow-up Hdwy	2.7	-	-	-	3.5 3.3
Pot Cap-1 Maneuver	290	-	-	-	~ 30 380
Stage 1	-	-	-	-	195 -
Stage 2	-	-	-	-	341 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	290	-	-	-	~ 29 380
Mov Cap-2 Maneuver	-	-	-	-	124 -
Stage 1	-	-	-	-	192 -
Stage 2	-	-	-	-	341 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	41.7
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	290	-	-	-	163
HCM Lane V/C Ratio	0.016	-	-	-	0.411
HCM Control Delay (s)	17.6	-	-	-	41.7
HCM Lane LOS	C	-	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	1.8

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

HCM Signalized Intersection Capacity Analysis

6: Providence Dr/Crestview Dr & OR 99W

01/12/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	38	1608	47	98	1121	107	25	12	60	297	27	104	
Future Volume (vph)	38	1608	47	98	1121	107	25	12	60	297	27	104	
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)	1687	3214	1424	1614	3135	1473	1575	1724	1423	1646	1732	1473	
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)	1687	3214	1424	1614	3135	1473	1221	1724	1423	1297	1732	1473	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	
Adj. Flow (vph)	43	1827	53	111	1274	122	28	14	68	338	31	118	
RTOR Reduction (vph)	0	0	24	0	0	51	0	0	51	0	0	88	
Lane Group Flow (vph)	43	1827	29	111	1274	71	28	14	17	338	31	30	
Heavy Vehicles (%)	0%	5%	6%	2%	8%	0%	4%	0%	3%	0%	0%	0%	
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)	4.8	65.0	65.0	9.5	69.7	69.7	30.5	30.5	30.5	30.5	30.5	30.5	
Effective Green, g (s)	4.8	65.0	65.0	9.5	69.7	69.7	30.5	30.5	30.5	30.5	30.5	30.5	
Actuated g/C Ratio	0.04	0.54	0.54	0.08	0.58	0.58	0.25	0.25	0.25	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	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)	67	1740	771	127	1820	855	310	438	361	329	440	374	
v/s Ratio Prot	0.03	c0.57		c0.07	c0.41			0.01			0.02		
v/s Ratio Perm			0.02			0.05	0.02		0.01	c0.26		0.02	
v/c Ratio	0.64	1.05	0.04	0.87	0.70	0.08	0.09	0.03	0.05	1.03	0.07	0.08	
Uniform Delay, d1	56.8	27.5	12.9	54.7	17.8	11.1	34.2	33.6	33.8	44.8	34.0	34.1	
Progression Factor	0.97	1.32	3.05	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	15.0	32.8	0.1	44.9	2.3	0.2	0.2	0.0	0.1	56.8	0.1	0.1	
Delay (s)	70.0	69.0	39.3	99.5	20.0	11.3	34.3	33.7	33.9	101.6	34.1	34.2	
Level of Service	E	E	D	F	C	B	C	C	C	F	C	C	
Approach Delay (s)		68.2			25.2			34.0			81.0		
Approach LOS		E			C			C			F		
Intersection Summary													
HCM 2000 Control Delay			52.7									HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.02										
Actuated Cycle Length (s)			120.0									Sum of lost time (s)	15.0
Intersection Capacity Utilization			91.2%									ICU Level of Service	F
Analysis Period (min)			15										

c Critical Lane Group

HCM 6th Signalized Intersection Summary
6: Providence Dr/Crestview Dr & OR 99W

01/12/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (veh/h)	38	1608	47	98	1121	107	25	12	60	297	27	104
Future Volume (veh/h)	38	1608	47	98	1121	107	25	12	60	297	27	104
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1859	1790	1776	1701	1665	1728	1647	1701	1660	1728	1728	1728
Adj Flow Rate, veh/h	43	1827	53	111	1274	122	28	14	68	338	31	118
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	0	5	6	2	8	0	4	0	3	0	0	0
Cap, veh/h	56	1842	815	128	1824	845	322	432	358	362	439	372
Arrive On Green	0.02	0.36	0.36	0.08	0.58	0.58	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	1770	3400	1505	1620	3164	1465	1090	1701	1407	1216	1728	1465
Grp Volume(v), veh/h	43	1827	53	111	1274	122	28	14	68	338	31	118
Grp Sat Flow(s),veh/h/ln	1770	1700	1505	1620	1582	1465	1090	1701	1407	1216	1728	1465
Q Serve(g_s), s	2.9	64.2	2.8	8.1	34.2	4.6	2.4	0.7	4.5	29.8	1.6	7.8
Cycle Q Clear(g_c), s	2.9	64.2	2.8	8.1	34.2	4.6	4.0	0.7	4.5	30.5	1.6	7.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	56	1842	815	128	1824	845	322	432	358	362	439	372
V/C Ratio(X)	0.77	0.99	0.07	0.87	0.70	0.14	0.09	0.03	0.19	0.93	0.07	0.32
Avail Cap(c_a), veh/h	89	1842	815	128	1824	845	322	432	358	362	439	372
HCM Platoon Ratio	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.3	38.0	18.4	54.6	18.0	11.7	35.5	33.7	35.1	46.7	34.0	36.3
Incr Delay (d2), s/veh	25.9	19.2	0.2	43.0	2.2	0.4	0.2	0.0	0.4	31.4	0.1	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.0	41.0	1.7	8.3	17.5	2.7	1.2	0.6	2.9	19.5	1.3	5.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	84.2	57.1	18.6	97.6	20.3	12.1	35.7	33.7	35.4	78.1	34.1	37.0
LnGrp LOS	F	E	B	F	C	B	D	C	D	E	C	D
Approach Vol, veh/h		1923			1507			110			487	
Approach Delay, s/veh		56.7			25.3			35.3			65.3	
Approach LOS		E			C			D			E	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	14.0	71.0		35.0	9.8	75.2		35.0				
Change Period (Y+Rc), s	4.5	6.0		4.5	6.0	* 6		4.5				
Max Green Setting (Gmax), s	9.5	65.0		30.5	6.0	* 69		30.5				
Max Q Clear Time (g_c+I1), s	10.1	66.2		32.5	4.9	36.2		6.5				
Green Ext Time (p_c), s	0.0	0.0		0.0	0.0	16.0		0.5				

Intersection Summary

HCM 6th Ctrl Delay	45.4
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCS7 Roundabouts Report

General Information				Site Information			
Analyst	MRR			Intersection	Crestview Dr/Jory Rd		
Agency or Co.	KAI			E/W Street Name	Jory Rd		
Date Performed	12/06/2021			N/S Street Name	Crestview Dr		
Analysis Year	2026			Analysis Time Period (hrs)	0.25		
Time Analyzed	Total AM			Peak Hour Factor	0.88		
Project Description	Crestview Green			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
Movement																
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	115	0	17	0	11	96	51	0	5	281	5
Percent Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0
Flow Rate (v _{pc}), pc/h	0	16	0	36	0	131	0	19	0	12	111	58	0	6	326	6
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)		4.9763			4.9763			4.9763			4.9763	
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		52.00			150.00			181.00			338.00	
Entry Volume veh/h		52.00			150.00			178.82			331.61	
Circulating Flow (v _c), pc/h	463			139			22			143		
Exiting Flow (v _{ex}), pc/h	64			18			146			493		
Capacity (c _{pce}), pc/h		860.56			1197.58			1349.38			1192.70	
Capacity (c), veh/h		860.56			1197.58			1333.15			1170.15	
v/c Ratio (x)		0.06			0.13			0.13			0.28	

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		4.8			4.1			3.8			5.7	
Lane LOS		A			A			A			A	
95% Queue, veh		0.2			0.4			0.5			1.2	
Approach Delay, s/veh	4.8			4.1			3.8			5.7		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh LOS	4.8						A					

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	0	0	32	57	1
Future Vol, veh/h	1	0	0	32	57	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	4	0	0
Mvmt Flow	1	0	0	36	64	1

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	101	65	65	0	0
Stage 1	65	-	-	-	-
Stage 2	36	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-
Pot Cap-1 Maneuver	902	1005	1550	-	-
Stage 1	963	-	-	-	-
Stage 2	992	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	902	1005	1550	-	-
Mov Cap-2 Maneuver	902	-	-	-	-
Stage 1	963	-	-	-	-
Stage 2	992	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1550	-	902	-	-
HCM Lane V/C Ratio	-	-	0.001	-	-
HCM Control Delay (s)	0	-	9	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

HCS7 Roundabouts Report

General Information				Site Information			
Analyst	MRR			Intersection	Springbrook/Crestview		
Agency or Co.	KAI			E/W Street Name	Crestview Dr		
Date Performed	12/6/2021			N/S Street Name	Springbrook Rd		
Analysis Year	2026			Analysis Time Period (hrs)	0.25		
Time Analyzed	Total PM			Peak Hour Factor	0.81		
Project Description	Crestview Green			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	78	23	40	0	18	15	163	3	22	224	18	4	198	265	54
Percent Heavy Vehicles, %	0	12	0	0	0	0	0	0	0	12	5	0	0	0	4	9
Flow Rate (v _{pc}), pc/h	0	108	28	49	0	22	19	201	4	30	290	22	5	244	340	73
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				2				2				7			

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)		4.9763			4.9763			4.9763			4.9763	
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		185			242			346			662	
Entry Volume veh/h		173			242			329			643	
Circulating Flow (v _c), pc/h	615			437			385			75		
Exiting Flow (v _{ex}), pc/h	294			122			604			415		
Capacity (c _{pc}), pc/h		737			884			932			1278	
Capacity (c), veh/h		691			883			886			1240	
v/c Ratio (x)		0.25			0.27			0.37			0.52	

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		8.2			7.0			8.3			8.6	
Lane LOS		A			A			A			A	
95% Queue, veh		1.0			1.1			1.7			3.1	
Approach Delay, s/veh	8.2			7.0			8.3			8.6		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh LOS	8.2						A					

HCM 6th TWSC
 2: N Springbrook Rd & NE Benjamin Rd

01/12/2022

Intersection						
Int Delay, s/veh	2.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	49	11	84	30	16	110
Future Vol, veh/h	49	11	84	30	16	110
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	0	1	0	0	3
Mvmt Flow	56	13	95	34	18	125

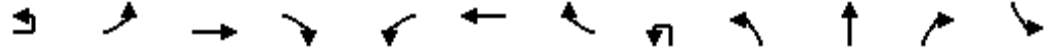
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	273	112	0	0	129	0
Stage 1	112	-	-	-	-	-
Stage 2	161	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	721	947	-	-	1469	-
Stage 1	918	-	-	-	-	-
Stage 2	873	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	712	947	-	-	1469	-
Mov Cap-2 Maneuver	712	-	-	-	-	-
Stage 1	918	-	-	-	-	-
Stage 2	862	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.3	0	0.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	746	1469
HCM Lane V/C Ratio	-	-	0.091	0.012
HCM Control Delay (s)	-	-	10.3	7.5
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.3	0

HCM Signalized Intersection Capacity Analysis
 3: Springbrook Rd & OR 99W

01/12/2022



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	
Lane Configurations		↔	↕	↗	↖	↕	↗		↖	↕	↗	↖	
Traffic Volume (vph)	5	99	1217	105	462	1430	67	1	322	188	345	207	
Future Volume (vph)	5	99	1217	105	462	1430	67	1	322	188	345	207	
Ideal Flow (vphpl)	1900	1750	1750	1750	1750	1800	1750	1900	1750	1750	1750	1750	
Grade (%)			0%			0%				3%			
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	0.97	0.95	1.00		0.97	1.00	1.00	0.97	
Frbp, ped/bikes		1.00	1.00	0.99	1.00	1.00	0.97		1.00	1.00	0.98	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85	1.00	
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	0.95	
Satd. Flow (prot)		1646	3197	1466	3014	3320	1414		3145	1626	1348	3193	
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	0.95	
Satd. Flow (perm)		1646	3197	1466	3014	3320	1414		3145	1626	1348	3193	
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)	5	105	1295	112	491	1521	71	1	343	200	367	220	
RTOR Reduction (vph)	0	0	0	61	0	0	31	0	0	0	255	0	
Lane Group Flow (vph)	0	110	1295	51	491	1521	40	0	344	200	112	220	
Confl. Peds. (#/hr)		5		2	2		5		3		3	3	
Confl. Bikes (#/hr)				1									
Heavy Vehicles (%)	1%	1%	4%	0%	7%	3%	2%	1%	1%	6%	7%	1%	
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot	
Protected Phases	5	5	2		1	6		3	3	8		7	
Permitted Phases				2			6				8		
Actuated Green, G (s)		12.5	64.3	64.3	26.2	78.0	78.0		18.0	18.0	18.0	15.0	
Effective Green, g (s)		12.5	64.3	64.3	26.2	78.0	78.0		18.0	18.0	18.0	15.0	
Actuated g/C Ratio		0.09	0.46	0.46	0.19	0.56	0.56		0.13	0.13	0.13	0.11	
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	4.0	4.0	2.3	4.0	4.0		2.3	2.3	2.3	2.3	
Lane Grp Cap (vph)		146	1468	673	564	1849	787		404	209	173	342	
v/s Ratio Prot		0.07	c0.41		c0.16	0.46			c0.11	c0.12		0.07	
v/s Ratio Perm				0.04			0.03				0.08		
v/c Ratio		0.75	0.88	0.08	0.87	0.82	0.05		0.85	0.96	0.65	0.64	
Uniform Delay, d1		62.2	34.4	21.2	55.3	25.3	14.1		59.7	60.6	58.0	59.9	
Progression Factor		1.00	1.00	1.00	1.06	0.86	2.05		1.00	1.00	1.00	1.00	
Incremental Delay, d2		18.2	8.0	0.2	7.7	2.3	0.1		15.4	49.4	6.7	3.4	
Delay (s)		80.5	42.4	21.4	66.1	24.1	29.1		75.1	110.0	64.7	63.4	
Level of Service		F	D	C	E	C	C		E	F	E	E	
Approach Delay (s)			43.6			34.2				78.6			
Approach LOS			D			C				E			
Intersection Summary													
HCM 2000 Control Delay			50.1		HCM 2000 Level of Service					D			
HCM 2000 Volume to Capacity ratio			0.90										
Actuated Cycle Length (s)			140.0	Sum of lost time (s)					16.5				
Intersection Capacity Utilization			85.4%	ICU Level of Service					E				
Analysis Period (min)			15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: Springbrook Rd & OR 99W

01/12/2022

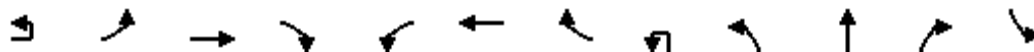


Movement	SBT	SBR
Lane Configurations	↑	↗
Traffic Volume (vph)	164	101
Future Volume (vph)	164	101
Ideal Flow (vphpl)	1750	1750
Grade (%)	0%	
Total Lost time (s)	4.0	4.0
Lane Util. Factor	1.00	1.00
Frpb, ped/bikes	1.00	0.98
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	1636	1464
Flt Permitted	1.00	1.00
Satd. Flow (perm)	1636	1464
Peak-hour factor, PHF	0.94	0.94
Adj. Flow (vph)	174	107
RTOR Reduction (vph)	0	96
Lane Group Flow (vph)	174	11
Confl. Peds. (#/hr)		3
Confl. Bikes (#/hr)		
Heavy Vehicles (%)	7%	0%
Turn Type	NA	Perm
Protected Phases	4	
Permitted Phases		4
Actuated Green, G (s)	15.0	15.0
Effective Green, g (s)	15.0	15.0
Actuated g/C Ratio	0.11	0.11
Clearance Time (s)	4.0	4.0
Vehicle Extension (s)	2.3	2.3
Lane Grp Cap (vph)	175	156
v/s Ratio Prot	0.11	
v/s Ratio Perm		0.01
v/c Ratio	0.99	0.07
Uniform Delay, d1	62.5	56.2
Progression Factor	1.00	1.00
Incremental Delay, d2	66.0	0.1
Delay (s)	128.5	56.4
Level of Service	F	E
Approach Delay (s)	84.5	
Approach LOS	F	
Intersection Summary		

HCM 6th Signalized Intersection Summary

3: Springbrook Rd & OR 99W

01/12/2022



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL
Lane Configurations		↔	↕	↗	↖	↕	↗		↖	↕	↗	↖
Traffic Volume (veh/h)	5	99	1217	105	462	1430	67	1	322	188	345	207
Future Volume (veh/h)	5	99	1217	105	462	1430	67	1	322	188	345	207
Initial Q (Qb), veh		0	0	0	0	0	0		0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		1.00	1.00		1.00		1.00		0.99	1.00
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Work Zone On Approach			No			No				No		
Adj Sat Flow, veh/h/ln		1736	1695	1750	1654	1758	1723		1688	1619	1606	1736
Adj Flow Rate, veh/h		105	1295	0	491	1521	0		343	200	197	220
Peak Hour Factor		0.94	0.94	0.94	0.94	0.94	0.94		0.94	0.94	0.94	0.94
Percent Heavy Veh, %		1	4	0	7	3	2		1	6	7	1
Cap, veh/h		126	1539		530	1921			386	208	174	329
Arrive On Green		0.08	0.48	0.00	0.35	1.00	0.00		0.12	0.13	0.13	0.10
Sat Flow, veh/h		1654	3221	1483	3057	3340	1460		3118	1619	1351	3208
Grp Volume(v), veh/h		105	1295	0	491	1521	0		343	200	197	220
Grp Sat Flow(s),veh/h/ln		1654	1611	1483	1528	1670	1460		1559	1619	1351	1604
Q Serve(g_s), s		8.8	49.2	0.0	21.6	0.0	0.0		15.2	17.2	13.2	9.3
Cycle Q Clear(g_c), s		8.8	49.2	0.0	21.6	0.0	0.0		15.2	17.2	13.2	9.3
Prop In Lane		1.00		1.00	1.00		1.00		1.00		1.00	1.00
Lane Grp Cap(c), veh/h		126	1539		530	1921			386	208	174	329
V/C Ratio(X)		0.84	0.84		0.93	0.79			0.89	0.96	1.13	0.67
Avail Cap(c_a), veh/h		165	1539		633	1921			423	208	174	367
HCM Platoon Ratio		1.00	1.00	1.00	2.00	2.00	2.00		1.00	1.00	1.00	1.00
Upstream Filter(I)		1.00	1.00	0.00	0.40	0.40	0.00		1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh		63.8	31.9	0.0	44.9	0.0	0.0		60.4	60.6	33.0	60.5
Incr Delay (d2), s/veh		20.9	5.7	0.0	8.3	1.4	0.0		18.2	50.8	108.9	3.3
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln		7.8	26.6	0.0	10.0	0.7	0.0		11.4	15.3	15.6	7.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh		84.7	37.7	0.0	53.2	1.4	0.0		78.6	111.5	141.9	63.9
LnGrp LOS		F	D		D	A			E	F	F	E
Approach Vol, veh/h			1400	A		2012	A			740		
Approach Delay, s/veh			41.2			14.0				104.3		
Approach LOS			D			B				F		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	28.3	71.4	21.3	19.0	14.6	85.0	18.3	22.0				
Change Period (Y+Rc), s	4.0	4.5	4.0	4.0	4.0	4.5	4.0	4.0				
Max Green Setting (Gmax), s	29.0	60.5	19.0	15.0	14.0	75.5	16.0	18.0				
Max Q Clear Time (g_c+I1), s	23.6	51.2	17.2	16.7	10.8	2.0	11.3	19.2				
Green Ext Time (p_c), s	0.6	6.6	0.2	0.0	0.0	27.4	0.2	0.0				

Intersection Summary

HCM 6th Ctrl Delay	43.7
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

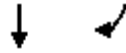
User approved ignoring U-Turning movement.

Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

3: Springbrook Rd & OR 99W

01/12/2022

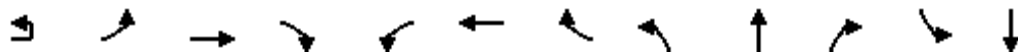


Movement	SBT	SBR
Lane Configurations	↑	↑
Traffic Volume (veh/h)	164	101
Future Volume (veh/h)	164	101
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		0.99
Parking Bus, Adj	1.00	1.00
Work Zone On Approach	No	
Adj Sat Flow, veh/h/ln	1654	1750
Adj Flow Rate, veh/h	174	54
Peak Hour Factor	0.94	0.94
Percent Heavy Veh, %	7	0
Cap, veh/h	177	158
Arrive On Green	0.11	0.11
Sat Flow, veh/h	1654	1471
Grp Volume(v), veh/h	174	54
Grp Sat Flow(s),veh/h/ln	1654	1471
Q Serve(g_s), s	14.7	4.1
Cycle Q Clear(g_c), s	14.7	4.1
Prop In Lane		1.00
Lane Grp Cap(c), veh/h	177	158
V/C Ratio(X)	0.98	0.34
Avail Cap(c_a), veh/h	177	158
HCM Platoon Ratio	1.00	1.00
Upstream Filter(l)	1.00	1.00
Uniform Delay (d), s/veh	62.4	42.0
Incr Delay (d2), s/veh	61.9	0.8
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(95%),veh/ln	14.3	3.3
Unsig. Movement Delay, s/veh		
LnGrp Delay(d),s/veh	124.2	42.7
LnGrp LOS	F	D
Approach Vol, veh/h	448	
Approach Delay, s/veh	84.8	
Approach LOS	F	
Timer - Assigned Phs		

HCM Signalized Intersection Capacity Analysis

4: Brutscher St & OR 99W

01/12/2022



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↔	↕	↗	↖	↕	↗	↖	↕		↖	↗
Traffic Volume (vph)	3	21	1258	83	212	1758	41	244	12	152	18	14
Future Volume (vph)	3	21	1258	83	212	1758	41	244	12	152	18	14
Ideal Flow (vphpl)	1900	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	1.00	1.00	1.00	1.00	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	0.86		1.00	0.88
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	3135	1430	1614	3197	1417	1644	1434		1678	1496
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00	0.71	1.00		0.49	1.00
Satd. Flow (perm)		1646	3135	1430	1614	3197	1417	1232	1434		866	1496
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	3	22	1297	86	219	1812	42	252	12	157	19	14
RTOR Reduction (vph)	0	0	0	29	0	0	13	0	123	0	0	40
Lane Group Flow (vph)	0	25	1297	57	219	1812	29	252	46	0	19	25
Confl. Peds. (#/hr)								1		1	1	
Heavy Vehicles (%)	0%	0%	5%	3%	3%	4%	5%	1%	0%	4%	0%	0%
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA
Protected Phases	5	5	2		1	6			4			8
Permitted Phases				2			6	4				8
Actuated Green, G (s)		4.9	75.3	75.3	22.1	92.5	92.5	30.1	30.1		30.1	30.1
Effective Green, g (s)		4.9	75.3	75.3	22.1	92.5	92.5	30.1	30.1		30.1	30.1
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)		57	1686	769	254	2112	936	264	308		186	321
v/s Ratio Prot		0.02	c0.41		0.14	c0.57			0.03			0.02
v/s Ratio Perm				0.04			0.02	c0.20			0.02	
v/c Ratio		0.44	0.77	0.07	0.86	0.86	0.03	0.95	0.15		0.10	0.08
Uniform Delay, d1		66.2	25.5	15.6	57.5	18.6	8.2	54.3	44.6		44.1	43.9
Progression Factor		1.04	0.80	1.39	1.37	2.06	2.56	1.00	1.00		1.00	1.00
Incremental Delay, d2		1.6	1.8	0.1	7.5	1.3	0.0	42.7	0.2		0.2	0.1
Delay (s)		70.1	22.2	21.8	86.4	39.5	21.1	97.0	44.7		44.3	43.9
Level of Service		E	C	C	F	D	C	F	D		D	D
Approach Delay (s)			23.0			44.1			76.0			44.0
Approach LOS			C			D			E			D
Intersection Summary												
HCM 2000 Control Delay			40.0			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			12.5			
Intersection Capacity Utilization			88.0%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 4: Brutscher St & OR 99W

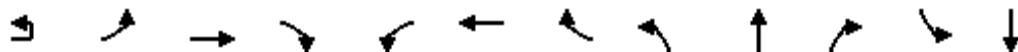
01/12/2022

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	49
Future Volume (vph)	49
Ideal Flow (vphpl)	1750
Grade (%)	
Total Lost time (s)	
Lane Util. Factor	
Frbp, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.97
Adj. Flow (vph)	51
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	1
Heavy Vehicles (%)	4%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM 6th Signalized Intersection Summary

4: Brutscher St & OR 99W

01/12/2022



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↔	↕	↗	↖	↕	↗	↖	↕		↖	↗
Traffic Volume (veh/h)	3	21	1258	83	212	1758	41	244	12	152	18	14
Future Volume (veh/h)	3	21	1258	83	212	1758	41	244	12	152	18	14
Initial Q (Qb), veh		0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach			No			No			No			No
Adj Sat Flow, veh/h/ln		1728	1660	1687	1709	1695	1682	1736	1750	1750	1822	1822
Adj Flow Rate, veh/h		22	1297	86	219	1812	42	252	12	105	19	14
Peak Hour Factor		0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %		0	5	3	3	4	5	1	0	0	0	0
Cap, veh/h		27	1701	771	260	2210	978	285	34	299	245	76
Arrive On Green		0.03	1.00	1.00	0.11	0.46	0.46	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h		1646	3154	1430	1628	3221	1425	1239	154	1350	1241	344
Grp Volume(v), veh/h		22	1297	86	219	1812	42	252	0	117	19	0
Grp Sat Flow(s),veh/h/ln		1646	1577	1430	1628	1611	1425	1239	0	1505	1241	0
Q Serve(g_s), s		1.9	0.0	0.0	18.5	68.3	2.3	26.4	0.0	9.2	1.8	0.0
Cycle Q Clear(g_c), s		1.9	0.0	0.0	18.5	68.3	2.3	31.0	0.0	9.2	11.0	0.0
Prop In Lane		1.00		1.00	1.00		1.00	1.00		0.90	1.00	
Lane Grp Cap(c), veh/h		27	1701	771	260	2210	978	285	0	333	245	0
V/C Ratio(X)		0.81	0.76	0.11	0.84	0.82	0.04	0.88	0.00	0.35	0.08	0.00
Avail Cap(c_a), veh/h		129	1701	771	260	2210	978	285	0	333	245	0
HCM Platoon Ratio		2.00	2.00	2.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)		0.41	0.41	0.41	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh		67.5	0.0	0.0	60.8	30.3	12.5	57.8	0.0	46.0	50.7	0.0
Incr Delay (d2), s/veh		13.5	1.4	0.1	20.8	3.6	0.1	26.0	0.0	0.5	0.1	0.0
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln		1.6	0.6	0.0	14.3	36.9	1.2	16.7	0.0	6.4	1.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh		81.0	1.4	0.1	81.6	33.9	12.6	83.8	0.0	46.5	50.8	0.0
LnGrp LOS		F	A	A	F	C	B	F	A	D	D	A
Approach Vol, veh/h			1405			2073			369			84
Approach Delay, s/veh			2.5			38.5			72.0			45.9
Approach LOS			A			D			E			D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	26.9	80.0		35.0	6.3	100.6		35.0				
Change Period (Y+Rc), s	4.5	* 4.5		4.0	4.0	4.5		4.0				
Max Green Setting (Gmax), s	21.0	* 76		31.0	11.0	85.5		31.0				
Max Q Clear Time (g_c+I1), s	20.5	2.0		33.0	3.9	70.3		13.0				
Green Ext Time (p_c), s	0.0	29.2		0.0	0.0	13.6		0.3				

Intersection Summary

HCM 6th Ctrl Delay	28.9
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
 4: Brutscher St & OR 99W

01/12/2022

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	49
Future Volume (veh/h)	49
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1822
Adj Flow Rate, veh/h	51
Peak Hour Factor	0.97
Percent Heavy Veh, %	0
Cap, veh/h	277
Arrive On Green	0.22
Sat Flow, veh/h	1252
Grp Volume(v), veh/h	65
Grp Sat Flow(s),veh/h/ln	1595
Q Serve(g_s), s	4.6
Cycle Q Clear(g_c), s	4.6
Prop In Lane	0.78
Lane Grp Cap(c), veh/h	353
V/C Ratio(X)	0.18
Avail Cap(c_a), veh/h	353
HCM Platoon Ratio	1.00
Upstream Filter(l)	1.00
Uniform Delay (d), s/veh	44.2
Incr Delay (d2), s/veh	0.2
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(95%),veh/ln	3.4
Unsig. Movement Delay, s/veh	
LnGrp Delay(d),s/veh	44.4
LnGrp LOS	D
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	

Intersection

Int Delay, s/veh 1.1

Movement	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕↕	↕↕		↕	
Traffic Vol, veh/h	1	12	1464	2033	66	24	16
Future Vol, veh/h	1	12	1464	2033	66	24	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	None	-	None
Storage Length	-	100	-	-	-	0	-
Veh in Median Storage, #	-	-	0	0	-	0	-
Grade, %	-	-	-2	2	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	5	4	3	5	0
Mvmt Flow	1	13	1525	2118	69	25	17

Major/Minor	Major1		Major2		Minor2		
Conflicting Flow All	2186	2187	0	-	0	2944	1094
Stage 1	-	-	-	-	-	2153	-
Stage 2	-	-	-	-	-	791	-
Critical Hdwy	6.4	4.1	-	-	-	6.9	6.9
Critical Hdwy Stg 1	-	-	-	-	-	5.9	-
Critical Hdwy Stg 2	-	-	-	-	-	5.9	-
Follow-up Hdwy	2.5	2.2	-	-	-	3.55	3.3
Pot Cap-1 Maneuver	57	246	-	-	-	~ 11	212
Stage 1	-	-	-	-	-	72	-
Stage 2	-	-	-	-	-	399	-
Platoon blocked, %			-	-	-		
Mov Cap-1 Maneuver	192	192	-	-	-	~ 10	212
Mov Cap-2 Maneuver	-	-	-	-	-	55	-
Stage 1	-	-	-	-	-	67	-
Stage 2	-	-	-	-	-	399	-
























Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	94.9
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	192	-	-	-	78
HCM Lane V/C Ratio	0.071	-	-	-	0.534
HCM Control Delay (s)	25.1	-	-	-	94.9
HCM Lane LOS	D	-	-	-	F
HCM 95th %tile Q(veh)	0.2	-	-	-	2.3

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

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

01/12/2022

													
Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Lane Configurations													
Traffic Volume (vph)	126	1339	23	1	54	1963	227	67	34	114	226	14	
Future Volume (vph)	126	1339	23	1	54	1963	227	67	34	114	226	14	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1800	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	
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	
Frt	1.00	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1687	3214	1510		1646	3225	1473	1638	1724	1451	1646	1732	
Flt Permitted	0.95	1.00	1.00		0.95	1.00	1.00	0.75	1.00	1.00	0.73	1.00	
Satd. Flow (perm)	1687	3214	1510		1646	3225	1473	1289	1724	1451	1271	1732	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	133	1409	24	1	57	2066	239	71	36	120	238	15	
RTOR Reduction (vph)	0	0	9	0	0	0	58	0	0	95	0	0	
Lane Group Flow (vph)	133	1409	15	0	58	2066	181	71	36	25	238	15	
Heavy Vehicles (%)	0%	5%	0%	0%	0%	5%	0%	0%	0%	1%	0%	0%	
Turn Type	Prot	NA	Perm	Prot	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	1	6			8			4	
Permitted Phases			2				6	8		8	4		
Actuated Green, G (s)	10.5	87.2	87.2		8.8	85.5	85.5	29.0	29.0	29.0	29.0	29.0	
Effective Green, g (s)	10.5	87.2	87.2		8.8	85.5	85.5	29.0	29.0	29.0	29.0	29.0	
Actuated g/C Ratio	0.08	0.62	0.62		0.06	0.61	0.61	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	
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	
Lane Grp Cap (vph)	126	2001	940		103	1969	899	267	357	300	263	358	
v/s Ratio Prot	c0.08	c0.44			0.04	c0.64			0.02			0.01	
v/s Ratio Perm			0.01				0.12	0.06		0.02	c0.19		
v/c Ratio	1.06	0.70	0.02		0.56	1.05	0.20	0.27	0.10	0.08	0.90	0.04	
Uniform Delay, d1	64.8	17.7	10.1		63.7	27.2	12.1	46.6	44.9	44.8	54.2	44.4	
Progression Factor	1.04	1.46	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	84.9	1.6	0.0		8.3	34.6	0.5	0.7	0.2	0.2	32.0	0.1	
Delay (s)	152.1	27.4	10.1		72.0	61.9	12.6	47.3	45.1	44.9	86.2	44.5	
Level of Service	F	C	B		E	E	B	D	D	D	F	D	
Approach Delay (s)		37.7				57.1			45.7			74.9	
Approach LOS		D				E			D			E	
Intersection Summary													
HCM 2000 Control Delay			51.1									HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.02										
Actuated Cycle Length (s)			140.0									Sum of lost time (s)	15.0
Intersection Capacity Utilization			97.6%									ICU Level of Service	F
Analysis Period (min)			15										

c Critical Lane Group

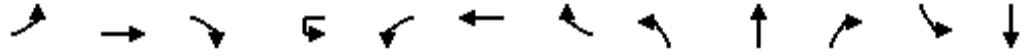
HCM Signalized Intersection Capacity Analysis
 6: Providence Dr/Crestview Dr & OR 99W

01/12/2022

Movement	SBR
Lane Configurations	7
Traffic Volume (vph)	69
Future Volume (vph)	69
Ideal Flow (vphpl)	1750
Grade (%)	
Total Lost time (s)	4.5
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1473
Flt Permitted	1.00
Satd. Flow (perm)	1473
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	73
RTOR Reduction (vph)	58
Lane Group Flow (vph)	15
Heavy Vehicles (%)	0%
Turn Type	Perm
Protected Phases	
Permitted Phases	4
Actuated Green, G (s)	29.0
Effective Green, g (s)	29.0
Actuated g/C Ratio	0.21
Clearance Time (s)	4.5
Vehicle Extension (s)	4.0
Lane Grp Cap (vph)	305
v/s Ratio Prot	
v/s Ratio Perm	0.01
v/c Ratio	0.05
Uniform Delay, d1	44.5
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	44.6
Level of Service	D
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM 6th Signalized Intersection Summary
6: Providence Dr/Crestview Dr & OR 99W

01/12/2022



Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	126	1339	23	1	54	1963	227	67	34	114	226	14
Future Volume (veh/h)	126	1339	23	1	54	1963	227	67	34	114	226	14
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00		1.00		1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No		No		No		No	
Adj Sat Flow, veh/h/ln	1859	1790	1859		1728	1707	1728	1701	1701	1688	1728	1728
Adj Flow Rate, veh/h	133	1409	24		57	2066	186	71	36	67	238	15
Peak Hour Factor	0.95	0.95	0.95		0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	5	0		0	5	0	0	0	1	0	0
Cap, veh/h	114	3385	1568		72	3128	1412	303	371	312	291	377
Arrive On Green	0.04	0.67	0.67		0.04	0.96	0.96	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	1770	3400	1575		1646	3244	1465	1191	1701	1430	1193	1728
Grp Volume(v), veh/h	133	1409	24		57	2066	186	71	36	67	238	15
Grp Sat Flow(s),veh/h/ln	1770	1700	1575		1646	1622	1465	1191	1701	1430	1193	1728
Q Serve(g_s), s	9.0	26.7	0.7		4.8	8.8	0.7	7.0	2.4	5.4	27.9	1.0
Cycle Q Clear(g_c), s	9.0	26.7	0.7		4.8	8.8	0.7	8.0	2.4	5.4	30.2	1.0
Prop In Lane	1.00		1.00		1.00		1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	114	3385	1568		72	3128	1412	303	371	312	291	377
V/C Ratio(X)	1.17	0.42	0.02		0.79	0.66	0.13	0.23	0.10	0.22	0.82	0.04
Avail Cap(c_a), veh/h	114	3385	1568		135	3128	1412	303	371	312	291	377
HCM Platoon Ratio	0.67	0.67	0.67		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.0	4.6	0.2		66.3	0.2	0.1	46.3	43.7	44.9	55.8	43.2
Incr Delay (d2), s/veh	136.8	0.4	0.0		23.7	1.1	0.2	0.6	0.2	0.5	17.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	13.8	10.6	0.0		4.4	0.9	0.1	3.9	1.9	3.6	15.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	203.7	4.9	0.2		90.0	1.4	0.3	46.9	43.9	45.4	72.9	43.3
LnGrp LOS	F	A	A		F	A	A	D	D	D	E	D
Approach Vol, veh/h		1566				2309			174			326
Approach Delay, s/veh		21.7				3.5			45.7			65.4
Approach LOS		C				A			D			E
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.6	146.9		35.0	15.0	142.5		35.0				
Change Period (Y+Rc), s	4.5	6.0		4.5	6.0	* 6		4.5				
Max Green Setting (Gmax), s	11.5	83.0		30.5	9.0	* 86		30.5				
Max Q Clear Time (g_c+I1), s	6.8	28.7		32.2	11.0	10.8		10.0				
Green Ext Time (p_c), s	0.1	29.8		0.0	0.0	51.5		0.9				

Intersection Summary

HCM 6th Ctrl Delay	16.3
HCM 6th LOS	B

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved ignoring U-Turning movement.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
 6: Providence Dr/Crestview Dr & OR 99W

01/12/2022

Movement	SBR
Lane Configurations	7
Traffic Volume (veh/h)	69
Future Volume (veh/h)	69
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1728
Adj Flow Rate, veh/h	73
Peak Hour Factor	0.95
Percent Heavy Veh, %	0
Cap, veh/h	319
Arrive On Green	0.22
Sat Flow, veh/h	1465
Grp Volume(v), veh/h	73
Grp Sat Flow(s),veh/h/ln	1465
Q Serve(g_s), s	5.7
Cycle Q Clear(g_c), s	5.7
Prop In Lane	1.00
Lane Grp Cap(c), veh/h	319
V/C Ratio(X)	0.23
Avail Cap(c_a), veh/h	319
HCM Platoon Ratio	1.00
Upstream Filter(l)	1.00
Uniform Delay (d), s/veh	45.1
Incr Delay (d2), s/veh	0.5
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(95%),veh/ln	3.9
Unsig. Movement Delay, s/veh	
LnGrp Delay(d),s/veh	45.6
LnGrp LOS	D
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	

HCS7 Roundabouts Report

General Information				Site Information			
Analyst	MRR			Intersection	Crestview Dr/Jory Rd		
Agency or Co.	KAI			E/W Street Name	Jory Rd		
Date Performed	12/06/2021			N/S Street Name	Crestview Dr		
Analysis Year	2026			Analysis Time Period (hrs)	0.25		
Time Analyzed	Total PM			Peak Hour Factor	0.95		
Project Description	Crestview Green			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
Movement																
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	74	0	11	0	36	223	128	0	19	214	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	9	0	22	0	78	0	12	0	38	239	135	0	20	230	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)		4.9763			4.9763			4.9763			4.9763	
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		31.00			90.00			412.00			266.00	
Entry Volume veh/h		31.00			90.00			407.31			261.49	
Circulating Flow (v _c), pc/h	328			286			29			116		
Exiting Flow (v _{ex}), pc/h	155			54			260			330		
Capacity (c _{PCE}), pc/h		987.60			1030.83			1339.78			1226.01	
Capacity (c), veh/h		987.60			1030.83			1324.54			1205.22	
v/c Ratio (x)		0.03			0.09			0.31			0.22	

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		3.9			4.3			5.5			4.9	
Lane LOS		A			A			A			A	
95% Queue, veh		0.1			0.3			1.3			0.8	
Approach Delay, s/veh	3.9			4.3			5.5			4.9		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh LOS	5.1						A					

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	0	0	66	37	1
Future Vol, veh/h	1	0	0	66	37	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	1	0	0	70	39	1

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	110	40	40	0	0
Stage 1	40	-	-	-	-
Stage 2	70	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-
Pot Cap-1 Maneuver	892	1037	1583	-	-
Stage 1	988	-	-	-	-
Stage 2	958	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	892	1037	1583	-	-
Mov Cap-2 Maneuver	892	-	-	-	-
Stage 1	988	-	-	-	-
Stage 2	958	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1583	-	892	-	-
HCM Lane V/C Ratio	-	-	0.001	-	-
HCM Control Delay (s)	0	-	9	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

























Appendix G

Year 2026 Total Mitigated Conditions Level of Service Worksheets

HCM Signalized Intersection Capacity Analysis

6: Providence Dr/Crestview Dr & OR 99W

01/12/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	1608	47	98	1121	107	25	12	60	297	27	104
Future Volume (vph)	38	1608	47	98	1121	107	25	12	60	297	27	104
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	0.95	0.95	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	0.96	1.00
Satd. Flow (prot)	1687	3214	1424	1614	3135	1473	1575	1724	1423	1564	1580	1473
Fl _t Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00
Satd. Flow (perm)	1687	3214	1424	1614	3135	1473	1575	1724	1423	1564	1580	1473
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	43	1827	53	111	1274	122	28	14	68	338	31	118
RTOR Reduction (vph)	0	0	28	0	0	51	0	0	64	0	0	98
Lane Group Flow (vph)	43	1827	25	111	1274	71	28	14	4	183	186	20
Heavy Vehicles (%)	0%	5%	6%	2%	8%	0%	4%	0%	3%	0%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	8.3	56.0	56.0	16.7	64.4	64.4	7.4	7.4	7.4	20.4	20.4	20.4
Effective Green, g (s)	8.3	56.0	56.0	16.7	64.4	64.4	7.4	7.4	7.4	20.4	20.4	20.4
Actuated g/C Ratio	0.07	0.47	0.47	0.14	0.54	0.54	0.06	0.06	0.06	0.17	0.17	0.17
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)	116	1499	664	224	1682	790	97	106	87	265	268	250
v/s Ratio Prot	0.03	c0.57		c0.07	c0.41		c0.02	0.01		0.12	c0.12	
v/s Ratio Perm			0.02			0.05			0.00			0.01
v/c Ratio	0.37	1.22	0.04	0.50	0.76	0.09	0.29	0.13	0.05	0.69	0.69	0.08
Uniform Delay, d ₁	53.4	32.0	17.4	47.8	21.7	13.5	53.8	53.3	53.0	46.8	46.9	41.9
Progression Factor	1.08	0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d ₂	2.1	103.4	0.1	2.3	3.2	0.2	2.2	0.8	0.3	8.1	8.1	0.2
Delay (s)	59.9	129.0	17.4	50.1	24.9	13.8	56.0	54.0	53.3	54.9	55.0	42.1
Level of Service	E	F	B	D	C	B	E	D	D	D	E	D
Approach Delay (s)		124.4			25.9			54.1			51.9	
Approach LOS		F			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			76.9				HCM 2000 Level of Service				E	
HCM 2000 Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)				19.5	
Intersection Capacity Utilization			83.0%				ICU Level of Service				E	
Analysis Period (min)			15									

c Critical Lane Group

HCM 6th Signalized Intersection Summary
6: Providence Dr/Crestview Dr & OR 99W

01/12/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (veh/h)	38	1608	47	98	1121	107	25	12	60	297	27	104
Future Volume (veh/h)	38	1608	47	98	1121	107	25	12	60	297	27	104
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1859	1790	1776	1701	1665	1728	1647	1701	1660	1728	1728	1728
Adj Flow Rate, veh/h	43	1827	53	111	1274	122	28	14	68	360	0	118
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	0	5	6	2	8	0	4	0	3	0	0	0
Cap, veh/h	56	1898	840	115	1850	856	104	113	94	468	0	208
Arrive On Green	0.01	0.18	0.18	0.07	0.58	0.58	0.07	0.07	0.07	0.14	0.00	0.14
Sat Flow, veh/h	1770	3400	1505	1620	3164	1465	1568	1701	1407	3292	0	1465
Grp Volume(v), veh/h	43	1827	53	111	1274	122	28	14	68	360	0	118
Grp Sat Flow(s),veh/h/ln	1770	1700	1505	1620	1582	1465	1568	1701	1407	1646	0	1465
Q Serve(g_s), s	2.9	63.9	3.5	8.2	33.6	4.5	2.0	0.9	5.7	12.6	0.0	9.0
Cycle Q Clear(g_c), s	2.9	63.9	3.5	8.2	33.6	4.5	2.0	0.9	5.7	12.6	0.0	9.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	56	1898	840	115	1850	856	104	113	94	468	0	208
V/C Ratio(X)	0.77	0.96	0.06	0.97	0.69	0.14	0.27	0.12	0.73	0.77	0.00	0.57
Avail Cap(c_a), veh/h	74	1898	840	115	1850	856	399	432	358	837	0	372
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	58.9	47.7	23.1	55.6	17.3	11.3	53.2	52.7	54.9	49.6	0.0	48.0
Incr Delay (d2), s/veh	33.6	13.6	0.1	73.7	2.1	0.3	1.9	0.7	14.2	3.8	0.0	3.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.3	41.8	2.2	9.5	17.1	2.6	1.6	0.8	4.3	9.3	0.0	6.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	92.5	61.3	23.2	129.3	19.4	11.6	55.2	53.4	69.1	53.4	0.0	51.5
LnGrp LOS	F	E	C	F	B	B	E	D	E	D	A	D
Approach Vol, veh/h		1923			1507			110				478
Approach Delay, s/veh		60.9			26.9			63.6				52.9
Approach LOS		E			C			E				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.0	73.0		21.5	9.8	76.2		12.5				
Change Period (Y+Rc), s	4.5	6.0		4.5	6.0	* 6		4.5				
Max Green Setting (Gmax), s	8.5	31.0		30.5	5.0	* 35		30.5				
Max Q Clear Time (g_c+I1), s	10.2	65.9		14.6	4.9	35.6		7.7				
Green Ext Time (p_c), s	0.0	0.0		2.4	0.0	0.0		0.5				

Intersection Summary

HCM 6th Ctrl Delay	47.3
HCM 6th LOS	D

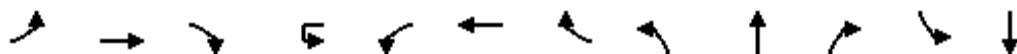
Notes

- User approved pedestrian interval to be less than phase max green.
- User approved volume balancing among the lanes for turning movement.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis

6: Providence Dr/Crestview Dr & OR 99W

01/12/2022



Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	126	1339	23	1	54	1963	227	67	34	114	226	14
Future Volume (vph)	126	1339	23	1	54	1963	227	67	34	114	226	14
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1800	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
Lane Util. Factor	1.00	0.95	1.00		1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95
Fr _t	1.00	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00
Fl _t Protected	0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96
Satd. Flow (prot)	1687	3214	1510		1646	3225	1473	1638	1724	1451	1564	1576
Fl _t Permitted	0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96
Satd. Flow (perm)	1687	3214	1510		1646	3225	1473	1638	1724	1451	1564	1576
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	133	1409	24	1	57	2066	239	71	36	120	238	15
RTOR Reduction (vph)	0	0	10	0	0	0	45	0	0	109	0	0
Lane Group Flow (vph)	133	1409	14	0	58	2066	194	71	36	11	126	127
Heavy Vehicles (%)	0%	5%	0%	0%	0%	5%	0%	0%	0%	1%	0%	0%
Turn Type	Prot	NA	Perm	Prot	Prot	NA	Perm	Split	NA	Perm	Split	NA
Protected Phases	5	2		1	1	6		8	8		4	4
Permitted Phases			2				6			8		
Actuated Green, G (s)	21.5	81.4	81.4		9.9	69.8	69.8	12.4	12.4	12.4	16.8	16.8
Effective Green, g (s)	21.5	81.4	81.4		9.9	69.8	69.8	12.4	12.4	12.4	16.8	16.8
Actuated g/C Ratio	0.15	0.58	0.58		0.07	0.50	0.50	0.09	0.09	0.09	0.12	0.12
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
Vehicle Extension (s)	4.0	5.0	5.0		4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0
Lane Grp Cap (vph)	259	1868	877		116	1607	734	145	152	128	187	189
v/s Ratio Prot	c0.08	c0.44			0.04	c0.64		c0.04	0.02		0.08	c0.08
v/s Ratio Perm			0.01				0.13			0.01		
v/c Ratio	0.51	0.75	0.02		0.50	1.29	0.26	0.49	0.24	0.08	0.67	0.67
Uniform Delay, d ₁	54.4	21.8	12.4		62.7	35.1	20.3	60.8	59.4	58.6	59.0	59.0
Progression Factor	1.16	0.51	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d ₂	1.9	2.4	0.0		4.6	133.4	0.9	3.5	1.1	0.4	9.2	9.0
Delay (s)	65.0	13.5	12.4		67.2	168.5	21.2	64.3	60.5	59.0	68.2	68.0
Level of Service	E	B	B		E	F	C	E	E	E	E	E
Approach Delay (s)		17.8				151.1			60.9			65.1
Approach LOS		B				F			E			E

Intersection Summary

HCM 2000 Control Delay	93.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	19.5
Intersection Capacity Utilization	91.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

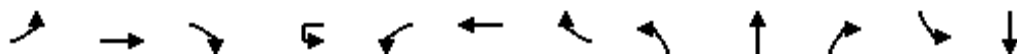
HCM Signalized Intersection Capacity Analysis
 6: Providence Dr/Crestview Dr & OR 99W

01/12/2022

Movement	SBR
Lane Configurations	7
Traffic Volume (vph)	69
Future Volume (vph)	69
Ideal Flow (vphpl)	1750
Grade (%)	
Total Lost time (s)	4.5
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1473
Flt Permitted	1.00
Satd. Flow (perm)	1473
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	73
RTOR Reduction (vph)	64
Lane Group Flow (vph)	9
Heavy Vehicles (%)	0%
Turn Type	Perm
Protected Phases	
Permitted Phases	4
Actuated Green, G (s)	16.8
Effective Green, g (s)	16.8
Actuated g/C Ratio	0.12
Clearance Time (s)	4.5
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	176
v/s Ratio Prot	
v/s Ratio Perm	0.01
v/c Ratio	0.05
Uniform Delay, d1	54.5
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	54.7
Level of Service	D
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM 6th Signalized Intersection Summary
6: Providence Dr/Crestview Dr & OR 99W

01/12/2022



Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	126	1339	23	1	54	1963	227	67	34	114	226	14
Future Volume (veh/h)	126	1339	23	1	54	1963	227	67	34	114	226	14
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00		1.00		1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No				No
Adj Sat Flow, veh/h/ln	1859	1790	1859		1728	1707	1728	1701	1701	1688	1728	1728
Adj Flow Rate, veh/h	133	1409	24		57	2066	186	71	36	67	249	0
Peak Hour Factor	0.95	0.95	0.95		0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	5	0		0	5	0	0	0	1	0	0
Cap, veh/h	126	2228	1032		71	2000	903	108	113	95	315	0
Arrive On Green	0.14	1.00	1.00		0.04	0.62	0.62	0.07	0.07	0.07	0.10	0.00
Sat Flow, veh/h	1770	3400	1575		1646	3244	1465	1620	1701	1430	3292	0
Grp Volume(v), veh/h	133	1409	24		57	2066	186	71	36	67	249	0
Grp Sat Flow(s),veh/h/ln	1770	1700	1575		1646	1622	1465	1620	1701	1430	1646	0
Q Serve(g_s), s	10.0	0.0	0.0		4.8	86.3	7.8	6.0	2.8	6.4	10.4	0.0
Cycle Q Clear(g_c), s	10.0	0.0	0.0		4.8	86.3	7.8	6.0	2.8	6.4	10.4	0.0
Prop In Lane	1.00		1.00		1.00		1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	126	2228	1032		71	2000	903	108	113	95	315	0
V/C Ratio(X)	1.05	0.63	0.02		0.80	1.03	0.21	0.66	0.32	0.71	0.79	0.00
Avail Cap(c_a), veh/h	126	2228	1032		100	2000	903	353	371	312	717	0
HCM Platoon Ratio	2.00	2.00	2.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	60.0	0.0	0.0		66.3	26.8	11.8	63.8	62.3	64.0	61.9	0.0
Incr Delay (d2), s/veh	94.6	1.4	0.0		30.2	29.2	0.5	9.4	2.3	12.8	4.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	12.0	0.8	0.0		4.7	49.1	4.6	5.0	2.4	4.9	8.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	154.6	1.4	0.0		96.5	56.0	12.3	73.3	64.6	76.8	66.4	0.0
LnGrp LOS	F	A	A		F	F	B	E	E	E	E	A
Approach Vol, veh/h		1566				2309			174			322
Approach Delay, s/veh		14.4				53.5			72.8			65.7
Approach LOS		B				D			E			E
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.6	97.7		17.9	16.0	92.3		13.8				
Change Period (Y+Rc), s	4.5	6.0		4.5	6.0	* 6		4.5				
Max Green Setting (Gmax), s	8.5	51.0		30.5	10.0	* 50		30.5				
Max Q Clear Time (g_c+I1), s	6.8	2.0		12.4	12.0	88.3		8.4				
Green Ext Time (p_c), s	0.0	28.2		1.0	0.0	0.0		0.9				

Intersection Summary

HCM 6th Ctrl Delay	41.1
HCM 6th LOS	D

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved volume balancing among the lanes for turning movement.
- User approved ignoring U-Turning movement.

HCM 6th Signalized Intersection Summary
 6: Providence Dr/Crestview Dr & OR 99W

01/12/2022

Movement	SBR
Lane Configurations	7
Traffic Volume (veh/h)	69
Future Volume (veh/h)	69
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1728
Adj Flow Rate, veh/h	73
Peak Hour Factor	0.95
Percent Heavy Veh, %	0
Cap, veh/h	140
Arrive On Green	0.10
Sat Flow, veh/h	1465
Grp Volume(v), veh/h	73
Grp Sat Flow(s),veh/h/ln	1465
Q Serve(g_s), s	6.6
Cycle Q Clear(g_c), s	6.6
Prop In Lane	1.00
Lane Grp Cap(c), veh/h	140
V/C Ratio(X)	0.52
Avail Cap(c_a), veh/h	319
HCM Platoon Ratio	1.00
Upstream Filter(l)	1.00
Uniform Delay (d), s/veh	60.2
Incr Delay (d2), s/veh	3.0
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(95%),veh/ln	4.7
Unsig. Movement Delay, s/veh	
LnGrp Delay(d),s/veh	63.2
LnGrp LOS	E
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.	

Appendix H

Benjamin Road Right-In Access Sensitivity Analysis Level of Service Worksheets

HCS7 Roundabouts Report

General Information				Site Information			
Analyst	MRR			Intersection	Springbrook/Crestview		
Agency or Co.	KAI			E/W Street Name	Crestview Dr		
Date Performed	12/6/2021			N/S Street Name	Springbrook Rd		
Analysis Year	2026			Analysis Time Period (hrs)	0.25		
Time Analyzed	Total AM			Peak Hour Factor	0.87		
Project Description	Crestview Green			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
Movement																
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	13	11	3	0	25	24	93	1	10	149	13	0	223	59	23
Percent Heavy Vehicles, %	0	17	100	0	0	60	0	0	0	8	7	88	0	0	6	5
Flow Rate (v _{pc}), pc/h	0	17	25	3	0	46	28	107	1	12	183	28	0	256	72	28
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)		4.9763			4.9763			4.9763			4.9763	
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		45			181			224			356	
Entry Volume veh/h		30			164			198			351	
Circulating Flow (v _c), pc/h	375			213			298			87		
Exiting Flow (v _{ex}), pc/h	309			68			307			122		
Capacity (c _{pc}), pc/h		941			1111			1018			1263	
Capacity (c), veh/h		628			1005			900			1244	
v/c Ratio (x)		0.05			0.16			0.22			0.28	

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		6.3			5.1			6.2			5.4	
Lane LOS		A			A			A			A	
95% Queue, veh		0.2			0.6			0.8			1.2	
Approach Delay, s/veh	6.3			5.1			6.2			5.4		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh LOS	5.6						A					

HCM 6th TWSC
2: N Springbrook Rd & NE Benjamin Rd

01/12/2022

Intersection						
Int Delay, s/veh	2.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	24	8	45	39	13	47
Future Vol, veh/h	24	8	45	39	13	47
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	4	25	8	3	0	9
Mvmt Flow	28	9	52	45	15	55

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	160	75	0	0	97
Stage 1	75	-	-	-	-
Stage 2	85	-	-	-	-
Critical Hdwy	6.44	6.45	-	-	4.1
Critical Hdwy Stg 1	5.44	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-
Follow-up Hdwy	3.536	3.525	-	-	2.2
Pot Cap-1 Maneuver	826	926	-	-	1509
Stage 1	943	-	-	-	-
Stage 2	933	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	818	926	-	-	1509
Mov Cap-2 Maneuver	818	-	-	-	-
Stage 1	943	-	-	-	-
Stage 2	924	-	-	-	-

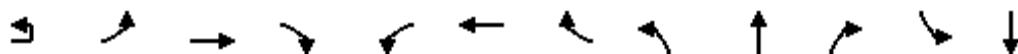
Approach	WB	NB	SB
HCM Control Delay, s	9.5	0	1.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	843	1509
HCM Lane V/C Ratio	-	-	0.044	0.01
HCM Control Delay (s)	-	-	9.5	7.4
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0

HCM Signalized Intersection Capacity Analysis

3: Springbrook Rd & OR 99W

01/12/2022



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↔	↕	↗	↖	↕	↗	↖	↕	↗	↖	↕
Traffic Volume (vph)	2	34	1187	74	272	728	63	118	111	363	83	104
Future Volume (vph)	2	34	1187	74	272	728	63	118	111	363	83	104
Ideal Flow (vphpl)	1900	1750	1750	1750	1750	1800	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
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
Frbp, ped/bikes		1.00	1.00	0.99	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
Frt		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1614	3167	1468	2880	3167	1390	3084	1539	1357	3131	1620
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)		1614	3167	1468	2880	3167	1390	3084	1539	1357	3131	1620
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	2	37	1304	81	299	800	69	130	122	399	91	114
RTOR Reduction (vph)	0	0	0	39	0	0	27	0	0	278	0	0
Lane Group Flow (vph)	0	39	1304	42	299	800	42	130	122	121	91	114
Confl. Peds. (#/hr)				1	1			3				
Heavy Vehicles (%)	3%	3%	5%	0%	12%	8%	7%	3%	12%	8%	3%	8%
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA
Protected Phases	5	5	2		1	6		3	8		7	4
Permitted Phases				2			6			8		
Actuated Green, G (s)		5.5	62.5	62.5	16.8	73.8	73.8	10.6	15.4	15.4	8.8	13.6
Effective Green, g (s)		5.5	62.5	62.5	16.8	73.8	73.8	10.6	15.4	15.4	8.8	13.6
Actuated g/C Ratio		0.05	0.52	0.52	0.14	0.61	0.61	0.09	0.13	0.13	0.07	0.11
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
Vehicle Extension (s)		2.3	4.0	4.0	2.3	4.0	4.0	2.3	2.3	2.3	2.3	2.3
Lane Grp Cap (vph)		73	1649	764	403	1947	854	272	197	174	229	183
v/s Ratio Prot		0.02	c0.41		c0.10	0.25		c0.04	0.08		0.03	0.07
v/s Ratio Perm				0.03			0.03			c0.09		
v/c Ratio		0.53	0.79	0.06	0.74	0.41	0.05	0.48	0.62	0.70	0.40	0.62
Uniform Delay, d1		56.0	23.4	14.2	49.5	11.9	9.2	52.1	49.5	50.1	53.1	50.8
Progression Factor		1.00	1.00	1.00	0.95	0.58	0.73	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		4.9	4.0	0.1	6.0	0.6	0.1	0.8	4.5	10.1	0.7	5.2
Delay (s)		60.9	27.4	14.3	53.2	7.5	6.8	52.8	54.1	60.1	53.7	56.0
Level of Service		E	C	B	D	A	A	D	D	E	D	E
Approach Delay (s)			27.6			19.2			57.5			53.0
Approach LOS			C			B			E			D
Intersection Summary												
HCM 2000 Control Delay			32.3			HCM 2000 Level of Service					C	
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)					16.5	
Intersection Capacity Utilization			73.8%			ICU Level of Service					D	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

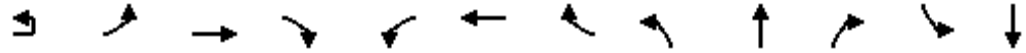
3: Springbrook Rd & OR 99W

01/12/2022

Movement	SBR
Lane Configurations	7
Traffic Volume (vph)	69
Future Volume (vph)	69
Ideal Flow (vphpl)	1750
Grade (%)	
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Frpb, ped/bikes	0.98
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1382
Flt Permitted	1.00
Satd. Flow (perm)	1382
Peak-hour factor, PHF	0.91
Adj. Flow (vph)	76
RTOR Reduction (vph)	67
Lane Group Flow (vph)	9
Confl. Peds. (#/hr)	3
Heavy Vehicles (%)	6%
Turn Type	Perm
Protected Phases	
Permitted Phases	4
Actuated Green, G (s)	13.6
Effective Green, g (s)	13.6
Actuated g/C Ratio	0.11
Clearance Time (s)	4.0
Vehicle Extension (s)	2.3
Lane Grp Cap (vph)	156
v/s Ratio Prot	
v/s Ratio Perm	0.01
v/c Ratio	0.06
Uniform Delay, d1	47.5
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	47.6
Level of Service	D
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM 6th Signalized Intersection Summary
 3: Springbrook Rd & OR 99W

01/12/2022



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↔	↕	↗	↖	↕	↗	↖	↕	↗	↖	↕
Traffic Volume (veh/h)	2	34	1187	74	272	728	63	118	111	363	83	104
Future Volume (veh/h)	2	34	1187	74	272	728	63	118	111	363	83	104
Initial Q (Qb), veh		0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach			No			No			No			No
Adj Sat Flow, veh/h/ln		1709	1682	1750	1586	1688	1654	1660	1537	1592	1709	1641
Adj Flow Rate, veh/h		37	1304	0	299	800	0	130	122	234	91	114
Peak Hour Factor		0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %		3	5	0	12	8	7	3	12	8	3	8
Cap, veh/h		45	1345		641	1975		376	269	235	138	158
Arrive On Green		0.03	0.42	0.00	0.22	0.62	0.00	0.12	0.17	0.17	0.04	0.10
Sat Flow, veh/h		1628	3195	1483	2931	3207	1402	3067	1537	1342	3158	1641
Grp Volume(v), veh/h		37	1304	0	299	800	0	130	122	234	91	114
Grp Sat Flow(s),veh/h/ln		1628	1598	1483	1465	1603	1402	1534	1537	1342	1579	1641
Q Serve(g_s), s		2.7	47.9	0.0	10.7	15.3	0.0	4.7	8.5	20.9	3.4	8.1
Cycle Q Clear(g_c), s		2.7	47.9	0.0	10.7	15.3	0.0	4.7	8.5	20.9	3.4	8.1
Prop In Lane		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h		45	1345		641	1975		376	269	235	138	158
V/C Ratio(X)		0.81	0.97		0.47	0.41		0.35	0.45	1.00	0.66	0.72
Avail Cap(c_a), veh/h		149	1345		641	1975		409	269	235	421	287
HCM Platoon Ratio		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)		1.00	1.00	0.00	0.87	0.87	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh		58.0	34.0	0.0	40.8	11.8	0.0	48.3	44.4	49.5	56.5	52.7
Incr Delay (d2), s/veh		18.7	18.3	0.0	0.3	0.5	0.0	0.3	0.7	57.6	3.3	3.8
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln		2.4	28.2	0.0	6.7	8.5	0.0	3.3	6.0	16.2	2.6	6.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh		76.8	52.3	0.0	41.1	12.3	0.0	48.6	45.1	107.0	59.7	56.4
LnGrp LOS		E	D		D	B		D	D	F	E	E
Approach Vol, veh/h			1341	A		1099	A		486			281
Approach Delay, s/veh			53.0			20.2			75.9			54.1
Approach LOS			D			C			E			D
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	30.8	55.0	18.7	15.6	7.3	78.4	9.2	25.0				
Change Period (Y+Rc), s	4.5	* 4.5	4.0	4.0	4.0	4.5	4.0	4.0				
Max Green Setting (Gmax), s	16.0	* 51	16.0	21.0	11.0	55.5	16.0	21.0				
Max Q Clear Time (g_c+I1), s	12.7	49.9	6.7	10.1	4.7	17.3	5.4	22.9				
Green Ext Time (p_c), s	0.2	0.5	0.2	0.4	0.0	8.6	0.1	0.0				

Intersection Summary

HCM 6th Ctrl Delay	45.3
HCM 6th LOS	D

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved ignoring U-Turning movement.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
 3: Springbrook Rd & OR 99W

01/12/2022

Movement	SBR
Lane Configurations	7
Traffic Volume (veh/h)	69
Future Volume (veh/h)	69
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	0.99
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1668
Adj Flow Rate, veh/h	76
Peak Hour Factor	0.91
Percent Heavy Veh, %	6
Cap, veh/h	135
Arrive On Green	0.10
Sat Flow, veh/h	1400
Grp Volume(v), veh/h	76
Grp Sat Flow(s),veh/h/ln	1400
Q Serve(g_s), s	5.6
Cycle Q Clear(g_c), s	5.6
Prop In Lane	1.00
Lane Grp Cap(c), veh/h	135
V/C Ratio(X)	0.56
Avail Cap(c_a), veh/h	245
HCM Platoon Ratio	1.00
Upstream Filter(l)	1.00
Uniform Delay (d), s/veh	41.5
Incr Delay (d2), s/veh	2.2
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(95%),veh/ln	3.7
Unsig. Movement Delay, s/veh	
LnGrp Delay(d),s/veh	43.8
LnGrp LOS	D
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	
Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.	

HCM Signalized Intersection Capacity Analysis

4: Brutscher St & OR 99W

01/12/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	1565	41	90	1053	28	49	4	99	21	6	27
Future Volume (vph)	25	1565	41	90	1053	28	49	4	99	21	6	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	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.86		1.00	0.88	
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)	1372	3135	1364	1583	3079	1171	1599	1402		1411	1235	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.73	1.00		0.46	1.00	
Satd. Flow (perm)	1372	3135	1364	1583	3079	1171	1233	1402		678	1235	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	27	1720	45	99	1157	31	54	4	109	23	7	30
RTOR Reduction (vph)	0	0	13	0	0	7	0	100	0	0	27	0
Lane Group Flow (vph)	27	1720	32	99	1157	24	54	13	0	23	10	0
Heavy Vehicles (%)	20%	5%	8%	5%	8%	27%	4%	0%	7%	19%	33%	24%
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)	5.1	85.4	85.4	12.0	92.3	92.3	10.1	10.1		10.1	10.1	
Effective Green, g (s)	5.1	85.4	85.4	12.0	92.3	92.3	10.1	10.1		10.1	10.1	
Actuated g/C Ratio	0.04	0.71	0.71	0.10	0.77	0.77	0.08	0.08		0.08	0.08	
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)	58	2231	970	158	2368	900	103	118		57	103	
v/s Ratio Prot	0.02	c0.55		c0.06	0.38			0.01			0.01	
v/s Ratio Perm			0.02			0.02	c0.04			0.03		
v/c Ratio	0.47	0.77	0.03	0.63	0.49	0.03	0.52	0.11		0.40	0.09	
Uniform Delay, d1	56.1	11.1	5.1	51.8	5.1	3.3	52.6	50.8		52.1	50.7	
Progression Factor	0.80	0.86	1.66	1.46	0.09	0.01	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.2	1.7	0.0	4.8	0.6	0.0	3.6	0.3		3.4	0.3	
Delay (s)	47.4	11.2	8.5	80.5	1.0	0.1	56.3	51.1		55.5	51.0	
Level of Service	D	B	A	F	A	A	E	D		E	D	
Approach Delay (s)		11.7			7.1			52.8			52.7	
Approach LOS		B			A			D			D	

Intersection Summary

HCM 2000 Control Delay	12.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary

4: Brutscher St & OR 99W

01/12/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	1565	41	90	1053	28	49	4	99	21	6	27
Future Volume (veh/h)	25	1565	41	90	1053	28	49	4	99	21	6	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1455	1660	1619	1682	1641	1381	1695	1750	1750	1560	1366	1366
Adj Flow Rate, veh/h	27	1720	45	99	1157	31	54	4	109	23	7	30
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	20	5	8	5	8	27	4	0	0	19	33	33
Cap, veh/h	30	2241	975	119	2379	894	163	6	160	101	25	107
Arrive On Green	0.03	0.94	0.94	0.15	1.00	1.00	0.11	0.11	0.11	0.11	0.11	0.11
Sat Flow, veh/h	1386	3154	1372	1602	3118	1171	1243	53	1438	1067	226	967
Grp Volume(v), veh/h	27	1720	45	99	1157	31	54	0	113	23	0	37
Grp Sat Flow(s),veh/h/ln	1386	1577	1372	1602	1559	1171	1243	0	1491	1067	0	1192
Q Serve(g_s), s	2.3	13.1	0.2	7.2	0.0	0.0	5.0	0.0	8.7	2.5	0.0	3.4
Cycle Q Clear(g_c), s	2.3	13.1	0.2	7.2	0.0	0.0	8.4	0.0	8.7	11.3	0.0	3.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.96	1.00		0.81
Lane Grp Cap(c), veh/h	30	2241	975	119	2379	894	163	0	166	101	0	133
V/C Ratio(X)	0.91	0.77	0.05	0.83	0.49	0.03	0.33	0.00	0.68	0.23	0.00	0.28
Avail Cap(c_a), veh/h	127	2241	975	187	2379	894	211	0	224	142	0	179
HCM Platoon Ratio	1.33	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.54	0.54	0.54	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	58.2	1.3	1.0	50.4	0.0	0.0	52.8	0.0	51.3	56.7	0.0	48.9
Incr Delay (d2), s/veh	26.1	1.4	0.0	11.9	0.7	0.1	0.9	0.0	3.8	0.8	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.8	2.8	0.1	5.4	0.4	0.0	2.9	0.0	6.2	1.3	0.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	84.2	2.7	1.0	62.3	0.7	0.1	53.7	0.0	55.1	57.6	0.0	49.8
LnGrp LOS	F	A	A	E	A	A	D	A	E	E	A	D
Approach Vol, veh/h		1792			1287			167				60
Approach Delay, s/veh		3.9			5.4			54.6				52.8
Approach LOS		A			A			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.9	89.7		17.3	6.6	96.1		17.3				
Change Period (Y+Rc), s	4.0	4.5		4.0	4.0	4.5		4.0				
Max Green Setting (Gmax), s	14.0	75.5		18.0	11.0	78.5		18.0				
Max Q Clear Time (g_c+I1), s	9.2	15.1		10.7	4.3	2.0		13.3				
Green Ext Time (p_c), s	0.0	40.2		0.4	0.0	23.3		0.1				

Intersection Summary

HCM 6th Ctrl Delay	8.0
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑↑	↑↑		↘	
Traffic Vol, veh/h	4	1655	1229	21	38	21
Future Vol, veh/h	4	1655	1229	21	38	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-2	2	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	50	5	10	11	0	0
Mvmt Flow	5	1881	1397	24	43	24

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	1421	0	-	0	2360 711
Stage 1	-	-	-	-	1409 -
Stage 2	-	-	-	-	951 -
Critical Hdwy	5.1	-	-	-	6.8 6.9
Critical Hdwy Stg 1	-	-	-	-	5.8 -
Critical Hdwy Stg 2	-	-	-	-	5.8 -
Follow-up Hdwy	2.7	-	-	-	3.5 3.3
Pot Cap-1 Maneuver	290	-	-	-	~ 30 380
Stage 1	-	-	-	-	195 -
Stage 2	-	-	-	-	341 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	290	-	-	-	~ 29 380
Mov Cap-2 Maneuver	-	-	-	-	124 -
Stage 1	-	-	-	-	192 -
Stage 2	-	-	-	-	341 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	41.7
HCM LOS			E

























Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	290	-	-	-	163
HCM Lane V/C Ratio	0.016	-	-	-	0.411
HCM Control Delay (s)	17.6	-	-	-	41.7
HCM Lane LOS	C	-	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	1.8

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

HCM Signalized Intersection Capacity Analysis

6: Providence Dr/Crestview Dr & OR 99W

01/12/2022

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	38	1608	47	98	1121	77	25	12	60	297	27	104	
Future Volume (vph)	38	1608	47	98	1121	77	25	12	60	297	27	104	
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)	1687	3214	1424	1614	3135	1473	1575	1724	1423	1646	1732	1473	
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)	1687	3214	1424	1614	3135	1473	1221	1724	1423	1297	1732	1473	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	
Adj. Flow (vph)	43	1827	53	111	1274	88	28	14	68	338	31	118	
RTOR Reduction (vph)	0	0	24	0	0	37	0	0	51	0	0	88	
Lane Group Flow (vph)	43	1827	29	111	1274	51	28	14	17	338	31	30	
Heavy Vehicles (%)	0%	5%	6%	2%	8%	0%	4%	0%	3%	0%	0%	0%	
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)	4.8	65.0	65.0	9.5	69.7	69.7	30.5	30.5	30.5	30.5	30.5	30.5	
Effective Green, g (s)	4.8	65.0	65.0	9.5	69.7	69.7	30.5	30.5	30.5	30.5	30.5	30.5	
Actuated g/C Ratio	0.04	0.54	0.54	0.08	0.58	0.58	0.25	0.25	0.25	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	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)	67	1740	771	127	1820	855	310	438	361	329	440	374	
v/s Ratio Prot	0.03	c0.57		c0.07	c0.41			0.01			0.02		
v/s Ratio Perm			0.02			0.03	0.02		0.01	c0.26		0.02	
v/c Ratio	0.64	1.05	0.04	0.87	0.70	0.06	0.09	0.03	0.05	1.03	0.07	0.08	
Uniform Delay, d1	56.8	27.5	12.9	54.7	17.8	10.9	34.2	33.6	33.8	44.8	34.0	34.1	
Progression Factor	0.97	1.32	3.05	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	15.0	32.8	0.1	44.9	2.3	0.1	0.2	0.0	0.1	56.8	0.1	0.1	
Delay (s)	70.0	69.0	39.3	99.5	20.0	11.1	34.3	33.7	33.9	101.6	34.1	34.2	
Level of Service	E	E	D	F	C	B	C	C	C	F	C	C	
Approach Delay (s)		68.2			25.5			34.0			81.0		
Approach LOS		E			C			C			F		
Intersection Summary													
HCM 2000 Control Delay			53.1									HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.02										
Actuated Cycle Length (s)			120.0									Sum of lost time (s)	15.0
Intersection Capacity Utilization			91.2%									ICU Level of Service	F
Analysis Period (min)			15										

c Critical Lane Group

HCM 6th Signalized Intersection Summary
6: Providence Dr/Crestview Dr & OR 99W

01/12/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (veh/h)	38	1608	47	98	1121	77	25	12	60	297	27	104
Future Volume (veh/h)	38	1608	47	98	1121	77	25	12	60	297	27	104
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1859	1790	1776	1701	1665	1728	1647	1701	1660	1728	1728	1728
Adj Flow Rate, veh/h	43	1827	53	111	1274	88	28	14	68	338	31	118
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	0	5	6	2	8	0	4	0	3	0	0	0
Cap, veh/h	56	1842	815	128	1824	845	322	432	358	362	439	372
Arrive On Green	0.02	0.36	0.36	0.08	0.58	0.58	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	1770	3400	1505	1620	3164	1465	1090	1701	1407	1216	1728	1465
Grp Volume(v), veh/h	43	1827	53	111	1274	88	28	14	68	338	31	118
Grp Sat Flow(s),veh/h/ln	1770	1700	1505	1620	1582	1465	1090	1701	1407	1216	1728	1465
Q Serve(g_s), s	2.9	64.2	2.8	8.1	34.2	3.2	2.4	0.7	4.5	29.8	1.6	7.8
Cycle Q Clear(g_c), s	2.9	64.2	2.8	8.1	34.2	3.2	4.0	0.7	4.5	30.5	1.6	7.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	56	1842	815	128	1824	845	322	432	358	362	439	372
V/C Ratio(X)	0.77	0.99	0.07	0.87	0.70	0.10	0.09	0.03	0.19	0.93	0.07	0.32
Avail Cap(c_a), veh/h	89	1842	815	128	1824	845	322	432	358	362	439	372
HCM Platoon Ratio	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.3	38.0	18.4	54.6	18.0	11.4	35.5	33.7	35.1	46.7	34.0	36.3
Incr Delay (d2), s/veh	25.9	19.2	0.2	43.0	2.2	0.2	0.2	0.0	0.4	31.4	0.1	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.0	41.0	1.7	8.3	17.5	1.9	1.2	0.6	2.9	19.5	1.3	5.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	84.2	57.1	18.6	97.6	20.3	11.7	35.7	33.7	35.4	78.1	34.1	37.0
LnGrp LOS	F	E	B	F	C	B	D	C	D	E	C	D
Approach Vol, veh/h		1923			1473			110			487	
Approach Delay, s/veh		56.7			25.6			35.3			65.3	
Approach LOS		E			C			D			E	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	14.0	71.0		35.0	9.8	75.2		35.0				
Change Period (Y+Rc), s	4.5	6.0		4.5	6.0	* 6		4.5				
Max Green Setting (Gmax), s	9.5	65.0		30.5	6.0	* 69		30.5				
Max Q Clear Time (g_c+I1), s	10.1	66.2		32.5	4.9	36.2		6.5				
Green Ext Time (p_c), s	0.0	0.0		0.0	0.0	15.8		0.5				

Intersection Summary

HCM 6th Ctrl Delay	45.7
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCS7 Roundabouts Report

General Information				Site Information			
Analyst	MRR			Intersection	Crestview Dr/Jory Rd		
Agency or Co.	KAI			E/W Street Name	Jory Rd		
Date Performed	12/06/2021			N/S Street Name	Crestview Dr		
Analysis Year	2026			Analysis Time Period (hrs)	0.25		
Time Analyzed	Total AM (Benjamin RI)			Peak Hour Factor	0.88		
Project Description	Crestview Green			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	14	0	32	0	115	0	17	0	11	95	22	0	5	281	5
Percent Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0
Flow Rate (V _{pcu}), pc/h	0	16	0	36	0	131	0	19	0	12	110	25	0	6	326	6
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)		4.9763			4.9763			4.9763			4.9763	
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		52.00			150.00			147.00			338.00	
Entry Volume veh/h		52.00			150.00			144.84			331.61	
Circulating Flow (v _c), pc/h	463			138			22			143		
Exiting Flow (v _{ex}), pc/h	31			18			145			493		
Capacity (C _{pce}), pc/h		860.56			1198.80			1349.38			1192.70	
Capacity (c), veh/h		860.56			1198.80			1329.58			1170.15	
v/c Ratio (x)		0.06			0.13			0.11			0.28	

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		4.8			4.1			3.6			5.7	
Lane LOS		A			A			A			A	
95% Queue, veh		0.2			0.4			0.4			1.2	
Approach Delay, s/veh	4.8			4.1			3.6			5.7		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh LOS	4.8						A					

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	0	1	32	57	1
Future Vol, veh/h	1	0	1	32	57	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	4	0	0
Mvmt Flow	1	0	1	36	64	1

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	103	65	65	0	0
Stage 1	65	-	-	-	-
Stage 2	38	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-
Pot Cap-1 Maneuver	900	1005	1550	-	-
Stage 1	963	-	-	-	-
Stage 2	990	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	899	1005	1550	-	-
Mov Cap-2 Maneuver	899	-	-	-	-
Stage 1	962	-	-	-	-
Stage 2	990	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	0.2	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1550	-	899	-	-
HCM Lane V/C Ratio	0.001	-	0.001	-	-
HCM Control Delay (s)	7.3	0	9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

HCM 6th TWSC
10: Benjamin Rd & Jory Rd

01/12/2022

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	0	2	28	0	57
Future Vol, veh/h	5	0	2	28	0	57
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	4	0	0
Mvmt Flow	6	0	2	31	0	64

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	67	32	64	0	0
Stage 1	32	-	-	-	-
Stage 2	35	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-
Pot Cap-1 Maneuver	943	1048	1551	-	-
Stage 1	996	-	-	-	-
Stage 2	993	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	942	1048	1551	-	-
Mov Cap-2 Maneuver	942	-	-	-	-
Stage 1	995	-	-	-	-
Stage 2	993	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.8	0.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1551	-	942	-	-
HCM Lane V/C Ratio	0.001	-	0.006	-	-
HCM Control Delay (s)	7.3	0	8.8	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

HCS7 Roundabouts Report

General Information				Site Information			
Analyst	MRR			Intersection	Springbrook/Crestview		
Agency or Co.	KAI			E/W Street Name	Crestview Dr		
Date Performed	12/6/2021			N/S Street Name	Springbrook Rd		
Analysis Year	2026			Analysis Time Period (hrs)	0.25		
Time Analyzed	Total PM			Peak Hour Factor	0.81		
Project Description	Crestview Green			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	78	23	40	0	18	15	163	3	22	224	18	4	198	265	54
Percent Heavy Vehicles, %	0	12	0	0	0	0	0	0	0	12	5	0	0	0	4	9
Flow Rate (v _{pc}), pc/h	0	108	28	49	0	22	19	201	4	30	290	22	5	244	340	73
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				2				2				7			

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)		4.9763			4.9763			4.9763			4.9763	
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		185			242			346			662	
Entry Volume veh/h		173			242			329			643	
Circulating Flow (v _c), pc/h	615			437			385			75		
Exiting Flow (v _{ex}), pc/h	294			122			604			415		
Capacity (c _{pc}), pc/h		737			884			932			1278	
Capacity (c), veh/h		691			883			886			1240	
v/c Ratio (x)		0.25			0.27			0.37			0.52	

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		8.2			7.0			8.3			8.6	
Lane LOS		A			A			A			A	
95% Queue, veh		1.0			1.1			1.7			3.1	
Approach Delay, s/veh	8.2			7.0			8.3			8.6		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh LOS	8.2						A					

HCM 6th TWSC
 2: N Springbrook Rd & NE Benjamin Rd

01/12/2022

Intersection						
Int Delay, s/veh	2.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	49	11	84	30	16	110
Future Vol, veh/h	49	11	84	30	16	110
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	0	1	0	0	3
Mvmt Flow	56	13	95	34	18	125

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	273	112	0	0	129	0
Stage 1	112	-	-	-	-	-
Stage 2	161	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	721	947	-	-	1469	-
Stage 1	918	-	-	-	-	-
Stage 2	873	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	712	947	-	-	1469	-
Mov Cap-2 Maneuver	712	-	-	-	-	-
Stage 1	918	-	-	-	-	-
Stage 2	862	-	-	-	-	-

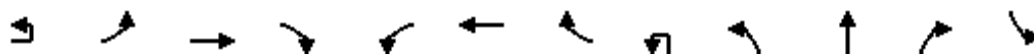
Approach	WB	NB	SB
HCM Control Delay, s	10.3	0	0.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	746	1469
HCM Lane V/C Ratio	-	-	0.091	0.012
HCM Control Delay (s)	-	-	10.3	7.5
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.3	0

HCM Signalized Intersection Capacity Analysis

3: Springbrook Rd & OR 99W

01/12/2022



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	
Lane Configurations		↔	↕	↗	↖	↕	↗		↖	↕	↗	↖	
Traffic Volume (vph)	5	99	1217	105	462	1430	67	1	322	188	345	207	
Future Volume (vph)	5	99	1217	105	462	1430	67	1	322	188	345	207	
Ideal Flow (vphpl)	1900	1750	1750	1750	1750	1800	1750	1900	1750	1750	1750	1750	
Grade (%)			0%			0%				3%			
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	0.97	0.95	1.00		0.97	1.00	1.00	0.97	
Frbp, ped/bikes		1.00	1.00	0.99	1.00	1.00	0.97		1.00	1.00	0.98	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85	1.00	
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	0.95	
Satd. Flow (prot)		1646	3197	1466	3014	3320	1414		3145	1626	1348	3193	
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	0.95	
Satd. Flow (perm)		1646	3197	1466	3014	3320	1414		3145	1626	1348	3193	
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)	5	105	1295	112	491	1521	71	1	343	200	367	220	
RTOR Reduction (vph)	0	0	0	61	0	0	31	0	0	0	255	0	
Lane Group Flow (vph)	0	110	1295	51	491	1521	40	0	344	200	112	220	
Confl. Peds. (#/hr)		5		2	2		5		3		3	3	
Confl. Bikes (#/hr)				1									
Heavy Vehicles (%)	1%	1%	4%	0%	7%	3%	2%	1%	1%	6%	7%	1%	
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot	
Protected Phases	5	5	2		1	6		3	3	8		7	
Permitted Phases				2			6				8		
Actuated Green, G (s)		12.5	64.3	64.3	26.2	78.0	78.0		18.0	18.0	18.0	15.0	
Effective Green, g (s)		12.5	64.3	64.3	26.2	78.0	78.0		18.0	18.0	18.0	15.0	
Actuated g/C Ratio		0.09	0.46	0.46	0.19	0.56	0.56		0.13	0.13	0.13	0.11	
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	4.0	4.0	2.3	4.0	4.0		2.3	2.3	2.3	2.3	
Lane Grp Cap (vph)		146	1468	673	564	1849	787		404	209	173	342	
v/s Ratio Prot		0.07	c0.41		c0.16	0.46			c0.11	c0.12		0.07	
v/s Ratio Perm				0.04			0.03				0.08		
v/c Ratio		0.75	0.88	0.08	0.87	0.82	0.05		0.85	0.96	0.65	0.64	
Uniform Delay, d1		62.2	34.4	21.2	55.3	25.3	14.1		59.7	60.6	58.0	59.9	
Progression Factor		1.00	1.00	1.00	1.06	0.86	2.05		1.00	1.00	1.00	1.00	
Incremental Delay, d2		18.2	8.0	0.2	7.7	2.3	0.1		15.4	49.4	6.7	3.4	
Delay (s)		80.5	42.4	21.4	66.1	24.1	29.1		75.1	110.0	64.7	63.4	
Level of Service		F	D	C	E	C	C		E	F	E	E	
Approach Delay (s)			43.6			34.2				78.6			
Approach LOS			D			C				E			
Intersection Summary													
HCM 2000 Control Delay			50.1		HCM 2000 Level of Service					D			
HCM 2000 Volume to Capacity ratio			0.90										
Actuated Cycle Length (s)			140.0		Sum of lost time (s)					16.5			
Intersection Capacity Utilization			85.4%		ICU Level of Service					E			
Analysis Period (min)			15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: Springbrook Rd & OR 99W

01/12/2022



Movement	SBT	SBR
Lane Configurations	↑	↗
Traffic Volume (vph)	164	101
Future Volume (vph)	164	101
Ideal Flow (vphpl)	1750	1750
Grade (%)	0%	
Total Lost time (s)	4.0	4.0
Lane Util. Factor	1.00	1.00
Frpb, ped/bikes	1.00	0.98
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	1636	1464
Flt Permitted	1.00	1.00
Satd. Flow (perm)	1636	1464
Peak-hour factor, PHF	0.94	0.94
Adj. Flow (vph)	174	107
RTOR Reduction (vph)	0	96
Lane Group Flow (vph)	174	11
Confl. Peds. (#/hr)		3
Confl. Bikes (#/hr)		
Heavy Vehicles (%)	7%	0%
Turn Type	NA	Perm
Protected Phases	4	
Permitted Phases		4
Actuated Green, G (s)	15.0	15.0
Effective Green, g (s)	15.0	15.0
Actuated g/C Ratio	0.11	0.11
Clearance Time (s)	4.0	4.0
Vehicle Extension (s)	2.3	2.3
Lane Grp Cap (vph)	175	156
v/s Ratio Prot	0.11	
v/s Ratio Perm		0.01
v/c Ratio	0.99	0.07
Uniform Delay, d1	62.5	56.2
Progression Factor	1.00	1.00
Incremental Delay, d2	66.0	0.1
Delay (s)	128.5	56.4
Level of Service	F	E
Approach Delay (s)	84.5	
Approach LOS	F	
Intersection Summary		

HCM 6th Signalized Intersection Summary
 3: Springbrook Rd & OR 99W

01/12/2022



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL
Lane Configurations		↔	↕	↗	↖	↕	↗		↖	↕	↗	↖
Traffic Volume (veh/h)	5	99	1217	105	462	1430	67	1	322	188	345	207
Future Volume (veh/h)	5	99	1217	105	462	1430	67	1	322	188	345	207
Initial Q (Qb), veh		0	0	0	0	0	0		0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		1.00	1.00		1.00		1.00		0.99	1.00
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Work Zone On Approach			No			No				No		
Adj Sat Flow, veh/h/ln		1736	1695	1750	1654	1758	1723		1688	1619	1606	1736
Adj Flow Rate, veh/h		105	1295	0	491	1521	0		343	200	197	220
Peak Hour Factor		0.94	0.94	0.94	0.94	0.94	0.94		0.94	0.94	0.94	0.94
Percent Heavy Veh, %		1	4	0	7	3	2		1	6	7	1
Cap, veh/h		126	1539		530	1921			386	208	174	329
Arrive On Green		0.08	0.48	0.00	0.35	1.00	0.00		0.12	0.13	0.13	0.10
Sat Flow, veh/h		1654	3221	1483	3057	3340	1460		3118	1619	1351	3208
Grp Volume(v), veh/h		105	1295	0	491	1521	0		343	200	197	220
Grp Sat Flow(s),veh/h/ln		1654	1611	1483	1528	1670	1460		1559	1619	1351	1604
Q Serve(g_s), s		8.8	49.2	0.0	21.6	0.0	0.0		15.2	17.2	13.2	9.3
Cycle Q Clear(g_c), s		8.8	49.2	0.0	21.6	0.0	0.0		15.2	17.2	13.2	9.3
Prop In Lane		1.00		1.00	1.00		1.00		1.00		1.00	1.00
Lane Grp Cap(c), veh/h		126	1539		530	1921			386	208	174	329
V/C Ratio(X)		0.84	0.84		0.93	0.79			0.89	0.96	1.13	0.67
Avail Cap(c_a), veh/h		165	1539		633	1921			423	208	174	367
HCM Platoon Ratio		1.00	1.00	1.00	2.00	2.00	2.00		1.00	1.00	1.00	1.00
Upstream Filter(I)		1.00	1.00	0.00	0.40	0.40	0.00		1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh		63.8	31.9	0.0	44.9	0.0	0.0		60.4	60.6	33.0	60.5
Incr Delay (d2), s/veh		20.9	5.7	0.0	8.3	1.4	0.0		18.2	50.8	108.9	3.3
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln		7.8	26.6	0.0	10.0	0.7	0.0		11.4	15.3	15.6	7.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh		84.7	37.7	0.0	53.2	1.4	0.0		78.6	111.5	141.9	63.9
LnGrp LOS		F	D		D	A			E	F	F	E
Approach Vol, veh/h			1400	A		2012	A			740		
Approach Delay, s/veh			41.2			14.0				104.3		
Approach LOS			D			B				F		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	28.3	71.4	21.3	19.0	14.6	85.0	18.3	22.0				
Change Period (Y+Rc), s	4.0	4.5	4.0	4.0	4.0	4.5	4.0	4.0				
Max Green Setting (Gmax), s	29.0	60.5	19.0	15.0	14.0	75.5	16.0	18.0				
Max Q Clear Time (g_c+I1), s	23.6	51.2	17.2	16.7	10.8	2.0	11.3	19.2				
Green Ext Time (p_c), s	0.6	6.6	0.2	0.0	0.0	27.4	0.2	0.0				

Intersection Summary

HCM 6th Ctrl Delay	43.7
HCM 6th LOS	D

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved ignoring U-Turning movement.
- Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
 3: Springbrook Rd & OR 99W

01/12/2022

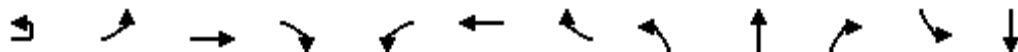


Movement	SBT	SBR
Lane Configurations	↑	↑
Traffic Volume (veh/h)	164	101
Future Volume (veh/h)	164	101
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		0.99
Parking Bus, Adj	1.00	1.00
Work Zone On Approach	No	
Adj Sat Flow, veh/h/ln	1654	1750
Adj Flow Rate, veh/h	174	54
Peak Hour Factor	0.94	0.94
Percent Heavy Veh, %	7	0
Cap, veh/h	177	158
Arrive On Green	0.11	0.11
Sat Flow, veh/h	1654	1471
Grp Volume(v), veh/h	174	54
Grp Sat Flow(s),veh/h/ln	1654	1471
Q Serve(g_s), s	14.7	4.1
Cycle Q Clear(g_c), s	14.7	4.1
Prop In Lane		1.00
Lane Grp Cap(c), veh/h	177	158
V/C Ratio(X)	0.98	0.34
Avail Cap(c_a), veh/h	177	158
HCM Platoon Ratio	1.00	1.00
Upstream Filter(l)	1.00	1.00
Uniform Delay (d), s/veh	62.4	42.0
Incr Delay (d2), s/veh	61.9	0.8
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(95%),veh/ln	14.3	3.3
Unsig. Movement Delay, s/veh		
LnGrp Delay(d),s/veh	124.2	42.7
LnGrp LOS	F	D
Approach Vol, veh/h	448	
Approach Delay, s/veh	84.8	
Approach LOS	F	
Timer - Assigned Phs		

HCM Signalized Intersection Capacity Analysis

4: Brutscher St & OR 99W

01/12/2022



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↔	↕	↗	↖	↕	↗	↖	↕		↖	↗
Traffic Volume (vph)	3	21	1258	83	212	1758	41	244	12	152	18	14
Future Volume (vph)	3	21	1258	83	212	1758	41	244	12	152	18	14
Ideal Flow (vphpl)	1900	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	1.00	1.00	1.00	1.00	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	0.86		1.00	0.88
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	3135	1430	1614	3197	1417	1644	1434		1678	1496
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00	0.71	1.00		0.49	1.00
Satd. Flow (perm)		1646	3135	1430	1614	3197	1417	1232	1434		866	1496
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	3	22	1297	86	219	1812	42	252	12	157	19	14
RTOR Reduction (vph)	0	0	0	29	0	0	13	0	123	0	0	40
Lane Group Flow (vph)	0	25	1297	57	219	1812	29	252	46	0	19	25
Confl. Peds. (#/hr)								1		1	1	
Heavy Vehicles (%)	0%	0%	5%	3%	3%	4%	5%	1%	0%	4%	0%	0%
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA
Protected Phases	5	5	2		1	6			4			8
Permitted Phases				2			6	4				8
Actuated Green, G (s)		4.9	75.3	75.3	22.1	92.5	92.5	30.1	30.1		30.1	30.1
Effective Green, g (s)		4.9	75.3	75.3	22.1	92.5	92.5	30.1	30.1		30.1	30.1
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)		57	1686	769	254	2112	936	264	308		186	321
v/s Ratio Prot		0.02	c0.41		0.14	c0.57			0.03			0.02
v/s Ratio Perm				0.04			0.02	c0.20			0.02	
v/c Ratio		0.44	0.77	0.07	0.86	0.86	0.03	0.95	0.15		0.10	0.08
Uniform Delay, d1		66.2	25.5	15.6	57.5	18.6	8.2	54.3	44.6		44.1	43.9
Progression Factor		1.04	0.80	1.39	1.37	2.06	2.56	1.00	1.00		1.00	1.00
Incremental Delay, d2		1.6	1.8	0.1	7.5	1.3	0.0	42.7	0.2		0.2	0.1
Delay (s)		70.1	22.2	21.8	86.4	39.5	21.1	97.0	44.7		44.3	43.9
Level of Service		E	C	C	F	D	C	F	D		D	D
Approach Delay (s)			23.0			44.1			76.0			44.0
Approach LOS			C			D			E			D
Intersection Summary												
HCM 2000 Control Delay			40.0			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			12.5			
Intersection Capacity Utilization			88.0%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 4: Brutscher St & OR 99W

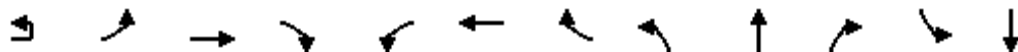
01/12/2022

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	49
Future Volume (vph)	49
Ideal Flow (vphpl)	1750
Grade (%)	
Total Lost time (s)	
Lane Util. Factor	
Frbp, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.97
Adj. Flow (vph)	51
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	1
Heavy Vehicles (%)	4%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM 6th Signalized Intersection Summary

4: Brutscher St & OR 99W

01/12/2022



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↔	↕	↗	↖	↕	↗	↖	↕		↖	↗
Traffic Volume (veh/h)	3	21	1258	83	212	1758	41	244	12	152	18	14
Future Volume (veh/h)	3	21	1258	83	212	1758	41	244	12	152	18	14
Initial Q (Qb), veh		0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach			No			No			No			No
Adj Sat Flow, veh/h/ln		1728	1660	1687	1709	1695	1682	1736	1750	1750	1822	1822
Adj Flow Rate, veh/h		22	1297	86	219	1812	42	252	12	105	19	14
Peak Hour Factor		0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %		0	5	3	3	4	5	1	0	0	0	0
Cap, veh/h		27	1701	771	260	2210	978	285	34	299	245	76
Arrive On Green		0.03	1.00	1.00	0.11	0.46	0.46	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h		1646	3154	1430	1628	3221	1425	1239	154	1350	1241	344
Grp Volume(v), veh/h		22	1297	86	219	1812	42	252	0	117	19	0
Grp Sat Flow(s),veh/h/ln		1646	1577	1430	1628	1611	1425	1239	0	1505	1241	0
Q Serve(g_s), s		1.9	0.0	0.0	18.5	68.3	2.3	26.4	0.0	9.2	1.8	0.0
Cycle Q Clear(g_c), s		1.9	0.0	0.0	18.5	68.3	2.3	31.0	0.0	9.2	11.0	0.0
Prop In Lane		1.00		1.00	1.00		1.00	1.00		0.90	1.00	
Lane Grp Cap(c), veh/h		27	1701	771	260	2210	978	285	0	333	245	0
V/C Ratio(X)		0.81	0.76	0.11	0.84	0.82	0.04	0.88	0.00	0.35	0.08	0.00
Avail Cap(c_a), veh/h		129	1701	771	260	2210	978	285	0	333	245	0
HCM Platoon Ratio		2.00	2.00	2.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)		0.41	0.41	0.41	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh		67.5	0.0	0.0	60.8	30.3	12.5	57.8	0.0	46.0	50.7	0.0
Incr Delay (d2), s/veh		13.5	1.4	0.1	20.8	3.6	0.1	26.0	0.0	0.5	0.1	0.0
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln		1.6	0.6	0.0	14.3	36.9	1.2	16.7	0.0	6.4	1.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh		81.0	1.4	0.1	81.6	33.9	12.6	83.8	0.0	46.5	50.8	0.0
LnGrp LOS		F	A	A	F	C	B	F	A	D	D	A
Approach Vol, veh/h			1405			2073			369			84
Approach Delay, s/veh			2.5			38.5			72.0			45.9
Approach LOS			A			D			E			D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	26.9	80.0		35.0	6.3	100.6		35.0				
Change Period (Y+Rc), s	4.5	* 4.5		4.0	4.0	4.5		4.0				
Max Green Setting (Gmax), s	21.0	* 76		31.0	11.0	85.5		31.0				
Max Q Clear Time (g_c+I1), s	20.5	2.0		33.0	3.9	70.3		13.0				
Green Ext Time (p_c), s	0.0	29.2		0.0	0.0	13.6		0.3				

Intersection Summary

HCM 6th Ctrl Delay	28.9
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
 4: Brutscher St & OR 99W

01/12/2022

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	49
Future Volume (veh/h)	49
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1822
Adj Flow Rate, veh/h	51
Peak Hour Factor	0.97
Percent Heavy Veh, %	0
Cap, veh/h	277
Arrive On Green	0.22
Sat Flow, veh/h	1252
Grp Volume(v), veh/h	65
Grp Sat Flow(s),veh/h/ln	1595
Q Serve(g_s), s	4.6
Cycle Q Clear(g_c), s	4.6
Prop In Lane	0.78
Lane Grp Cap(c), veh/h	353
V/C Ratio(X)	0.18
Avail Cap(c_a), veh/h	353
HCM Platoon Ratio	1.00
Upstream Filter(l)	1.00
Uniform Delay (d), s/veh	44.2
Incr Delay (d2), s/veh	0.2
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(95%),veh/ln	3.4
Unsig. Movement Delay, s/veh	
LnGrp Delay(d),s/veh	44.4
LnGrp LOS	D
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	

Intersection

Int Delay, s/veh 1.1

Movement	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↕↕	↕↕		↕↕	
Traffic Vol, veh/h	1	12	1464	2033	66	24	16
Future Vol, veh/h	1	12	1464	2033	66	24	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	None	-	None
Storage Length	-	100	-	-	-	0	-
Veh in Median Storage, #	-	-	0	0	-	0	-
Grade, %	-	-	-2	2	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	5	4	3	5	0
Mvmt Flow	1	13	1525	2118	69	25	17

Major/Minor	Major1		Major2		Minor2		
Conflicting Flow All	2186	2187	0	-	0	2944	1094
Stage 1	-	-	-	-	-	2153	-
Stage 2	-	-	-	-	-	791	-
Critical Hdwy	6.4	4.1	-	-	-	6.9	6.9
Critical Hdwy Stg 1	-	-	-	-	-	5.9	-
Critical Hdwy Stg 2	-	-	-	-	-	5.9	-
Follow-up Hdwy	2.5	2.2	-	-	-	3.55	3.3
Pot Cap-1 Maneuver	57	246	-	-	-	~ 11	212
Stage 1	-	-	-	-	-	72	-
Stage 2	-	-	-	-	-	399	-
Platoon blocked, %			-	-	-		
Mov Cap-1 Maneuver	192	192	-	-	-	~ 10	212
Mov Cap-2 Maneuver	-	-	-	-	-	55	-
Stage 1	-	-	-	-	-	67	-
Stage 2	-	-	-	-	-	399	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	94.9
HCM LOS			F
























Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	192	-	-	-	78
HCM Lane V/C Ratio	0.071	-	-	-	0.534
HCM Control Delay (s)	25.1	-	-	-	94.9
HCM Lane LOS	D	-	-	-	F
HCM 95th %tile Q(veh)	0.2	-	-	-	2.3

Notes

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

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

01/12/2022

													
Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Lane Configurations													
Traffic Volume (vph)	126	1339	23	1	54	1963	167	67	34	114	226	14	
Future Volume (vph)	126	1339	23	1	54	1963	167	67	34	114	226	14	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1800	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	
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	
Frt	1.00	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1687	3214	1510		1646	3225	1473	1638	1724	1451	1646	1732	
Flt Permitted	0.95	1.00	1.00		0.95	1.00	1.00	0.75	1.00	1.00	0.73	1.00	
Satd. Flow (perm)	1687	3214	1510		1646	3225	1473	1289	1724	1451	1271	1732	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	133	1409	24	1	57	2066	176	71	36	120	238	15	
RTOR Reduction (vph)	0	0	9	0	0	0	42	0	0	95	0	0	
Lane Group Flow (vph)	133	1409	15	0	58	2066	134	71	36	25	238	15	
Heavy Vehicles (%)	0%	5%	0%	0%	0%	5%	0%	0%	0%	1%	0%	0%	
Turn Type	Prot	NA	Perm	Prot	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	1	6			8			4	
Permitted Phases			2				6	8		8	4		
Actuated Green, G (s)	10.5	87.2	87.2		8.8	85.5	85.5	29.0	29.0	29.0	29.0	29.0	
Effective Green, g (s)	10.5	87.2	87.2		8.8	85.5	85.5	29.0	29.0	29.0	29.0	29.0	
Actuated g/C Ratio	0.08	0.62	0.62		0.06	0.61	0.61	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	
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	
Lane Grp Cap (vph)	126	2001	940		103	1969	899	267	357	300	263	358	
v/s Ratio Prot	c0.08	c0.44			0.04	c0.64			0.02			0.01	
v/s Ratio Perm			0.01				0.09	0.06		0.02	c0.19		
v/c Ratio	1.06	0.70	0.02		0.56	1.05	0.15	0.27	0.10	0.08	0.90	0.04	
Uniform Delay, d1	64.8	17.7	10.1		63.7	27.2	11.7	46.6	44.9	44.8	54.2	44.4	
Progression Factor	1.04	1.46	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	84.9	1.6	0.0		8.3	34.6	0.3	0.7	0.2	0.2	32.0	0.1	
Delay (s)	152.1	27.4	10.1		72.0	61.9	12.0	47.3	45.1	44.9	86.2	44.5	
Level of Service	F	C	B		E	E	B	D	D	D	F	D	
Approach Delay (s)		37.7				58.3			45.7			74.9	
Approach LOS		D				E			D			E	
Intersection Summary													
HCM 2000 Control Delay			51.6									HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.02										
Actuated Cycle Length (s)			140.0									Sum of lost time (s)	15.0
Intersection Capacity Utilization			97.6%									ICU Level of Service	F
Analysis Period (min)			15										

c Critical Lane Group

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

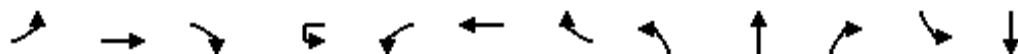
01/12/2022

Movement	SBR
Lane Configurations	7
Traffic Volume (vph)	69
Future Volume (vph)	69
Ideal Flow (vphpl)	1750
Grade (%)	
Total Lost time (s)	4.5
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1473
Flt Permitted	1.00
Satd. Flow (perm)	1473
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	73
RTOR Reduction (vph)	58
Lane Group Flow (vph)	15
Heavy Vehicles (%)	0%
Turn Type	Perm
Protected Phases	
Permitted Phases	4
Actuated Green, G (s)	29.0
Effective Green, g (s)	29.0
Actuated g/C Ratio	0.21
Clearance Time (s)	4.5
Vehicle Extension (s)	4.0
Lane Grp Cap (vph)	305
v/s Ratio Prot	
v/s Ratio Perm	0.01
v/c Ratio	0.05
Uniform Delay, d1	44.5
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	44.6
Level of Service	D
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM 6th Signalized Intersection Summary

6: Providence Dr/Crestview Dr & OR 99W

01/12/2022



Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	126	1339	23	1	54	1963	167	67	34	114	226	14
Future Volume (veh/h)	126	1339	23	1	54	1963	167	67	34	114	226	14
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00		1.00		1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No				No
Adj Sat Flow, veh/h/ln	1859	1790	1859		1728	1707	1728	1701	1701	1688	1728	1728
Adj Flow Rate, veh/h	133	1409	24		57	2066	123	71	36	67	238	15
Peak Hour Factor	0.95	0.95	0.95		0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	5	0		0	5	0	0	0	1	0	0
Cap, veh/h	114	3385	1568		72	3128	1412	303	371	312	291	377
Arrive On Green	0.04	0.67	0.67		0.04	0.96	0.96	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	1770	3400	1575		1646	3244	1465	1191	1701	1430	1193	1728
Grp Volume(v), veh/h	133	1409	24		57	2066	123	71	36	67	238	15
Grp Sat Flow(s),veh/h/ln	1770	1700	1575		1646	1622	1465	1191	1701	1430	1193	1728
Q Serve(g_s), s	9.0	26.7	0.7		4.8	8.8	0.5	7.0	2.4	5.4	27.9	1.0
Cycle Q Clear(g_c), s	9.0	26.7	0.7		4.8	8.8	0.5	8.0	2.4	5.4	30.2	1.0
Prop In Lane	1.00		1.00		1.00		1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	114	3385	1568		72	3128	1412	303	371	312	291	377
V/C Ratio(X)	1.17	0.42	0.02		0.79	0.66	0.09	0.23	0.10	0.22	0.82	0.04
Avail Cap(c_a), veh/h	114	3385	1568		135	3128	1412	303	371	312	291	377
HCM Platoon Ratio	0.67	0.67	0.67		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.0	4.6	0.2		66.3	0.2	0.1	46.3	43.7	44.9	55.8	43.2
Incr Delay (d2), s/veh	136.8	0.4	0.0		23.7	1.1	0.1	0.6	0.2	0.5	17.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	13.8	10.6	0.0		4.4	0.9	0.1	3.9	1.9	3.6	15.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	203.7	4.9	0.2		90.0	1.4	0.2	46.9	43.9	45.4	72.9	43.3
LnGrp LOS	F	A	A		F	A	A	D	D	D	E	D
Approach Vol, veh/h		1566				2246			174			326
Approach Delay, s/veh		21.7				3.5			45.7			65.4
Approach LOS		C				A			D			E
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.6	146.9		35.0	15.0	142.5		35.0				
Change Period (Y+Rc), s	4.5	6.0		4.5	6.0	* 6		4.5				
Max Green Setting (Gmax), s	11.5	83.0		30.5	9.0	* 86		30.5				
Max Q Clear Time (g_c+I1), s	6.8	28.7		32.2	11.0	10.8		10.0				
Green Ext Time (p_c), s	0.1	29.8		0.0	0.0	50.5		0.9				

Intersection Summary

HCM 6th Ctrl Delay	16.5
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
 6: Providence Dr/Crestview Dr & OR 99W

01/12/2022

Movement	SBR
Lane Configurations	7
Traffic Volume (veh/h)	69
Future Volume (veh/h)	69
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1728
Adj Flow Rate, veh/h	73
Peak Hour Factor	0.95
Percent Heavy Veh, %	0
Cap, veh/h	319
Arrive On Green	0.22
Sat Flow, veh/h	1465
Grp Volume(v), veh/h	73
Grp Sat Flow(s),veh/h/ln	1465
Q Serve(g_s), s	5.7
Cycle Q Clear(g_c), s	5.7
Prop In Lane	1.00
Lane Grp Cap(c), veh/h	319
V/C Ratio(X)	0.23
Avail Cap(c_a), veh/h	319
HCM Platoon Ratio	1.00
Upstream Filter(l)	1.00
Uniform Delay (d), s/veh	45.1
Incr Delay (d2), s/veh	0.5
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(95%),veh/ln	3.9
Unsig. Movement Delay, s/veh	
LnGrp Delay(d),s/veh	45.6
LnGrp LOS	D
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	

HCS7 Roundabouts Report

General Information				Site Information			
Analyst	MRR			Intersection	Crestview Dr/Jory Rd		
Agency or Co.	KAI			E/W Street Name	Jory Rd		
Date Performed	12/06/2021			N/S Street Name	Crestview Dr		
Analysis Year	2026			Analysis Time Period (hrs)	0.25		
Time Analyzed	Total PM (Benjamin RI)			Peak Hour Factor	0.95		
Project Description	Crestview Green			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
Movement																
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	74	0	11	0	36	219	72	0	19	214	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	9	0	22	0	78	0	12	0	38	235	76	0	20	230	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)		4.9763			4.9763			4.9763			4.9763	
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		31.00			90.00			349.00			266.00	
Entry Volume veh/h		31.00			90.00			344.39			261.49	
Circulating Flow (v _c), pc/h	328			282			29			116		
Exiting Flow (v _{ex}), pc/h	96			54			256			330		
Capacity (c _{PCE}), pc/h		987.60			1035.05			1339.78			1226.01	
Capacity (c), veh/h		987.60			1035.05			1322.09			1205.22	
v/c Ratio (x)		0.03			0.09			0.26			0.22	

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		3.9			4.2			5.0			4.9	
Lane LOS		A			A			A			A	
95% Queue, veh		0.1			0.3			1.0			0.8	
Approach Delay, s/veh	3.9			4.2			5.0			4.9		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh LOS	4.8						A					

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	0	4	66	37	1
Future Vol, veh/h	1	0	4	66	37	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	1	0	4	70	39	1

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	118	40	40	0	0
Stage 1	40	-	-	-	-
Stage 2	78	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-
Pot Cap-1 Maneuver	883	1037	1583	-	-
Stage 1	988	-	-	-	-
Stage 2	950	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	880	1037	1583	-	-
Mov Cap-2 Maneuver	880	-	-	-	-
Stage 1	985	-	-	-	-
Stage 2	950	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.1	0.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1583	-	880	-	-
HCM Lane V/C Ratio	0.003	-	0.001	-	-
HCM Control Delay (s)	7.3	0	9.1	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection						
Int Delay, s/veh	1.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	TT			TT	TT	
Traffic Vol, veh/h	14	0	4	56	0	37
Future Vol, veh/h	14	0	4	56	0	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	15	0	4	60	0	39

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	88	20	39	0	0
Stage 1	20	-	-	-	-
Stage 2	68	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-
Pot Cap-1 Maneuver	918	1064	1584	-	-
Stage 1	1008	-	-	-	-
Stage 2	960	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	915	1064	1584	-	-
Mov Cap-2 Maneuver	915	-	-	-	-
Stage 1	1005	-	-	-	-
Stage 2	960	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	0.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1584	-	915	-	-
HCM Lane V/C Ratio	0.003	-	0.016	-	-
HCM Control Delay (s)	7.3	0	9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Appendix I

SimTraffic Queuing and Blocking Reports

Queuing and Blocking Report
Existing AM

01/03/2022

Intersection: 3: Springbrook Rd & OR 99W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	UL	T	T	R	L	L	T	T	L	L	T	R
Maximum Queue (ft)	114	473	506	284	253	274	234	260	122	172	856	396
Average Queue (ft)	39	290	311	16	131	152	123	142	34	61	360	318
95th Queue (ft)	90	438	463	159	225	247	209	233	87	129	919	472
Link Distance (ft)		3290	3290				1276	1276			1990	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	350			360	460	460			270	270		350
Storage Blk Time (%)		3	4								1	28
Queuing Penalty (veh)		1	3								3	64

Intersection: 3: Springbrook Rd & OR 99W

Movement	SB	SB	SB	SB
Directions Served	L	L	T	R
Maximum Queue (ft)	232	277	419	122
Average Queue (ft)	138	166	131	30
95th Queue (ft)	239	258	299	77
Link Distance (ft)			1297	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	190	190		130
Storage Blk Time (%)	2	10	12	
Queuing Penalty (veh)	4	17	44	

Intersection: 4: 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)	144	377	383	144	174	173	189	38	117	148	74	85
Average Queue (ft)	25	182	202	13	61	61	76	4	46	57	19	20
95th Queue (ft)	86	318	339	76	131	142	167	21	100	115	54	59
Link Distance (ft)		1276	1276			1292	1292			759	654	654
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	260			200	350			80	220			
Storage Blk Time (%)		2	7				5					
Queuing Penalty (veh)		1	3				1					

Queuing and Blocking Report
Existing AM

01/03/2022

Intersection: 5: OR 99W & Vittoria Way

Movement	EB	EB	EB	SB
Directions Served	L	T	T	LR
Maximum Queue (ft)	48	10	20	343
Average Queue (ft)	5	0	1	128
95th Queue (ft)	26	7	14	353
Link Distance (ft)		1292	1292	994
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	300			
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: 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)	361	380	134	215	120	118	84	109
Average Queue (ft)	124	136	18	98	29	35	23	40
95th Queue (ft)	273	295	94	179	87	94	62	89
Link Distance (ft)	415	415			1834	1834	1211	
Upstream Blk Time (%)	0	0						
Queuing Penalty (veh)	1	1						
Storage Bay Dist (ft)			100	300				200
Storage Blk Time (%)			7					
Queuing Penalty (veh)			4					

Intersection: 7: OR 99W & Benjamin Rd

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	33	543
Average Queue (ft)	6	392
95th Queue (ft)	25	672
Link Distance (ft)		1487
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	300	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 149

Queuing and Blocking Report
Existing PM

01/03/2022

Intersection: 3: N Springbrook Rd & OR 99W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	UL	T	T	R	L	L	T	T	R	UL	L	T
Maximum Queue (ft)	395	512	558	285	525	590	1236	1271	352	320	370	1719
Average Queue (ft)	194	251	262	10	460	515	739	680	48	213	302	1407
95th Queue (ft)	337	506	531	121	616	699	1506	1487	275	371	469	2179
Link Distance (ft)		3290	3290				1276	1276				1668
Upstream Blk Time (%)							6	2				43
Queuing Penalty (veh)							62	18				0
Storage Bay Dist (ft)	350			360	460	460			370	270	270	
Storage Blk Time (%)	2	5	6		32	49	1	5		17	24	54
Queuing Penalty (veh)	9	6	7		201	311	6	10		88	122	341

Intersection: 3: N Springbrook Rd & OR 99W

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	L	T	R
Maximum Queue (ft)	400	235	280	1348	300
Average Queue (ft)	326	199	264	1284	109
95th Queue (ft)	522	280	328	1518	285
Link Distance (ft)				1297	
Upstream Blk Time (%)				71	
Queuing Penalty (veh)				0	
Storage Bay Dist (ft)	350	190	190		130
Storage Blk Time (%)	18	26	66	66	3
Queuing Penalty (veh)	93	71	176	312	15

Intersection: 4: Brutscher St & OR 99W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	UL	T	T	R	L	T	T	R	L	TR	L	TR
Maximum Queue (ft)	123	392	404	215	449	1374	1356	238	244	782	60	124
Average Queue (ft)	25	215	235	34	288	601	588	26	222	444	15	35
95th Queue (ft)	84	379	394	141	509	1402	1390	134	285	940	47	89
Link Distance (ft)		1276	1276			1292	1292			759	654	654
Upstream Blk Time (%)						8	7			21		
Queuing Penalty (veh)						79	72			0		
Storage Bay Dist (ft)	260			200	350			80	220			
Storage Blk Time (%)		3	10		14	16	27	0	48	1		
Queuing Penalty (veh)		1	8		119	31	11	0	67	3		

Queuing and Blocking Report
Existing PM

01/03/2022

Intersection: 5: OR 99W & Vittoria Wy

Movement	EB	WB	WB	SB
Directions Served	UL	T	TR	LR
Maximum Queue (ft)	69	274	270	266
Average Queue (ft)	11	49	48	101
95th Queue (ft)	38	257	255	252
Link Distance (ft)		415	415	994
Upstream Blk Time (%)		1	1	
Queuing Penalty (veh)		11	9	
Storage Bay Dist (ft)	300			
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Providence Dr & OR 99W

Movement	EB	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	T	R	UL	T	T	L	R
Maximum Queue (ft)	370	367	114	200	546	514	155	143
Average Queue (ft)	167	181	12	67	170	181	75	53
95th Queue (ft)	307	313	70	142	575	582	138	106
Link Distance (ft)	415	415			1834	1834	1211	
Upstream Blk Time (%)	0	0						
Queuing Penalty (veh)	0	0						
Storage Bay Dist (ft)			100	300				200
Storage Blk Time (%)		13			3		0	
Queuing Penalty (veh)		3			2		0	

Intersection: 7: OR 99W & NE Benjamin Rd

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	74	732
Average Queue (ft)	18	461
95th Queue (ft)	62	808
Link Distance (ft)		1487
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	300	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 2265

Queuing and Blocking Report
Background AM

01/04/2022

Intersection: 3: N Springbrook Rd & OR 99W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	UL	T	T	R	L	L	T	T	L	L	T	R
Maximum Queue (ft)	220	482	499	284	253	274	245	263	113	130	937	392
Average Queue (ft)	40	267	285	10	129	156	109	126	31	66	299	273
95th Queue (ft)	125	435	458	121	224	242	214	232	82	114	850	456
Link Distance (ft)		3290	3290				1276	1276			1623	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	350			360	460	460			270	270		350
Storage Blk Time (%)		3	3								0	21
Queuing Penalty (veh)		1	3								0	49

Intersection: 3: N Springbrook Rd & OR 99W

Movement	SB	SB	SB	SB
Directions Served	L	L	T	R
Maximum Queue (ft)	93	167	272	88
Average Queue (ft)	22	57	111	32
95th Queue (ft)	66	118	212	68
Link Distance (ft)			1297	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	190	190		130
Storage Blk Time (%)		0	12	0
Queuing Penalty (veh)		0	18	0

Intersection: 4: 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)	191	380	385	208	174	298	312	54	116	169	100	98
Average Queue (ft)	25	182	203	19	64	99	109	6	42	66	25	22
95th Queue (ft)	100	330	346	104	142	224	232	29	93	133	69	64
Link Distance (ft)		1276	1276			1295	1295			759	654	654
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	260			200	350			80	220			
Storage Blk Time (%)		3	8			0	7	0		0		
Queuing Penalty (veh)		1	3			0	2	0		0		

Queuing and Blocking Report
Background AM

01/04/2022

Intersection: 5: OR 99W & Vittoria Wy

Movement	EB	EB	EB	SB
Directions Served	L	T	T	LR
Maximum Queue (ft)	131	712	743	570
Average Queue (ft)	7	124	140	234
95th Queue (ft)	66	477	529	637
Link Distance (ft)		1295	1295	994
Upstream Blk Time (%)				2
Queuing Penalty (veh)				0
Storage Bay Dist (ft)	300			
Storage Blk Time (%)		6		
Queuing Penalty (veh)		0		

Intersection: 6: 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)	96	509	497	158	182	352	360	55	66	50	103	273
Average Queue (ft)	24	372	386	25	83	157	170	13	22	8	29	183
95th Queue (ft)	66	552	554	107	160	284	306	36	58	33	71	276
Link Distance (ft)	403	403	403			1822	1822			1210		
Upstream Blk Time (%)		15	17									
Queuing Penalty (veh)		87	103									
Storage Bay Dist (ft)				100	300			230	200		200	200
Storage Blk Time (%)			36			1	2					9
Queuing Penalty (veh)			17			1	2					9

Intersection: 6: Providence Dr & OR 99W

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	300	93
Average Queue (ft)	41	34
95th Queue (ft)	182	74
Link Distance (ft)	748	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		200
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: OR 99W & NE Benjamin Rd

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	27	784
Average Queue (ft)	4	524
95th Queue (ft)	22	916
Link Distance (ft)		1487
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	300	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 295

Queuing and Blocking Report
Background PM

01/04/2022

Intersection: 3: N Springbrook Rd & OR 99W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	UL	T	T	R	L	L	T	T	R	UL	L	T
Maximum Queue (ft)	451	759	757	475	525	589	1143	1106	440	318	370	1687
Average Queue (ft)	160	353	362	46	379	419	629	613	30	193	276	1428
95th Queue (ft)	338	665	677	277	616	692	1295	1266	214	339	453	2159
Link Distance (ft)		3290	3290				1276	1276				1624
Upstream Blk Time (%)							4	1				45
Queuing Penalty (veh)							37	8				0
Storage Bay Dist (ft)	350			360	460	460			370	270	270	
Storage Blk Time (%)	1	11	12		20	28	4	12		8	15	50
Queuing Penalty (veh)	4	12	12		139	201	18	8		40	78	328

Intersection: 3: N Springbrook Rd & OR 99W

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	L	T	R
Maximum Queue (ft)	400	218	280	1346	300
Average Queue (ft)	343	79	197	915	144
95th Queue (ft)	511	184	362	1558	338
Link Distance (ft)				1297	
Upstream Blk Time (%)				27	
Queuing Penalty (veh)				0	
Storage Bay Dist (ft)	350	190	190		130
Storage Blk Time (%)	26	2	5	85	9
Queuing Penalty (veh)	135	5	13	257	33

Intersection: 4: Brutscher St & OR 99W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	UL	T	T	R	L	T	T	R	L	TR	L	TR
Maximum Queue (ft)	195	512	522	308	450	940	948	240	244	673	68	131
Average Queue (ft)	29	218	231	51	316	529	527	36	220	442	16	42
95th Queue (ft)	108	408	430	195	527	1001	997	160	292	918	48	103
Link Distance (ft)		1276	1276			1295	1295			759	654	654
Upstream Blk Time (%)						2	2			22		
Queuing Penalty (veh)						20	16			0		
Storage Bay Dist (ft)	260			200	350			80	220			
Storage Blk Time (%)		6	13		16	15	25	0	46	3		
Queuing Penalty (veh)		1	11		139	30	10	0	72	6		

Queuing and Blocking Report
Background PM

01/04/2022

Intersection: 5: OR 99W & Vittoria Wy

Movement	EB	WB	WB	SB
Directions Served	L	T	TR	LR
Maximum Queue (ft)	67	181	162	162
Average Queue (ft)	11	9	8	53
95th Queue (ft)	39	104	93	130
Link Distance (ft)		403	403	994
Upstream Blk Time (%)		0	0	
Queuing Penalty (veh)		4	3	
Storage Bay Dist (ft)	300			
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Providence Dr & OR 99W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	R	UL	T	T	R	L	T	R	L
Maximum Queue (ft)	173	236	247	52	400	1818	1816	330	132	81	134	268
Average Queue (ft)	87	55	63	3	101	1499	1490	138	59	24	59	167
95th Queue (ft)	157	145	159	28	310	2370	2360	380	117	64	118	247
Link Distance (ft)	403	403	403			1822	1822			1210		
Upstream Blk Time (%)						20	18					
Queuing Penalty (veh)						220	199					
Storage Bay Dist (ft)				100	300			230	200		200	200
Storage Blk Time (%)			3			30	31				0	6
Queuing Penalty (veh)			1			17	51				0	3

Intersection: 6: Providence Dr & OR 99W

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	220	107
Average Queue (ft)	22	32
95th Queue (ft)	124	79
Link Distance (ft)	748	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		200
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 7: OR 99W & NE Benjamin Rd

Movement	EB	EB	EB	WB	WB	SB
Directions Served	L	T	T	T	TR	LR
Maximum Queue (ft)	246	152	160	1383	1359	1136
Average Queue (ft)	128	10	5	722	710	642
95th Queue (ft)	303	106	82	2219	2178	1141
Link Distance (ft)		1822	1822	2650	2650	1487
Upstream Blk Time (%)				1	1	
Queuing Penalty (veh)				0	0	
Storage Bay Dist (ft)	300					
Storage Blk Time (%)	8	0				
Queuing Penalty (veh)	69	0				

Network Summary

Network wide Queuing Penalty: 2201

Queuing and Blocking Report
Total AM

01/04/2022

Intersection: 3: N Springbrook Rd & OR 99W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB	
Directions Served	UL	T	T	R	L	L	T	T	L	L	T	R	
Maximum Queue (ft)	118	464	480	95	286	302	184	187	97	257	959	400	
Average Queue (ft)	36	260	270	3	126	153	62	71	32	63	291	281	
95th Queue (ft)	85	408	427	68	229	254	146	158	75	156	911	467	
Link Distance (ft)		3290	3290				1276	1276			1905		
Upstream Blk Time (%)												0	
Queuing Penalty (veh)												0	
Storage Bay Dist (ft)	350			360	460	460			270	270		350	
Storage Blk Time (%)		2	3			0						0	20
Queuing Penalty (veh)		1	2			0						2	47

Intersection: 3: N Springbrook Rd & OR 99W

Movement	SB	SB	SB	SB
Directions Served	L	L	T	R
Maximum Queue (ft)	88	127	220	144
Average Queue (ft)	22	55	97	35
95th Queue (ft)	61	103	176	87
Link Distance (ft)			1297	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	190	190		130
Storage Blk Time (%)			7	0
Queuing Penalty (veh)			11	0

Intersection: 4: 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)	81	359	384	205	193	96	81	19	127	168	84	83
Average Queue (ft)	24	185	198	21	81	11	18	1	42	68	18	21
95th Queue (ft)	64	325	337	115	162	47	55	10	97	135	56	60
Link Distance (ft)		1276	1276			1302	1302			759	653	653
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	260			200	350			80	220			
Storage Blk Time (%)		3	8				0					
Queuing Penalty (veh)		1	3				0					

Queuing and Blocking Report
Total AM

01/04/2022

Intersection: 5: OR 99W & Vittoria Wy

Movement	EB	EB	EB	SB
Directions Served	L	T	T	LR
Maximum Queue (ft)	129	703	737	933
Average Queue (ft)	7	243	259	615
95th Queue (ft)	65	691	705	1022
Link Distance (ft)		1302	1302	1002
Upstream Blk Time (%)				1
Queuing Penalty (veh)				0
Storage Bay Dist (ft)	300			
Storage Blk Time (%)		12		
Queuing Penalty (veh)		1		

Intersection: 6: 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)	124	500	498	160	211	316	343	218	79	50	98	274
Average Queue (ft)	42	424	433	35	103	172	174	30	24	10	36	244
95th Queue (ft)	96	568	562	134	188	282	288	126	63	36	83	309
Link Distance (ft)	400	400	400			4549	4549			1212		
Upstream Blk Time (%)		23	27									
Queuing Penalty (veh)		130	154									
Storage Bay Dist (ft)				100	300			230	200		200	200
Storage Blk Time (%)			38		0	0	2					32
Queuing Penalty (veh)			18		0	0	2					44

Intersection: 6: Providence Dr & OR 99W

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	536	219
Average Queue (ft)	209	66
95th Queue (ft)	612	149
Link Distance (ft)	747	
Upstream Blk Time (%)	5	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		200
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Network Summary

Network wide Queuing Penalty: 416

Queuing and Blocking Report
Total PM

01/04/2022

Intersection: 3: N Springbrook Rd & OR 99W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	UL	T	T	R	L	L	T	T	R	UL	L	T
Maximum Queue (ft)	460	665	677	475	510	563	1092	1106	349	319	370	1625
Average Queue (ft)	176	343	362	55	393	442	719	642	12	209	297	1511
95th Queue (ft)	364	621	640	306	616	705	1447	1358	130	360	461	1859
Link Distance (ft)		3290	3290				1276	1276				1551
Upstream Blk Time (%)							10	2				53
Queuing Penalty (veh)							104	23				0
Storage Bay Dist (ft)	350			360	460	460			370	270	270	
Storage Blk Time (%)	0	11	12		23	38	2	9		8	21	47
Queuing Penalty (veh)	1	12	13		165	265	8	6		44	112	314

Intersection: 3: N Springbrook Rd & OR 99W

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	L	T	R
Maximum Queue (ft)	400	226	280	1251	300
Average Queue (ft)	368	116	213	848	139
95th Queue (ft)	500	241	364	1602	330
Link Distance (ft)				1297	
Upstream Blk Time (%)				32	
Queuing Penalty (veh)				0	
Storage Bay Dist (ft)	350	190	190		130
Storage Blk Time (%)	32	5	11	79	6
Queuing Penalty (veh)	164	12	30	241	20

Intersection: 4: Brutscher St & OR 99W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	UL	T	T	R	L	T	T	R	L	TR	L	TR
Maximum Queue (ft)	147	492	501	310	450	1164	1165	209	245	717	65	124
Average Queue (ft)	28	231	244	51	311	637	631	31	213	352	14	43
95th Queue (ft)	90	414	429	194	536	1246	1230	147	288	826	45	106
Link Distance (ft)		1276	1276			1295	1295			759	654	654
Upstream Blk Time (%)						6	6			19		
Queuing Penalty (veh)						63	56			0		
Storage Bay Dist (ft)	260			200	350			80	220			
Storage Blk Time (%)		6	13		17	22	26	0	39	1		
Queuing Penalty (veh)		1	11		147	46	11	0	64	3		

Queuing and Blocking Report

Total PM

01/04/2022

Intersection: 5: OR 99W & Vittoria Wy

Movement	EB	EB	EB	WB	WB	SB
Directions Served	UL	T	T	T	TR	LR
Maximum Queue (ft)	58	51	63	231	239	208
Average Queue (ft)	18	7	6	39	40	63
95th Queue (ft)	51	65	64	223	227	177
Link Distance (ft)		1295	1295	407	407	994
Upstream Blk Time (%)				1	1	
Queuing Penalty (veh)				8	7	
Storage Bay Dist (ft)	300					
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 6: Providence Dr & OR 99W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	R	UL	T	T	R	L	T	R	L
Maximum Queue (ft)	349	247	274	50	400	4446	4440	330	139	70	146	274
Average Queue (ft)	179	65	72	2	102	3153	3146	193	62	27	52	210
95th Queue (ft)	338	163	180	25	322	5094	5072	433	123	64	111	305
Link Distance (ft)	407	407	407			4377	4377			1210		
Upstream Blk Time (%)	3					14	15					
Queuing Penalty (veh)	16					0	0					
Storage Bay Dist (ft)				100	300			230	200		200	200
Storage Blk Time (%)			4			36	36					24
Queuing Penalty (veh)			1			20	82					20

Intersection: 6: Providence Dr & OR 99W

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	475	149
Average Queue (ft)	111	45
95th Queue (ft)	418	103
Link Distance (ft)	747	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		200
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Network Summary

Network wide Queuing Penalty: 2092

Queuing and Blocking Report
 Total AM - Mitigated

01/04/2022

Intersection: 6: 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)	110	528	516	160	233	364	392	275	75	55	103	264
Average Queue (ft)	41	447	454	28	102	192	201	33	24	12	37	138
95th Queue (ft)	88	588	579	121	197	320	340	138	63	38	86	244
Link Distance (ft)	403	403	403			4549	4549			1210		
Upstream Blk Time (%)		30	34									
Queuing Penalty (veh)		168	190									
Storage Bay Dist (ft)				100	300			230	200		200	200
Storage Blk Time (%)			40			1	6					0
Queuing Penalty (veh)			19			1	6					1

Intersection: 6: Providence Dr & OR 99W

Movement	SB	SB
Directions Served	LT	R
Maximum Queue (ft)	305	215
Average Queue (ft)	190	54
95th Queue (ft)	270	137
Link Distance (ft)	747	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		200
Storage Blk Time (%)	7	
Queuing Penalty (veh)	17	

Queuing and Blocking Report
Total PM

01/04/2022

Intersection: 6: Providence Dr & OR 99W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	R	UL	T	T	R	L	T	R	L
Maximum Queue (ft)	259	287	302	52	400	4446	4447	330	142	81	143	210
Average Queue (ft)	123	135	137	6	95	3946	3944	190	59	26	56	123
95th Queue (ft)	217	223	239	39	307	5315	5307	435	116	65	113	211
Link Distance (ft)	407	407	407			4377	4377			1210		
Upstream Blk Time (%)						47	49					
Queuing Penalty (veh)						0	0					
Storage Bay Dist (ft)				100	300			230	200		200	200
Storage Blk Time (%)			16			41	41				0	0
Queuing Penalty (veh)			4			23	93				0	0

Intersection: 6: Providence Dr & OR 99W

Movement	SB	SB
Directions Served	LT	R
Maximum Queue (ft)	264	148
Average Queue (ft)	169	44
95th Queue (ft)	237	104
Link Distance (ft)	747	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		200
Storage Blk Time (%)	3	
Queuing Penalty (veh)	6	

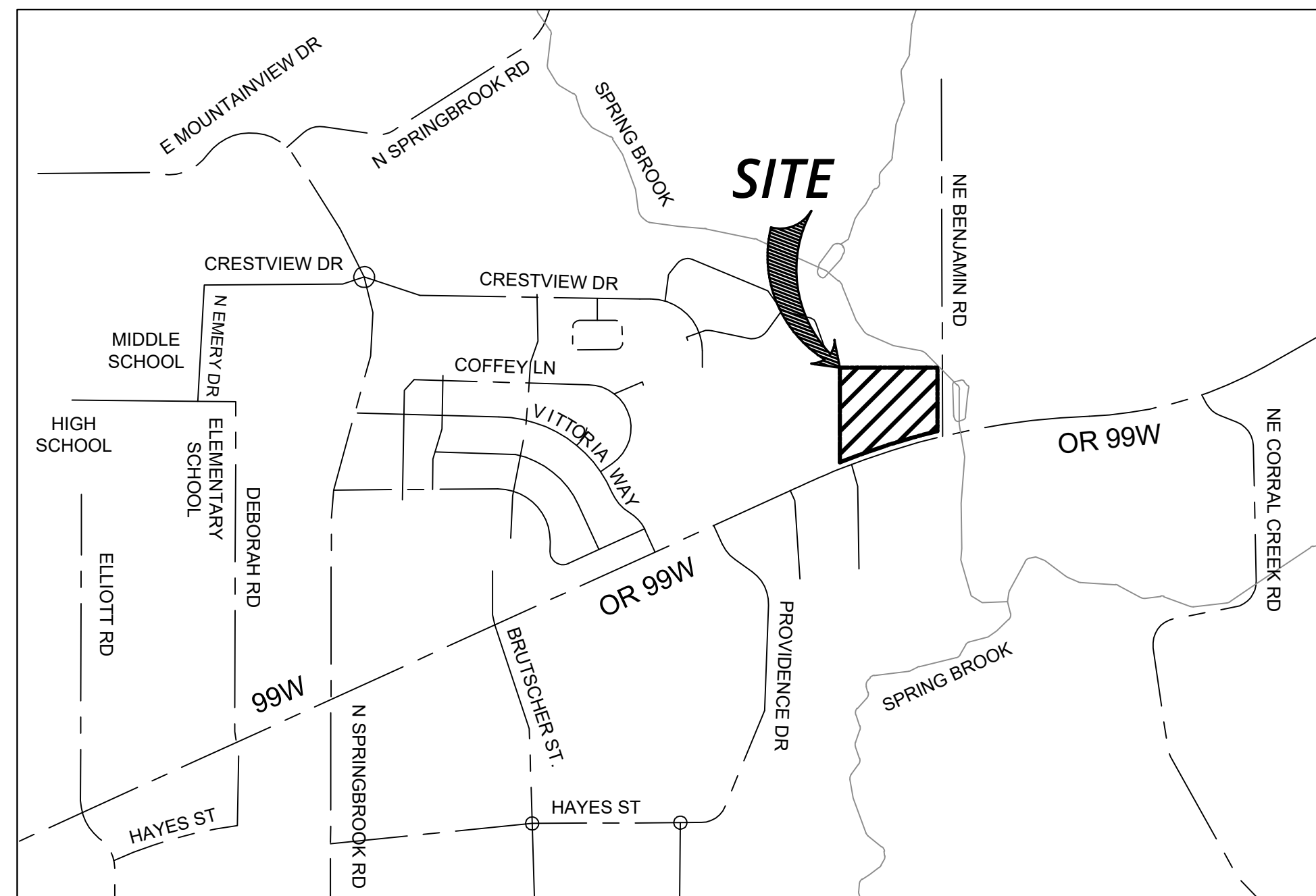
LAND USE DOCUMENTS

FOR

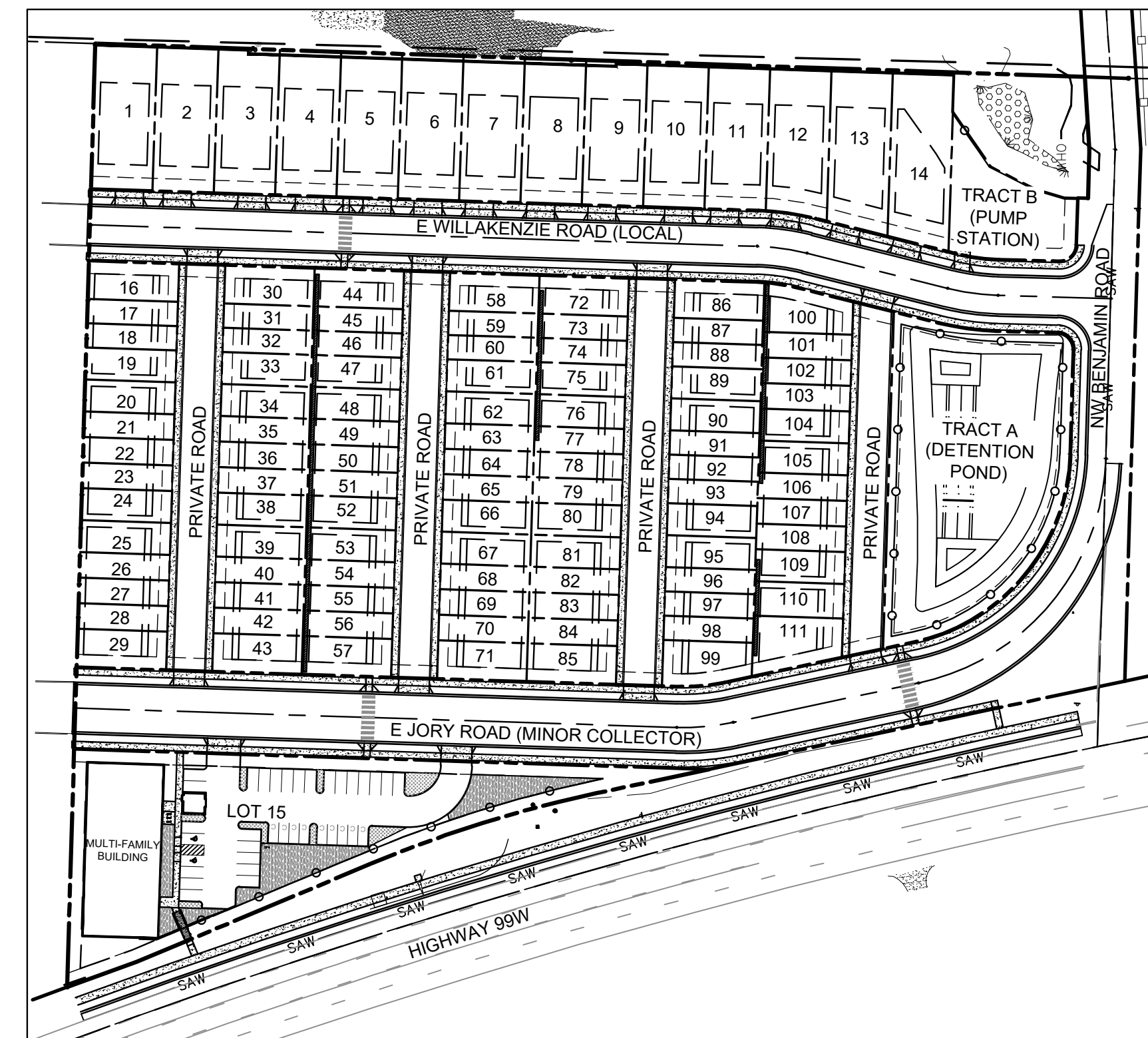
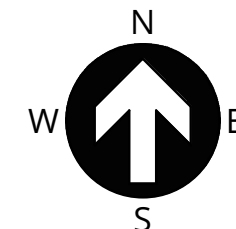
CRESTVIEW GREEN

PLANNED UNIT DEVELOPMENT

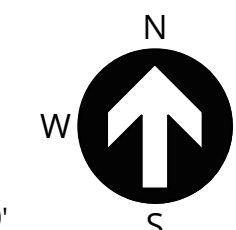
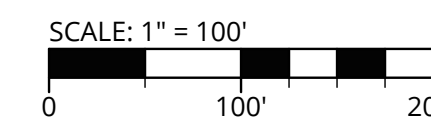
PREPARED FOR
WESTWOOD HOMES LLC



VICINITY MAP
NOT TO SCALE



SITE MAP



CIVIL SHEET LIST	
SHEET NUMBER	SHEET TITLE
C000	COVER SHEET
C100	EXISTING CONDITIONS & DEMOLITION PLAN
C110	TREE REMOVAL AND PRESERVATION PLAN
C150	OVERALL TENTATIVE PLAT
C151	TENTATIVE PLAT I
C152	TENTATIVE PLAT II
C153	TENTATIVE PLAT III
C154	TENTATIVE PLAT IV
C200	OVERALL SITE PLAN
C205	GRADING PLAN
C210	TYPICAL SECTIONS
C215	MULTI-FAMILY SITE PLAN
C220	MULTI-FAMILY GRADING PLAN
C230	CIRCULATION PLAN
C240	FIRE ACCESS PLAN
C250	PHOTOMETRICS PLAN
C251	MULTI-FAMILY PHOTOMETRICS PLAN
C300	COMPOSITE UTILITY PLAN
C305	MULTI-FAMILY UTILITY PLAN

ATTENTION EXCAVATORS:

OREGON LAW REQUIRES YOU TO FOLLOW RULES ADOPTED BY THE OREGON UTILITY NOTIFICATION CENTER. THOSE RULES ARE SET FORTH IN OAR 952-001-0010 THROUGH OAR 952-001-0090. YOU MAY OBTAIN COPIES OF THESE RULES FROM THE CENTER BY CALLING 503-232-1987. IF YOU HAVE ANY QUESTIONS ABOUT THE RULES, YOU MAY CONTACT THE CENTER. YOU MUST NOTIFY THE CENTER AT LEAST TWO BUSINESS DAYS, BEFORE COMMENCING AN EXCAVATION. CALL 503-246-6699.

PROJECT TEAM

OWNER / APPLICANT

WESTWOOD HOMES LLC
12118 NW BLACKHAWK DRIVE,
PORTLAND, OR 97229
CONTACT: TODD BOYCE
PHONE: (503) 715-2383
EMAIL: Todd@westwoodhomesllc.com

SURVEYOR

S&F LAND SERVICES
4858 SW SCHOLLS FERRY RD, STE A
PORTLAND, OR 97225
CONTACT: CHRIS SHERBY, PLS
PHONE: (503) 345-0328
EMAIL: chris.sherby@sflands.com

CIVIL ENGINEER

3J CONSULTING, INC.
9600 SW NIMBUS AVENUE, SUITE 100
BEAVERTON, OR 97008
CONTACT: JIM SCHMITT, PE
PHONE: (503) 946-9365
EMAIL: jim.schmitt@3j-consulting.com

LANDSCAPE ARCHITECT

MEARS DESIGN GROUP
PO BOX 23338
PORTLAND, OR 97281
CONTACT: TROY MEARS
PHONE: (503) 601-4516
EMAIL: troy@meardsdesigngroup.com

PLANNER

3J CONSULTING, INC.
9600 SW NIMBUS AVENUE, SUITE 100
BEAVERTON, OR 97008
CONTACT: MERCEDES SERRA
PHONE: (503) 946-9365
EMAIL: mercedes.serra@3j-consulting.com

SITE INFORMATION

LOCATION

4821 E PORTLAND RD
NEWBERG, OR 97132
NEAR THE INTERSECTION OF 99W
AND PROVIDENCE DRIVE,
NEWBERG, OREGON
(45°18'45.1" N - 122°55'48.7" W)

ZONING

R1, R2, & C-2

TAX LOT(S)

352W16 900, 1000

YAMHILL COUNTY - STATION NO. 22

YAMHILL COUNTY STATION NO. 22 LOCATED AT THE NORTHERLY RIGHT OF WAY
LINE OF DOUGLAS AVENUE AND ON THE CENTERLINE OF SPRINGBROOK WAY.

SECTION, TOWNSHIP, RANGE

TAX LOTS 1000 AND 900 LOCATED IN THE
NE 1/4 OF SECTION 16, T.3S., R.2W., W.M.
CITY OF NEWBERG, YAMHILL COUNTY, OREGON

FLOOD HAZARD

FIRM PANEL MAP NUMBER:
41071C0235D ZONE X (UN-SHADED)

GROSS SITE AREA

10.58 ACRES

UTILITIES & SERVICES

WATER, STORM, SEWER, ROADS

CITY OF NEWBERG, PUBLIC WORKS
PHONE: 503-537-1273

POLICE

NEWBERG-DUNDEE POLICE
DEPARTMENT
PHONE: 503-538-8321 NON-EMERGENCY
CALL 9-1-1 IN CASE OF EMERGENCY

SCHOOLS

NEWBERG OREGON SCHOOL DISTRICT
PHONE: 503-554-5000

ELECTRICAL POWER

PORTLAND GENERAL ELECTRIC
PHONE: 503-463-6187

99W FRONTAGE

OREGON DEPT. OF TRANSPORTATION
PHONE: 503-986-4180

FIRE

TUALATIN VALLEY FIRE & RESCUE
STATION NUMBER 21
PHONE: 503-649-8577 NON-EMERGENCY
CALL 9-1-1 IN CASE OF EMERGENCY

PARKS

CHEHALEM PARKS AND REC. DISTRICT
PHONE: 503-554-0283

ELECTRICAL LIGHTING

PORTLAND GENERAL ELECTRIC
PHONE: 503-672-5417

TELECOMMUNICATIONS

WAVE BROADBAND
PHONE: 206-446-8262

TELECOMMUNICATIONS

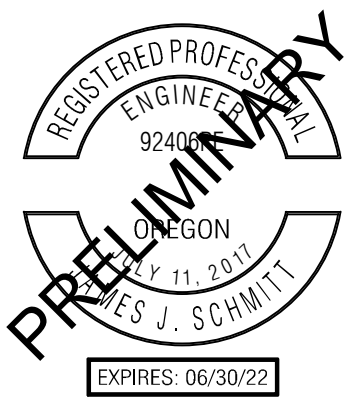
ZIPLY FIBER
PHONE: 503-526-3544

GAS

NORTHWEST NATURAL
PHONE: 800-422-4012

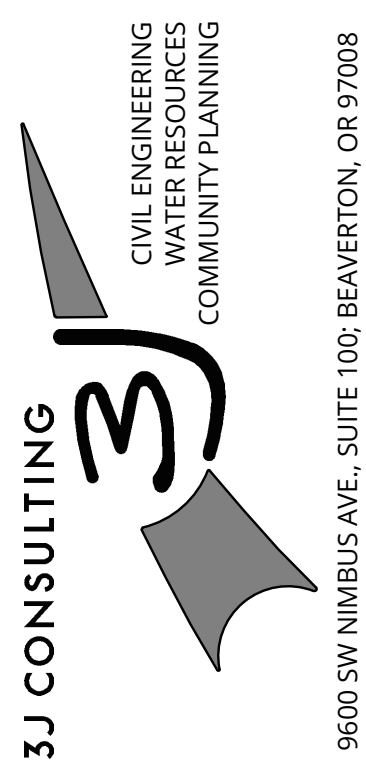
CABLE

COMCAST CABLE
PHONE: 971-777-0933



PUBLISH DATE
02/10/2022
ISSUED FOR
LAND USE DOCUMENTS
REVISIONS

COVER SHEET
CRESTVIEW GREEN
PLANNED UNIT DEVELOPMENT
WESTWOOD HOMES LLC
NEWBERG, OR



PROJECT INFORMATION
3J PROJECT # | 21701
TAX LOT(S) | 352W16 900, 1000
LAND USE # | TBD
DESIGNED BY | JMF, SRC, JGW
CHECKED BY | JJS

SHEET NUMBER
C000



- ### DEMOLITION KEY NOTES
- 1 SHUT OFF, DISCONNECT, AND REMOVE UTILITY LINES AND DISPOSE OFF-SITE.
 - 2 REMOVE EXISTING STRUCTURE AND FOUNDATION AND DISPOSE OFF-SITE AFTER ALL UTILITY LINES ARE PROPERLY SHUT OFF AND DISCONNECTED.
 - 3 REMOVE EXISTING FENCING AND ASSOCIATED APPURTENANCES AND DISPOSE OFF-SITE.
 - 4 REMOVE EXISTING AC AND DISPOSE OF OFF-SITE.
 - 5 REMOVE EXISTING GRAVEL AND DISPOSE OF OFF-SITE.
 - 6 LOCATE AND REMOVE SEPTIC SYSTEM IN ACCORDANCE WITH YAMHILL COUNTY STANDARDS. PROVIDE CERTIFICATION FROM YAMHILL COUNTY TO THE CITY OF NEWBERG OF SEPTIC SYSTEM REMOVAL.

EXISTING CONDITIONS PLAN

THIS PLAN HAS BEEN PREPARED FOR INFORMATIVE PURPOSES ONLY. SITE BACKGROUND INFORMATION AND FEATURES HAVE BEEN GENERATED FROM A COMBINATION OF TOPOGRAPHIC SURVEY DATA PROVIDED BY S&F LAND SURVEYORS, OCTOBER 14, 2021, AERIAL IMAGERY, PUBLIC GIS DATA AND SITE ASSESSMENT/OBSERVATION. NO WARRANTY OR GUARANTEE OF ACCURACY IS EXPRESSED OR IMPLIED.

VERTICAL DATUM

NAVD88 BASED ON STATIC GPS OBSERVATIONS ON CONTROL POINT 1 AND PROCESSED THROUGH OPUS

HORIZONTAL DATUM (BASIS OF BEARINGS)

OREGON NORTH STATE PLANE COORDINATE SYSTEM NAD 83 (2011) BASED ON STATIC GPS OBSERVATIONS PROCESSED THROUGH OPUS AND ADJUSTED IN TRIMBLE BUSINESS CENTER. DISTANCES SHOWN HEREON ARE GROUND DISTANCES, INTERNATIONAL FEET, SCALED ABOUT CONTROL POINT NO 1. TO CONVERT TO GRID DISTANCES MULTIPLY BY THE COMBINED FACTOR OF 0.9998923000.

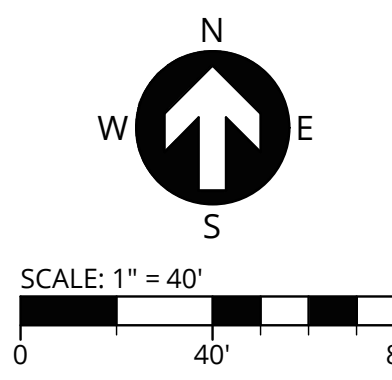
LEGEND

	EXISTING BUILDING
	PROJECT BOUNDARY
	RIGHT-OF-WAY LINE
	RIGHT-OF-WAY CENTERLINE
	DLC LINE
	EASEMENT LINE
	EXISTING LOT LINE
	EXISTING ADJACENT PROPERTY LINE
	EXISTING CONCRETE
	EXISTING GRAVEL
	EXISTING ASPHALT
	EXISTING WETLANDS
	EXISTING CURB
	EXISTING STRIPING: WHITE
	EXISTING STRIPING: YELLOW
	EXISTING TELECOM. LINE
	EXISTING GAS LINE
	EXISTING WATER MAIN
	EXISTING STORM DRAIN
	EXISTING WETLAND
	EXISTING MAJOR CONTOUR
	EXISTING MINOR CONTOUR
	EXISTING SURFACE BREAK LINE
	EXISTING CABLE LINE
	EXISTING UNDERGROUND POWER
	EXISTING OVERHEAD POWER
	EXISTING TREE LINE
	EXISTING VEGETATION LIMITS LINE
	WETLAND FLAG
	EXISTING POWER JUNCTION BOX
	EXISTING POWER METER
	EXISTING POWER POLE
	EXISTING DECIDUOUS TREE
	EXISTING CONIFEROUS TREE
	EXISTING INTERSECTION SIGNAL
	EXISTING GUY ANCHOR
	EXISTING STORM CULVERT
	EXISTING WATER SPIGOT - SHUTOFF
	EXISTING WATER METER
	EXISTING WATER VALVE
	EXISTING GAS FINK
	EXISTING TRAFFIC SIGNAL BOX

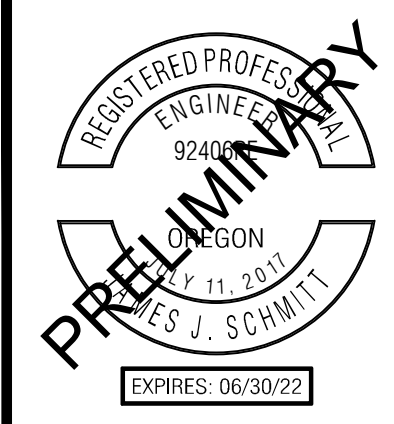
- ### GENERAL DEMOLITION NOTES
1. SEE TREE REMOVAL AND PRESERVATION PLAN (SHEET C110) FOR ALL TREE REMOVAL INFORMATION.
 2. SEE GEOTECHNICAL REPORT FOR SURFACE GRUBBING AND STRIPPING INFORMATION.
 3. NO UNAUTHORIZED GROUND DISTURBANCE MAY OCCUR WITHIN VEGETATED CORRIDOR AND SENSITIVE AREA.

FLOOD HAZARD INFORMATION

ZONE X (UN-SHADED) THE SITE IS LOCATED WITHIN ZONE X (UN-SHADED) PER FLOOD INSURANCE RATE MAP (FIRM) COMMUNITY-PANEL NUMBER 4107C0235D FEMA'S DEFINITION OF ZONE X (UN-SHADED) IS AN AREA OF MINIMAL FLOOD HAZARD. USUALLY DEPICTED ON FIRMS AS ABOVE THE 500-YEAR FLOOD LEVEL. ZONE X IS THE AREA DETERMINED TO BE OUTSIDE THE 500-YEAR FLOOD AND PROTECTED BY LEVEE FROM 100-YEAR FLOOD. IN COMMUNITIES THAT PARTICIPATE IN THE NFIP, FLOOD INSURANCE IS AVAILABLE TO ALL PROPERTY OWNERS AND RENTERS IN THESE ZONES.

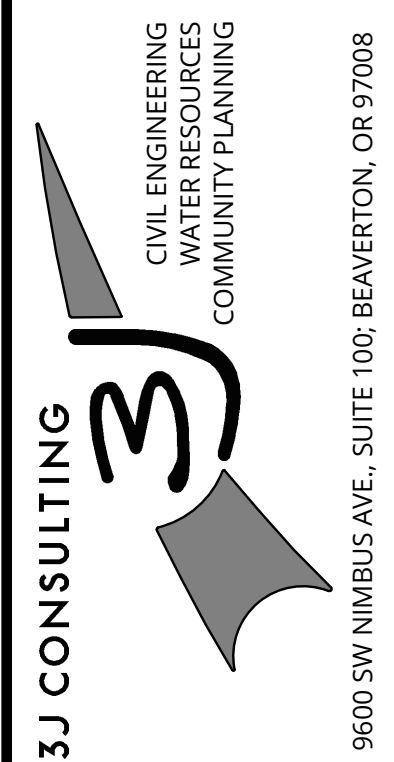


SECTION 16, T.3S., R.2W. W.M., YAMHILL COUNTY, OREGON



PUBLISH DATE
02/10/2022
ISSUED FOR
LAND USE DOCUMENTS
REVISIONS

EXISTING CONDITIONS & DEMOLITION PLAN
CRESTVIEW GREEN
PLANNED UNIT DEVELOPMENT
WESTWOOD HOMES LLC
NEWBERG, OR



PROJECT INFORMATION
3J PROJECT # | 21701
TAX LOT(S) | 3S2W16 900, 1000
LAND USE # | TBD
DESIGNED BY | JMF, SRC, JGW
CHECKED BY | JJS

SHEET NUMBER
C100



P:\21701-crestview-green\CADD\21701-EXISTING CONDITIONS.DWG

P:\21701-CRESTVIEW GREEN\CADD\21701- TREE REMOVAL AND PRESERVATION PLAN.DWG



LEGEND

- EXISTING CONIFEROUS TREE
- EXISTING DECIDUOUS TREE
- TREE TO BE REMOVED (848 TOTAL)
- PROPOSED TREE PROTECTING FENCING

GENERAL TREE INVENTORY STATISTICS

TOTAL TREE INVENTORY (IN PROJECT LIMITS):	186 EA
TOTAL TREES RETAINED:	16 EA
TOTAL TREES REMOVED:	170 EA

REGISTERED PROFESSIONAL ENGINEER
 OREGON
 92406
PRELIMINARY
 JES. J. SCHMITT
 EXPIRES: 06/30/22

PUBLISH DATE
02/10/2022
 ISSUED FOR
LAND USE DOCUMENTS
 REVISIONS

TREE REMOVAL AND PRESERVATION PLAN
CRESTVIEW GREEN
PLANNED UNIT DEVELOPMENT
 WESTWOOD HOMES LLC
 NEWBERG, OR

3J CONSULTING
 CIVIL ENGINEERING
 WATER RESOURCES
 COMMUNITY PLANNING
 9600 SW NIMBUS AVE., SUITE 100, BEAVERTON, OR 97008

PROJECT INFORMATION
 3J PROJECT # | 21701
 TAX LOT(S) | 3S2W16 900, 1000
 LAND USE # | TBD
 DESIGNED BY | JMF, SRC, JGW
 CHECKED BY | JJS

SHEET NUMBER
C110

N
 W ↑ E
 S

SCALE: 1" = 40'

0 40' 80'

SECTION 16, T.3S., R.2W. W.M.,
 YAMHILL COUNTY, OREGON

811
 Know what's below.
 Call before you dig.

P:\21701-CRESTVIEW GREEN\CADD\21701- TENTATIVE PLAT.DWG

TAX LOT 1600
TAX MAP 3 2 16AA

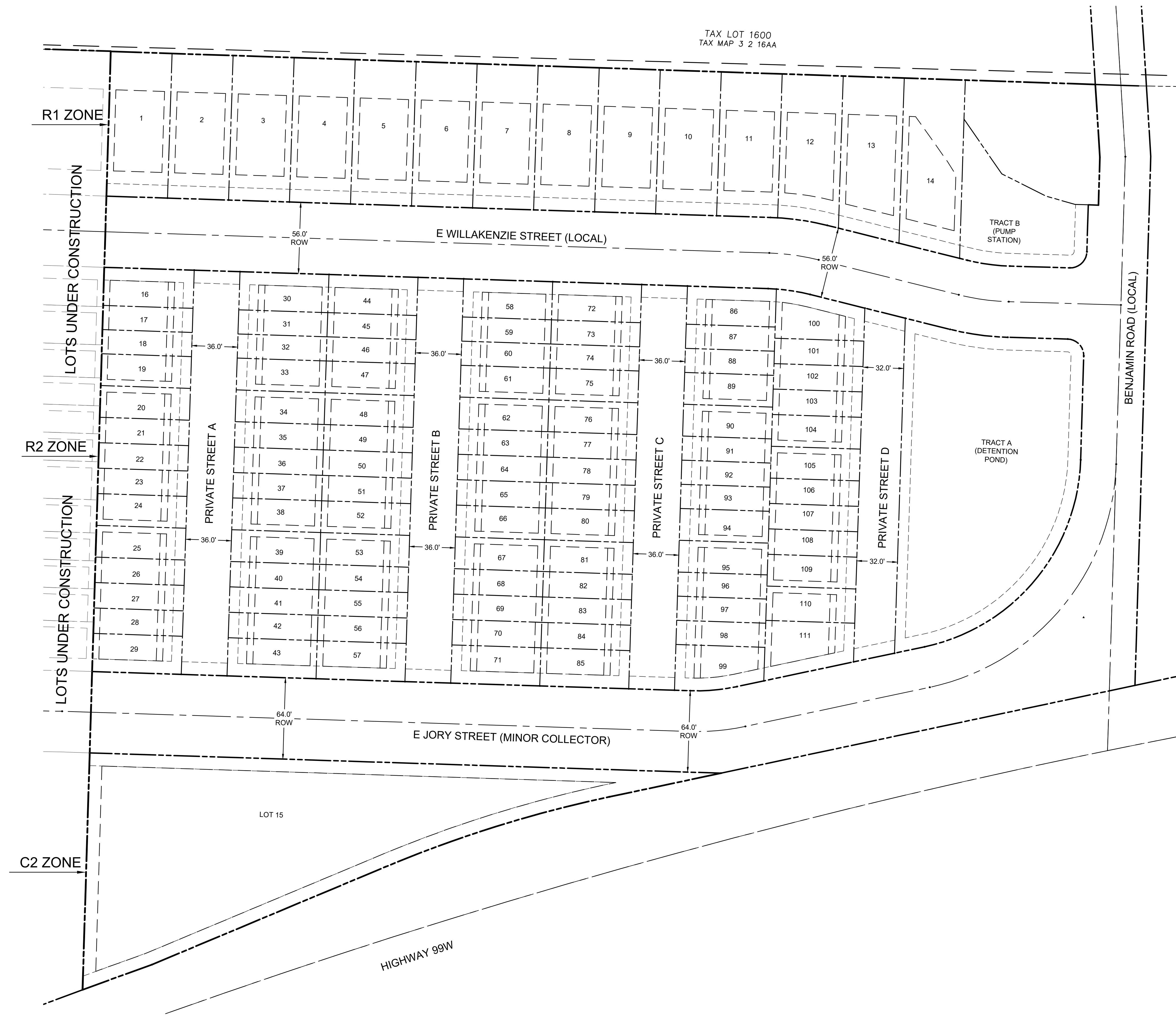
R1 ZONE

LOTS UNDER CONSTRUCTION

R2 ZONE

LOTS UNDER CONSTRUCTION

C2 ZONE



LEGEND

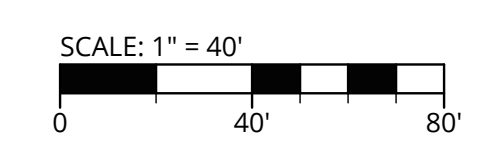
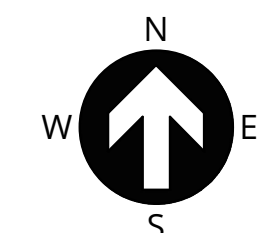
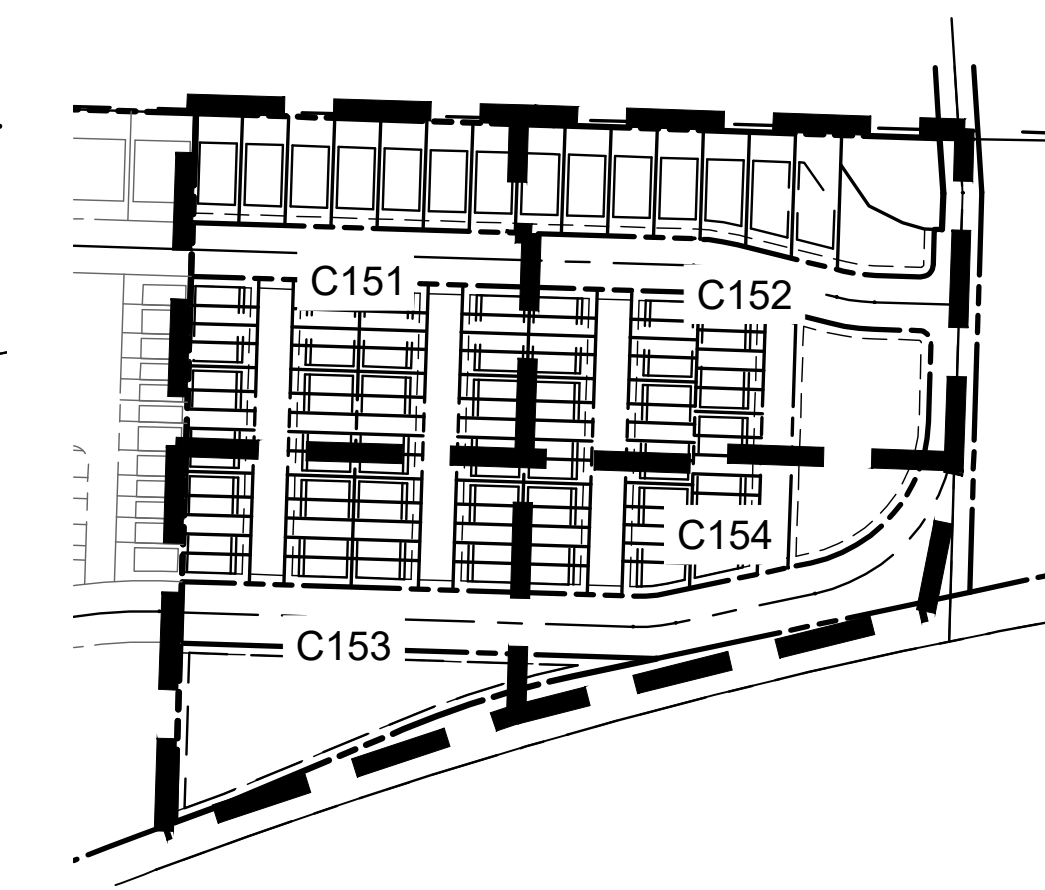
- PROPOSED LOT LINE
- PROPOSED EASEMENT LINE
- PROPOSED RIGHT OF WAY
- PROPOSED CENTERLINE
- PROPOSED SETBACK LINE
- PROPOSED DLC LINE

SITE STATISTICS

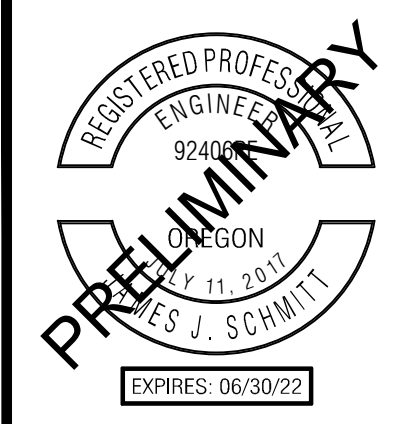
SITE ADDRESS	4821 E PORTLAND ROAD
TAX LOT	3216 900 & 1000
JURISDICTION	CITY OF NEWBERG
GROSS SITE AREA	10.58 ACRES
BUILDABLE SITE AREA	
PROPERTY ZONING	R-1, R-2, C-2
FLOOD HAZARD MAP NUMBER	FIRM PANEL NUMBER: 41071C0235D - ZONE X (UN-SHADED)

SUBDIVISION STATISTICS

ZONING CODE CHAPTER 33.120	ZONE R-1	ZONE R-2	ZONE C-2
ZONE AREA	2.13 ACRES	5.22 ACRES	0.95 ACRES
MAXIMUM DENSITY*	175 DENSITY POINTS/ACRE	310 DENSITY POINTS/ACRE	310 DENSITY POINTS/ACRE
MAXIMUM LOT SIZE	6,485 SF	2,869 SF	41,275 SF
MINIMUM LOT SIZE	5,429 SF	1,330 SF	41,275 SF
MINIMUM LOT WIDTH	48 FT	19 FT	N/A
MAXIMUM LOT COVERAGE	47.2%	50%	N/A
MAXIMUM BUILDING HEIGHT	30 FT	35 FT	N/A
SETBACKS			
FRONT	15 FT	15 FT	10 FT
GARAGE	20 FT	20 FT	N/A
INTERIOR	5 FT	5 FT	0 FT/10FT



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YAMHILL COUNTY, OREGON



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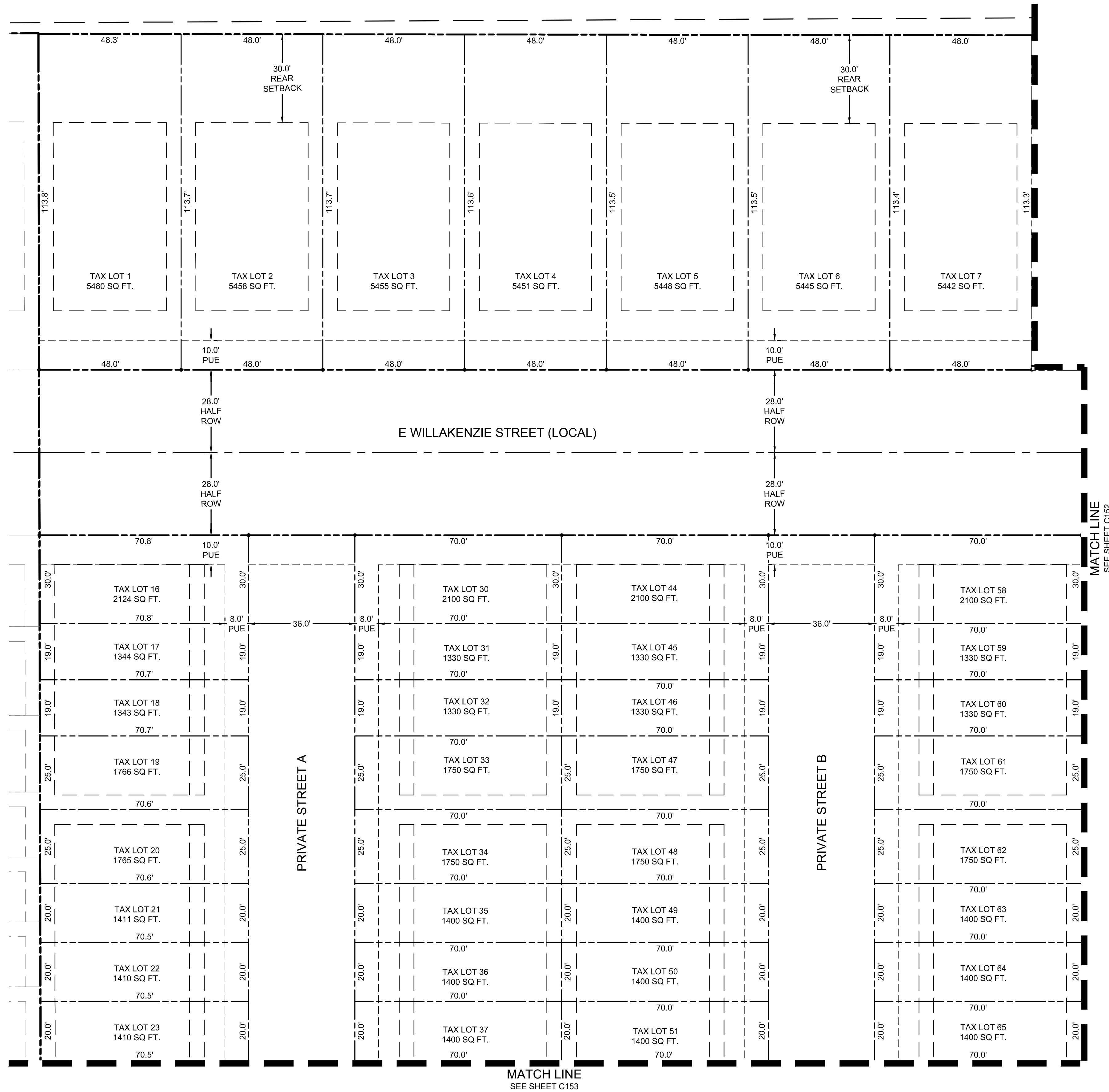
OVERALL TENTATIVE PLAT
CRESTVIEW GREEN
PLANNED UNIT DEVELOPMENT
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NEWBERG, OR

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TAX LOT(S) | 3S2W16 900, 1000
LAND USE # | TBD
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CHECKED BY | JJS

SHEET NUMBER
C150

P:\21701-CRESTVIEW GREEN\CADD\21701-TENTATIVE PLAT.DWG

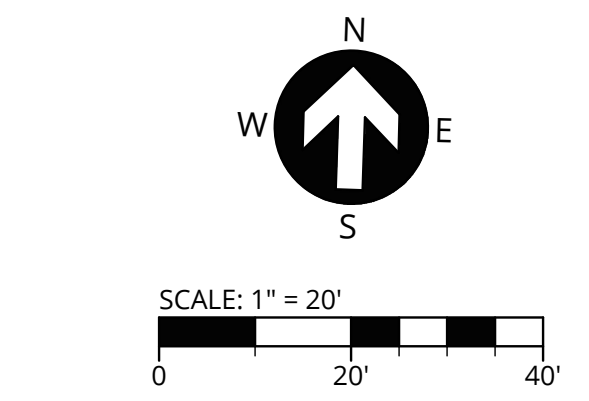
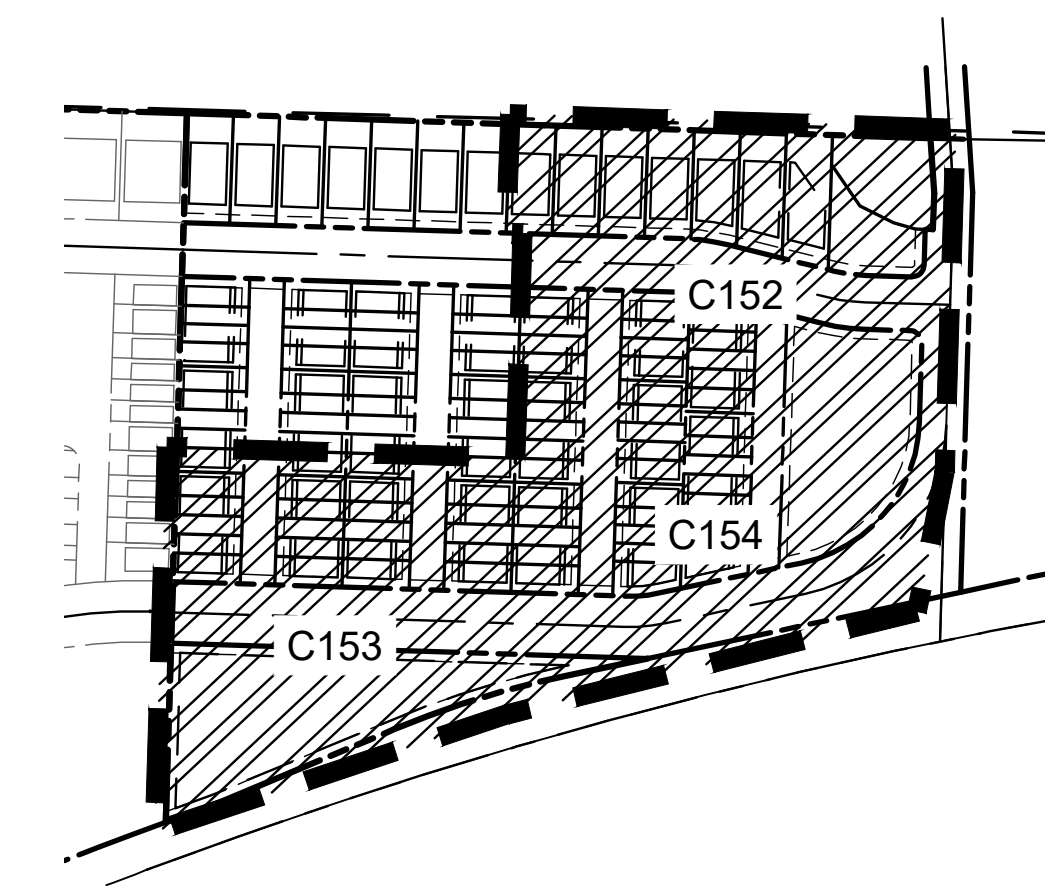


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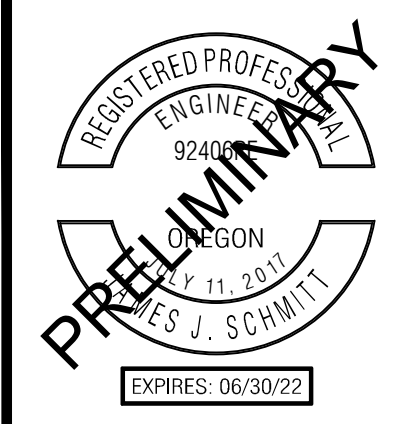
- PROPOSED LOT LINE
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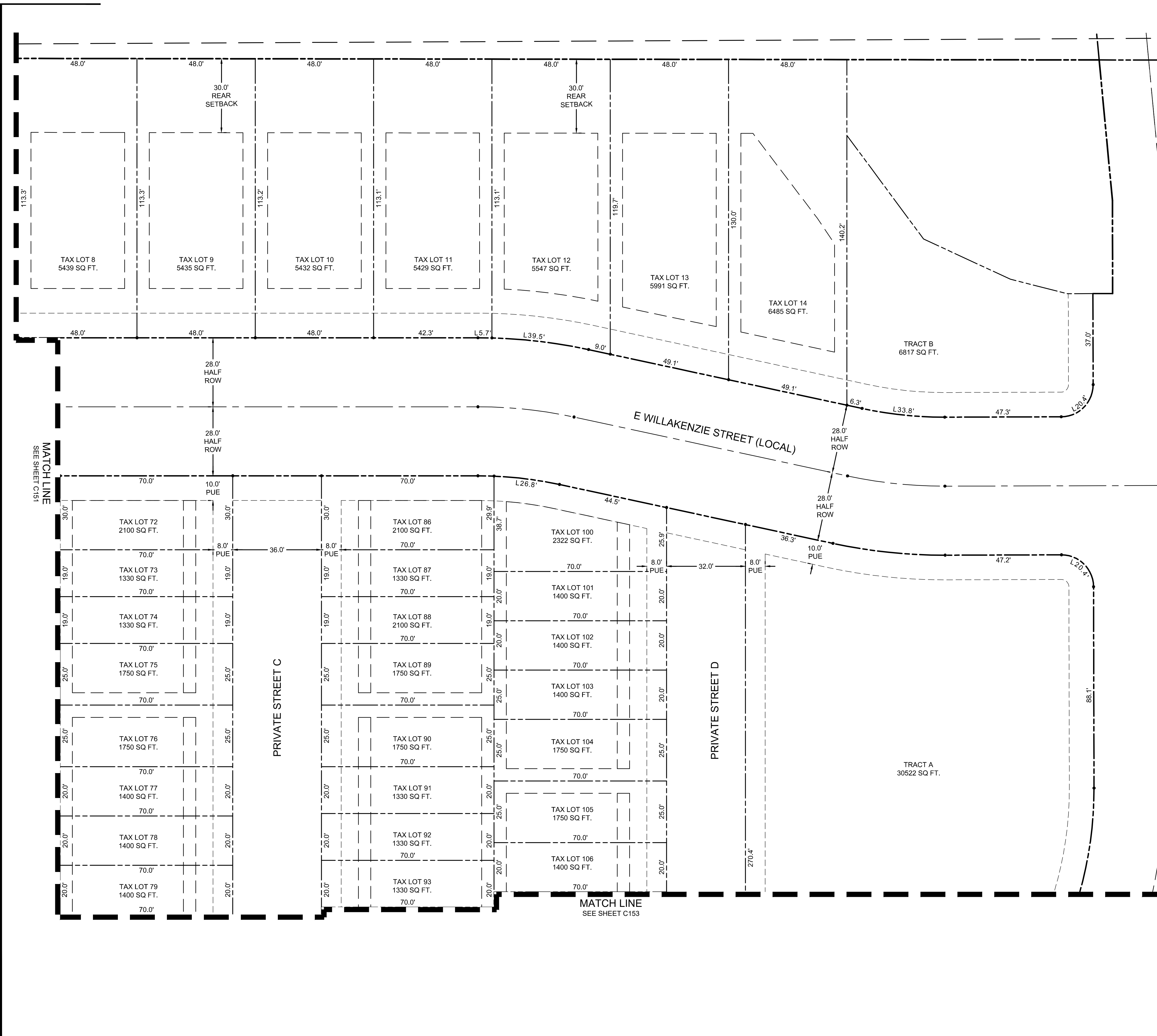
TENTATIVE PLAT I
CRESTVIEW GREEN
PLANNED UNIT DEVELOPMENT
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TAX LOT(S) | 3S2W16 900, 1000
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SHEET NUMBER
C151

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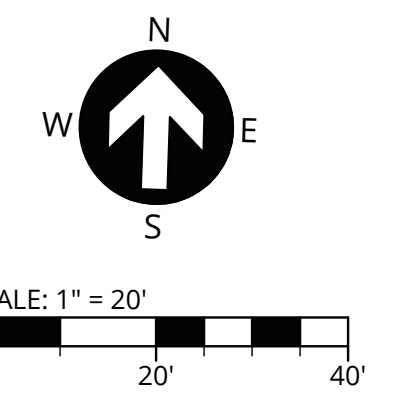
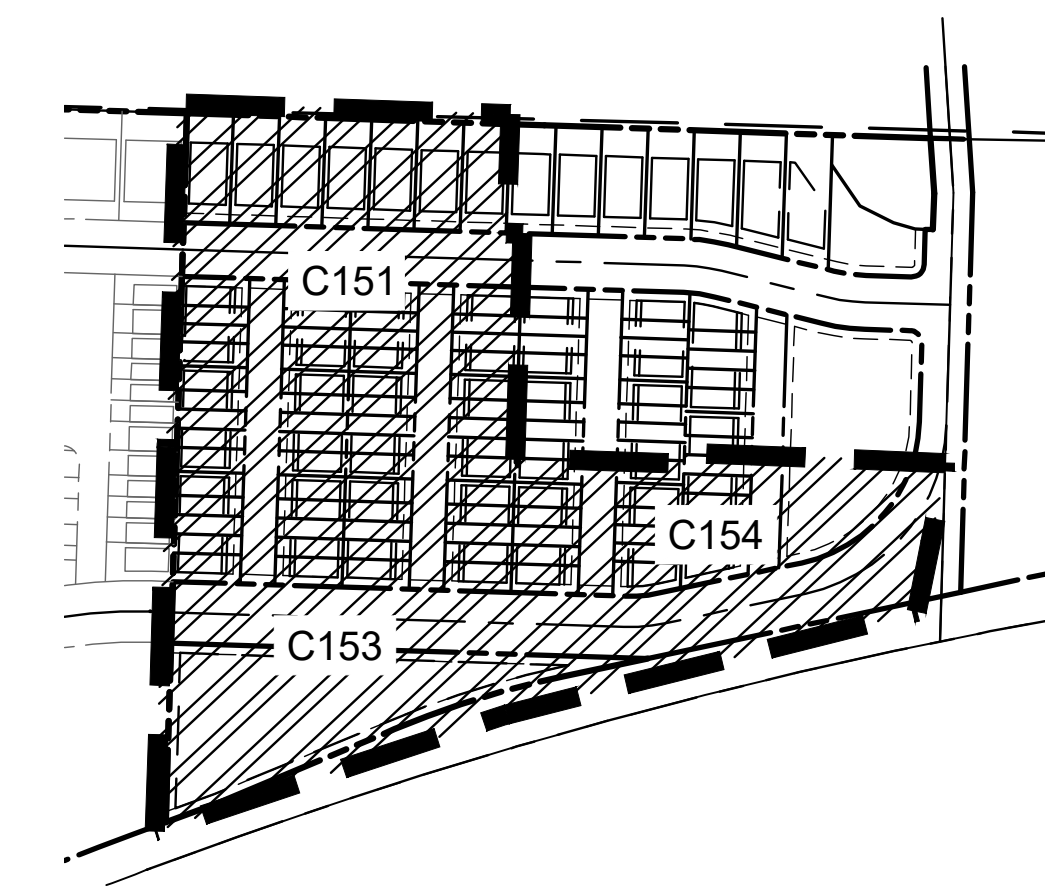


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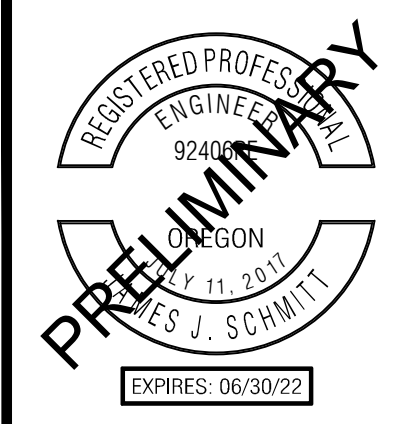
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- PROPOSED EASEMENT LINE
- PROPOSED RIGHT OF WAY
- PROPOSED CENTERLINE
- PROPOSED SETBACK LINE
- PROPOSED DLC LINE

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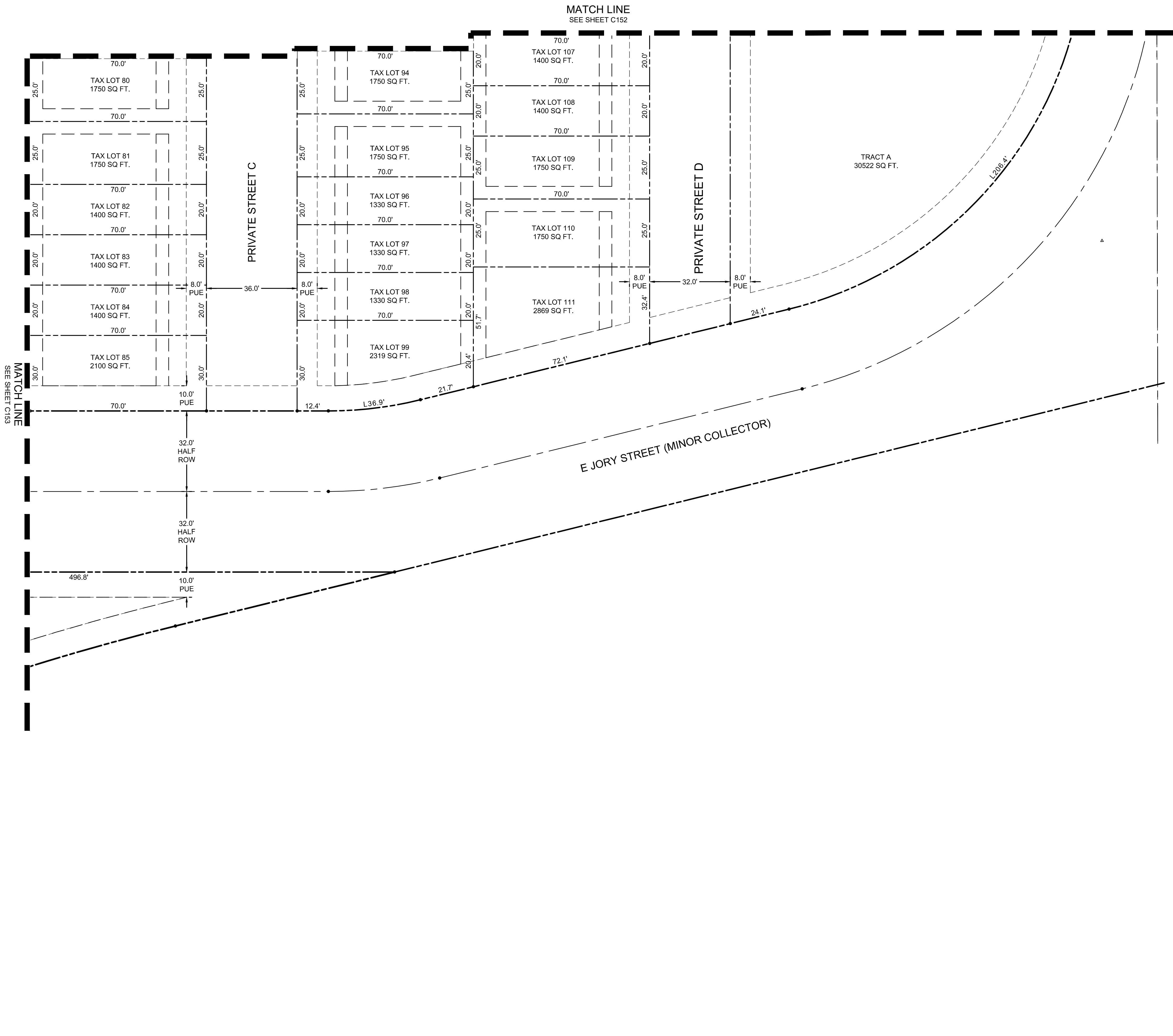
TENTATIVE PLAT II
CRESTVIEW GREEN
PLANNED UNIT DEVELOPMENT
WESTWOOD HOMES LLC
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WATER RESOURCES
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TAX LOT(S) | 3S2W16 900, 1000
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CHECKED BY | JJS

SHEET NUMBER
C152

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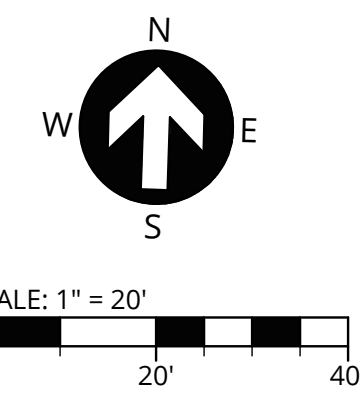
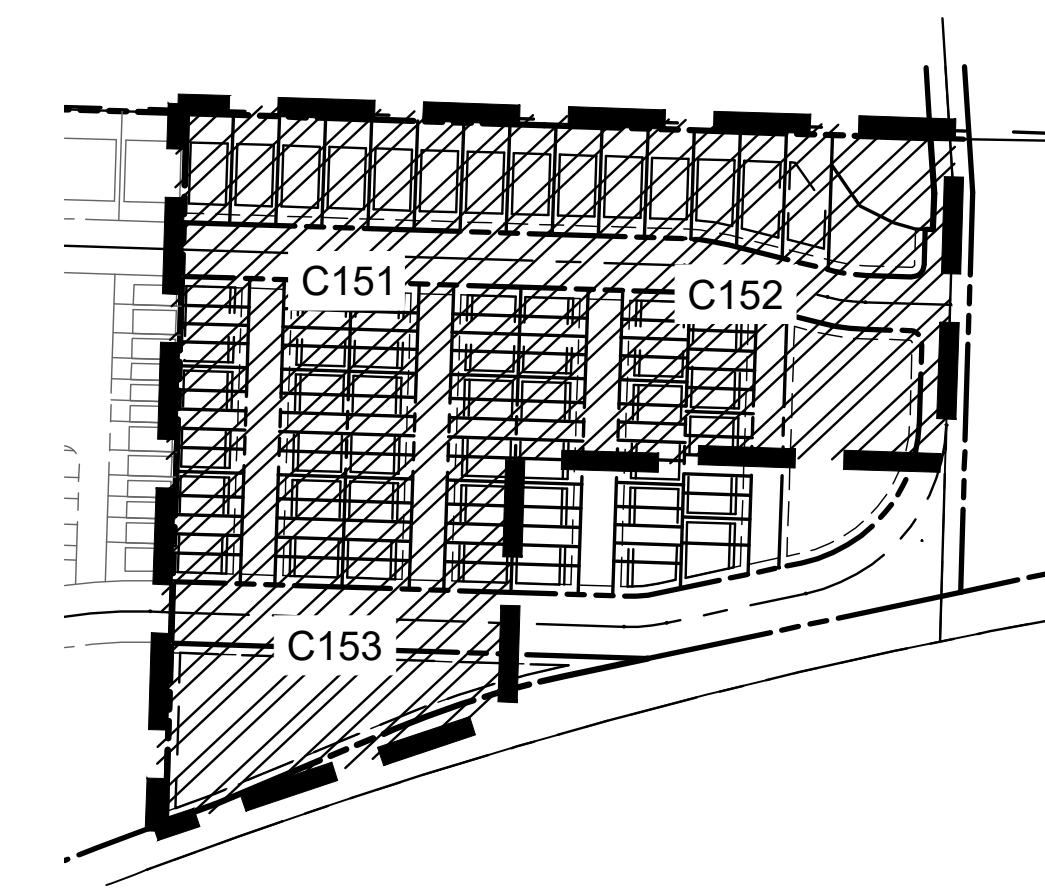


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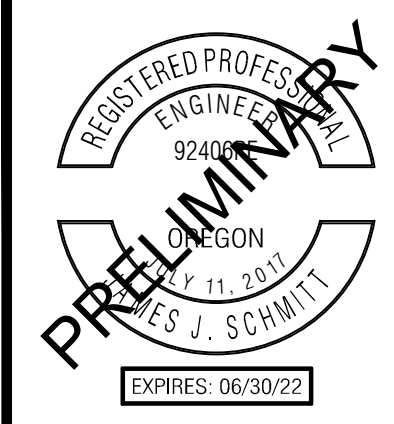
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- - - PROPOSED EASEMENT LINE
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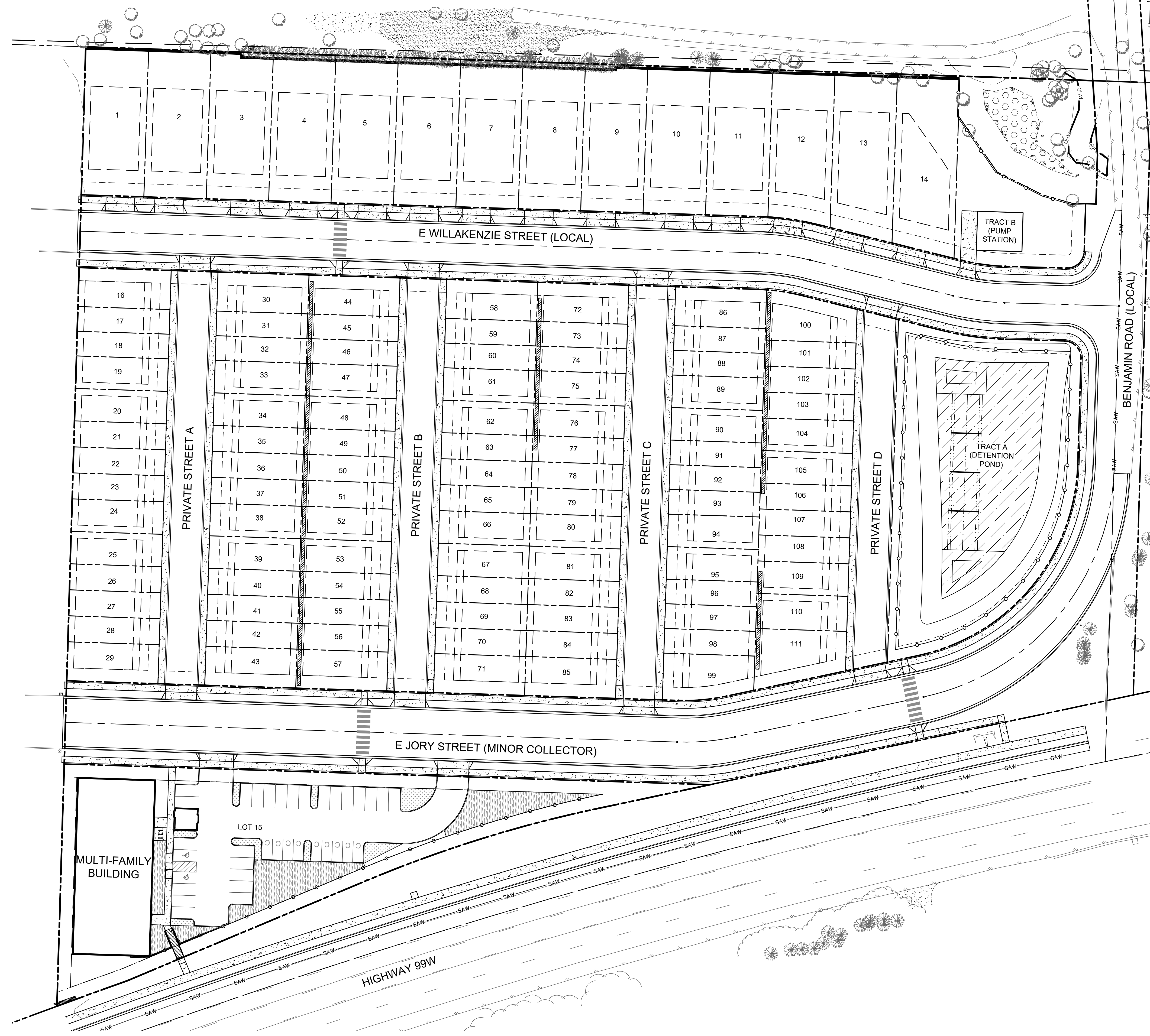
TENTATIVE PLAT IV
CRESTVIEW GREEN
PLANNED UNIT DEVELOPMENT
 WESTWOOD HOMES LLC
 NEWBERG, OR

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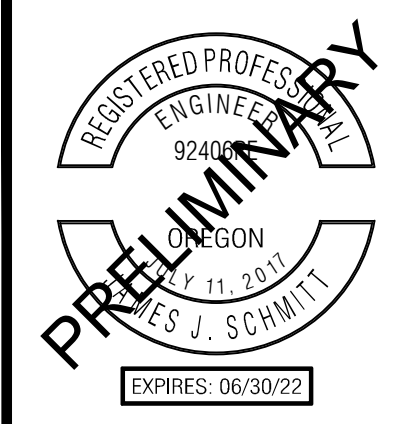
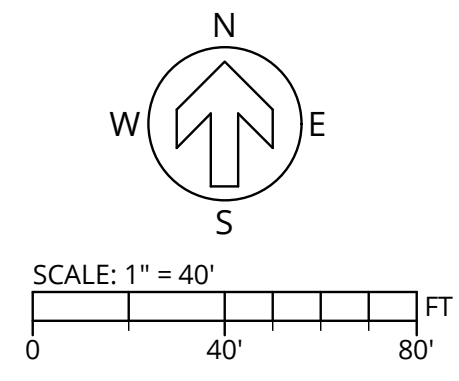
PROJECT INFORMATION
 3J PROJECT # | 21701
 TAX LOT(S) | 3S2W16 900, 1000
 LAND USE # | TBD
 DESIGNED BY | JMF, SRC, JGW
 CHECKED BY | JJS

SHEET NUMBER
C154

P:\21701-CRESTVIEW GREEN\CADD\21701-SITE PLAN.DWG



- LEGEND**
- EXISTING WETLANDS
 - PROPOSED LOT LINE
 - PROPOSED RIGHT OF WAY
 - PROPOSED CENTERLINE
 - PROPOSED SETBACK LINE
 - PROPOSED CURB AND GUTTER
 - PROPOSED CONCRETE
 - PROPOSED BUILDING LINE
 - PROPOSED FENCE
 - PROPOSED MAJOR CONTOUR
 - PROPOSED MINOR CONTOUR
 - PROPOSED DETENTION POND
 - PROPOSED RETAINING WALL
 - PROPOSED SOUND WALL
 - PROPOSED SAWCUT LINE



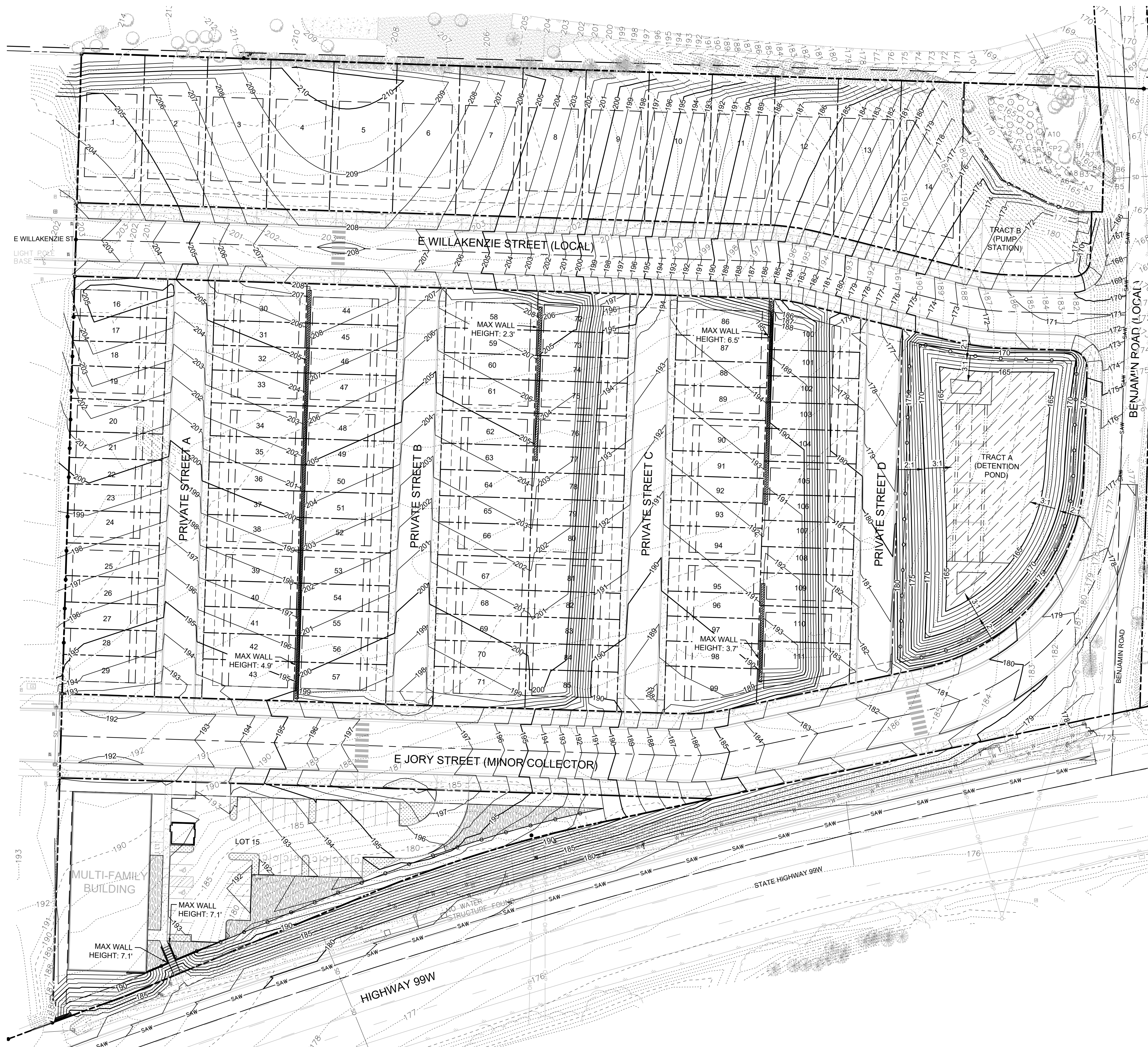
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OVERALL SITE PLAN
CRESTVIEW GREEN
PLANNED UNIT DEVELOPMENT
WESTWOOD HOMES LLC
NEWBERG, OR

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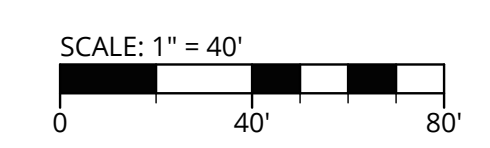
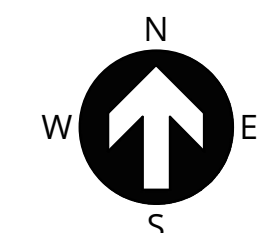
SHEET NUMBER
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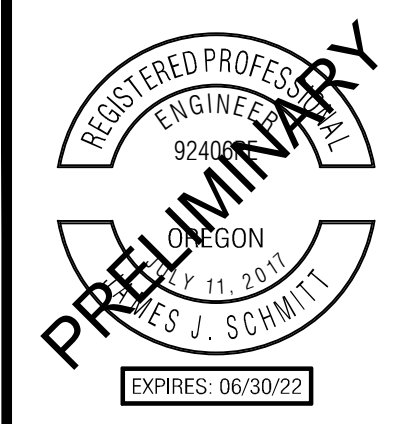


LEGEND

	PROPOSED LOT LINE
	PROPOSED RIGHT OF WAY
	PROPOSED CENTERLINE
	PROPOSED CURB
	PROPOSED BUILDING LINE
	PROPOSED FENCE
	PROPOSED MAJOR CONTOUR
	PROPOSED MINOR CONTOUR
	PROPOSED DETENTION POND
	PROPOSED RETAINING WALL



SECTION 16, T.3S., R.2W. W.M.,
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GRADING PLAN
CRESTVIEW GREEN
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WESTWOOD HOMES LLC
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3J CONSULTING

CIVIL ENGINEERING
WATER RESOURCES
COMMUNITY PLANNING

9600 SW NIMBUS AVE., SUITE 100, BEAVERTON, OR 97008

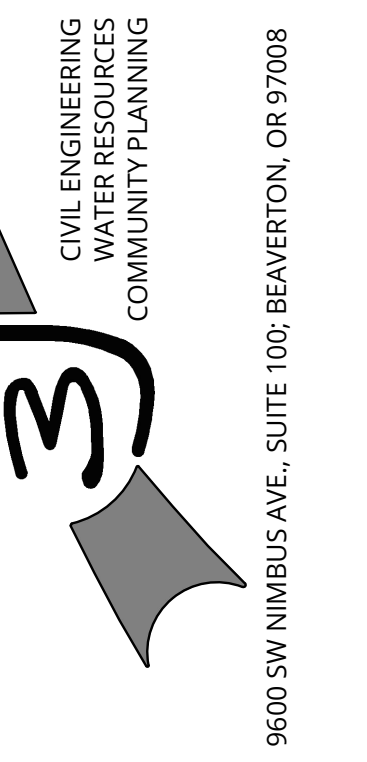
PROJECT INFORMATION
3J PROJECT # | 21701
TAX LOT(S) | 3S2W16 900, 1000
LAND USE # | TBD
DESIGNED BY | JMF, SRC, JGW
CHECKED BY | JJS

SHEET NUMBER
C205



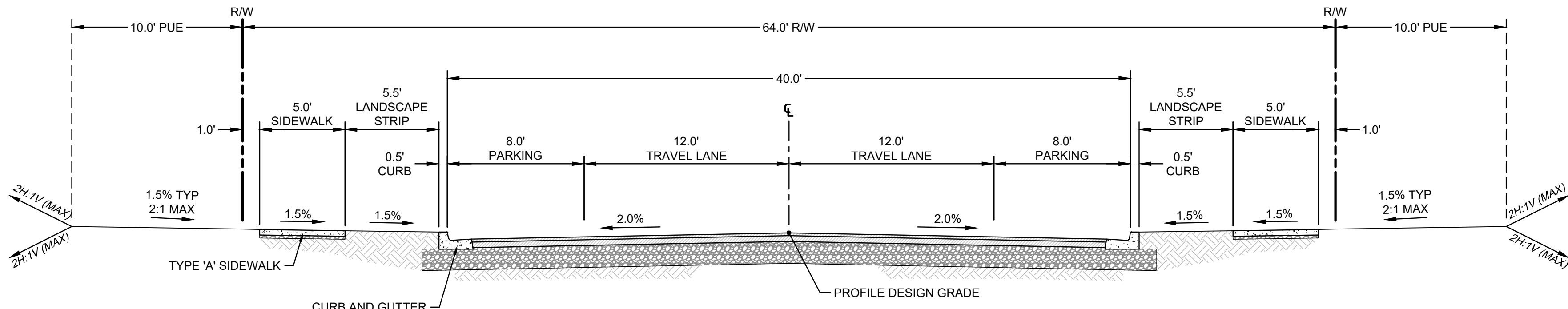
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TYPICAL SECTIONS
CRESTVIEW GREEN
PLANNED UNIT DEVELOPMENT
WESTWOOD HOMES LLC
NEWBERG, OR

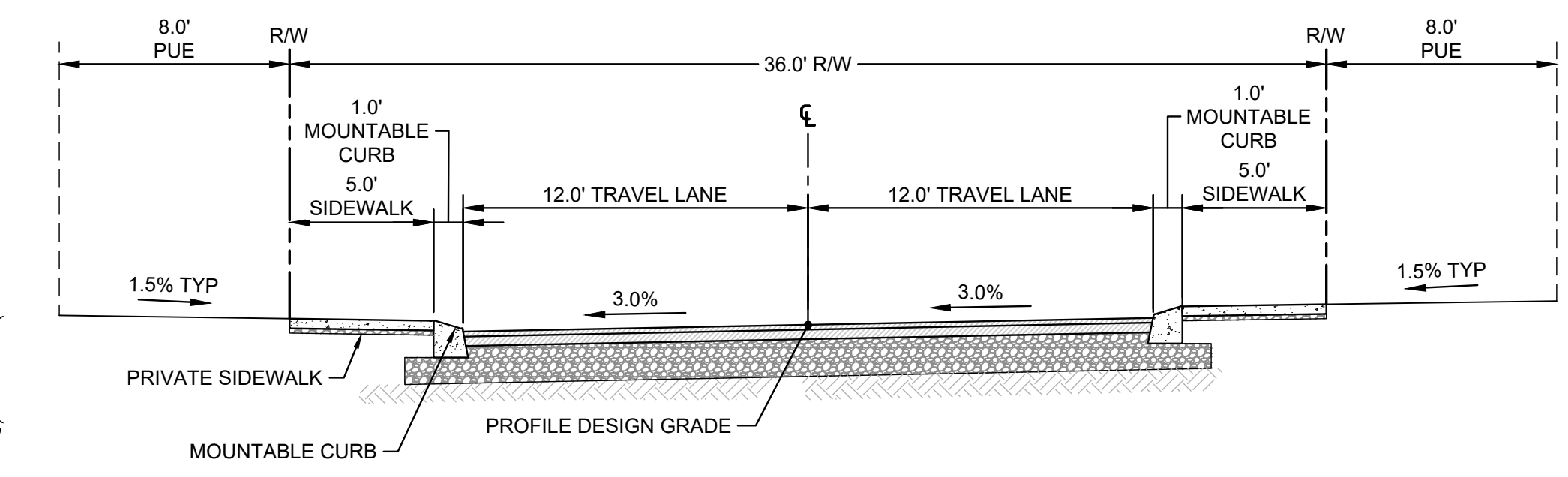


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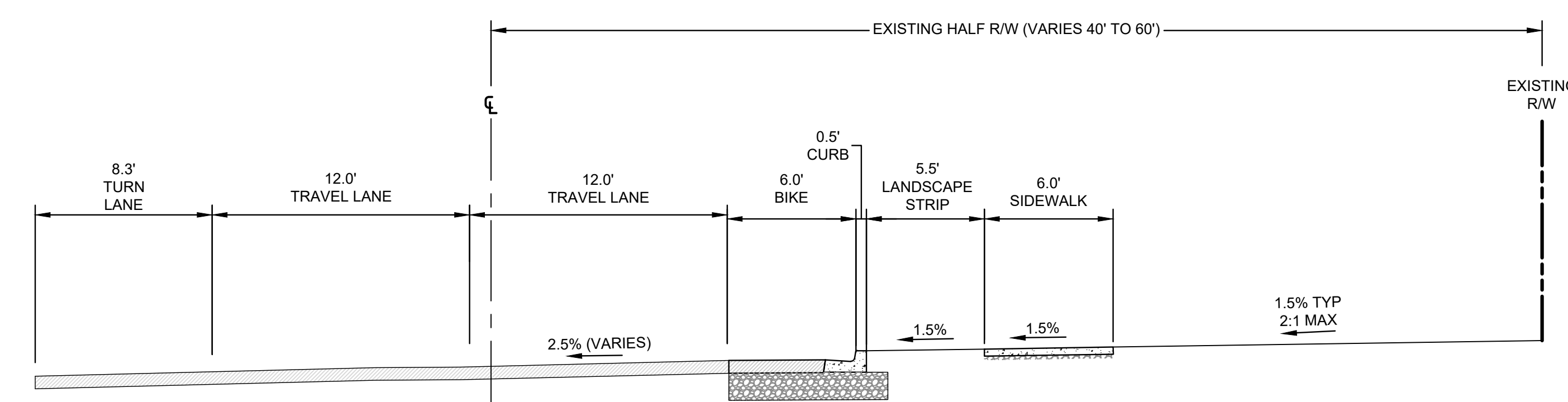
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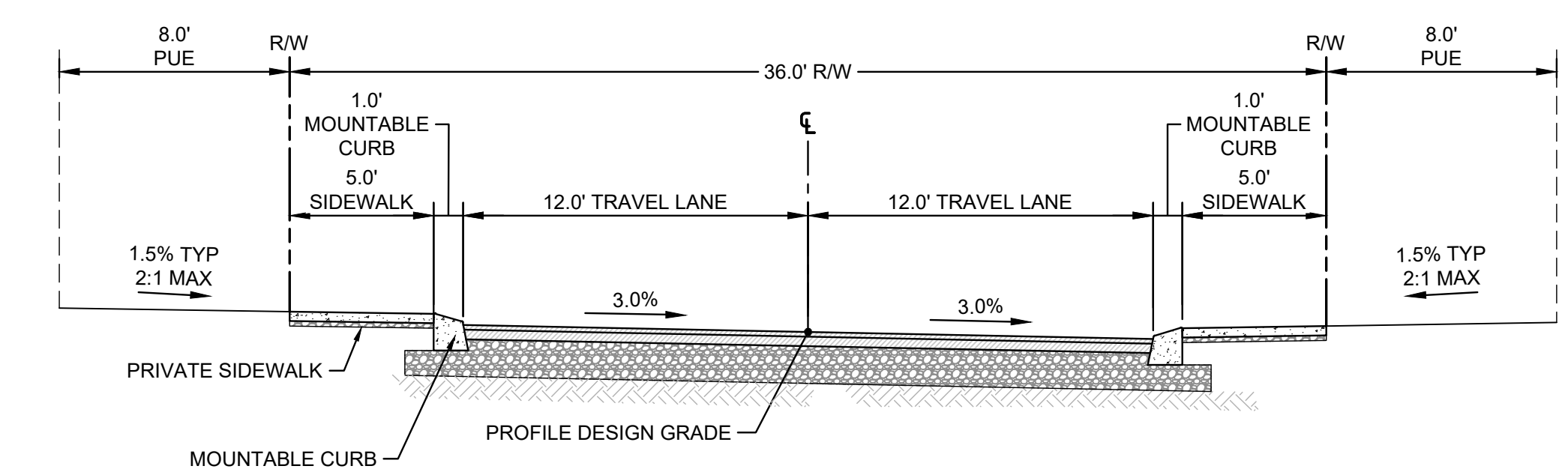
E JORY STREET - MINOR COLLECTOR
NTS



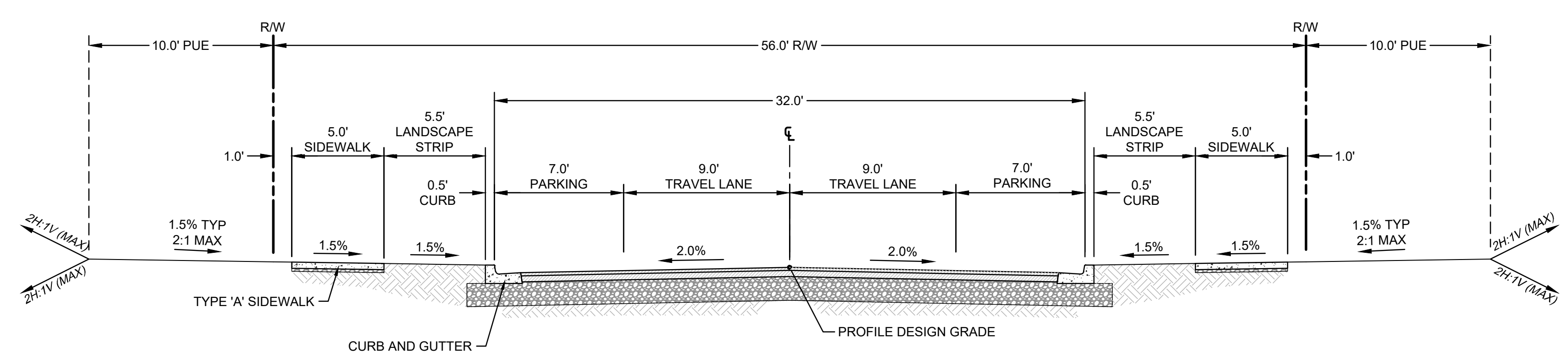
TYPICAL STREET SECTION 1 - SHED LEFT
PRIVATE STREET A
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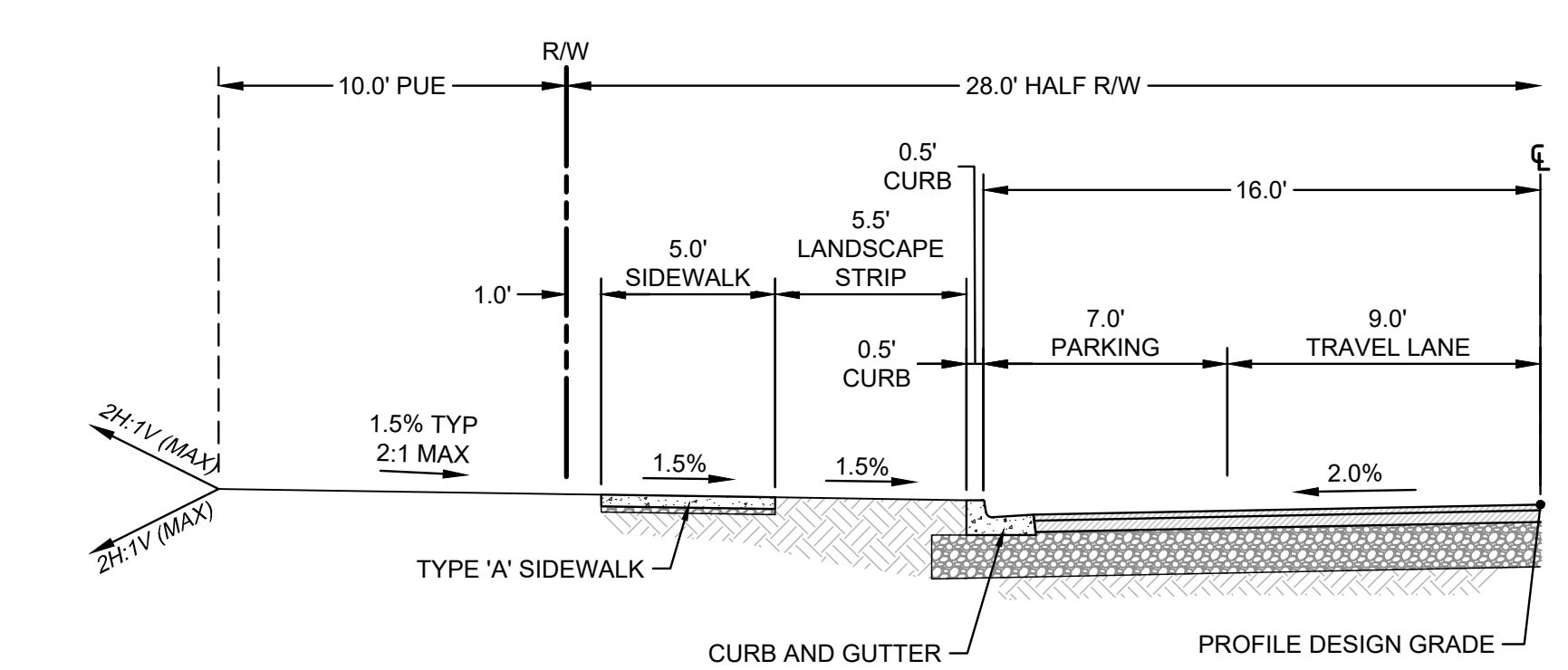
99W FRONTAGE IMPROVEMENTS
NTS



TYPICAL STREET SECTION 2 - SHED RIGHT
PRIVATE STREET B
PRIVATE STREET C
PRIVATE STREET D
NTS



E WILLAKENZIE STREET - LOCAL ROAD
NTS



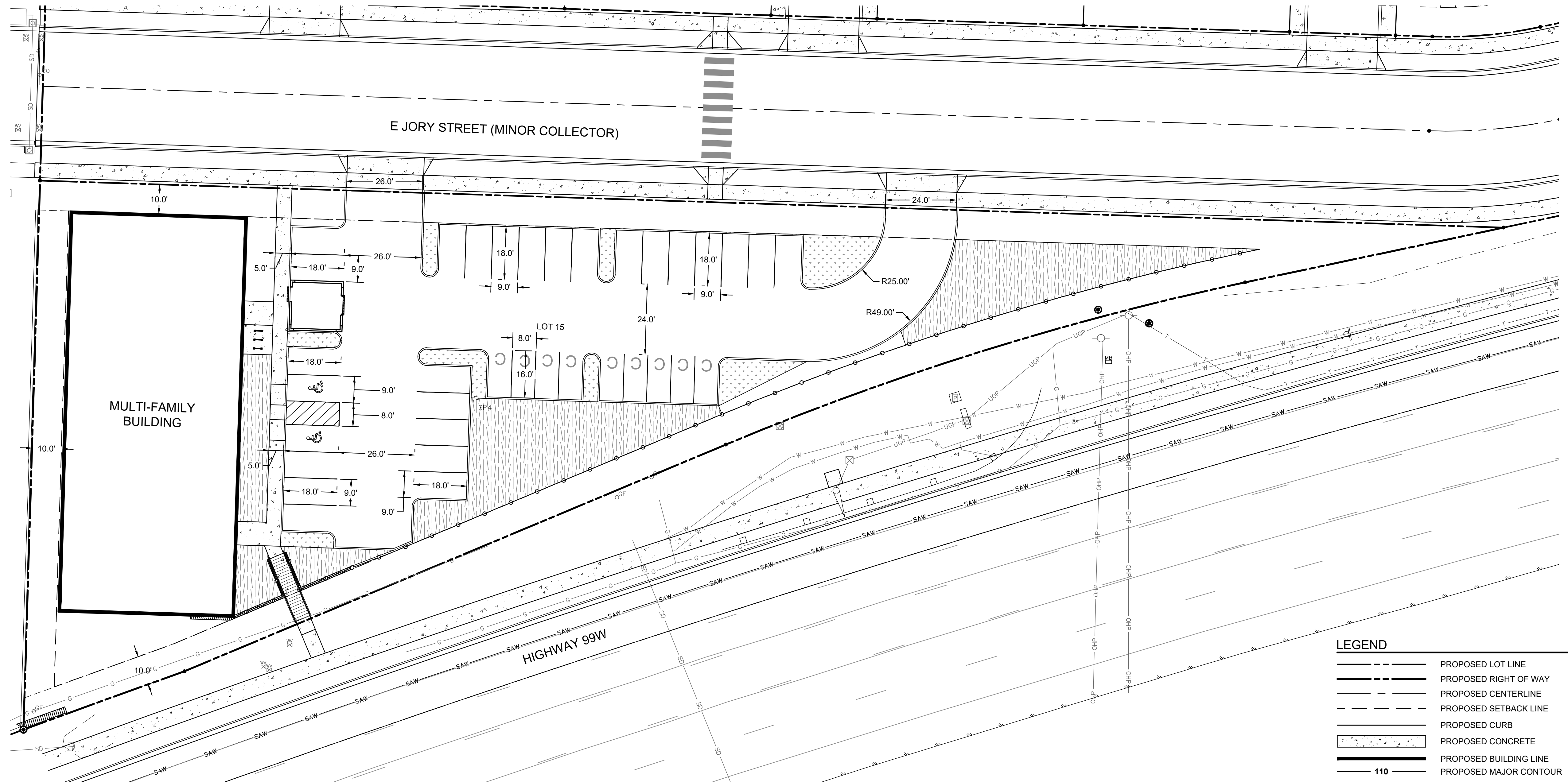
BENJAMIN ROAD - LOCAL ROAD (HALF STREET IMPROVEMENT)
NTS

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MULTI-FAMILY SITE PLAN
CRESTVIEW GREEN
PLANNED UNIT DEVELOPMENT
 WESTWOOD HOMES LLC
 NEWBERG, OR



LEGEND

	PROPOSED LOT LINE
	PROPOSED RIGHT OF WAY
	PROPOSED CENTERLINE
	PROPOSED SETBACK LINE
	PROPOSED CURB
	PROPOSED CONCRETE
	PROPOSED BUILDING LINE
	PROPOSED MAJOR CONTOUR
	PROPOSED MINOR CONTOUR
	EXISTING MAJOR CONTOUR
	EXISTING MINOR CONTOUR
	PROPOSED VEGETATION
	EXISTING TELECOM. LINE
	EXISTING GAS LINE
	EXISTING WATER MAIN
	EXISTING STORM DRAIN
	EXISTING CABLE LINE
	EXISTING UNDERGROUND POWER
	EXISTING OVERHEAD POWER
	EXISTING STORM CULVERT
	EXISTING GAS FINK

PARKING STATISTICS - MULTIFAMILY LOT

PROPOSED STALL COUNT & SUMMARY

TYPE = (WIDTH x DEPTH)	STANDARD 9' x 18'	COMPACT 8' x 16'	ADA 9' x 18'	TOTAL
MULTIPLE FAMILY APARTMENTS =	24	9	2	35
TOTAL =	24	9	2	35

VEHICLES
DEVELOPMENT CODE CHAPTER 15.440.30

	REQUIRED	PROPOSED
MAXIMUM PARKING - MULTI-FAMILY		NONE
MINIMUM PARKING - MULTI-FAMILY		35
PROPOSED		35

BICYCLES
DEVELOPMENT CODE CHAPTER 15.440.90

	MINIMUM	PROPOSED
MINIMUM BICYCLE PARKING - MULTI-FAMILY	6	6

ACCESSIBLE

OSSC SECTION 1106.1
MULTI-FAMILY PARKING LOT (76 TO 100)

	MINIMUM	PROPOSED
ACCESSIBLE SPACES	2	2
VAN ACCESSIBLE SPACES	1	1

LANDSCAPING

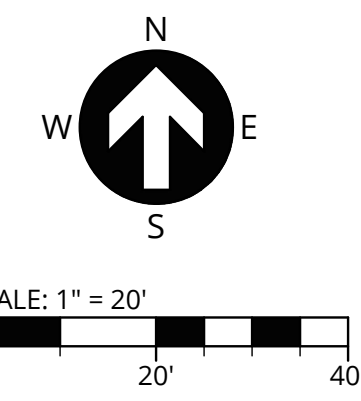
DEVELOPMENT CODE CHAPTER 15.420.010

	REQUIRED	PROPOSED
MULTI-FAMILY PARKING LOT (25 SF PER STALL)	875 SF	1,185 SF

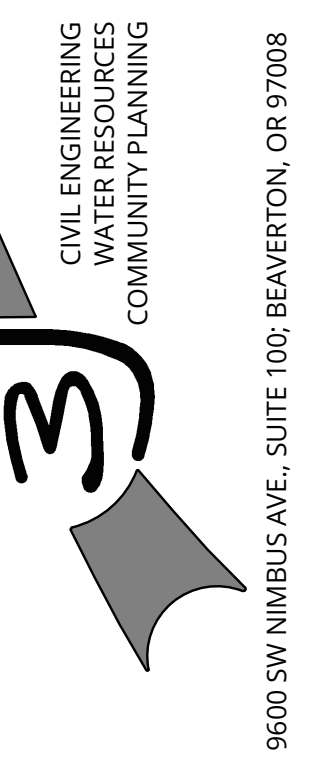
SETBACKS

ZONE C3 - MULTI-FAMILY LOT

	REQUIRED	PROPOSED
FRONT		10 FT
INTERIOR		0 FT/10 FT
STREET - EXPRESSWAY CENTERLINE		50 Ft



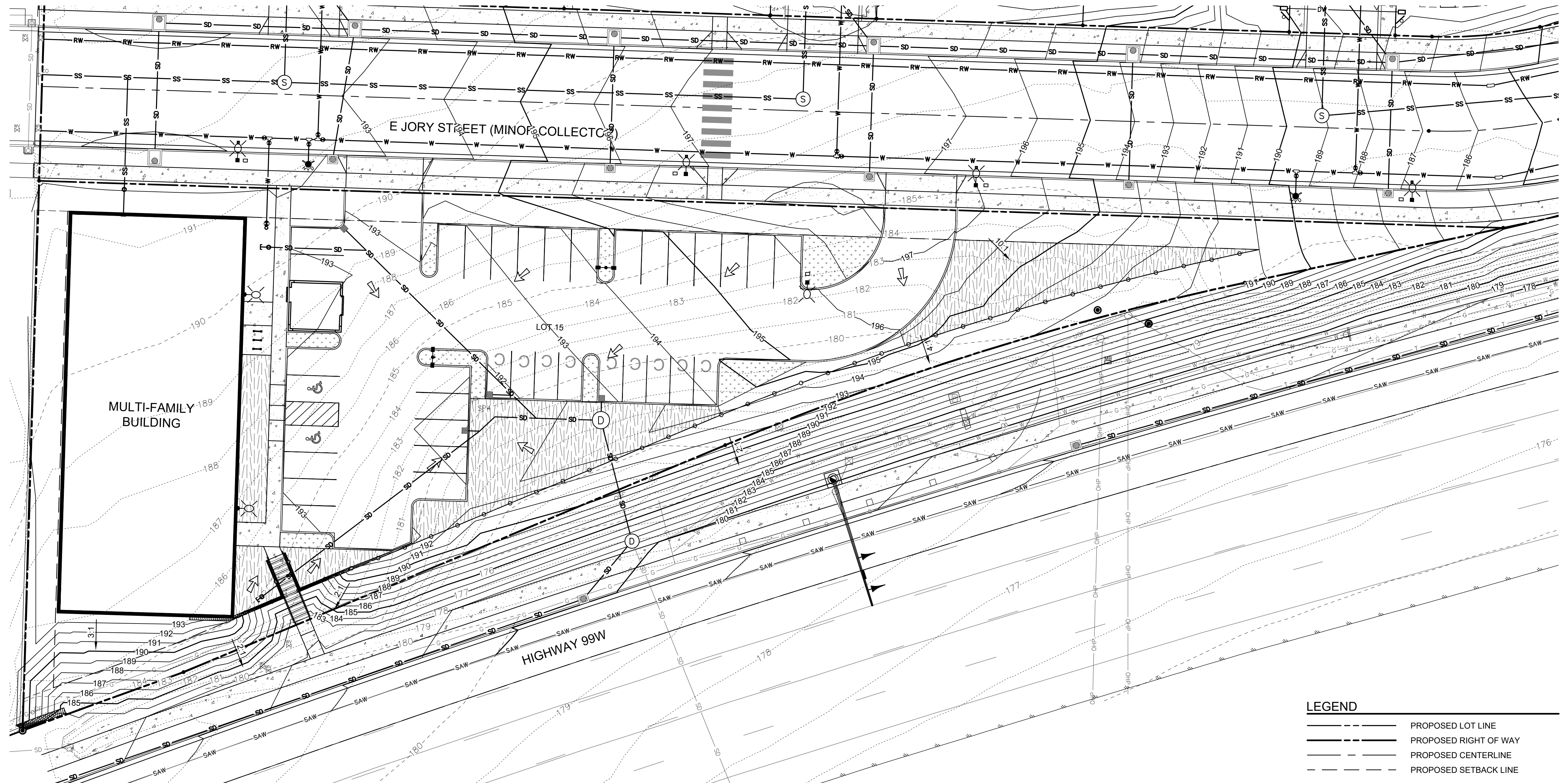
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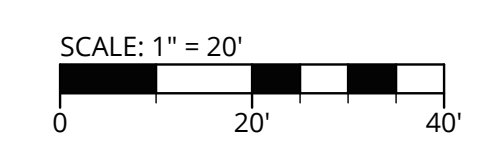
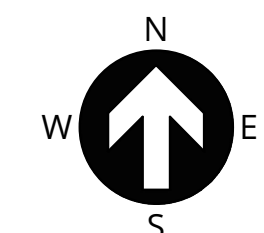
SHEET NUMBER
C215

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LEGEND

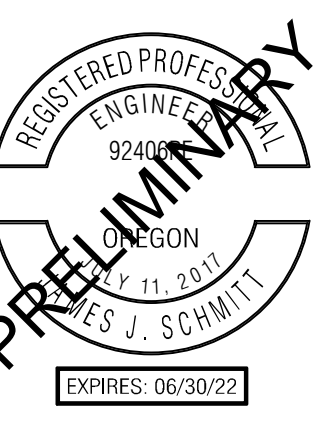
	PROPOSED LOT LINE
	PROPOSED RIGHT OF WAY
	PROPOSED CENTERLINE
	PROPOSED SETBACK LINE
	PROPOSED CURB FACE
	PROPOSED CURB BACK
	PROPOSED CONCRETE
	PROPOSED BUILDING LINE
	PROPOSED MAJOR CONTOUR
	PROPOSED MINOR CONTOUR
	EXISTING MAJOR CONTOUR
	EXISTING MINOR CONTOUR
	SURFACE RUN-OFF FLOW ARROW



SECTION 16, T.3S., R.2W. W.M.,
YAMHILL COUNTY, OREGON



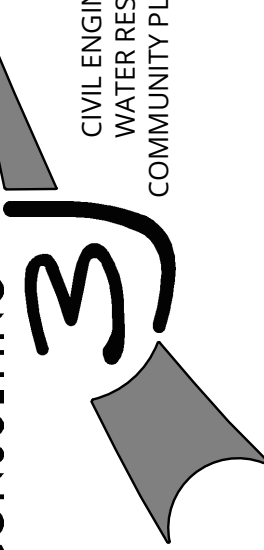
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CRESTVIEW GREEN
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3J CONSULTING



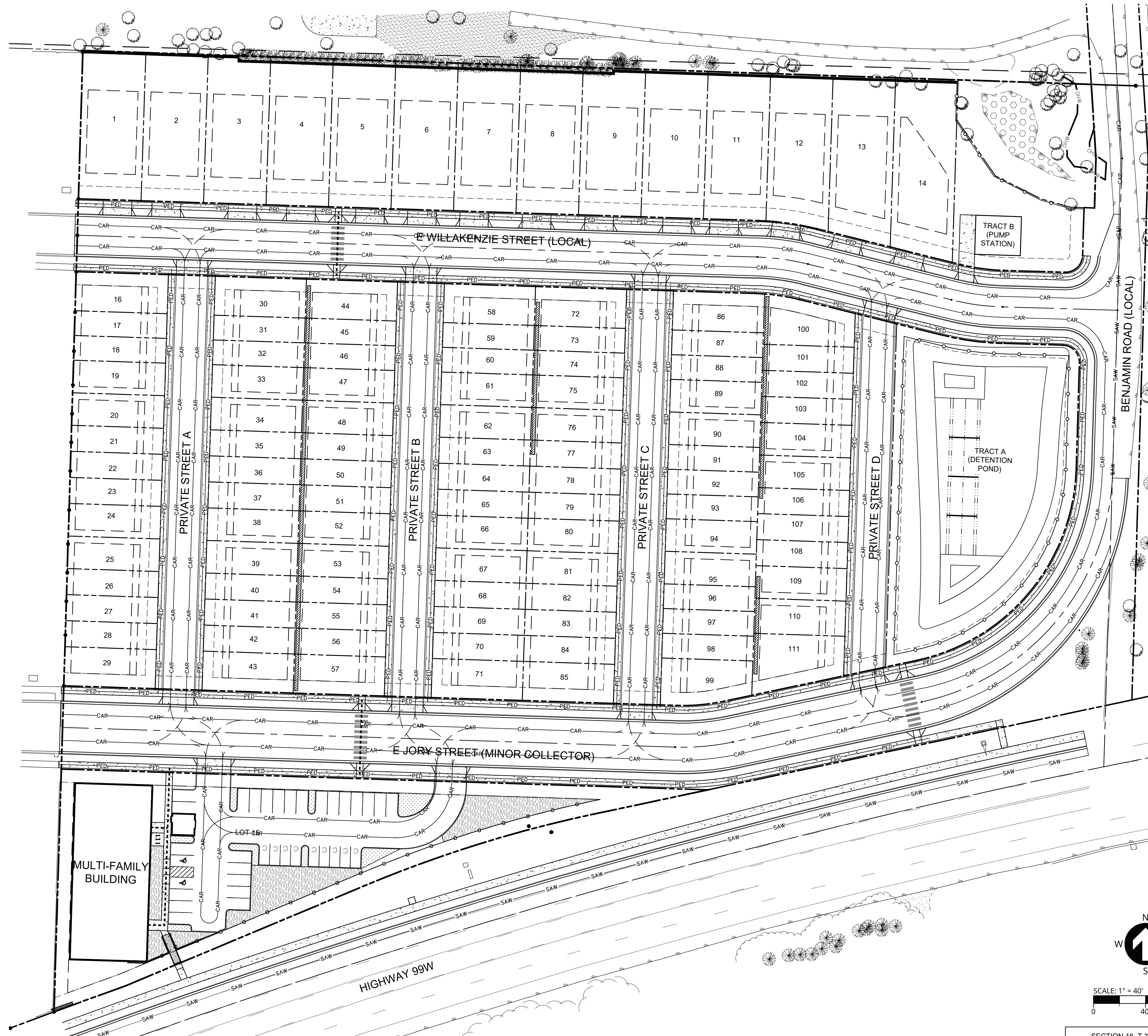
CIVIL ENGINEERING
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SHEET NUMBER
C220

P:\21701-CRESTVIEW GREEN\CADD\21701-CIRCULATION PLAN.DWG



LEGEND

- PED PEDESTRIAN PATHWAY
- ADA PATHWAY
- CAR VEHICLE PATHWAY

REGISTERED PROFESSIONAL ENGINEER
 OREGON
 92406
PRELIMINARY
 JES. J. SCHMITT
 EXPIRES: 06/30/22

PUBLISH DATE
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CIRCULATION PLAN
CRESTVIEW GREEN
PLANNED UNIT DEVELOPMENT
 WESTWOOD HOMES LLC
 NEWBERG, OR

3J CONSULTING
 CIVIL ENGINEERING
 WATER RESOURCES
 COMMUNITY PLANNING
 9600 SW NIMBUS AVE., SUITE 100, BEAVERTON, OR 97008

PROJECT INFORMATION
 3J PROJECT # | 21701
 TAX LOT(S) | 3S2W16 900, 1000
 LAND USE # | TBD
 DESIGNED BY | JMF, SRC, JGW
 CHECKED BY | JJS

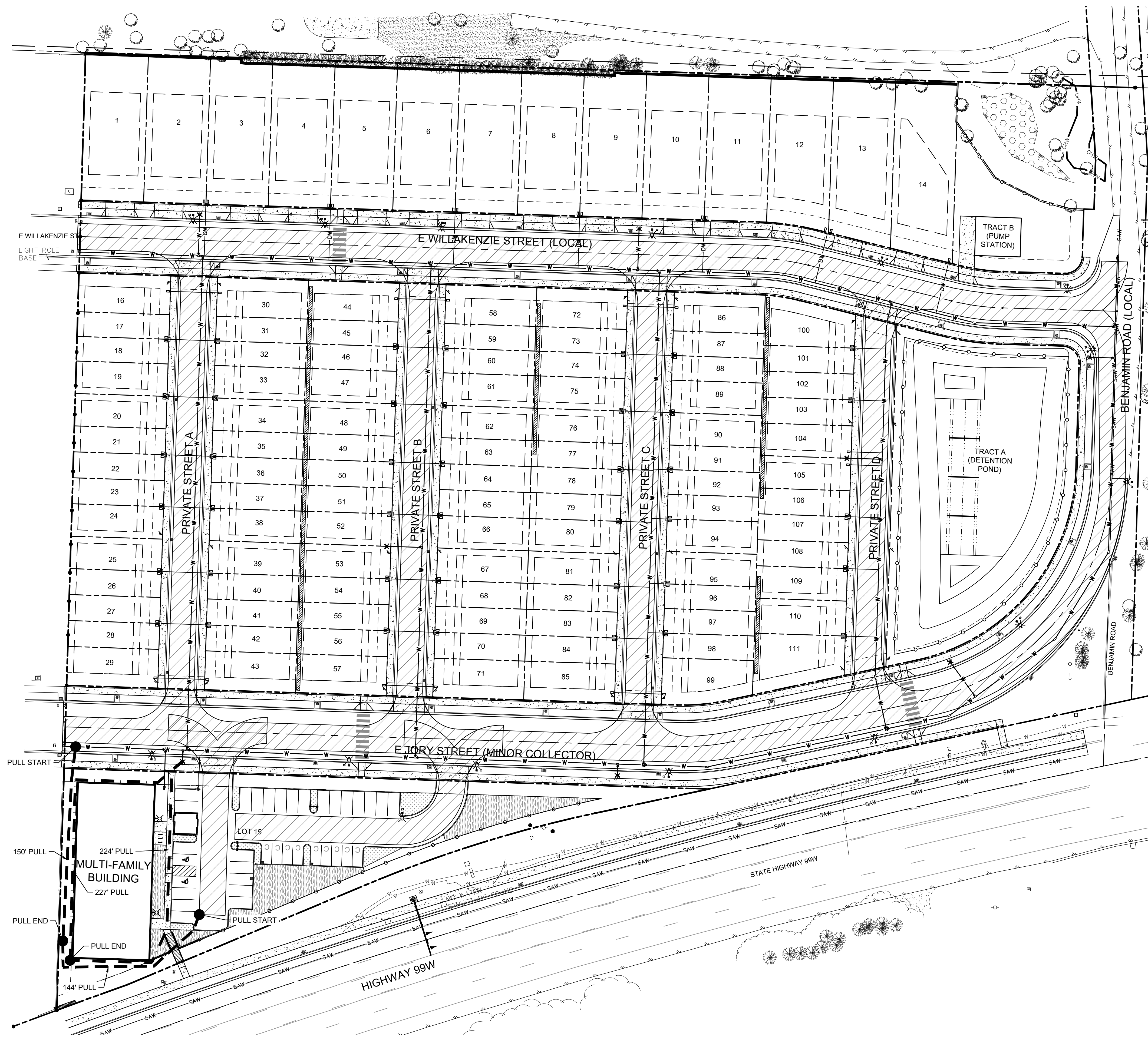
SHEET NUMBER
C230

SCALE: 1" = 40'

811
 Know what's below.
 Call before you dig.

SECTION 16, T.3S., R.2W. W.M.,
 YAMHILL COUNTY, OREGON

P:\21701-CRESTVIEW GREEN\CADD\21701-FIRE ACCESS PLAN.DWG



LEGEND

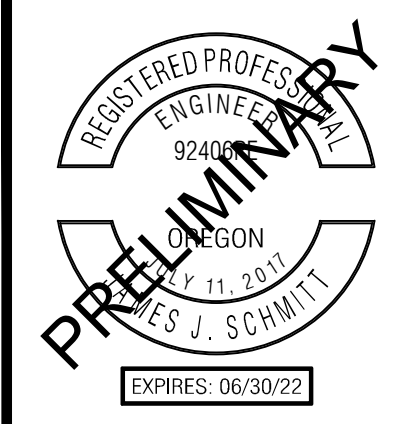
- FIRE HOSE PULL LENGTH FROM TRUCK
- FIRE HOSE PULL LENGTH FROM HYDRANT
- FIRE TRUCK TURNING AREA
- EXISTING WATER MAIN
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE

811
Know what's below.
Call before you dig.

SCALE: 1" = 40'
0 40' 80'

N
W ↑ E
S

SECTION 16, T.3S., R.2W. W.M.,
YAMHILL COUNTY, OREGON



PUBLISH DATE
02/10/2022

ISSUED FOR
LAND USE DOCUMENTS

REVISIONS

FIRE ACCESS PLAN

CRESTVIEW GREEN

PLANNED UNIT DEVELOPMENT

WESTWOOD HOMES LLC
NEWBERG, OR

3J CONSULTING

CIVIL ENGINEERING
WATER RESOURCES
COMMUNITY PLANNING

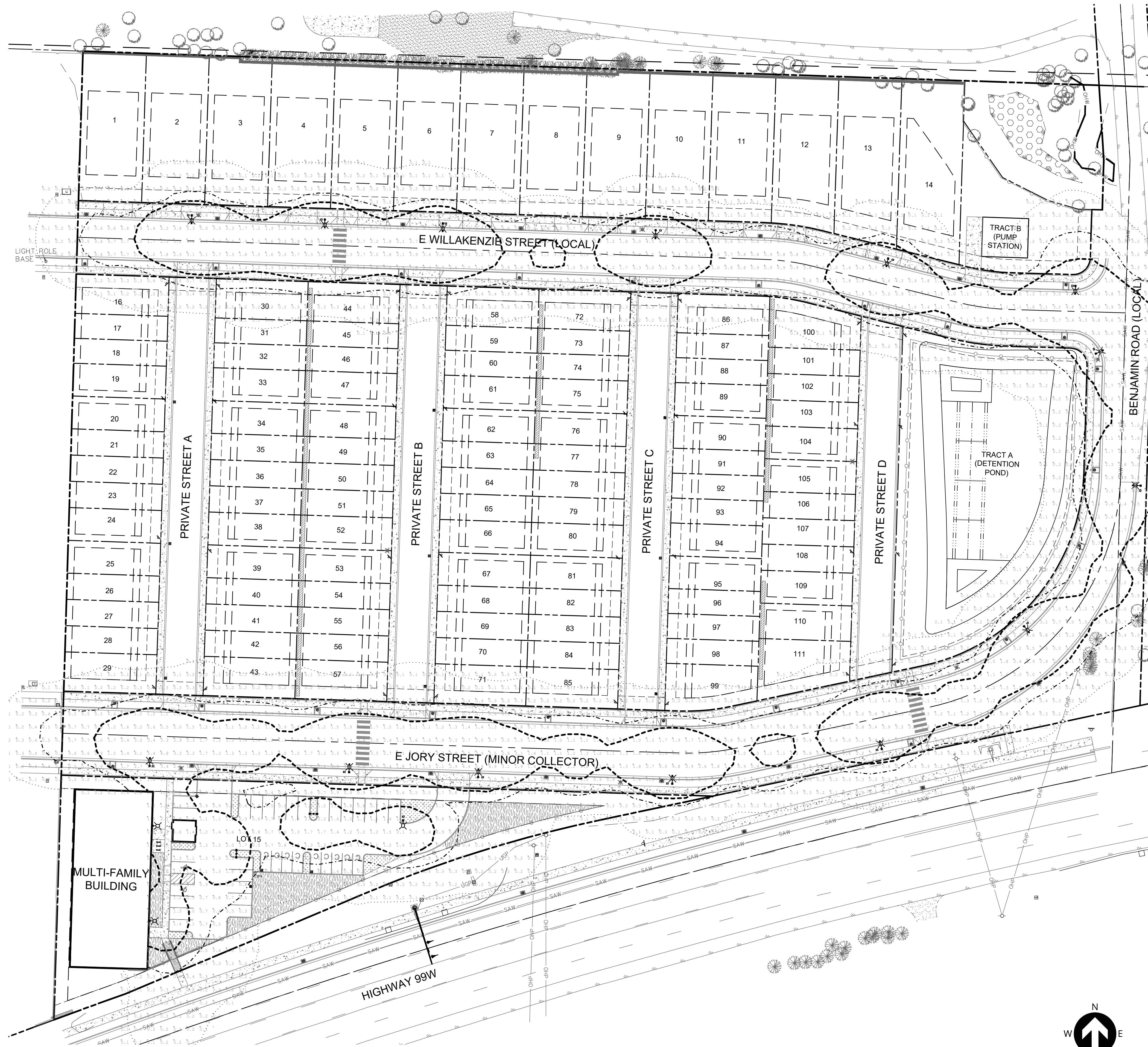
9600 SW NIMBUS AVE., SUITE 100, BEAVERTON, OR 97008

PROJECT INFORMATION

3J PROJECT # | 21701
TAX LOT(S) | 3S2W16 900, 1000
LAND USE # | TBD
DESIGNED BY | JMF, SRC, JGW
CHECKED BY | JJS

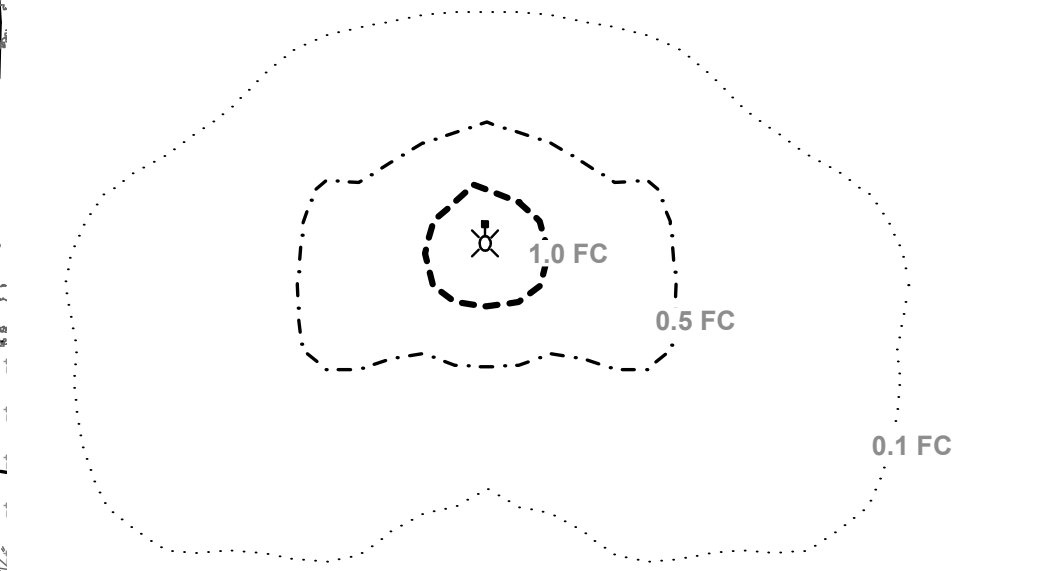
SHEET NUMBER
C240

P:\21701-CRESTVIEW GREEN\CADD\21701- PHOTOMETRICS PLAN.DWG



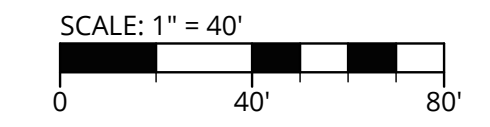
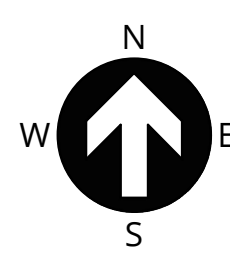
LEGEND

- PROPOSED LOT LINE
- PROPOSED RIGHT OF WAY
- PROPOSED CENTERLINE
- PROPOSED SETBACK LINE
- PROPOSED CURB
- PROPOSED CONCRETE
- PROPOSED BUILDING LINE
- ILLUMINATION ANALYSIS POINT (FC)
- FOOT CANDLE UNIT
- ✱ PROPOSED LUMINAIRE

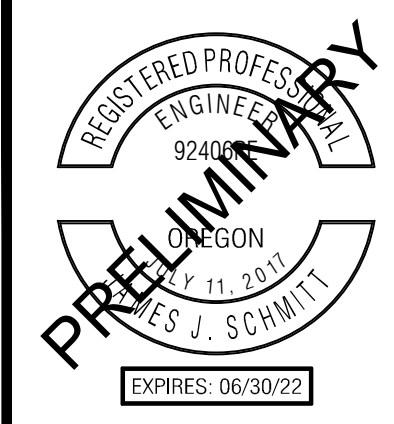


SITE LIGHTING LUMINAIRES
COBRAHEAD LIGHTS:
 LEOTEK GC1-40E-MV-NW-2-GY-530
 70W LED (5000 LUMENS) AT 30' MOUNTING HEIGHT
 LEOTEK GC1-90E-MV-NW-2-GY-700
 200W LED (15000 LUMENS) AT 30' MOUNTING HEIGHT

INTERSECTION LIGHTING SUMMARY		
E JORY STREET @ PRIVATE STREET A	CITY STANDARD	CALCULATED
AVERAGE MAINTAINED ILLUMINANCE (FC)	>1.0	1.08
UNIFORMITY (AVG/MIN RATIO)	<6.0	2.70
E JORY STREET @ PRIVATE STREET B	CITY STANDARD	CALCULATED
AVERAGE MAINTAINED ILLUMINANCE (FC)	>1.0	1.02
UNIFORMITY (AVG/MIN RATIO)	<6.0	2.55
E JORY STREET @ PRIVATE STREET C	CITY STANDARD	CALCULATED
AVERAGE MAINTAINED ILLUMINANCE (FC)	>1.0	1.00
UNIFORMITY (AVG/MIN RATIO)	<6.0	3.33
E JORY STREET @ PRIVATE STREET D	CITY STANDARD	CALCULATED
AVERAGE MAINTAINED ILLUMINANCE (FC)	>1.0	1.32
UNIFORMITY (AVG/MIN RATIO)	<6.0	4.40
E JORY STREET MID-BLOCK CROSSING	CITY STANDARD	CALCULATED
AVERAGE MAINTAINED ILLUMINANCE (FC)	>0.5	1.08
E WILLAKENZIE DRIVE @ PRIVATE STREET A	CITY STANDARD	CALCULATED
AVERAGE MAINTAINED ILLUMINANCE (FC)	>1.0	1.65
UNIFORMITY (AVG/MIN RATIO)	<6.0	5.50
E WILLAKENZIE DRIVE @ PRIVATE STREET B	CITY STANDARD	CALCULATED
AVERAGE MAINTAINED ILLUMINANCE (FC)	>1.0	1.81
UNIFORMITY (AVG/MIN RATIO)	<6.0	3.62
E WILLAKENZIE DRIVE @ PRIVATE STREET C	CITY STANDARD	CALCULATED
AVERAGE MAINTAINED ILLUMINANCE (FC)	>1.0	1.25
UNIFORMITY (AVG/MIN RATIO)	<6.0	4.17
E WILLAKENZIE DRIVE @ PRIVATE STREET D	CITY STANDARD	CALCULATED
AVERAGE MAINTAINED ILLUMINANCE (FC)	>1.0	1.73
UNIFORMITY (AVG/MIN RATIO)	<6.0	2.88
E WILLAKENZIE DRIVE MID-BLOCK CROSSING	CITY STANDARD	CALCULATED
AVERAGE MAINTAINED ILLUMINANCE (FC)	>0.5	3.64



SECTION 16, T.3S., R.2W. W.M.,
 YAMHILL COUNTY, OREGON



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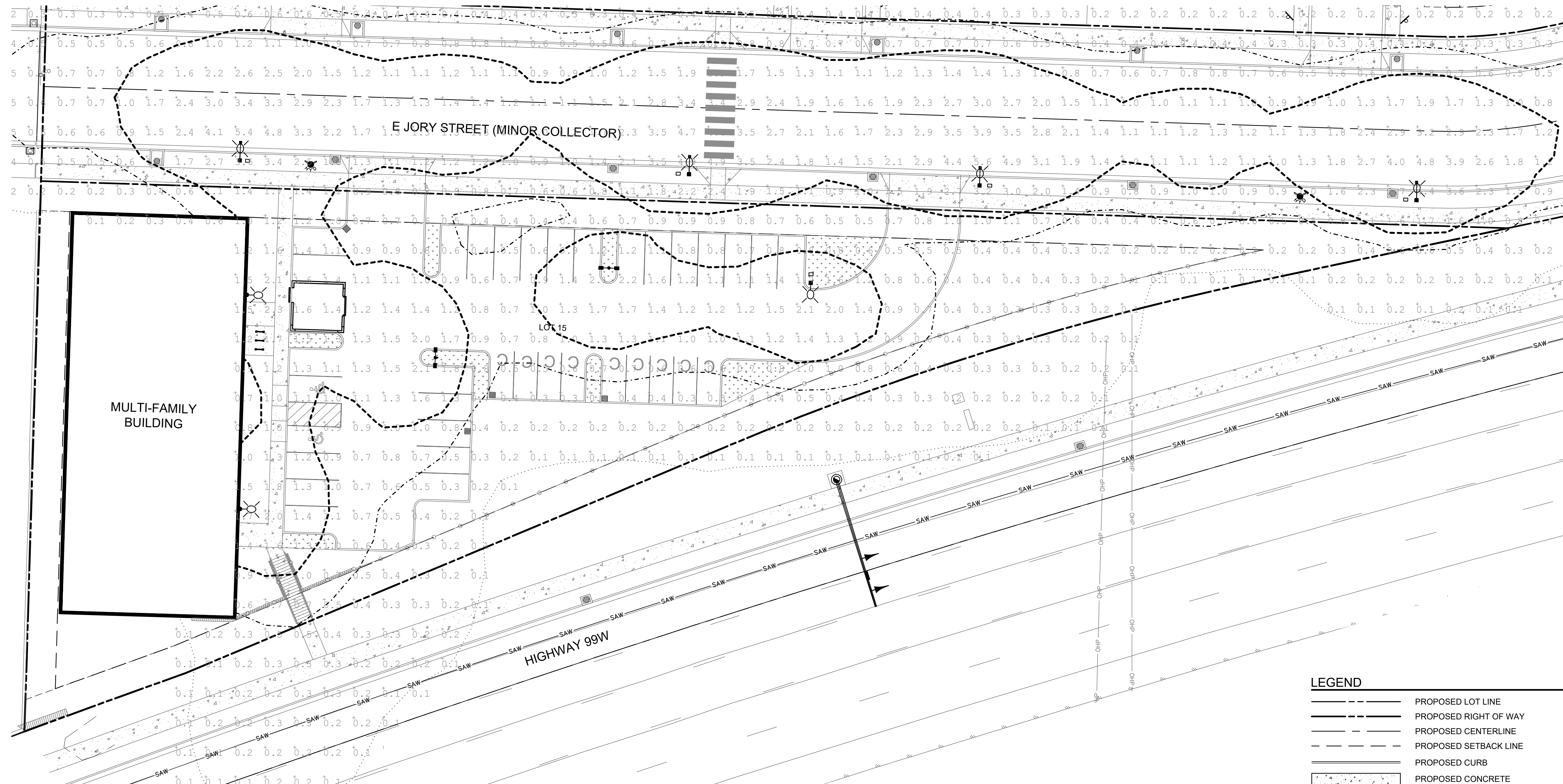
PHOTOMETRICS PLAN
CRESTVIEW GREEN
PLANNED UNIT DEVELOPMENT
 WESTWOOD HOMES LLC
 NEWBERG, OR

3J CONSULTING
 CIVIL ENGINEERING
 WATER RESOURCES
 COMMUNITY PLANNING
 9600 SW NIMBUS AVE., SUITE 100, BEAVERTON, OR 97008

PROJECT INFORMATION
 3J PROJECT # | 21701
 TAX LOT(S) | 3S2W16 900, 1000
 LAND USE # | TBD
 DESIGNED BY | JMF, SRC, JGW
 CHECKED BY | JJS

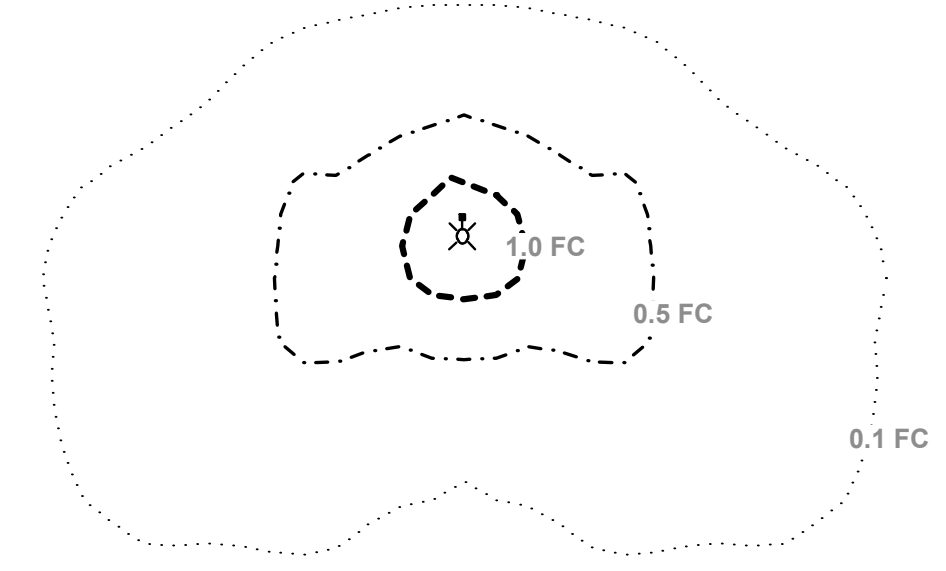
SHEET NUMBER
C250

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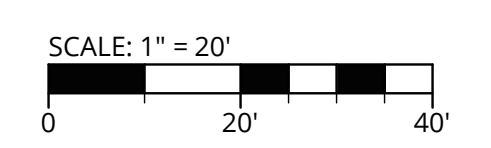
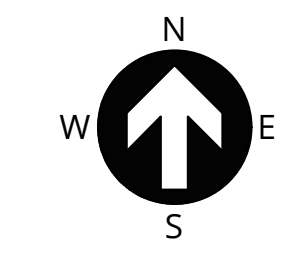
LEGEND

	PROPOSED LOT LINE
	PROPOSED RIGHT OF WAY
	PROPOSED CENTERLINE
	PROPOSED SETBACK LINE
	PROPOSED CURB
	PROPOSED CONCRETE
	PROPOSED BUILDING LINE
	ILLUMINATION ANALYSIS POINT (FC)
	FOOT CANDLE UNIT
	PROPOSED LUMINAIRE

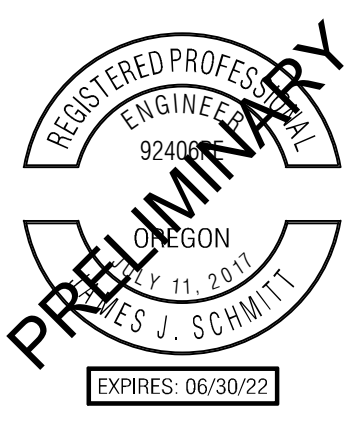


SITE LIGHTING LUMINAIRES
COBRAHEAD LIGHTS:
 LEOTEK GC1-40E-MV-NW-2-GY-530
 70W LED (5000 LUMENS) AT 30' MOUNTING HEIGHT

LEOTEK GC1-90E-MV-NW-2-GY-700
 200W LED (15000 LUMENS) AT 30' MOUNTING HEIGHT



SECTION 16, T.3S., R.2W. W.M.,
 YAMHILL COUNTY, OREGON



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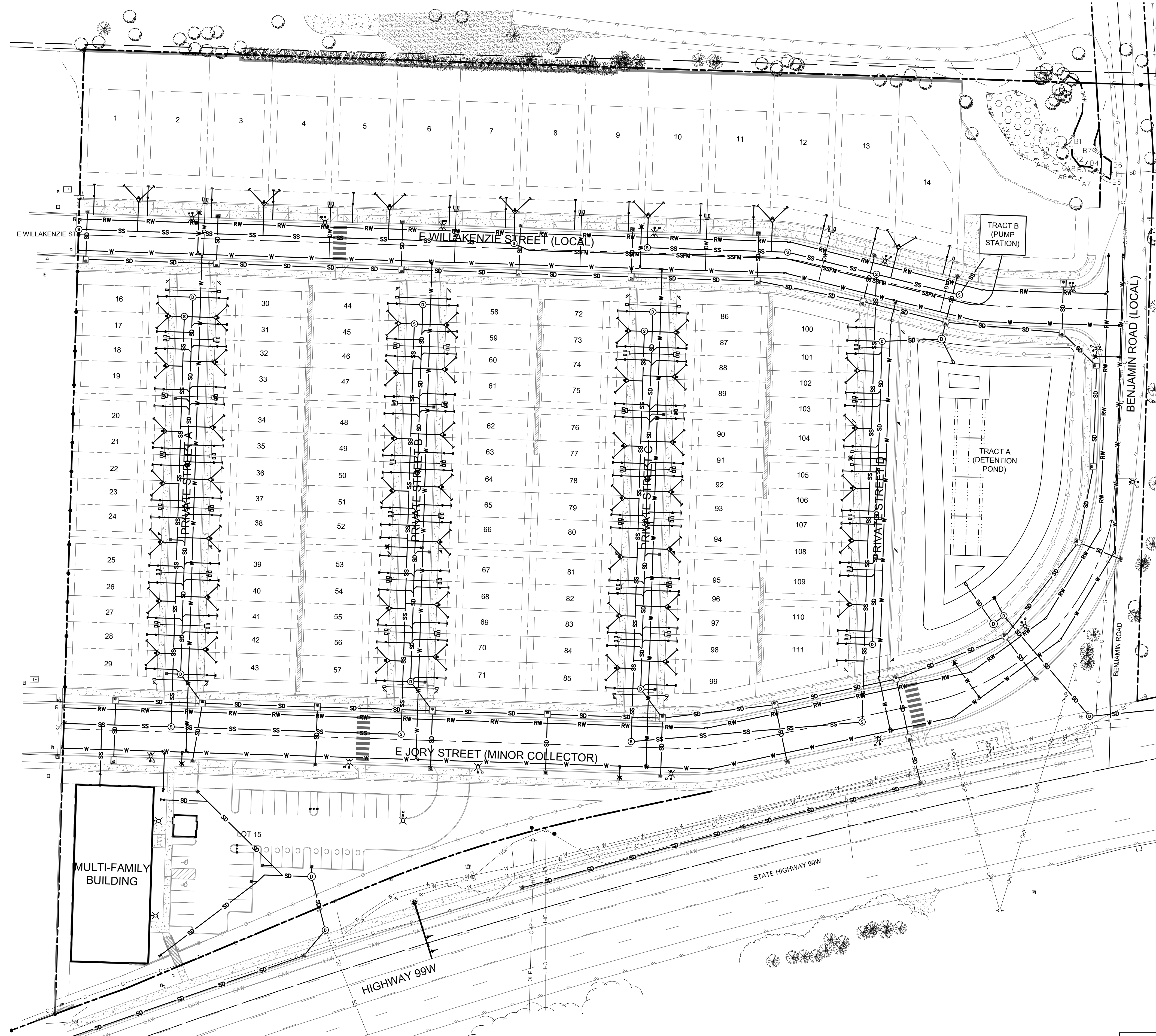
MULTI-FAMILY PHOTOMETRICS PLAN
CRESTVIEW GREEN
PLANNED UNIT DEVELOPMENT
 WESTWOOD HOMES LLC
 NEWBERG, OR

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 DESIGNED BY | JMF, SRC, JGW
 CHECKED BY | JJS

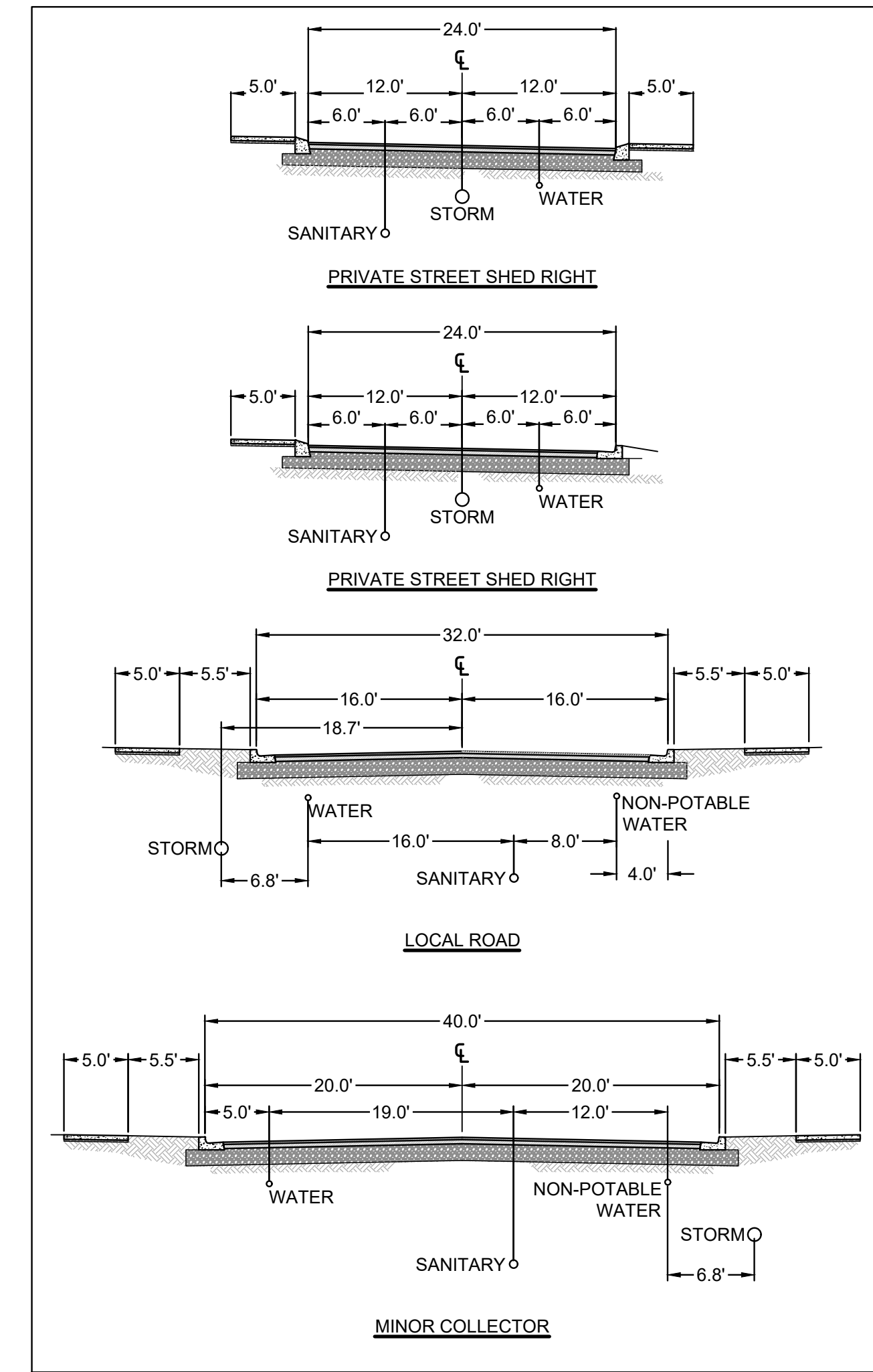
SHEET NUMBER
C251

P:\21701-CRESTVIEW GREEN\CADD\21701-COMPOSITE UTILITY PLAN.DWG

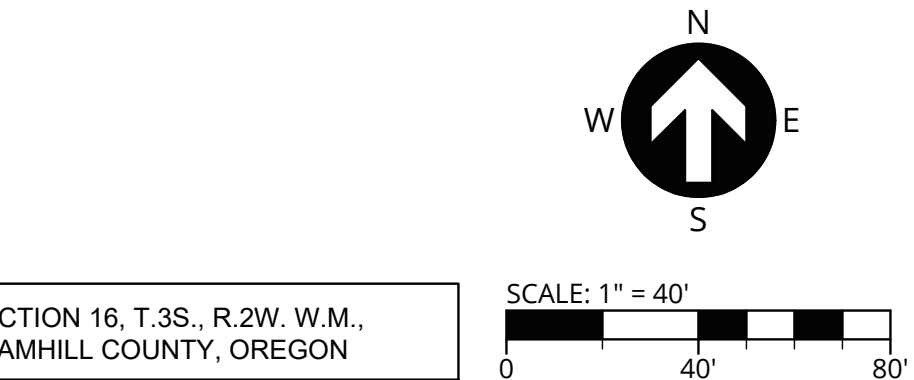


LEGEND

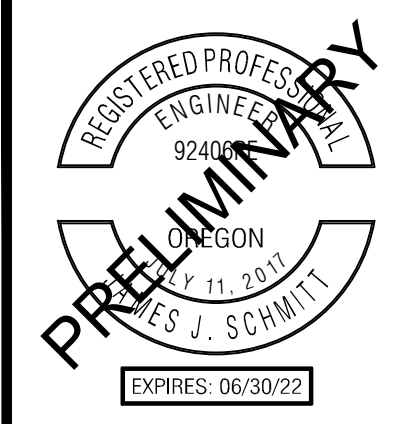
SD	PROPOSED STORM PIPE
SS	PROPOSED SANITARY PIPE
W	PROPOSED WATER MAIN
DW	PROPOSED WATER DOMESTIC SERVICE
FW	PROPOSED WATER FIRE SERVICE
RW	PROPOSED RECLAIMED WATER
[Symbol]	PROPOSED SUPERSIZED CURB INLET
[Symbol]	PROPOSED STANDARD CURB INLET
[Symbol]	PROPOSED WATER METER
[Symbol]	PROPOSED HYDRANT
[Symbol]	PROPOSED VALVE
[Symbol]	PROPOSED BLOW-OFF / AIR RELEASE ASSY.
[Symbol]	PROPOSED SEWER MANHOLE
[Symbol]	PROPOSED SEWER CLEANOUT
[Symbol]	PROPOSED STORM MANHOLE
[Symbol]	PROPOSED STORM CLEANOUT
SD	EXISTING STORM DRAIN
T	EXISTING TELECOM. LINE
G	EXISTING GAS LINE
W	EXISTING WATER MAIN
C	EXISTING CABLE LINE
UGP	EXISTING UNDERGROUND POWER
OHP	EXISTING OVERHEAD POWER



STREET UTILITIES TYPICAL SECTIONS NTS



SECTION 16, T.3S., R.2W. W.M.,
YAMHILL COUNTY, OREGON



PUBLISH DATE
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LAND USE DOCUMENTS
REVISIONS

COMPOSITE UTILITY PLAN
CRESTVIEW GREEN
PLANNED UNIT DEVELOPMENT
WESTWOOD HOMES LLC
NEWBERG, OR

3J CONSULTING
CIVIL ENGINEERING
WATER RESOURCES
COMMUNITY PLANNING
9600 SW NIMBUS AVE., SUITE 100, BEAVERTON, OR 97008

PROJECT INFORMATION
3J PROJECT # | 21701
TAX LOT(S) | 3S2W16 900, 1000
LAND USE # | TBD
DESIGNED BY | JMF, SRC, JGW
CHECKED BY | JJS

SHEET NUMBER
C300

P:\21701-CRESTVIEW GREEN\CADD\21701-COMPOSITE SANITARY SEWER PLAN.DWG



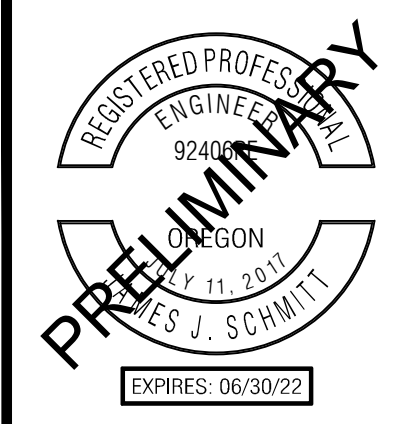
LEGEND

- PROPOSED SEWER BASIN LINES
- SS PROPOSED SANITARY PIPE
- SSFM PROPOSED FORCED SANITARY PIPE
- ⊙ PROPOSED SEWER MANHOLE
- PROPOSED SEWER CLEANOUT

PUBLISH DATE
02/10/2022

ISSUED FOR
LAND USE DOCUMENTS

REVISIONS



COMPOSITE SANITARY SEWER PLAN
CRESTVIEW GREEN
 PLANNED UNIT DEVELOPMENT
 WESTWOOD HOMES LLC
 NEWBERG, OR

Scale: 1" = 20'

0 20' 40'

North Arrow

811
 Know what's below.
 Call before you dig.

3J CONSULTING

CIVIL ENGINEERING
 WATER RESOURCES
 COMMUNITY PLANNING

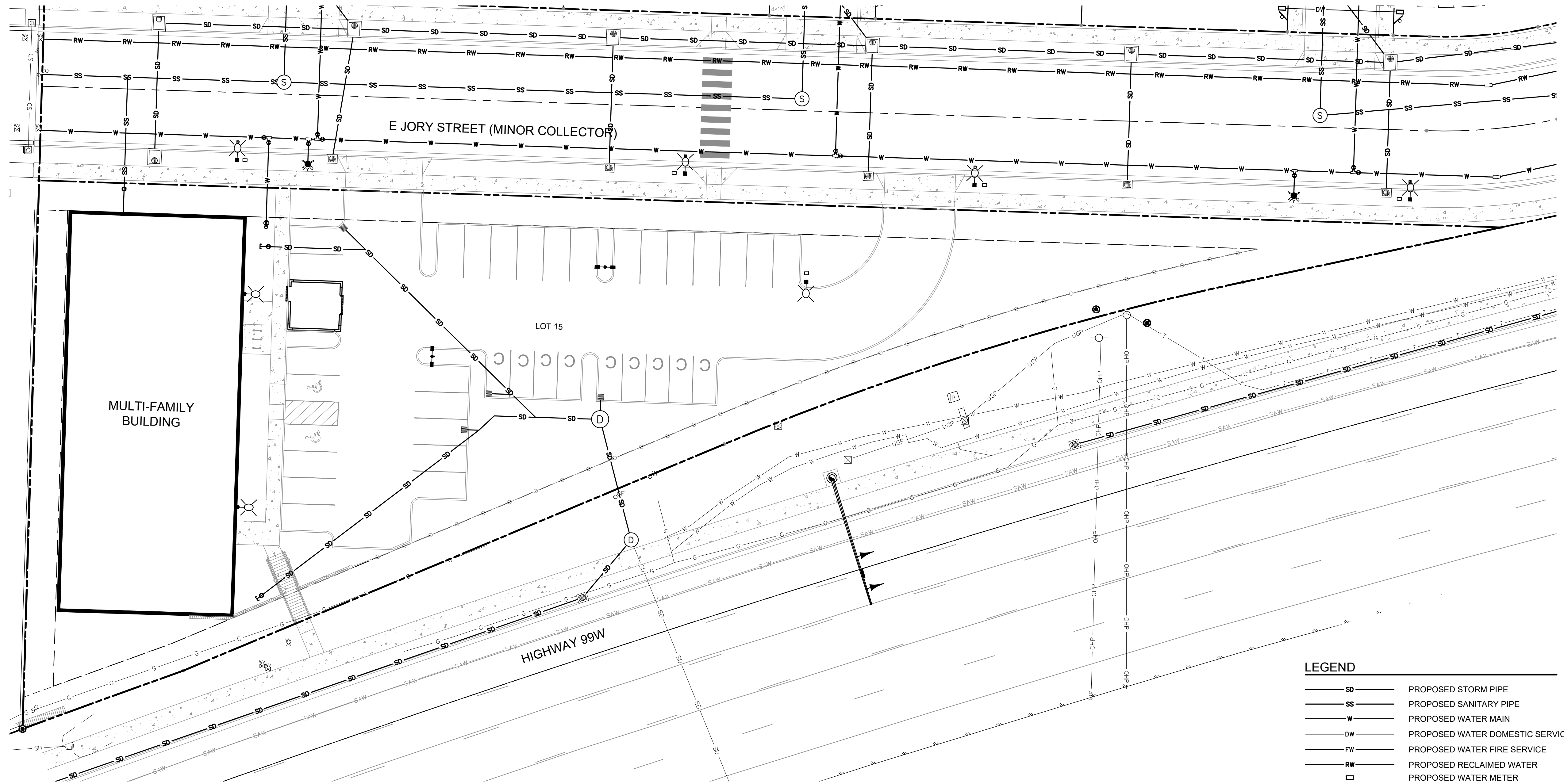
9600 SW NIMBUS AVE., SUITE 100, BEAVERTON, OR 97008

PROJECT INFORMATION

3J PROJECT # | 21701
 TAX LOT(S) | 3S2W16 900, 1000
 LAND USE # | TBD
 DESIGNED BY | JMF, SRC, JGW
 CHECKED BY | JJS

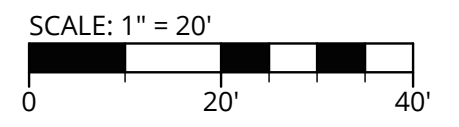
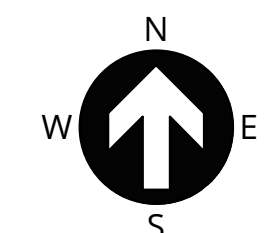
SHEET NUMBER
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LEGEND

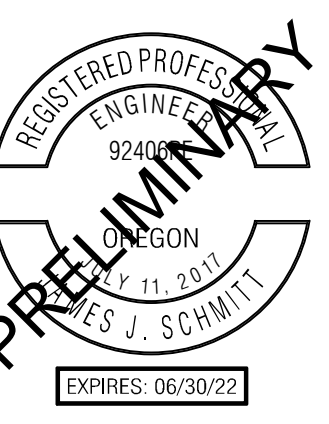
- SD — PROPOSED STORM PIPE
- SS — PROPOSED SANITARY PIPE
- W — PROPOSED WATER MAIN
- DW — PROPOSED WATER DOMESTIC SERVICE
- FW — PROPOSED WATER FIRE SERVICE
- RW — PROPOSED RECLAIMED WATER
- — PROPOSED WATER METER
- ⊗ — PROPOSED HYDRANT
- ⊙ — PROPOSED VALVE
- ⊕ — BLOW-OFF / AIR RELEASE ASSY.
- ⊗ — FIRE DPT. CONNECTION
- ⊙ — PROPOSED SEWER MANHOLE
- — PROPOSED SEWER CLEANOUT
- — PROPOSED STORM MANHOLE
- — PROPOSED STORM CLEANOUT
- SD — EXISTING STORM DRAIN
- T — EXISTING TELECOM. LINE
- G — EXISTING GAS LINE
- W — EXISTING WATER MAIN
- C — EXISTING CABLE LINE
- UGP — EXISTING UNDERGROUND POWER
- OHP — EXISTING OVERHEAD POWER



SECTION 16, T.3S., R.2W. W.M.,
YAMHILL COUNTY, OREGON



Know what's below.
Call before you dig.



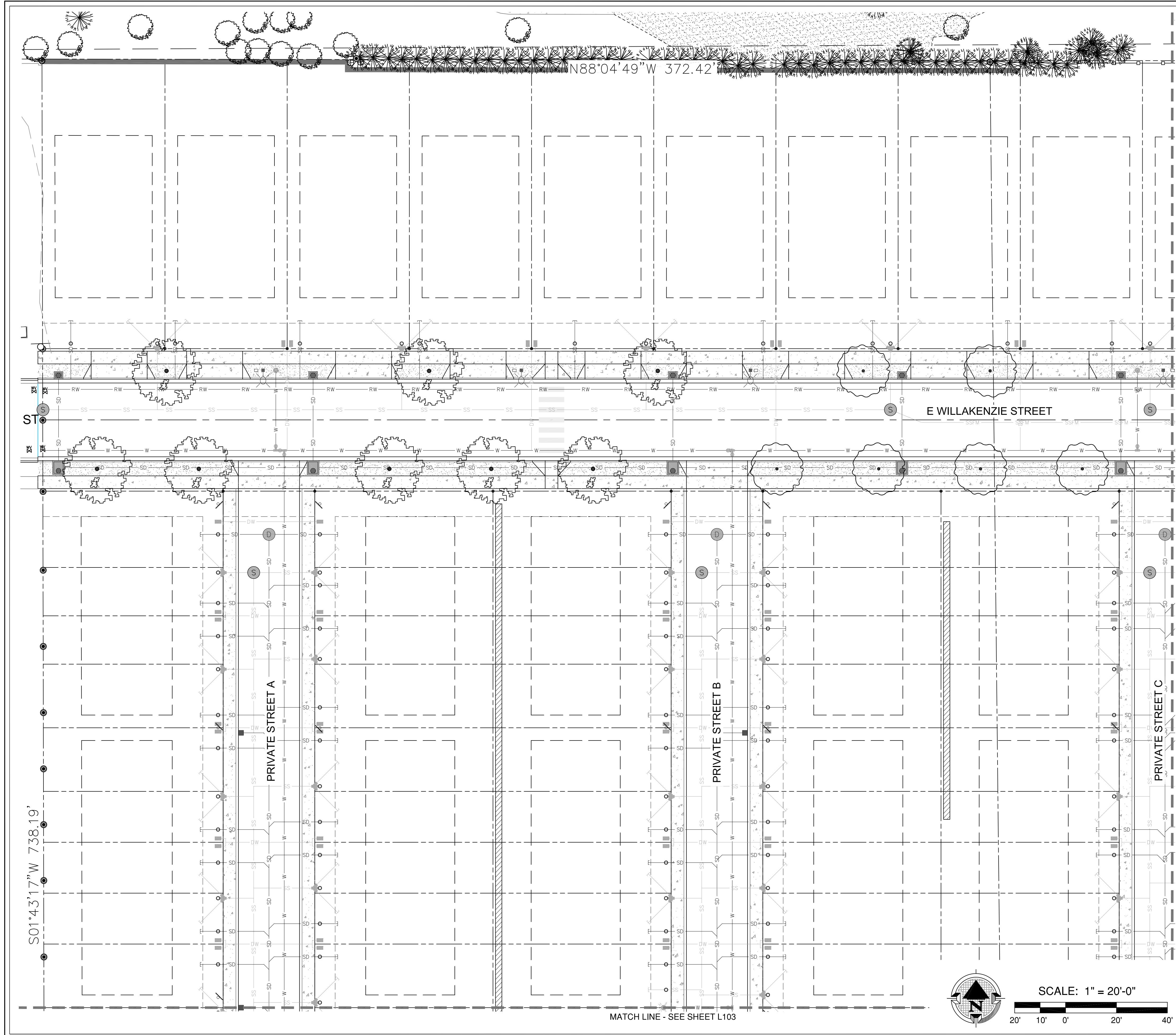
PUBLISH DATE
02/10/2022
ISSUED FOR
LAND USE DOCUMENTS
REVISIONS

MULTI-FAMILY UTILITY PLAN
CRESTVIEW GREEN
PLANNED UNIT DEVELOPMENT
WESTWOOD HOMES LLC
NEWBERG, OR

3J CONSULTING
CIVIL ENGINEERING
WATER RESOURCES
COMMUNITY PLANNING
9600 SW NIMBUS AVE., SUITE 100, BEAVERTON, OR 97008

PROJECT INFORMATION
3J PROJECT # | 21701
TAX LOT(S) | 3S2W16 900, 1000
LAND USE # | TBD
DESIGNED BY | JMF, SRC, JGW
CHECKED BY | JJS

SHEET NUMBER
C305



SITE PLANT MATERIALS LISTING:						
Botanical name Common Name						
SYM	TREES	(D)eciduous/ (E)vergreen	QTY.	SIZE	CONDITION	REMARKS
	Acer griseum Paperbark Maple	(D)	25	1.5" Cal.	B&B	Street Tree
	Calocedrus decurrens Incense Cedar	(E)	4	6-7"	B&B	Landscape
	Acer palmatum 'Sango Kaku' Coral Bark Maple	(D)	5	6-7"	B&B	Multi-stem Collected
	Camellia sasanqua 'Kanjiro' Kanjiro Camellia	(E)	11	6-7"	B&B	Landscape
	Cercidiphyllum japonicum Katsura Tree	(D)	12	1.5" Cal.	B&B	Street Tree
	Cladrastis lutea Yellowwood	(D)	18	1.5" Cal.	B&B	Street Tree
	Cupressus sempervirens Italian Cypress	(E)	6	6-7"	B&B	Landscape
	Fagus sylvatica 'Tricolor' Tricolor European Beech	(D)	4	1.5" Cal.	B&B	Parking Lot
	Fraxinus pennsylvanica 'Patmore' Patmore Ash	(D)	6	2" Cal.	B&B	Street Tree
	Picea pungens 'Moerheim' Moerheim Blue Spruce	(E)	13	6-7"	B&B	Landscape
	Pyrus calleryana 'Glen's Form' Chanticleer Pear	(D)	10	2" Cal.	B&B	Street Tree
	Styrax japonica Japanese Snowbell	(D)	9	1.5" Cal.	B&B	Street Tree
	Zelkova serrata 'Village Green' Village Green Zelkova	(D)	3	2" Cal.	B&B	Street Tree
		(D)	4	1.5" Cal.	B&B	Parking Lot
Total Trees			130			
SYM	SHRUBS	(D)eciduous/ (E)vergreen	QTY.	SIZE	CONDITION	REMARKS
	Azalea x 'Hino-Crimson' Hino-Crimson Azalea	(E)	4	1 Gal	Can	
	Berberis thunbergii 'Crimson Pygmy' Crimson Pygmy Barberry	(D)	34	1 Gal	Can	
	Calamagrostis x acutiflora 'Karl Foerster' Foerster's Feather Reed Grass	(E)	34	1 Gal	Can	
	Choisya ternata 'Sundance' Sundance Mexican Orange	(E)	4	3 Gal	Can	
	Cornus 'Elegantissima' Variegated Redtwig Dogwood	(D)	15	3 Gal	Can	
	Euonymus alata 'Compactus' Compact Winged Euonymus	(D)	14	5 Gal	Can	
	Euonymus fortunei 'Gold Splash' Gold Splash Euonymus	(E)	15	1 Gal	Can	
	Euonymus japonicus 'Aureovariegatus' Gold Spot Euonymus	(E)	44	5 Gal	Can	
	Hakonechloa macra 'All Gold' All Gold Japanese Fountain Grass	(E)	20	1 Gal	Can	
	Hemerocallis 'Stella d'oro' Stella d'oro Daylily	(D)	35	1 gal	Can	
	Hydrangea paniculata 'Littlelime' Littlelime Hydrangea	(D)	8	2 Gal	Can	
	Euonymus japonicus 'Silver King' Silver King Euonymus	(E)	23	5 Gal	Can	
	Ilex glabra 'Compacta' Compact Inkberry	(E)	19	3 Gal	Can	
	Polystichum munitum Sword Fern	(E)	27	1 Gal	Can	
	Prunus 'Otto Luken' Ottoluken Laurel	(E)	14	18-24"	B&B	Free of disease
	Rhododendron 'PJM Elite' PJM Elite Rhododendron	(E)	11	18-24"	Can	
	Rosa 'Pink Supreme Carpet' Pink Supreme Carpet Rose	(D)	10	3 Gal	Can	
	Rudbeckia fulgida 'Goldsturm' Black Eye Susan	(D)	23	1 Gal	Can	
	Sarcococca confusa Fragrant Box	(E)	16	1 Gal	Can	
	Spiraea x bumalda 'Anthony Waterer' Anthony Waterer Spirea	(D)	6	1 Gal	Can	
	Viburnum tinus 'Spring Bouquet' Spring Bouquet Viburnum	(E)	27	5 Gal	Can	
Total Shrubs			403			
SYM	GROUND COVER	(D)eciduous/ (E)vergreen	QTY.	SIZE	CONDITION	REMARKS
	Arctostaphylos uva-ursi 'Massachusetts' Massachusetts Kinnikinnick	(E)	1,625	4"	Pots	30" O.C.
	Fragaria x 'Lipstick' Lipstick Strawberry	(E)	525	4"	Pots	24" O.C.
	Mahonia repens Creeping Mahonia	(E)	1,455	1 Gal.	Can	36" O.C.
	Rubus calycinoides 'Emerald Carpet' Creeping Raspberry	(E)	2,255	4"	Pots	24" O.C.
	Vinca minor 'Bowles' Bowles Common Periwinkle	(E)	630	4"	Pots	18" O.C.
	EcoLawn (Hydro-seed)			3,125 SF		
	Lawn (Hydro-seed)			16,965 SF		

NOTES:
1. REFER TO SHEET L105 FOR SITE PLANTING DETAILS & NOTES

MEARS
DESIGN+GROUP
LANDSCAPE ARCHITECTURE & PLANNING
PO Box 23338 | PORTLAND, OREGON | 97281
PHONE: 503.601.4516 | FAX: 503.924.4668



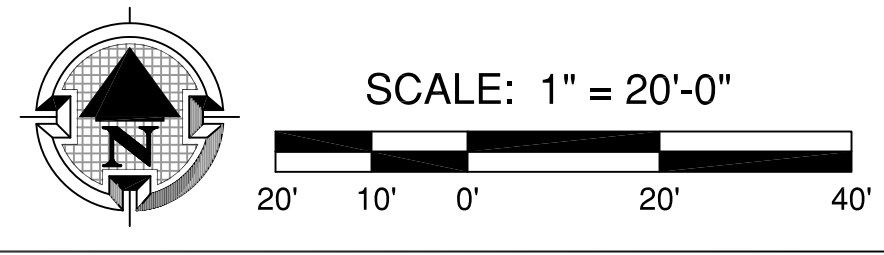
CRESTVIEW GREEN SUBDIVISION
TAX LOTS 321601000 & 321600900
NEWBERG, OREGON

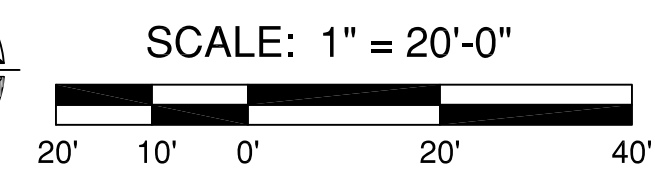
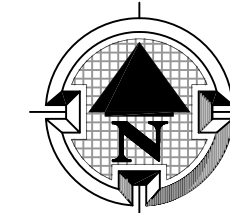
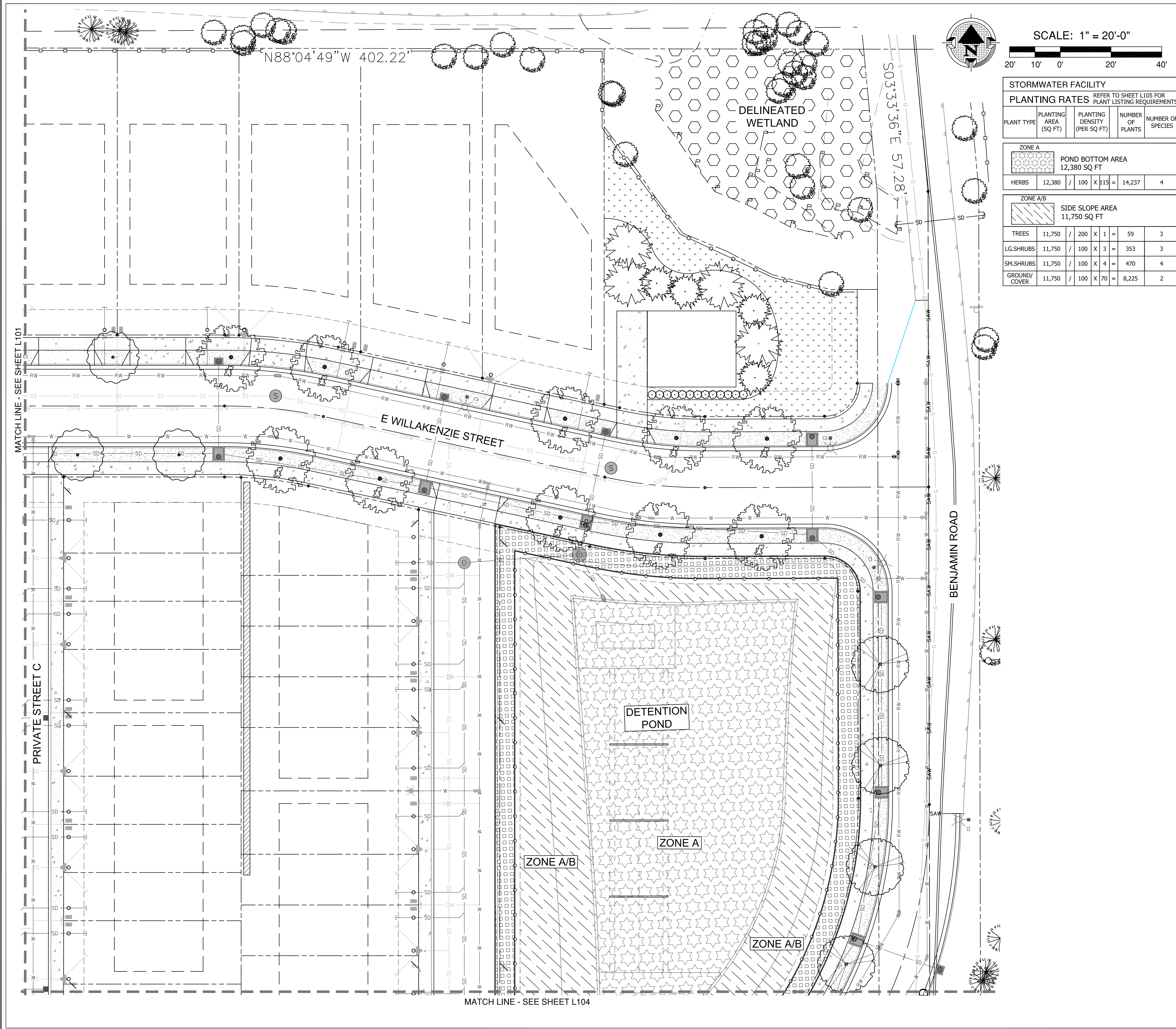
REVISIONS		
REV.	DATE	DESCRIPTION

SHEET NAME:
PLANTING PLAN

DRAWN BY: _____ TM
CHECKED BY: _____ TM
ISSUE DATE: 1/11/2022
JOB NO.: 2144

SHEET:
L101
OF 5
LAND USE SUBMITTAL





STORMWATER FACILITY REFER TO SHEET L105 FOR PLANT LISTING REQUIREMENTS

PLANTING RATES

PLANT TYPE	PLANTING AREA (SQ FT)	PLANTING DENSITY (PER SQ FT)	NUMBER OF PLANTS	NUMBER OF SPECIES
HERBS	12,380	/ 100	X 115 = 14,237	4

ZONE A

POND BOTTOM AREA 12,380 SQ FT

HERBS	12,380	/ 100	X 115 = 14,237	4
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ZONE A/B

SIDE SLOPE AREA 11,750 SQ FT

TREES	11,750	/ 200	X 1 = 59	3
LG.SHRUBS	11,750	/ 100	X 3 = 353	3
SM.SHRUBS	11,750	/ 100	X 4 = 470	4
GROUND/COVER	11,750	/ 100	X 70 = 8,225	2

SITE PLANT MATERIALS LISTING:

Botanical name		Common Name		QTY.	SIZE	CONDITION	REMARKS
SYM	TREES	(D)eciduous/ (E)vergreen					
⊗	Acer griseum Paperbark Maple	(D)		25	1.5" Cal.	B&B	Street Tree
⊗	Calocedrus decurrens Incense Cedar	(E)		4	6-7"	B&B	Landscape
⊗	Acer palmatum 'Sango Kaku' Coral Bark Maple	(D)		5	6-7"	B&B	Multi-stem Collected
⊗	Camellia sasanqua 'Kanjiro' Kanjiro Camellia	(E)		11	6-7"	B&B	Landscape
⊗	Cercidiphyllum japonicum Katsura Tree	(D)		12	1.5" Cal.	B&B	Street Tree
⊗	Cladrastis lutea Yellowwood	(D)		18	1.5" Cal.	B&B	Street Tree
⊗	Cupressus sempervirens Italian Cypress	(E)		6	6-7"	B&B	Landscape
⊗	Fagus sylvatica 'Tricolor' Tricolor European Beech	(D)		4	1.5" Cal.	B&B	Parking Lot
⊗	Fraxinus pennsylvanica 'Patmore' Patmore Ash	(D)		6	2" Cal.	B&B	Street Tree
⊗	Picea pungens 'Moerheim' Moerheim Blue Spruce	(E)		13	6-7"	B&B	Landscape
⊗	Pyrus calleryana 'Glen's Form' Chanticleer Pear	(D)		10	2" Cal.	B&B	Street Tree
⊗	Styrax japonica Japanese Snowbell	(D)		9	1.5" Cal.	B&B	Street Tree
⊗	Zelkova serrata 'Village Green' Village Green Zelkova	(D)		3	2" Cal.	B&B	Street Tree
		(D)		4	1.5" Cal.	B&B	Parking Lot
Total Trees				130			

SYM	SHRUBS	(D)eciduous/ (E)vergreen	QTY.	SIZE	CONDITION	REMARKS
⊗	Azalea x 'Hino-Crimson' Hino-Crimson Azalea	(E)	4	1 Gal	Can	
⊗	Berberis thunbergii 'Crimson Pygmy' Crimson Pygmy Barberry	(D)	34	1 Gal	Can	
⊗	Calamagrostis x acutiflora 'Karl Foerster' Foerster's Feather Reed Grass	(E)	34	1 Gal	Can	
⊗	Choisya ternata 'Sundance' Sundance Mexican Orange	(E)	4	3 Gal	Can	
⊗	Cornus 'Elegantissima' Variegated Redtwig Dogwood	(D)	15	3 Gal	Can	
⊗	Euonymus alata 'Compactus' Compact Winged Euonymus	(D)	14	5 Gal	Can	
⊗	Euonymus fortunei 'Gold Splash' Gold Splash Euonymus	(E)	15	1 Gal	Can	
⊗	Euonymus japonicus 'Aureovariegatus' Gold Spot Euonymus	(E)	44	5 Gal	Can	
⊗	Hakonechloa macra 'All Gold' All Gold Japanese Fountain Grass	(E)	20	1 Gal	Can	
⊗	Hemerocallis 'Stella d'oro' Stella d'oro Daylily	(D)	35	1 gal	Can	
⊗	Hydrangea paniculata 'Littlelime' Littlelime Hydrangea	(D)	8	2 Gal	Can	
⊗	Euonymus japonicus 'Silver King' Silver King Euonymus	(E)	23	5 Gal	Can	
⊗	Ilex glabra 'Compacta' Compact Inkberry	(E)	19	3 Gal	Can	
⊗	Polystichum munitum Sword Fern	(E)	27	1 Gal	Can	
⊗	Prunus 'Otto Luken' Ottoluken Laurel	(E)	14	18-24"	B&B	Free of disease
⊗	Rhododendron 'PJM Elite' PJM Elite Rhododendron	(E)	11	18-24"	Can	
⊗	Rosa 'Pink Supreme Carpet' Pink Supreme Carpet Rose	(D)	10	3 Gal	Can	
⊗	Rudbeckia fulgida 'Goldsturm' Black Eye Susan	(D)	23	1 Gal	Can	
⊗	Sarcococca confusa Fragrant Box	(E)	16	1 Gal	Can	
⊗	Spiraea x bumalda 'Anthony Waterer' Anthony Waterer Spiraea	(D)	6	1 Gal	Can	
⊗	Viburnum tinus 'Spring Bouquet' Spring Bouquet Viburnum	(E)	27	5 Gal	Can	
Total Shrubs				403		

SYM	GROUND COVER	(D)eciduous/ (E)vergreen	QTY.	SIZE	CONDITION	REMARKS
⊗	Arctostaphylos uva-ursi 'Massachusetts' Massachusetts Kinnikinnick	(E)	1,625	4"	Pots	30" O.C.
⊗	Fragaria x 'Lipstick' Lipstick Strawberry	(E)	525	4"	Pots	24" O.C.
⊗	Mahonia repens Creeping Mahonia	(E)	1,455	1 Gal.	Can	36" O.C.
⊗	Rubus calycinoides 'Emerald Carpet' Creeping Raspberry	(E)	2,255	4"	Pots	24" O.C.
⊗	Vinca minor 'Bowles' Bowles Common Periwinkle	(E)	630	4"	Pots	18" O.C.
	EcoLawn (Hydro-seed)		3,125	SF		
	Lawn (Hydro-seed)		16,965	SF		

NOTES:
1. REFER TO SHEET L105 FOR SITE PLANTING DETAILS & NOTES

MEARS
DESIGN+GROUP
LANDSCAPE ARCHITECTURE & PLANNING
PO BOX 23338 | PORTLAND, OREGON | 97281
PHONE: 503.601.4516 | FAX: 503.924.4668



CRESTVIEW GREEN SUBDIVISION
TAX LOTS 321601000 & 321600900
NEWBERG, OREGON

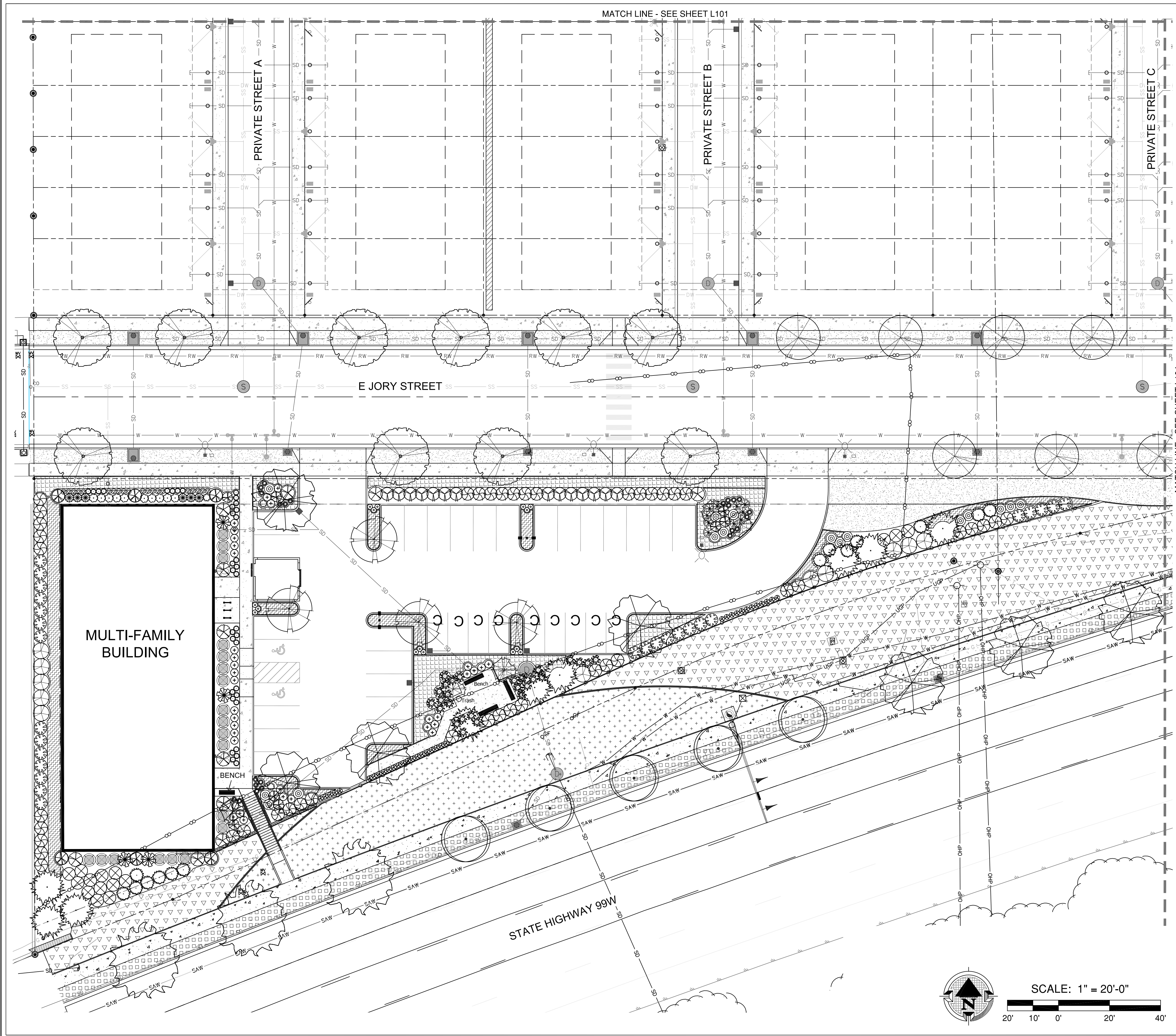
REVISIONS

REV.	DATE	DESCRIPTION

SHEET NAME:
PLANTING PLAN

DRAWN BY: _____ TM
CHECKED BY: _____ TM
ISSUE DATE: 1/11/2022
JOB NO.: 2144

SHEET:
L102
OF 5
LAND USE SUBMITTAL



SITE PLANT MATERIALS LISTING:

Botanical name Common Name						
SYM	TREES	(D)eciduous/ (E)vergreen	QTY.	SIZE	CONDITION	REMARKS
	Acer griseum Paperbark Maple	(D)	25	1.5" Cal.	B&B	Street Tree
	Calocedrus decurrens Incense Cedar	(E)	4	6-7'	B&B	Landscape
	Acer palmatum 'Sango Kaku' Coral Bark Maple	(D)	5	6-7'	B&B	Multi-stem Collected
	Camellia sasanqua 'Kanjiro' Kanjiro Camellia	(E)	11	6-7'	B&B	Landscape
	Cercidiphyllum japonicum Katsura Tree	(D)	12	1.5" Cal.	B&B	Street Tree
	Cladrastis lutea Yellowwood	(D)	18	1.5" Cal.	B&B	Street Tree
	Cupressus sempervirens Italian Cypress	(E)	6	6-7'	B&B	Landscape
	Fagus sylvatica 'Tricolor' Tricolor European Beech	(D)	4	1.5" Cal.	B&B	Parking Lot
	Fraxinus pennsylvanica 'Patmore' Patmore Ash	(D)	6	2" Cal.	B&B	Street Tree
	Picea pungens 'Moerheim' Moerheim Blue Spruce	(E)	13	6-7'	B&B	Landscape
	Pyrus calleryana 'Glen's Form' Chanticleer Pear	(D)	10	2" Cal.	B&B	Street Tree
	Styrax japonica Japanese Snowbell	(D)	9	1.5" Cal.	B&B	Street Tree
	Zelkova serrata 'Village Green' Village Green Zelkova	(D)	3	2" Cal.	B&B	Street Tree
		(D)	4	1.5" Cal.	B&B	Parking Lot
Total Trees			130			

SYM	SHRUBS	(D)eciduous/ (E)vergreen	QTY.	SIZE	CONDITION	REMARKS
	Azalea x 'Hino-Crimson' Hino-Crimson Azalea	(E)	4	1 Gal	Can	
	Berberis thunbergii 'Crimson Pygmy' Crimson Pygmy Barberry	(D)	34	1 Gal	Can	
	Calamagrostis x acutiflora 'Karl Foerster' Foerster's Feather Reed Grass	(E)	34	1 Gal	Can	
	Choisya ternata 'Sundance' Sundance Mexican Orange	(E)	4	3 Gal	Can	
	Cornus 'Elegantissima' Variegated Redtwig Dogwood	(D)	15	3 Gal	Can	
	Euonymus alata 'Compactus' Compact Winged Euonymus	(D)	14	5 Gal	Can	
	Euonymus fortunei 'Gold Splash' Gold Splash Euonymus	(E)	15	1 Gal	Can	
	Euonymus japonicus 'Aureovariegatus' Gold Spot Euonymus	(E)	44	5 Gal	Can	
	Hakonechloa macra 'All Gold' All Gold Japanese Fountain Grass	(E)	20	1 Gal	Can	
	Hemerocallis 'Stella d'oro' Stella d'oro Daylily	(D)	35	1 gal	Can	
	Hydrangea paniculata 'Littlelime' Littlelime Hydrangea	(D)	8	2 Gal	Can	
	Euonymus japonicus 'Silver King' Silver King Euonymus	(E)	23	5 Gal	Can	
	Ilex glabra 'Compacta' Compact Inkberry	(E)	19	3 Gal	Can	
	Polystichum munitum Sword Fern	(E)	27	1 Gal	Can	
	Prunus 'Otto Luken' Ottoluken Laurel	(E)	14	18-24"	B&B	Free of disease
	Rhododendron 'PJM Elite' PJM Elite Rhododendron	(E)	11	18-24"	Can	
	Rosa 'Pink Supreme Carpet' Pink Supreme Carpet Rose	(D)	10	3 Gal	Can	
	Rudbeckia fulgida 'Goldsturm' Black Eye Susan	(D)	23	1 Gal	Can	
	Sarcococca confusa Fragrant Box	(E)	16	1 Gal	Can	
	Spiraea x bumalda 'Anthony Waterer' Anthony Waterer Spiraea	(D)	6	1 Gal	Can	
	Viburnum tinus 'Spring Bouquet' Spring Bouquet Viburnum	(E)	27	5 Gal	Can	
Total Shrubs			403			

SYM	GROUND COVER	(D)eciduous/ (E)vergreen	QTY.	SIZE	CONDITION	REMARKS
	Arctostaphylos uva-ursi 'Massachusetts' Massachusetts Kinnikinnick	(E)	1,625	4"	Pots	30" O.C.
	Fragaria x 'Lipstick' Lipstick Strawberry	(E)	525	4"	Pots	24" O.C.
	Mahonia repens Creeping Mahonia	(E)	1,455	1 Gal.	Can	36" O.C.
	Rubus calycinoides 'Emerald Carpet' Creeping Raspberry	(E)	2,255	4"	Pots	24" O.C.
	Vinca minor 'Bowles' Bowles Common Periwinkle	(E)	630	4"	Pots	18" O.C.
	EcoLawn (Hydro-seed)		3,125	SF		
	Lawn (Hydro-seed)		16,965	SF		

NOTES:
1. REFER TO SHEET L105 FOR SITE PLANTING DETAILS & NOTES

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CRESTVIEW GREEN SUBDIVISION

TAX LOTS 321601000 & 321600900
NEWBERG, OREGON

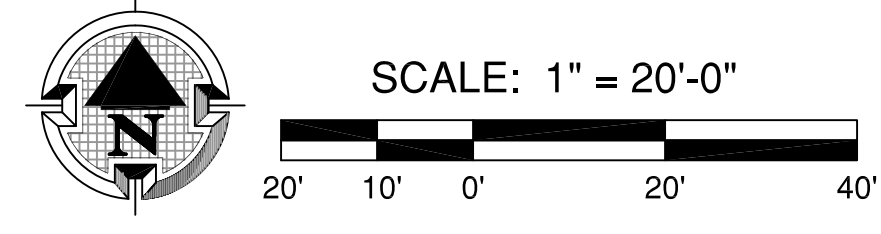
REVISIONS

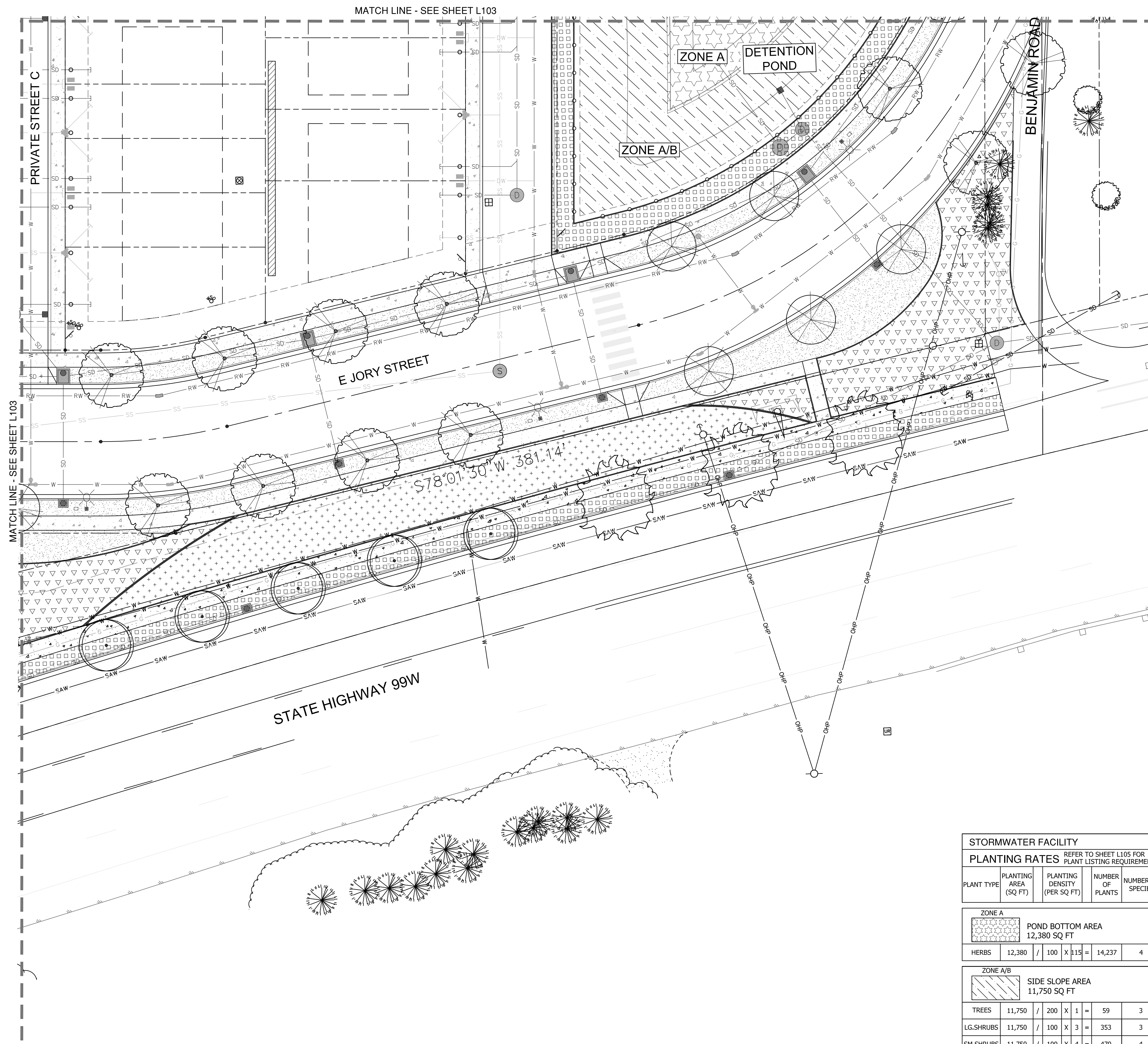
REV.	DATE	DESCRIPTION

SHEET NAME:
PLANTING PLAN

DRAWN BY: _____ TM
CHECKED BY: _____ TM
ISSUE DATE: 1/11/2022
JOB NO.: 2144

SHEET:
L103
OF 5
LAND USE SUBMITTAL





STORMWATER FACILITY
PLANTING RATES REFER TO SHEET L105 FOR PLANT LISTING REQUIREMENTS

PLANT TYPE	PLANTING AREA (SQ FT)	PLANTING DENSITY (PER SQ FT)	NUMBER OF PLANTS	NUMBER OF SPECIES
ZONE A POND BOTTOM AREA 12,380 SQ FT				
HERBS	12,380	/ 100	X 115 =	14,237 4
ZONE A/B SIDE SLOPE AREA 11,750 SQ FT				
TREES	11,750	/ 200	X 1 =	59 3
LG.SHRUBS	11,750	/ 100	X 3 =	353 3
SM.SHRUBS	11,750	/ 100	X 4 =	470 4
GROUND/COVER	11,750	/ 100	X 70 =	8,225 2



SITE PLANT MATERIALS LISTING:

Botanical name Common Name						
SYM	TREES	(D)eciduous/ (E)vergreen	QTY.	SIZE	CONDITION	REMARKS
	Acer griseum Paperbark Maple	(D)	25	1.5" Cal.	B&B	Street Tree
	Calocedrus decurrens Incense Cedar	(E)	4	6-7"	B&B	Landscape
	Acer palmatum 'Sango Kaku' Coral Bark Maple	(D)	5	6-7"	B&B	Multi-stem Collected
	Camellia sasanqua 'Kanjiro' Kanjiro Camellia	(E)	11	6-7"	B&B	Landscape
	Cercidiphyllum japonicum Katsura Tree	(D)	12	1.5" Cal.	B&B	Street Tree
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	Fagus sylvatica 'Tricolor' Tricolor European Beech	(D)	4	1.5" Cal.	B&B	Parking Lot
	Fraxinus pennsylvanica 'Patmore' Patmore Ash	(D)	6	2" Cal.	B&B	Street Tree
	Picea pungens 'Moerheim' Moerheim Blue Spruce	(E)	13	6-7"	B&B	Landscape
	Pyrus calleryana 'Glen's Form' Chanticleer Pear	(D)	10	2" Cal.	B&B	Street Tree
	Styrax japonica Japanese Snowbell	(D)	9	1.5" Cal.	B&B	Street Tree
	Zelkova serrata 'Village Green' Village Green Zelkova	(D)	3 4	2" Cal. 1.5" Cal.	B&B	Street Tree Parking Lot
Total Trees			130			

SYM	SHRUBS	(D)eciduous/ (E)vergreen	QTY.	SIZE	CONDITION	REMARKS
	Azalea x 'Hino-Crimson' Hino-Crimson Azalea	(E)	4	1 Gal	Can	
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	Rhododendron 'PJM Elite' PJM Elite Rhododendron	(E)	11	18-24"	Can	
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	Sarcococca confusa Fragrant Box	(E)	16	1 Gal	Can	
	Spiraea x bumalda 'Anthony Waterer' Anthony Waterer Spiraea	(D)	6	1 Gal	Can	
	Viburnum tinus 'Spring Bouquet' Spring Bouquet Viburnum	(E)	27	5 Gal	Can	
Total Shrubs			403			

SYM	GROUND COVER	(D)eciduous/ (E)vergreen	QTY.	SIZE	CONDITION	REMARKS
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	Fragaria x 'Lipstick' Lipstick Strawberry	(E)	525	4"	Pots	24" O.C.
	Mahonia repens Creeping Mahonia	(E)	1,455	1 Gal.	Can	36" O.C.
	Rubus calycinoides 'Emerald Carpet' Creeping Raspberry	(E)	2,255	4"	Pots	24" O.C.
	Vinca minor 'Bowles' Bowles Common Periwinkle	(E)	630	4"	Pots	18" O.C.
	EcoLawn (Hydro-seed)		3,125	SF		
	Lawn (Hydro-seed)		16,965	SF		

NOTES:
 1. REFER TO SHEET L105 FOR SITE PLANTING DETAILS & NOTES



CRESTVIEW GREEN SUBDIVISION

TAX LOTS 321601000 & 321600900
 NEWBERG, OREGON

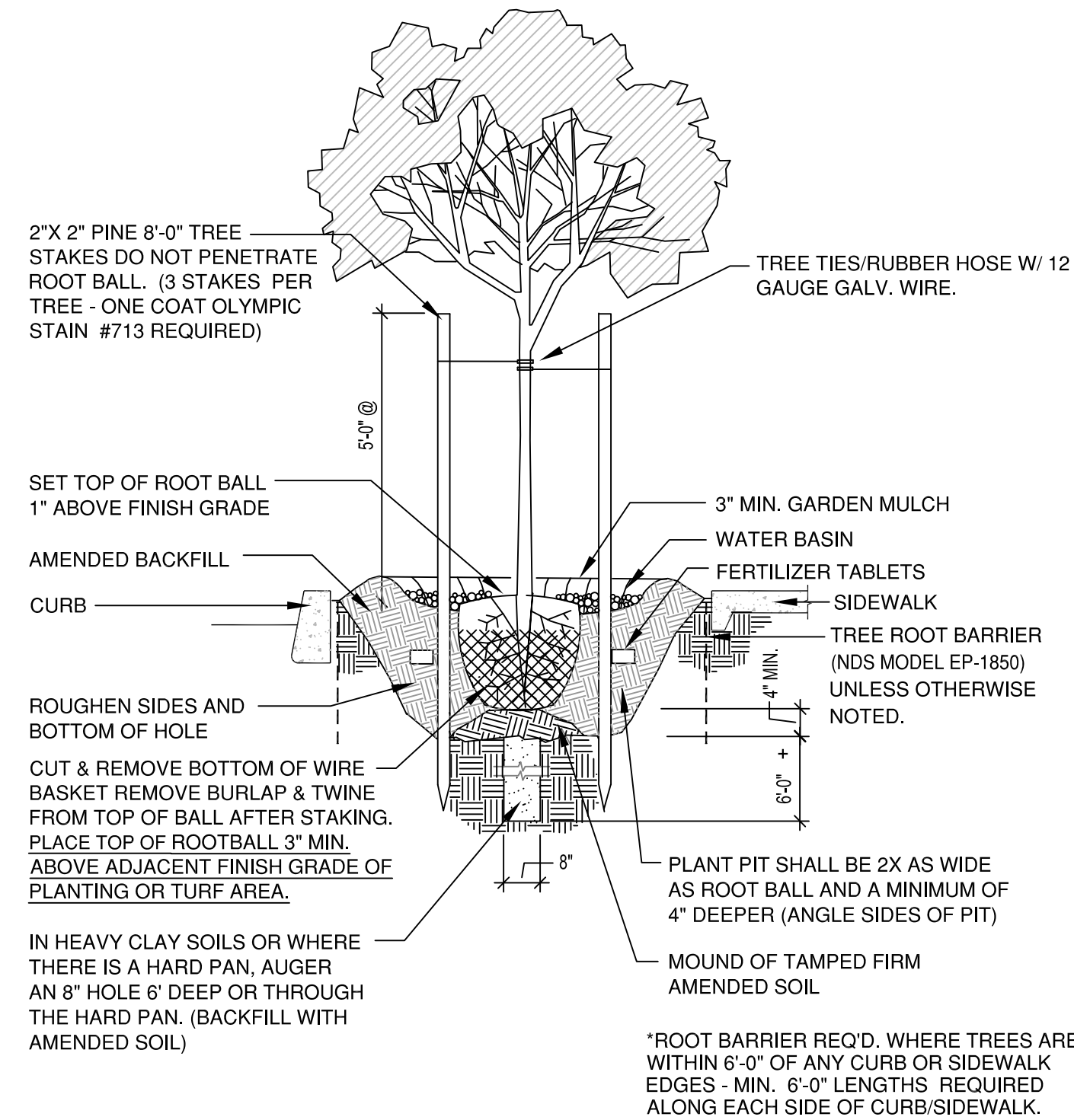
REVISIONS

REV.	DATE	DESCRIPTION

PLANTING PLAN

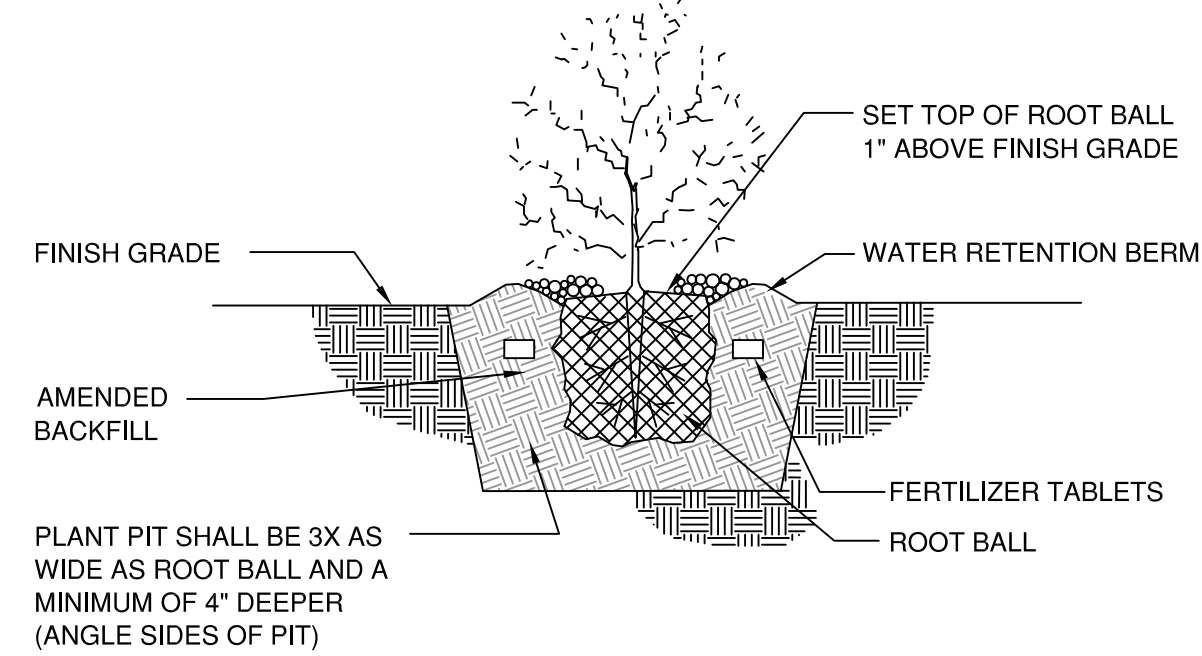
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 CHECKED BY: _____ TM
 ISSUE DATE: 1/11/2022
 JOB NO.: 2144

SHEET:
L104
 OF 5 LAND USE SUBMITTAL



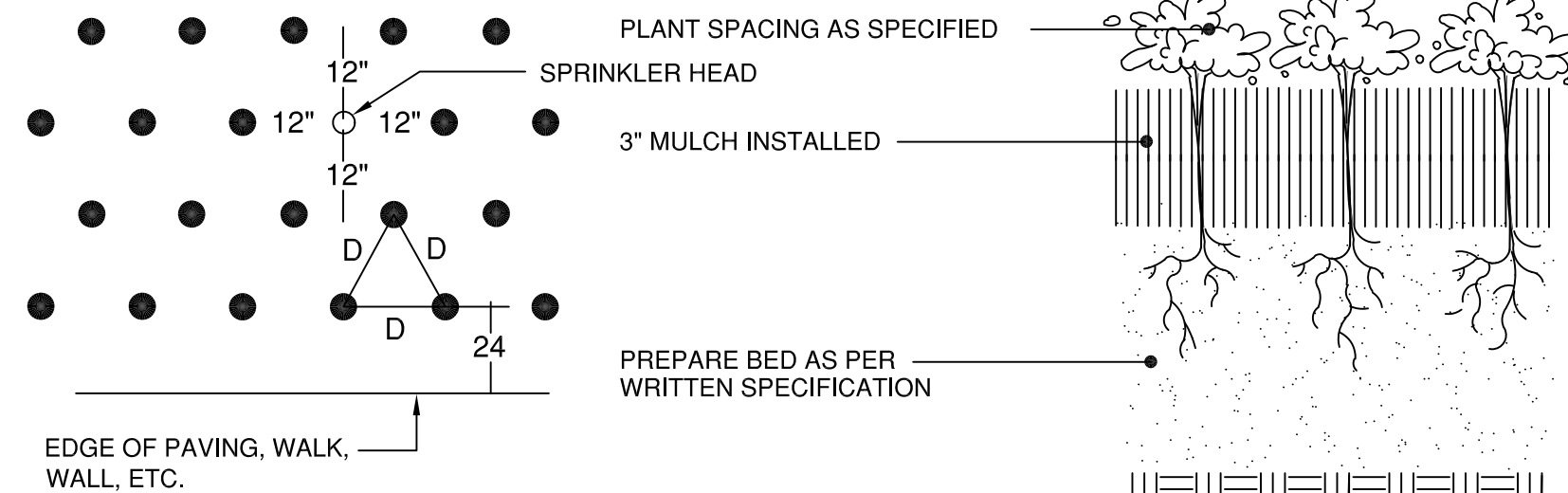
TREE PLANTING DETAIL

N.T.S.



SHRUB PLANTING DETAIL

N.T.S.



NOTE:
LOCATE PLANTS SPACED EQUAL DISTANCE (D)
FROM EACH OTHER AS SPECIFIED AND
MINIMUM OF 12\"/>

GROUND COVER PLANTING DETAIL

N.T.S.

NOTES:

- REFER TO THE CITY PLANNING DEPARTMENT APPROVED STREET TREE PLANTING LIST.
- ROOT BARRIER REQUIRED WHEN HARDSCAPE OR STRUCTURE IS LOCATED WITHIN A 6' RADIUS FROM CENTER OF TREE. ROOT BARRIER TO BE 18" DEEP AND SHALL BE INSTALLED ALONG ALL BOUNDARIES WITH HARDSCAPE e.g. SIDEWALK & CURB.
- LINEAR OR CIRCULAR APPLICATION OF ROOT BARRIER PERMITTED. ROOT BARRIER TO EXTENT AT MINIMUM 24" PAST CENTER OF TREE IN ALL DIRECTIONS OR HAVE A MINIMUM RADIUS OF 24" FOR CIRCULAR APPLICATION. USE CENTURY CP-SERIES ROOTBARRIER PANELS WITH INTERLOCKING JOINTS OR NDS RP SERIES ROOT BARRIER PANELS WITH INTERLOCKING JOINTS. ALL ROOT BARRIER INSTALLATIONS SHALL BE IN CONFORMANCE WITH MANUFACTURERS RECOMMENDATIONS.
- OPPOSITE TREE STAKES, PROVIDE TWO, 3" DIAMETER HDPE PERFORATED PIPE WATERING THROUGH, FILLED WITH CLEAN PEA GRAVEL.
- REMOVE NURSERY STAKES & INSTALL 2" DIAMETER TREATED STAKES, SET OUTSIDE ROOTBALL AND DRIVE A MINIMUM OF 12" INTO UNDISTURBED SOIL BELOW PLANTING HOLE. TRIM STAKE 6" ABOVE HIGHEST TREE TIE TO AVOID INTERFERENCE WITH CANOPY.
- FLEXIBLE NON-ABRASIVE TREE TIE SECURED TO STAKE WITH A NAIL. PLACE TIES 6" ABOVE THE LOWEST POINT ON THE TRUNK WHERE IT CAN BE HELD SUCH THAT THE TOP OF THE TREE SPRINGS BACK TO THE UPRIGHT POSITION WHEN BENT OR DEFLECTED.
- SET CROWN OF ROOTBALL 1-1/2" ABOVE FINISHED GRADE.
- PLANTING HOLE TO BE TWICE THE DIAMETER OF ROOTBALL, WITH ROOTBALL RESTING ON FIRM SOIL. SCARIFY SIDES OF PLANTING HOLE.
- BACKFILL WITH A MIXTURE OF 2/3 NATIVE SOIL AN 1/3 ORGANIC COMPOST. AREAS WITH POOR OR HEAVILY COMPACTED SOIL MAY REQUIRE ADDITIONAL AMENDMENT.

City of Newberg
PUBLIC WORKS ENGINEERING DIVISION
414 E. FIRST STREET NEWBERG, OR 97132
PHONE: 503-537-1240
FAX: 503-537-1277

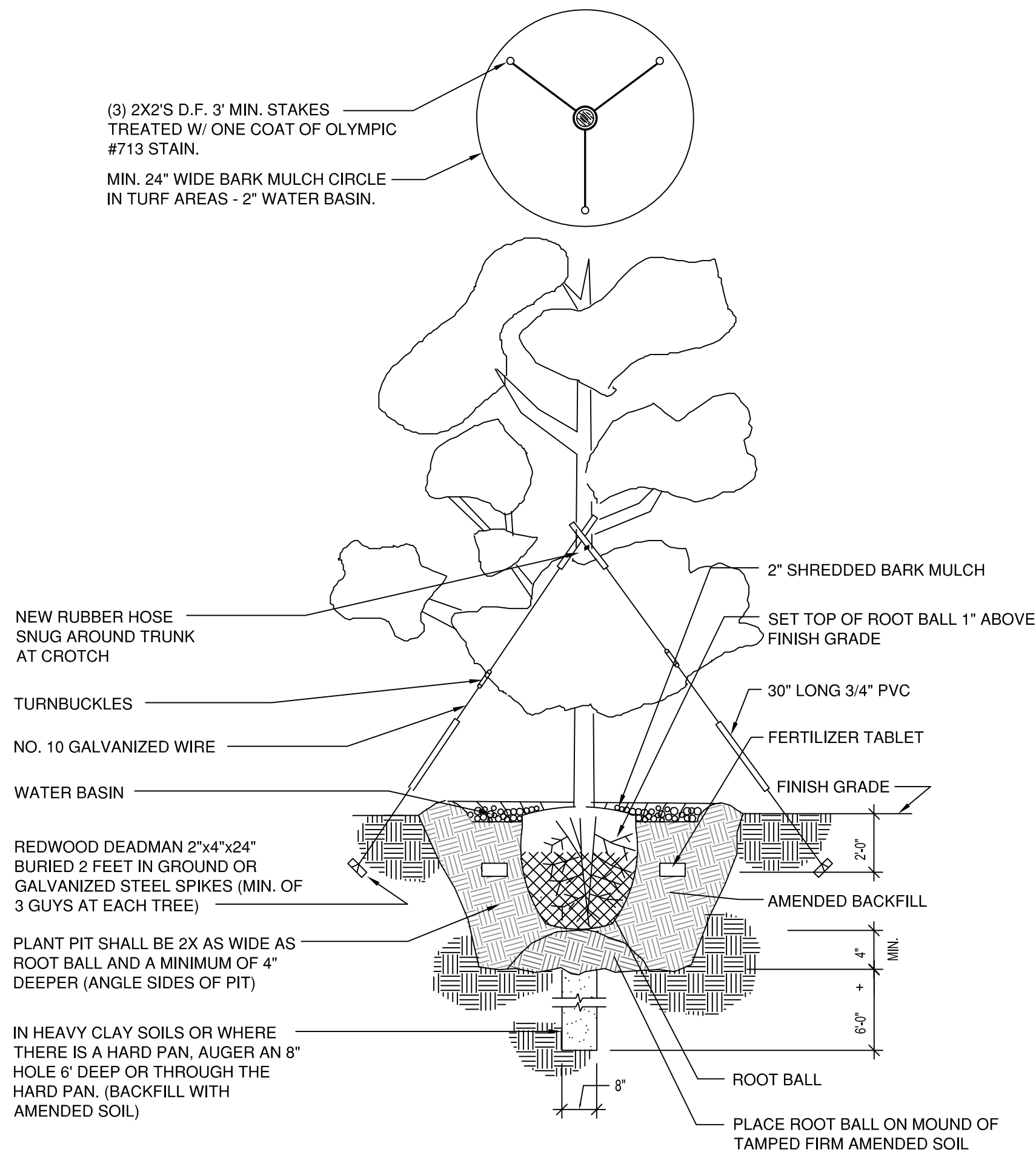
REVISIONS:
MAY 2014

STREET TREE & ROOT BARRIER

SCALE: N.T.S.
DATE: MARCH 2014
APPROVED BY: JAY H.
STANDARD DRAWING: 108

TYPICAL PLANTING NOTES:

- B&B stock may be substituted with container stock of equal grade.
- Container stock may be substituted with B&B stock of equal grade.
- Plant material shall conform with American Standard for Nursery Stock, ANSI Z60.1, 2014 edition.
- All trees shall be branched.
- Refer to project technical specification for topsoil requirement. All planting beds shall have a minimum of 18 inches topsoil. Re-use of existing topsoil is recommended, but must meet specifications.
- Garden mulch all planting beds with 3" min. Layer of specified garden mulch.
- In the event of a discrepancy between this material listing and the drawings, the drawings shall govern the plant species and quantities required.
- In the event of question or lack of clarity on drawings, Landscape Contractor is to call Landscape Architect before proceeding.
- Landscape contractor is to notify Landscape Architect prior to installation of plant material to approve final placement.
- Landscape Contractor to verify plant material quantities.
- Contractor will provide a one year warranty on all provided & installed plant material from date of final approval by owner's representative.



EVERGREEN TREE PLANTING DETAIL

N.T.S.

STORMWATER 'A' - BES SWALE (REFER TO PLANTING DETAILS THIS SHEET)					
	Minimum Species Composition	Plant Category	ZONE	Minimum Rooting Size	Spacing Format
BOTTOM					
POND BOTTOM 12,380 SQ FT					
Common Name (Botanical name)					
HERBACEOUS					
Slough Sedge (<i>Carex obnupta</i>)	3560	Herb	A	1/2 Gal.	1' o.c.
Creeping Spike Rush (<i>Eleocharis palustris</i>)	3559	Herb	A	1/2 Gal.	1' o.c.
Spreading Rush (<i>Juncus patens</i>)	3559	Herb	A	1/2 Gal.	1' o.c.
Small Fruited Bulrush (<i>Scirpus microcarpus</i>)	3559	Herb	A	1/2 Gal.	1' o.c.
Total Herbaceous Plants	14,237				
SIDE SLOPES					
UPLAND ZONE INTERIOR SIDE SLOPES 11,750 SQ FT					
Common Name (Botanical name)					
TREES					
Red Alder (<i>Alnus rubra</i>)	19	Tree	A/B	1.5" Cal.	Single
Cascara (<i>Rhamnus purshiana</i>)	21	Tree	A	1.5" Cal.	Single
Hogan Cedar (<i>Thuja plicata 'Hogan'</i>)	19	Tree	A/B	6-7"	Single
Total Tree	59				
LG. SHRUBS					
Indian Plum (<i>Oemleria cerasiformis</i>)	118	Shrub	A/B	3 gal.	4' o.c.
Salmonberry (<i>Rubus spectabilis</i>)	118	Shrub	A/B	3 gal.	4' o.c.
Douglas Spiraea (<i>Spiraea douglasii</i>)	117	Shrub	A/B	3 gal.	4' o.c.
Total Shrubs	353				
SM. SHRUBS					
Kelsey Dogwood (<i>Cornus sericea 'Kelseyii'</i>)	118	Shrub	B	1 gal.	2' o.c.
Oregon grape (<i>Mahonia aquifolium</i>)	118	Shrub	A/B	1 gal.	2' o.c.
Nootka Rose (<i>Rosa nutkana</i>)	117	Shrub	A/B	1 gal.	2' o.c.
Common Snowberry (<i>Symphoricarpos alba</i>)	117	Shrub	B	1 gal.	2' o.c.
Total Shrubs	470				
G.C.					
Kinnickinnick (<i>Arctostaphylos uva-ursi</i>)	4113	G.C.	B	1 gal.	12" o.c.
Coastal Strawberry (<i>Fragaria chiloensis</i>)	4112	G.C.	B	1 gal.	12" o.c.
Total Ground Cover	8225				



CRESTVIEW GREEN SUBDIVISION

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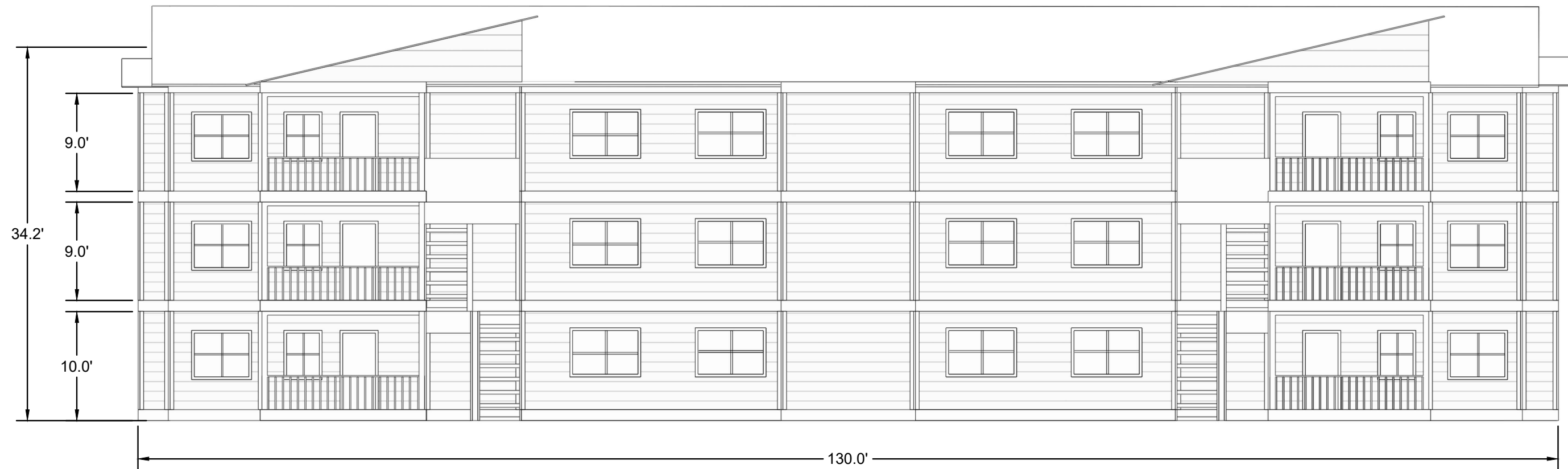
REVISIONS		
REV.	DATE	DESCRIPTION

SHEET NAME:
PLANTING PLAN

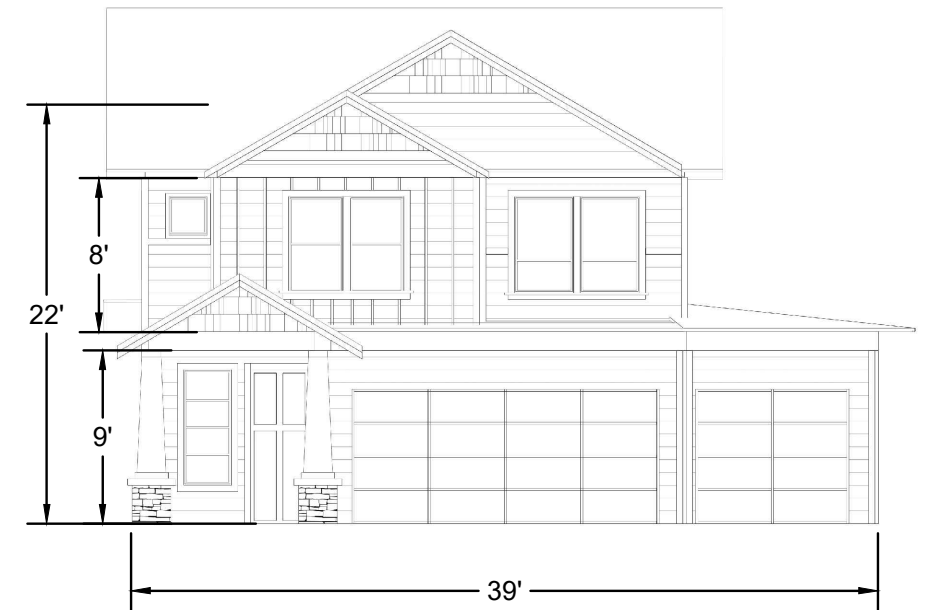
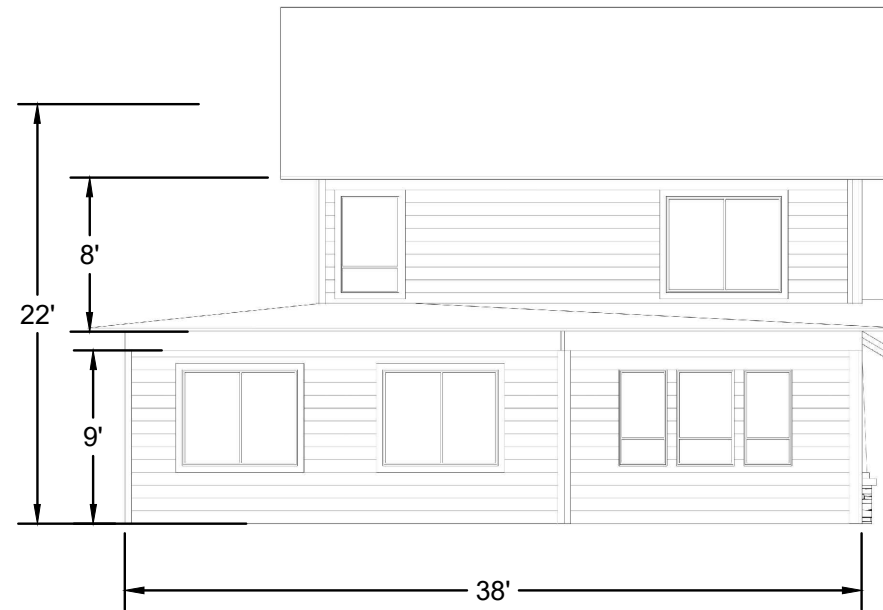
DRAWN BY: _____ TM
CHECKED BY: _____ TM
ISSUE DATE: 1/11/2022
JOB NO.: 2144

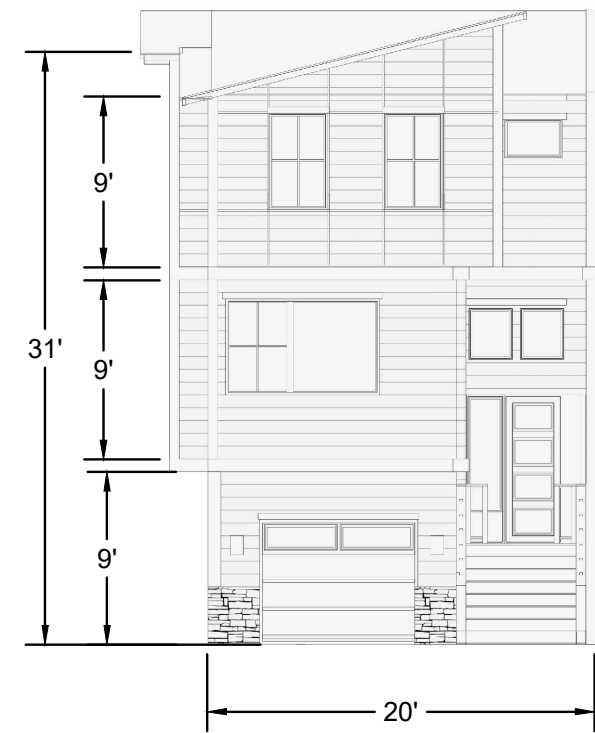
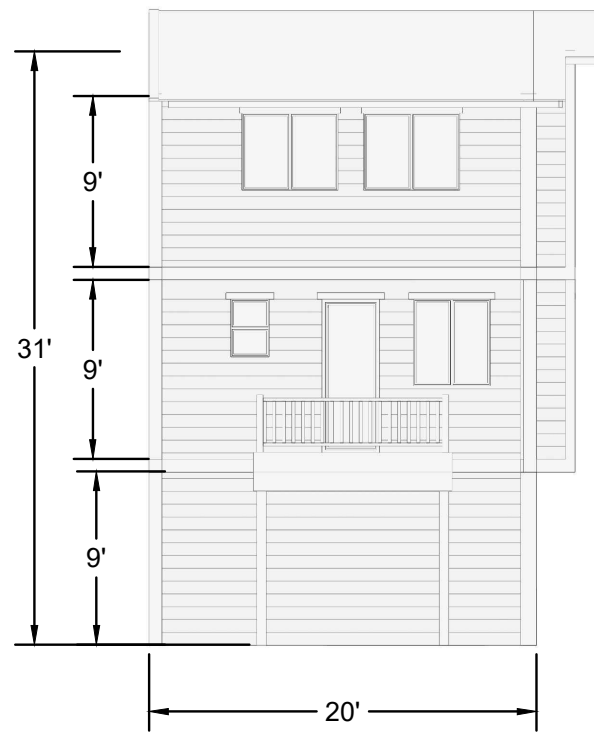
SHEET:
L105
OF 5
LAND USE SUBMITTAL











STREET FACING FACADE GLAZING AREA	
FRONT ELEVATION AREA (PER UNIT)	648 SF
FRONT GLAZING AREA (PER UNIT)	134 SF
PERCENT GLAZING (FRONT)	20.6%
STREET SIDE ELEVATION AREA	1,373 SF
STREET SIDE GLAZING AREA	99 SF
PERCENT GLAZING (STREET SIDE)	7.20%



2-PLEX TOWNHOUSE - TYPICAL FRONT ELEVATION



2-PLEX TOWNHOUSE - TYPICAL SIDE ELEVATION

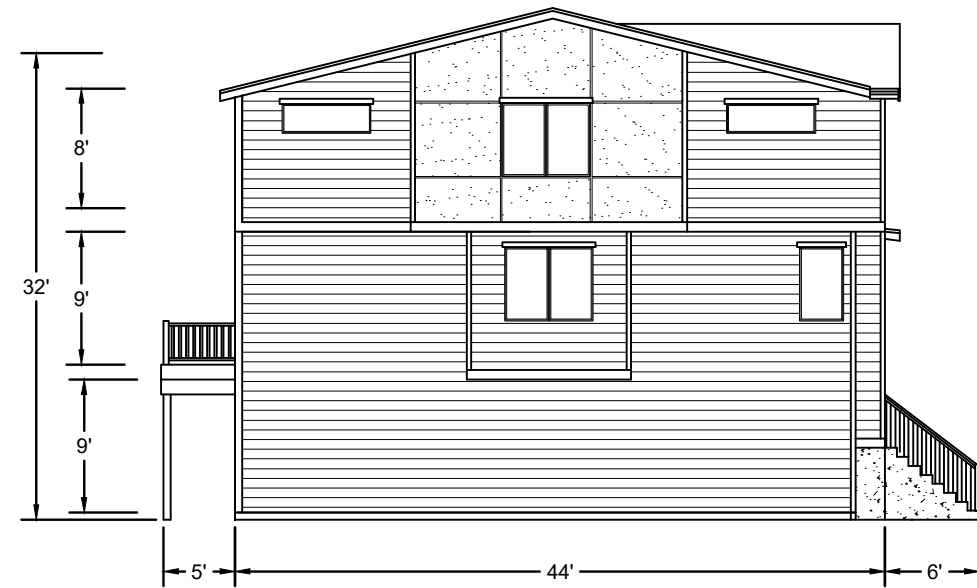


2-PLEX TOWNHOUSE - TYPICAL REAR ELEVATION

STREET FACING FACADE GLAZING AREA	
FRONT ELEVATION AREA (PER UNIT)	608 SF
FRONT GLAZING AREA (PER UNIT)	134 SF
PERCENT GLAZING (FRONT)	22.0%
STREET SIDE ELEVATION AREA	1,373 SF
STREET SIDE GLAZING AREA	99 SF
PERCENT GLAZING (STREET SIDE)	7.20%



4-PLEX TOWNHOUSE - TYPICAL FRONT ELEVATION

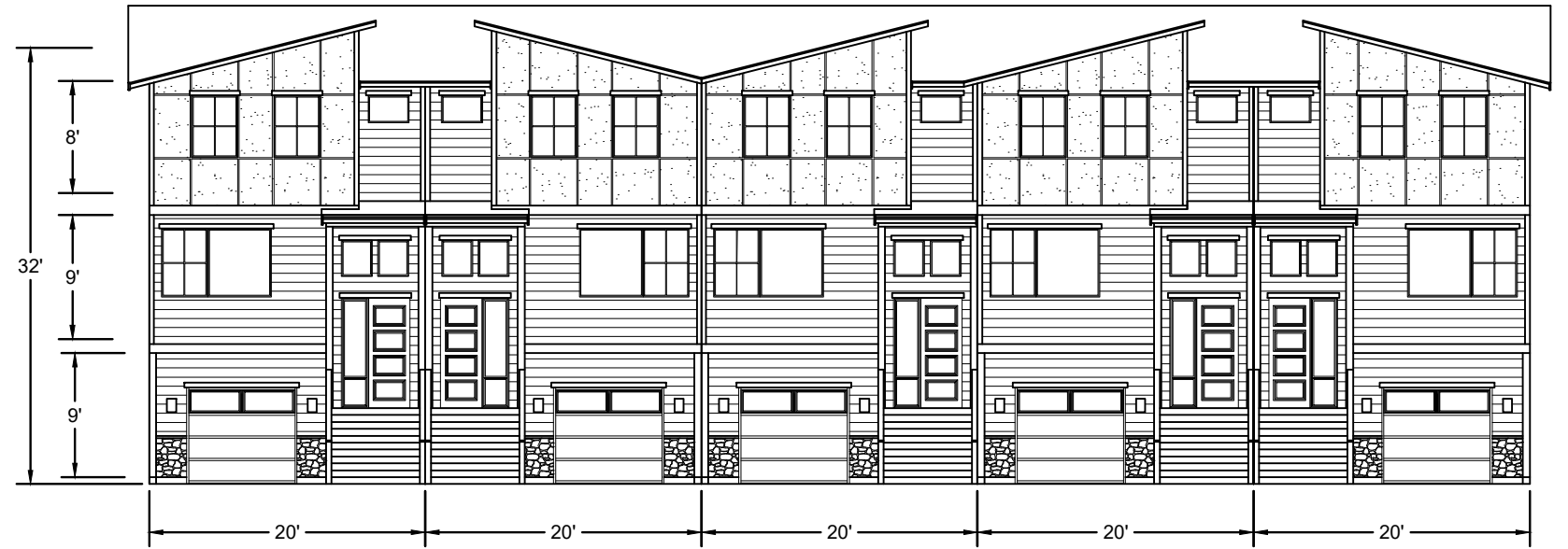


4-PLEX TOWNHOUSE - TYPICAL SIDE ELEVATION

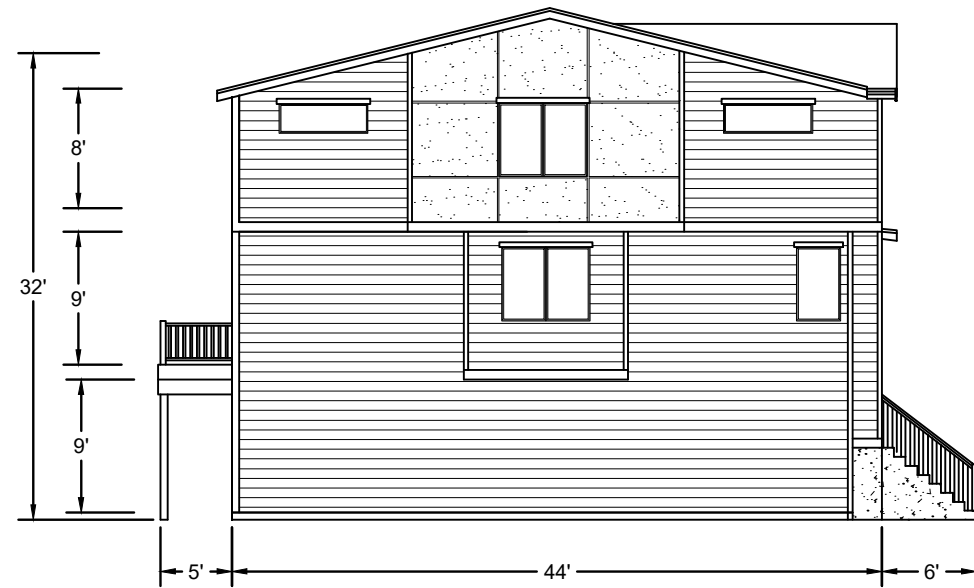


4-PLEX TOWNHOUSE - TYPICAL REAR ELEVATION

STREET FACING FACADE GLAZING AREA	
FRONT ELEVATION AREA (PER UNIT)	648 SF
FRONT GLAZING AREA (PER UNIT)	134 SF
PERCENT GLAZING (FRONT)	20.6%
STREET SIDE ELEVATION AREA	1,373 SF
STREET SIDE GLAZING AREA	99 SF
PERCENT GLAZING (STREET SIDE)	7.20%



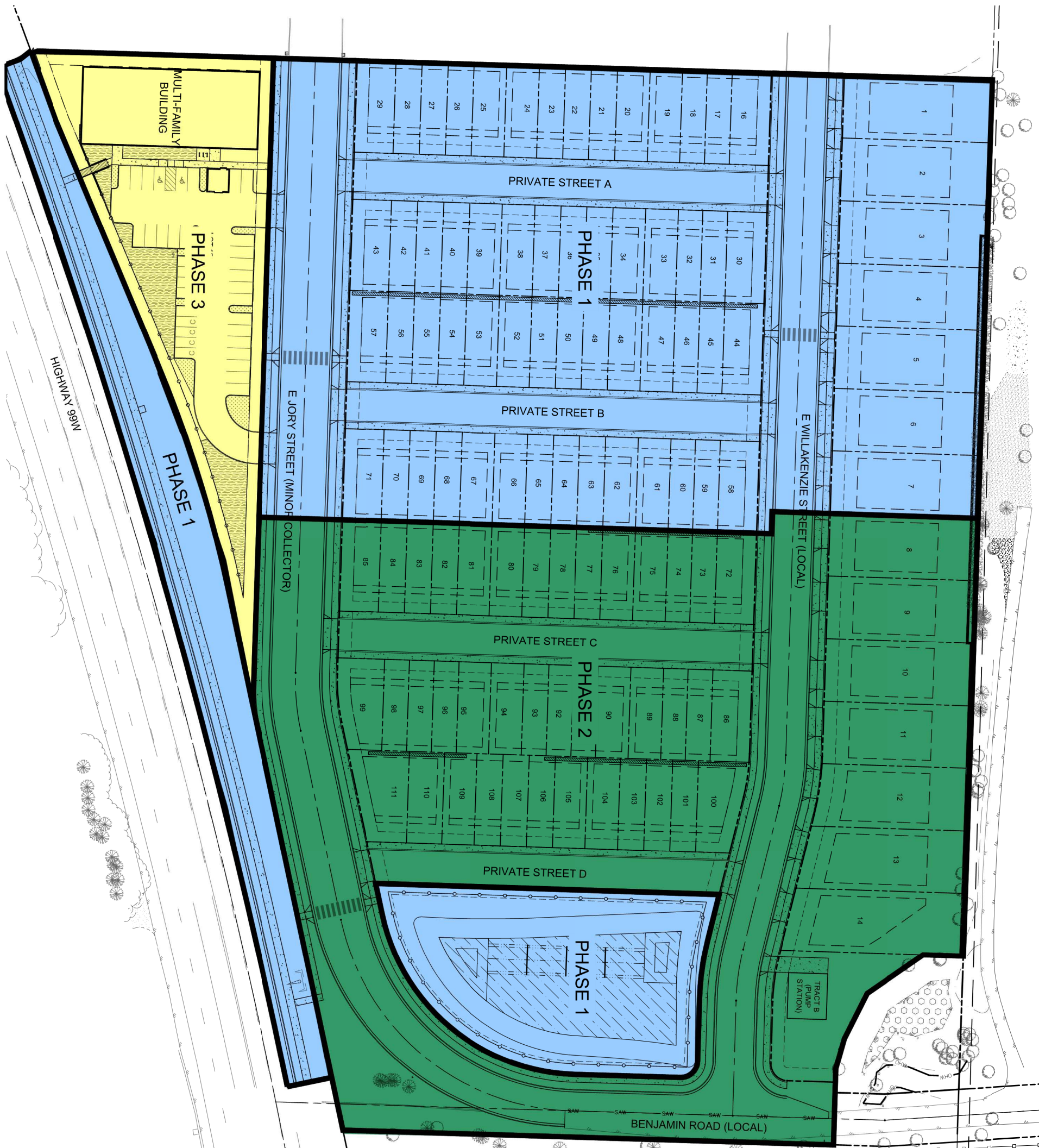
5-PLEX TOWNHOUSE - TYPICAL FRONT ELEVATION



5-PLEX TOWNHOUSE - TYPICAL SIDE ELEVATION



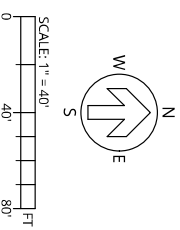
5-PLEX TOWNHOUSE - TYPICAL REAR ELEVATION



LEGEND

	EXISTING WETLANDS
	PROPOSED LOT LINE
	PROPOSED RIGHT OF WAY
	PROPOSED CENTERLINE
	PROPOSED SETBACK LINE
	PROPOSED CURB AND GUTTER
	PROPOSED CONCRETE
	PROPOSED BUILDING LINE
	PROPOSED FENCE
	PROPOSED MAJOR CONTOUR
	PROPOSED MINOR CONTOUR
	PROPOSED DETENTION POND
	PROPOSED RETAINING WALL
	PROPOSED SOUND WALL
	PROPOSED SAWCUT LINE

PHASE	TOTAL ACRES
PHASE 1	5.82
PHASE 2	4.70
PHASE 3	0.95



PROJECT INFORMATION
 34 PROJECT # | 21701
 TAX LOTS | 3252116 890, 1000
 LAND USE # | 1700
 DESIGNED BY | JMF, SRC, JGW
 CHECKED BY | JJS

SHEET NUMBER
C201

PHASING PLAN
CRESTVIEW GREEN
PLANNED UNIT DEVELOPMENT
 WESTWOOD HOMES LLC
 NEWBERG, OR

PRELIMINARY
 REGISTERED PROFESSIONAL ENGINEER
 9246 N.W. 117th St.
 T.L. PROSSER, INC.
 Expires: 06/30/22

PUBLISH DATE
 02/10/2022
 ISSUED FOR
 LAND USE DOCUMENTS
 REVISIONS



AmeriTitle, LLC
320 Church St. NE, Salem, OR 97301
PHONE (503)581-1431 FAX (503)364-8716

December 1, 2021
File Number: 444582AM
Report No.: 2
Title Officer: Jennifer Rush

PRELIMINARY TITLE REPORT

Property Address: 4813 E Portland Road, Newberg, OR 97132

Policy or Policies to be issued:

OWNER'S STANDARD COVERAGE

Proposed Insured: **Westwood Homes, LLC, an Oregon limited liability company**

Liability

\$2,200,000.00

Premium

\$3,900.00

Local Government Lien Search

\$40.00

We are prepared to issue ALTA (06/17/06) title insurance policy(ies) of WFG National Title Insurance Company, in the usual form insuring the title to the land described as follows:

Legal description attached hereto and made a part hereof marked Exhibit "A"

and dated as of 22nd day of November, 2021 at 7:30 a.m., title is [vested in](#):

The unknown successor trustee of the Richard D. Kimball Trust date July 18, 2014

The estate or interest in the land described or referred to in this Preliminary Title Report and covered herein is:

FEE SIMPLE

Except for the items properly cleared through closing, Schedule B of the proposed policy or policies will not insure against loss or damage which may arise by reason of the following:

GENERAL EXCEPTIONS:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
2. Facts, rights, interests or claims which are not shown by the Public Records but which could be ascertained by an inspection of the Land or by making inquiry of persons in possession thereof.
3. Easements, or claims of easement, not shown by the Public Records; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.
4. Any encroachment (of existing improvements located on the subject Land onto adjoining Land or of existing improvements located on adjoining Land onto the subject Land) encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the subject Land.
5. Any lien, or right to a lien, for services, labor, material, equipment rental, or workers compensation heretofore or hereafter furnished, imposed by law and not shown by the Public Records.

EXCEPTIONS 1 THROUGH 5 ABOVE APPLY TO STANDARD COVERAGE POLICIES AND MAY BE MODIFIED OR ELIMINATED ON AN EXTENDED COVERAGE POLICY.

SPECIAL EXCEPTIONS:

Tax Information:

Taxes assessed under Code No. 29.0 Account No. 29089 Map No. 3S2W16 01000

NOTE: The 2021-2022 Taxes: \$4,292.52, are Paid

6. Taxes deferred, as disclosed by the tax roll, the premises herein described have been zoned or classified for farm use. At any time that said Land is disqualified for such use the property will be subject to additional taxes or penalties and interest.
7. City liens, if any, of the City of Newberg.
8. The property lies within and is subject to the levies and assessments of the Yamhill Soil and Water Conservation District.
9. The rights of the public in and to that portion of the herein described property lying within the limits of public roads, streets or highways.
10. Covenant of Waiver of Rights and Remedies, including the terms and provisions thereof,
Recorded: January 31, 2007
Instrument No.: [2007-002372](#)
11. Covenant of Waiver of Rights and Remedies, including the terms and provisions thereof,
Recorded: January 31, 2007
Instrument No.: [2007-002373](#)
12. Covenant of Waiver of Rights and Remedies, including the terms and provisions thereof,
Recorded: June 13, 2008
Instrument No.: [2008-010247](#)

13. We have been advised that Richard Kimball is deceased. The Company will require a certified copy of the death certificate be recorded in Yamhill County Records prior to closing. If the decedent died subsequent to January 1, 2014 in Oregon, the death certificate must be short form (no medical information) in order to be accepted for recording in Oregon.
14. The Company will require a copy of the Richard D Kimball Trust dated July 18, 2014 Trust Agreement and all amendments thereto be furnished for our review prior to closing to determine the identity and powers of the Trustee(s) under said agreement.

The Company reserves the right to add additional items or make further requirements after review of the requested documentation.

15. Personal property taxes, if any.
16. Rights of tenants under existing leases or tenancies.
17. The Company will require a copy of the Operating Agreement (including any approvals of withdrawal of member(s) or acceptance of new member(s)) and the Articles of Organization of Westwood Homes LLC for its examination prior to closing. Any conveyance or encumbrance of the Limited Liability Company's property must be executed by all of the members unless otherwise provided for in the Operating Agreement.

The Company reserves the right to add additional items or make further requirements after review of the requested documentation.

INFORMATIONAL NOTES:

NOTE: As of the date hereof, there are no matters against the party(ies) shown below which would appear as exceptions to coverage in a title insurance product:

Parties:

Westwood Homes LLC

NOTE: This report does not include a search for financing statements filed in the office of the Secretary of State in this or any other State, or in a county other than the county wherein the premises are situated, and no liability is assumed if a financing statement is filed in the office of the County Clerk (Recorder) covering growing crops or fixtures on the premises wherein the lands are described other than by metes and bounds or under the rectangular survey system.

NOTE: Our examination of the title to the subject property discloses no open Deeds of Trust or Mortgages of record. The accuracy of this conclusion should be confirmed in writing prior to closing of the proposed transaction.

NOTE: This report does not include a search for financing statements filed in the office of the Secretary of State in this or any other State, or in a county other than the county wherein the premises are situated, and no liability is assumed if a financing statement is filed in the office of the County Clerk (Recorder) covering growing crops or fixtures on the premises wherein the lands are described other than by metes and bounds or under the rectangular survey system.

NOTE: THIS IS A TITLE ONLY ORDER, and as such this office will not be performing any escrow functions such as document preparation, wiring or payoff information, signings, closing protection letters and/or sub-escrows. For questions pertaining to your escrow,
Please contact: WFG National Title- Krista Thorne
Address: 2430 NE John Olsen Ave Ste. 125 Beaverton OR 97006
Reference: 21-136630

(If full escrow functions are needed on this transaction by this office, please contact us immediately.) (To release recordings for title only files, please contact our recording desk at (503)581-1431 or email SalemRecorder@AmeriTitle.com)

NOTE: We find no activity in the past 24 months regarding transfer of title to subject property.

NOTE: The following is the last deed of record affecting said land,

Document: Bargain and Sale Deed

Grantor: Richard D Kimball

Grantee: Richard D Kimball, Trustee or his successor Trustee, of the Richard D Kimball Trust dated July 18, 2014

Recorded: July 13, 2015

Instrument No.: 2015-10316

Rerecorded: November 30, 2015

Instrument No.: 2015-18573

NOTE: This Report No. 2 was updated to reflect the following changes:

1. Updated the taxes
2. Updated the effective date

NOTE: Any map or sketch enclosed as an attachment herewith is furnished for information purposes only to assist in property location with reference to streets and other parcels. No representation is made as to accuracy and the company assumes no liability for any loss occurring by reason of reliance thereon.

NOTE: Your application for title insurance was placed by reference to only a street address or tax identification number. Based on our records, we believe that the legal description in this report covers the parcel(s) of Land that you requested. If the legal description is incorrect, the parties to the transaction must notify the Company and/or the settlement company in order to prevent errors and to be certain that the correct parcel(s) of Land will appear on any documents to be recorded in connection with this transaction and on the policy of title insurance.

NOTE: Due to current conflicts or potential conflicts between state and federal law, which conflicts may extend to local law, regarding marijuana, if the transaction to be insured involves property which is currently used or is to be used in connection with a marijuana enterprise, including but not limited to the cultivation, storage, distribution, transport, manufacture, or sale of marijuana and/or products containing marijuana, the Company declines to close or insure the transaction, and this Preliminary Title Report shall automatically be considered null and void and of no force and effect.

THIS PRELIMINARY TITLE REPORT IS NOT AN ABSTRACT OF TITLE, REPORT OF THE CONDITION OF TITLE, LEGAL OPINION, OPINION OF TITLE, OR OTHER REPRESENTATION OF THE STATUS OF TITLE. THE PROCEDURES USED BY THE COMPANY TO DETERMINE INSURABILITY OF THE TITLE, INCLUDING ANY SEARCH AND EXAMINATION, ARE PROPRIETARY TO THE COMPANY, WERE PERFORMED SOLELY FOR THE BENEFIT OF THE COMPANY, AND CREATE NO EXTRACTIONAL LIABILITY TO ANY PERSON, INCLUDING A PROPOSED INSURED.

This report is preliminary to the issuance of a policy of title insurance and shall become null and void unless a policy is issued and the full premium paid.

End of Report

"Superior Service with Commitment and Respect for Customers and Employees"

EXHIBIT "A"
LEGAL DESCRIPTION

Beginning at an iron pipe 1541 feet South 89°57' East from the Southwest corner of the Benjamin Heater Donation Land Claim in Section 16, Township 3 South, Range 2 West of the Willamette Meridian in Yamhill County, Oregon, thence South 89°57' East along the South line of said Claim 373.3 feet, more or less, to an iron pipe set in County Survey #2795; thence South 00°36' East 612.8 feet to the center line of the West side Pacific Highway, thence South 71°11' West along the center line of said Highway 85.7 feet; thence South 67°36' West along the center line of said Highway 50.3 feet; thence South 65°30' West along the center line of said Highway 276.5 feet to the Southeast corner of Lot #2 of said survey #2795; thence North 774.4 feet to the place of beginning.

EXCEPTING THEREFROM premises sold and conveyed to the State of Oregon by and through its State Highway Commission by deed recorded April 8, 1935 in Book 110, Page 221, Deed and Mortgage Records of Yamhill County, Oregon.



AmeriTitle, LLC
320 Church St. NE, Salem, OR 97301
PHONE (503)581-1431 FAX (503)364-8716

December 1, 2021
File Number: 444574AM
Report No.: 4
Title Officer: Julie Lafoon

PRELIMINARY TITLE REPORT

Property Address: 4821 E Portland Road, Newberg, OR 97132

Policy or Policies to be issued:

OWNER'S STANDARD COVERAGE

Proposed Insured: **Westwood Homes, LLC, an Oregon limited liability company**

Liability

\$2,100,000.00

Premium

\$3,750.00

Local Government Lien Search

\$40.00

We are prepared to issue ALTA (06/17/06) title insurance policy(ies) of WFG National Title Insurance Company, in the usual form insuring the title to the land described as follows:

Legal description attached hereto and made a part hereof marked Exhibit "A"

and dated as of 22nd day of November, 2021 at 7:30 a.m., title is [vested in:](#)

Bruce A. Thomas and Valerie J. Thomas, as tenants by the entirety

The estate or interest in the land described or referred to in this Preliminary Title Report and covered herein is:

FEE SIMPLE

Except for the items properly cleared through closing, Schedule B of the proposed policy or policies will not insure against loss or damage which may arise by reason of the following:

GENERAL EXCEPTIONS:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
2. Facts, rights, interests or claims which are not shown by the Public Records but which could be ascertained by an inspection of the Land or by making inquiry of persons in possession thereof.
3. Easements, or claims of easement, not shown by the Public Records; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.
4. Any encroachment (of existing improvements located on the subject Land onto adjoining Land or of existing improvements located on adjoining Land onto the subject Land) encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the subject Land.
5. Any lien, or right to a lien, for services, labor, material, equipment rental, or workers compensation heretofore or hereafter furnished, imposed by law and not shown by the Public Records.

EXCEPTIONS 1 THROUGH 5 ABOVE APPLY TO STANDARD COVERAGE POLICIES AND MAY BE MODIFIED OR ELIMINATED ON AN EXTENDED COVERAGE POLICY.

SPECIAL EXCEPTIONS:

Tax Information:

Taxes assessed under Code No. 29.0 Account No. 29070 Map No. R3216 900

NOTE: The 2021-2022 Taxes: \$3,381.00, are Paid

6. INTENTIONALLY DELETED.
7. City liens, if any, of the City of Newberg.
8. The property lies within and is subject to the levies and assessments of the Yamhill Soil and Water Conservation District.
9. The rights of the public in and to that portion of the herein described property lying within the limits of public roads, streets or highways.
10. A Deed of Trust, including the terms and provisions thereof, to secure the amount noted below and other amounts secured thereunder, if any:
Amount: \$94,500.00
Trustor/Grantor: Bruce A. Thomas and Valerie J. Thomas
Trustee: Chicago Title Insurance Company
Beneficiary: First Franklin Financial Corporation
Dated: July 12, 1995
Recorded: July 21, 1995
Instrument No.: [1995-009522](#)

The beneficial interest under said Deed of Trust was assigned by successive assignments of record the last of which was assigned to Ocwen Loan Servicing LLC, by assignment recorded as Instrument No.: [2013-013294](#)
11. Covenant of Waiver of Rights and Remedies, including the terms and provisions thereof,
Recorded: January 31, 2007
Instrument No.: [2007-002368](#)

12. Covenant of Waiver of Rights and Remedies, including the terms and provisions thereof,
Recorded: January 31, 2007
Instrument No.: [2007-002369](#)
13. Covenant and Waiver of Rights and Remedies, including the terms and provisions thereof,
Recorded: January 31, 2007
Instrument No.: [2007-002370](#)
14. Covenant of Waiver of Rights and Remedies, including the terms and provisions thereof,
Recorded: January 31, 2007
Instrument No.: [2007-002371](#)
15. Covenant and Waiver of Rights and Remedies, including the terms and provisions thereof,
Recorded: June 13, 2008
Instrument No.: [2008-010249](#)
16. Covenant of Waiver and Rights of Remedies, including the terms and provisions thereof,
Recorded: June 13, 2008
Instrument No.: [2008-010250](#)
17. Personal property taxes, if any.
18. Sale Agreement, including the terms and provisions thereof,
Recorded: December 7, 2015
Instrument No.: [2015-018954](#)
Between: Valerie Thomas
And: Bruce Thomas
19. INTENTIONALLY DELETED.
20. INTENTIONALLLY DELETED.
21. INTENTIONALLY DELETED.
22. Unrecorded leaseholds, if any, and the rights of vendors and holders of security interest in personal property of tenants to remove said personal property at the expiration of the term.
23. Rights of tenants under existing leases or tenancies.

INFORMATIONAL NOTES:

NOTE: THIS IS A TITLE ONLY ORDER, and as such this office will not be performing any escrow functions such as document preparation, wiring or payoff information, signings, closing protection letters and/or sub-escrows. For questions pertaining to your escrow,
Please contact: WFG National Title
Attn: Krista Thorne:
Address: 2430 NE John Olsen Avenue, Ste. 125, Beaverton, OR 97006
Reference: 21-136607

(If full escrow functions are needed on this transaction by this office, please contact us immediately.) (To release recordings for title only files, please contact our recording desk at (503)581-1431 or email SalemRecorder@amerititle.com)

NOTE: As of the date hereof, there are no matters against the party(ies) shown below which would appear as exceptions to coverage in a title insurance product:

Parties:

Westwood Homes, LLC, an Oregon Corporation
Valerie J. Thomas
Bruce A. Thomas

NOTE: We find no activity in the past 24 months regarding transfer of title to subject property.

NOTE: The following is the last deed of record affecting said land,
Document: Statutory Warranty Deed
Grantor: Lloyd Schoene
Grantee: Bruce A. Thomas and Valerie J. Thomas, husband and wife
Recorded: July 21, 1995
Instrument No.: 1995-009521

NOTE: This Report No. 4 was updated to reflect the following changes:
1. Bring Current
2. Add Taxes Paid
3. Delete Exceptions 19, 20 and 21

NOTE: Any map or sketch enclosed as an attachment herewith is furnished for information purposes only to assist in property location with reference to streets and other parcels. No representation is made as to accuracy and the company assumes no liability for any loss occurring by reason of reliance thereon.

NOTE: Your application for title insurance was placed by reference to only a street address or tax identification number. Based on our records, we believe that the legal description in this report covers the parcel(s) of Land that you requested. If the legal description is incorrect, the parties to the transaction must notify the Company and/or the settlement company in order to prevent errors and to be certain that the correct parcel(s) of Land will appear on any documents to be recorded in connection with this transaction and on the policy of title insurance.

NOTE: Due to current conflicts or potential conflicts between state and federal law, which conflicts may extend to local law, regarding marijuana, if the transaction to be insured involves property which is currently used or is to be used in connection with a marijuana enterprise, including but not limited to the cultivation, storage, distribution, transport, manufacture, or sale of marijuana and/or products containing marijuana, the Company declines to close or insure the transaction, and this Preliminary Title Report shall automatically be considered null and void and of no force and effect.

THIS PRELIMINARY TITLE REPORT IS NOT AN ABSTRACT OF TITLE, REPORT OF THE CONDITION OF TITLE, LEGAL OPINION, OPINION OF TITLE, OR OTHER REPRESENTATION OF THE STATUS OF TITLE. THE PROCEDURES USED BY THE COMPANY TO DETERMINE INSURABILITY OF THE TITLE, INCLUDING ANY SEARCH AND EXAMINATION, ARE PROPRIETARY TO THE COMPANY, WERE PERFORMED SOLELY FOR THE BENEFIT OF THE COMPANY, AND CREATE NO EXTRACTIONAL LIABILITY TO ANY PERSON, INCLUDING A PROPOSED INSURED.

This report is preliminary to the issuance of a policy of title insurance and shall become null and void unless a policy is issued and the full premium paid.

End of Report

"Superior Service with Commitment and Respect for Customers and Employees"

EXHIBIT "A"
LEGAL DESCRIPTION

Part of the Sebastian Brutscher Donation Land Claim No. 51 in Township 3 South of Range 2 West of the Willamette Meridian in Yamhill County, Oregon, as follows:

Beginning 11.50 chains West at the Northeast corner of said claim, at the Northwest corner of land conveyed to William C. Everest by Deed recorded May 6, 1865, in Book "G", Page 496, Deed Records; thence South along the West line of said Everest Tract to the Northerly right of way line of U.S. Highway 99W as shown by Deed from W.T. West to Yamhill County, Oregon, recorded December 2, 1922, Book 87, Page 69, Deed Records; thence Westerly along said right of way to the East line of land conveyed to Caroline Hutchens by Deed recorded October 3, 1891, Book 26, Page 129, Deed Records; thence North along East line of said Hutchens Tract to the North line of the Sebastian Brutscher Claim and thence East 6.56 chains to the place of beginning.

AFTER RECORDING RETURN TO:

City of Newberg
Community Development Department
PO Box 970 – (414 E. First Street)
Newberg, OR 97132

COVENANT OF WAIVER OF RIGHTS AND REMEDIES

Recitals

- 1) The undersigned, Richard D. Kimball Trustee and Danna Kemp trustee (hereinafter referred to as "Owner" or "Owners") has/have petitioned the City of Newberg (hereinafter referred to as "City") to commence certain proceedings, relating to Crestview Green PUD, for the real property described in **Exhibit A** which is attached hereto and incorporated herein.
- 2) Pursuant to the enactment of **Ballot Measure 49** (adopted November 6, 2007), if a public entity enacts one or more land use regulations that restrict the residential use of private real property or a farming or forest practice and that reduce the fair market value of the property, then the owner of the property shall be entitled to just compensation from the public entity that enacted the land use regulation or regulations as provided in Measure 49.
- 3) There is the potential that the Oregon electors or the Oregon Legislature may, in the future, enact further statutory or constitutional amendments relating to compensation for the impact of local regulations upon real property, under certain circumstances.
- 4) City does not wish to approve the Owner's/Owners' requested proceedings if the result would or could arguably give rise to a later claim by the Owner or Owners, or the Owner's/Owners' successors or assigns for compensation for the land use regulations in effect upon the effective date of the proceedings, or would or could arguably require the City to waive the City's land use regulations in effect upon the effective date of the proceedings, which are being newly imposed upon the property by reason and result of the proceedings.
- 5) Owner(s) seek(s) to induce the City to proceed with the proceedings and therefore Owner(s) agree(s) to eliminate the potential of claim for compensation or the right to seek waiver from the City's land use regulations existing as of the effective date of the proceedings.

NOW THEREFORE, the undersigned Owner(s) warrant(s) that the Owner(s) executing this covenant hold(s) the full and complete present ownership or any interest therein in the property, and hereby agree(s) and covenant(s) as follows:

- 1) As inducement to the City to proceed with the following proceeding(s) affecting the subject real property: 4813 E Portland Road, which may include designation of the property as subject to additional applicable overlay zones and districts, e.g., Limited Use Overlay District, (all inclusively referred to herein as "proceedings"), the undersigned Owner(s), on behalf of Owner(s), Owner's/Owners' heirs, devisees, executors, administrators, successors and assigns, agree(s) and covenant(s) to the City of Newberg, its officers, agents, employees and assigns that the undersigned hereby remises, waives, releases and forever discharges, and agrees that Owner(s) shall be estopped from asserting any rights and remedies, actions, causes of action, suits, claims, liabilities, demands, and rights to waivers arising under or granted by any statutory or constitutional regulatory compensation or waiver provisions, including but not limited to Ballot Measure 49 (2007) or otherwise enacted after the date of this proceeding which would create a right of claim for compensation or waiver from City land use regulations that exist upon the effective date of the proceeding and which, by the approval of the proceeding, are then applicable to the property.
- 2) This waiver and release shall bind the undersigned's heirs, devisees, executors and administrators, successors in interests, and assigns. This covenant, waiver, release and discharge shall run with the land, and this instrument, or a memorandum hereof, may be recorded in the official records of the County in which the subject real property is located. This instrument may be terminated upon the filing of a Notice of Termination of Covenant filed by the City of Newberg.

- 3) If this instrument is given contemporaneous with a consent to future proceedings to be initiated by the City, Owner(s) acknowledge(s) that the proceedings may be initiated by the City of Newberg at any time in the discretion of the City of Newberg, and that this waiver and release is applicable to any ordinances adopted prior to the effective date of the proceeding.
- 4) This document is executed of my/our own free will and without duress. I, or if more than one, each of us respectively acknowledge that I/we have been advised to obtain legal advice prior to the execution of this document, and that either I, or each of us respectively, have either obtained legal advice or have independently elected not to seek legal advice prior to the execution of this document, recognizing that this document may affect my/our legal rights and remedies.

OWNER

OWNER

Danna Kemp, Trustee of the Richard D. Kimball Trust
Danna Kemp, Trustee of the Richard D. Kimball Trust

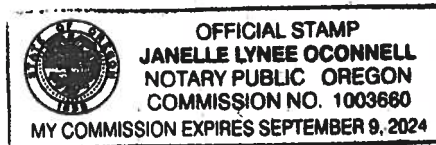
STATE OF OREGON)

) ss.
)

County of Yamhill

This instrument was acknowledged before me on this 23 day of February, 2022, by Danna Kemp, Trustee and of the Richard D. Kimball Trust.

Janelle Lynee OConnell
 Notary Public for Oregon
 My Commission expires: 9/9/2024



CITY OF NEWBERG

APPROVED AS TO FORM:

 Sue Ryan, City Recorder

 James Walker, City Attorney

Dated: _____

Dated: _____

AFTER RECORDING RETURN TO:
City of Newberg
Community Development Department
PO Box 970 – (414 E. First Street)
Newberg, OR 97132

COVENANT OF WAIVER OF RIGHTS AND REMEDIES

Recitals

- 1) The undersigned, Bruce A. Thomas and Valerie J. Thomas (hereinafter referred to as "Owner" or "Owners") has/have petitioned the City of Newberg (hereinafter referred to as "City") to commence certain proceedings, relating to Crestview Green PUD, for the real property described in **Exhibit A** which is attached hereto and incorporated herein.
- 2) Pursuant to the enactment of **Ballot Measure 49** (adopted November 6, 2007), if a public entity enacts one or more land use regulations that restrict the residential use of private real property or a farming or forest practice and that reduce the fair market value of the property, then the owner of the property shall be entitled to just compensation from the public entity that enacted the land use regulation or regulations as provided in Measure 49.
- 3) There is the potential that the Oregon electors or the Oregon Legislature may, in the future, enact further statutory or constitutional amendments relating to compensation for the impact of local regulations upon real property, under certain circumstances.
- 4) City does not wish to approve the Owner's/Owners' requested proceedings if the result would or could arguably give rise to a later claim by the Owner or Owners, or the Owner's/Owners' successors or assigns for compensation for the land use regulations in effect upon the effective date of the proceedings, or would or could arguably require the City to waive the City's land use regulations in effect upon the effective date of the proceedings, which are being newly imposed upon the property by reason and result of the proceedings.
- 5) Owner(s) seek(s) to induce the City to proceed with the proceedings and therefore Owner(s) agree(s) to eliminate the potential of claim for compensation or the right to seek waiver from the City's land use regulations existing as of the effective date of the proceedings.

NOW THEREFORE, the undersigned Owner(s) warrant(s) that the Owner(s) executing this covenant hold(s) the full and complete present ownership or any interest therein in the property, and hereby agree(s) and covenant(s) as follows:

- 1) As inducement to the City to proceed with the following proceeding(s) affecting the subject real property: 4821 E Portland Road, which may include designation of the property as subject to additional applicable overlay zones and districts, e.g., Limited Use Overlay District, (all inclusively referred to herein as "proceedings"), the undersigned Owner(s), on behalf of Owner(s), Owner's/Owners' heirs, devisees, executors, administrators, successors and assigns, agree(s) and covenant(s) to the City of Newberg, its officers, agents, employees and assigns that the undersigned hereby remises, waives, releases and forever discharges, and agrees that Owner(s) shall be estopped from asserting any rights and remedies, actions, causes of action, suits, claims, liabilities, demands, and rights to waivers arising under or granted by any statutory or constitutional regulatory compensation or waiver provisions, including but not limited to Ballot Measure 49 (2007) or otherwise enacted after the date of this proceeding which would create a right of claim for compensation or waiver from City land use regulations that exist upon the effective date of the proceeding and which, by the approval of the proceeding, are then applicable to the property.
- 2) This waiver and release shall bind the undersigned's heirs, devisees, executors and administrators, successors in interests, and assigns. This covenant, waiver, release and discharge shall run with the land, and this instrument, or a memorandum hereof, may be recorded in the official records of the County in which the subject real property is located. This instrument may be terminated upon the filing of a Notice of Termination of Covenant filed by the City of Newberg.

- 3) If this instrument is given contemporaneous with a consent to future proceedings to be initiated by the City, Owner(s) acknowledge(s) that the proceedings may be initiated by the City of Newberg at any time in the discretion of the City of Newberg, and that this waiver and release is applicable to any ordinances adopted prior to the effective date of the proceeding.
- 4) This document is executed of my/our own free will and without duress. I, or if more than one, each of us respectively acknowledge that I/we have been advised to obtain legal advice prior to the execution of this document, and that either I, or each of us respectively, have either obtained legal advice or have independently elected not to seek legal advice prior to the execution of this document, recognizing that this document may affect my/our legal rights and remedies.

OWNER

OWNER

Bruce A Thomas

STATE OF OREGON)

County of Yamhill ^{NEW} Clackamas ^{SS.}

This instrument was acknowledged before me on this 23rd day of February, 2022, by Bruce H. Thomas and NEW

Lana Renee Wilson

Notary Public for Oregon
My Commission expires: 8/9/2024



CITY OF NEWBERG

APPROVED AS TO FORM:

Sue Ryan, City Recorder

James Walker, City Attorney

Dated: _____

Dated: _____

AFTER RECORDING RETURN TO:
City of Newberg
Community Development Department
PO Box 970 – (414 E. First Street)
Newberg, OR 97132

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- 3) There is the potential that the Oregon electors or the Oregon Legislature may, in the future, enact further statutory or constitutional amendments relating to compensation for the impact of local regulations upon real property, under certain circumstances.
- 4) City does not wish to approve the Owner's/Owners' requested proceedings if the result would or could arguably give rise to a later claim by the Owner or Owners, or the Owner's/Owners' successors or assigns for compensation for the land use regulations in effect upon the effective date of the proceedings, or would or could arguably require the City to waive the City's land use regulations in effect upon the effective date of the proceedings, which are being newly imposed upon the property by reason and result of the proceedings.
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NOW THEREFORE, the undersigned Owner(s) warrant(s) that the Owner(s) executing this covenant hold(s) the full and complete present ownership or any interest therein in the property, and hereby agree(s) and covenant(s) as follows:

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- 2) This waiver and release shall bind the undersigned's heirs, devisees, executors and administrators, successors in interests, and assigns. This covenant, waiver, release and discharge shall run with the land, and this instrument, or a memorandum hereof, may be recorded in the official records of the County in which the subject real property is located. This instrument may be terminated upon the filing of a Notice of Termination of Covenant filed by the City of Newberg.

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- 4) This document is executed of my/our own free will and without duress. I, or if more than one, each of us respectively acknowledge that I/we have been advised to obtain legal advice prior to the execution of this document, and that either I, or each of us respectively, have either obtained legal advice or have independently elected not to seek legal advice prior to the execution of this document, recognizing that this document may affect my/our legal rights and remedies.

OWNER

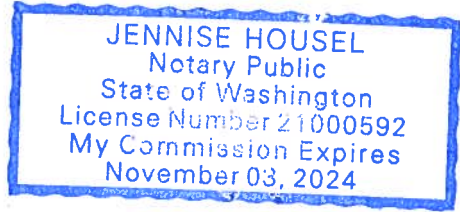
OWNER

Janice J. Thomas

STATE OF ~~OREGON~~) WA
 County of ~~Yamhill~~) Clark ss.

This instrument was acknowledged before me on this 20 day of Feb., 2022, by Valerie J. Thomas and _____.

Jennise House
 Notary Public for ~~Oregon~~ WA
 My Commission expires: 11/3/24



CITY OF NEWBERG

APPROVED AS TO FORM:

 Sue Ryan, City Recorder

 James Walker, City Attorney

Dated: _____

Dated: _____



Community Development Department

P.O. Box 970 ▪ 414 E First Street ▪ Newberg, Oregon 97132

503-537-1240. Fax 503-537-1272 www.newbergoregon.gov

WE WANT YOUR COMMENTS ON A PROPOSED NEW DEVELOPMENT IN YOUR NEIGHBORHOOD

A property owner in your neighborhood submitted an application to the City of Newberg for a Conditional Use Permit and Planned Unit Development at 4813 and 4821 E Portland Road. The Newberg Planning Commission will hold a hearing on **Date of Hearing** at 7pm at the Newberg Public Safety Building, 401 E. Third Street, Newberg, OR, to evaluate the proposal. You are invited to take part in the City's review of this project by sending in your written comments or testifying before the Planning Commission. For more details about giving comments, please see the back of this sheet.

The application would create a 133-unit residential planned unit development. The development includes 14 single-family lots, 95 attached single-family lots and 24 multi-family homes.

APPLICANT: *Mercedes Serra, 3J Consulting*
TELEPHONE: *503-946-9365*
PROPERTY OWNER: *Westwood Homes, LLC*
LOCATION: *4813 and 4821 E Portland Road*
TAX LOT NUMBER: *3216 1000 and 900*



We are mailing you information about this project because you own land within 500 feet of the proposed new project. We invite you to send any written comments for or against the proposal within 14 days from the date this notice is mailed.

If you mail your comments to the City, please put the following information on the outside of the envelope:

Written Comments: **File No. XX**
City of Newberg
Community Development Department
PO Box 970
Newberg, OR 97132

All written comments must be received by **12:00 p.m. on Month Day, Year**. Written information received after this time will be read out loud at the hearing subject to time limits for speakers and will be included in the record if there are further proceedings.

You can look over all the information about this project or drop comments off at Newberg City Hall, 414 E. First Street. You can also buy copies of the information for a cost of 25 cents a page. A staff report relating to the proposal will be available for inspection at no cost seven days prior to the public hearing. If you have any questions about the project, you can call the Newberg Planning Division at 503-537-1240.

Any issue which might be raised in an appeal of this case to the Land Use Board of Appeals (LUBA) must be raised during the public hearing process. You must include enough detail to enable the decision maker an opportunity to respond.

Prior to the conclusion of the initial evidentiary hearing, any participant may request an opportunity to present additional evidence, arguments or testimony regarding the application through a continuance or extension of the record. Failure of an issue to be raised in the hearing, in person or by letter, or failure to provide statements or evidence sufficient to afford the decision maker an opportunity to respond to the issue precludes appeal to the State Land Use Board of Appeals based on that issue.

The Planning Commission will make a decision at the end of the public hearing process. If you participate in the public hearing process, either by testifying at the public hearing, or by sending in written comments, we will send you information about any decision made by the City relating to this project.

Date Mailed: ***Month Day, Year***

ACCOMMODATION OF PHYSICAL IMPAIRMENTS:

In order to accommodate persons with physical impairments, please notify the City Recorder's office of any special physical or language accommodations you may need as far in advance of the meeting as possible and no later than 48 hours prior to the meeting. To request these arrangements, please contact the City Recorder at 503-537-1283. For TRS services please dial 711.

Land Use Notice

FILE # PUD22-XXXX/CUP22-XXXX

PROPOSAL: Planned Unit Development
14 Single-Family Homes, 95 Attached
Single-Family Homes, 24 Multi-Family Homes

FOR FURTHER INFORMATION, CONTACT:

City of Newberg
Community Development Department
414 E First Street
Phone: 503-537-1240

R321500500
Mcclure Charles J & Ellen R
Trustees For
30295 Highway 99W
Newberg OR 97132

R321500600
Jaime Lim
4900 E Portland Rd
Newberg OR 97132

R321500700
Lim Family LLC
922 N Killingsworth St
Portland OR 97217

R3216AA00200
Christopher Grage
Caprice Grage
30170 NE Benjamin Rd
Newberg OR 97132

R321601100
Newberg Crestview LLC
5285 Meadows Rd Ste 171
Lake Oswego OR 97035

R3216DA00100
John Trunk
Marita Trunk
1306 NE Harmony Ln
Newberg OR 97132

R3216DA00300
John Read
Ericka Read
1305 NE Harmony Ln
Newberg OR 97132

R3216DA00400
Wayne Cannaday
Rebecca Cannaday
1312 NE Klimek Ln
Newberg OR 97132

R3216DA00500
Jerald Neill Sr
Margaret Neill
1102 N Springbrook Rd No 222
Newberg OR 97132

R3216DA00600
Leo French-Pinzon
Cristina Pinzon
1300 NE Klimek Ln
Newberg OR 97132

R3216DA00700
Leo French-Pinzon
Cristina Pinzon
1300 NE Klimek Ln
Newberg OR 97132

R3216DA01900
Geovanni Zamora
Maria Zamora
1305 NE Klimek Ln
Newberg OR 97132

R3216AA00103
Damman Gary W & Joyce A
Trustees For
30160 NE Benjamin Rd
Newberg OR 97132

R3216AA01490
Anthony Perez
Elizabeth Perez
13665 NE Lakeshore Dr
Newberg OR 97132

R3216AA01590
Saaddedine Dichari
Eryn Dichari
13660 NE Lake Shore Dr
Newberg OR 97132

R3216AA00104
Taylor Family Trust
13700 NE Lake Shore Dr
Newberg OR 97132

R3216AB01100
Matthew Vondrachek
17684 SW Inkster Dr
Sherwood OR 97140

R3216AB01200
Daniel Gile
Darlene Gile
4505 NE Blue Heron Ct
Newberg OR 97132

R3216AB01300
Blake Williams
Chyrel Williams
4500 NE Blue Heron Ct
Newberg OR 97132

R3216AB01810
Palmer Dale B & Doris Trustees For
4408 NE Birdhaven Lp
Newberg OR 97132

R3216AB01811
Steven Goodfellow
Joanne Goodfellow
4410 NE Birdhaven Lp
Newberg OR 97132

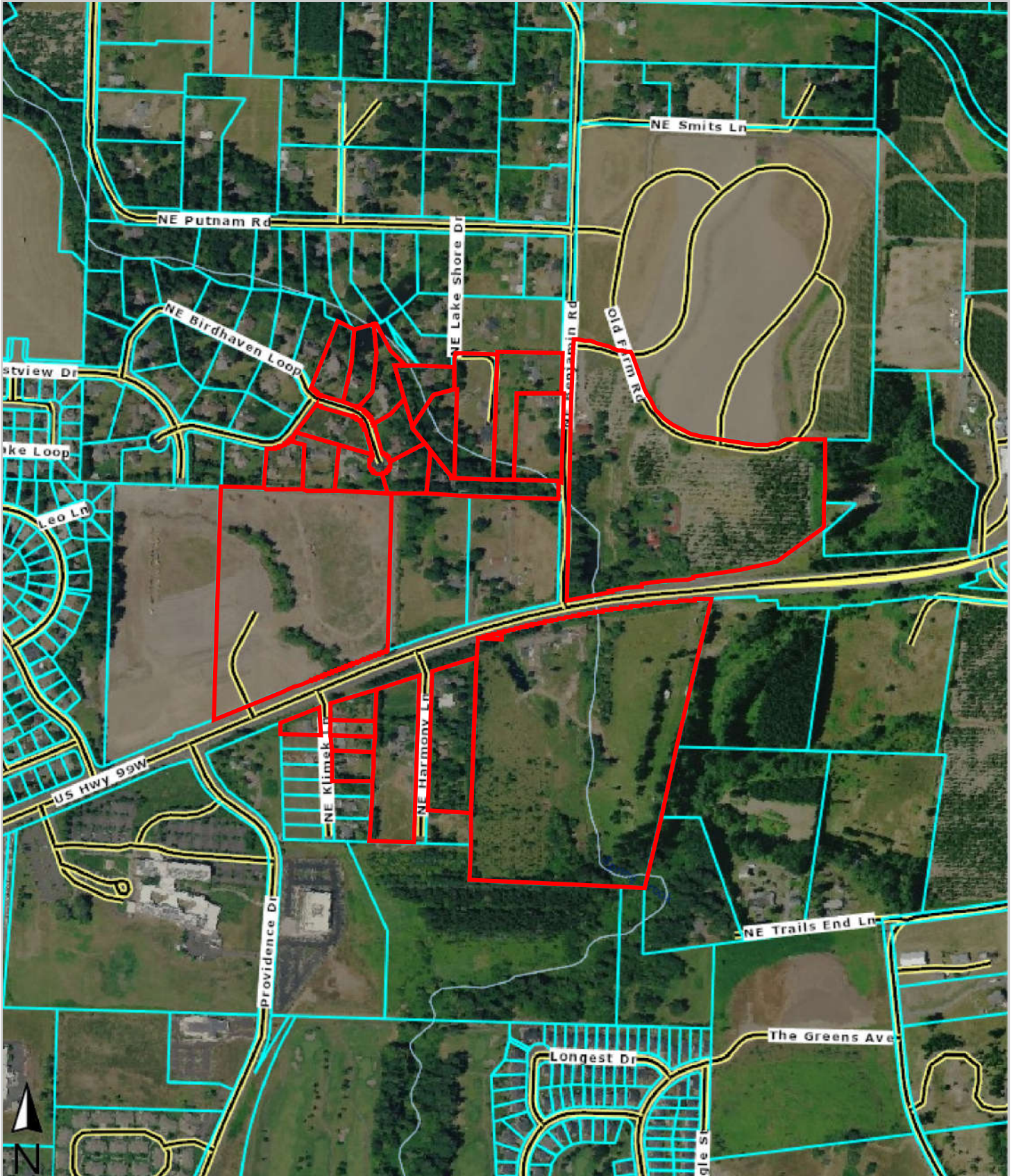
R3216AB01812
Bruce Barnett
1102 N Spring Brook Rd No 268
Newberg OR 97132

R3216AB01813
Brian Abbe
Laila Abbe
4507 NE Blue Heron Ct
Newberg OR 97132

R3216AB01814
Tonna Farrar
4509 NE Blue Heron Ct
Newberg OR 97132

R3216AB01815
Paul Anderson
Carla Anderson
4601 NE Blue Heron Ct
Newberg OR 97132

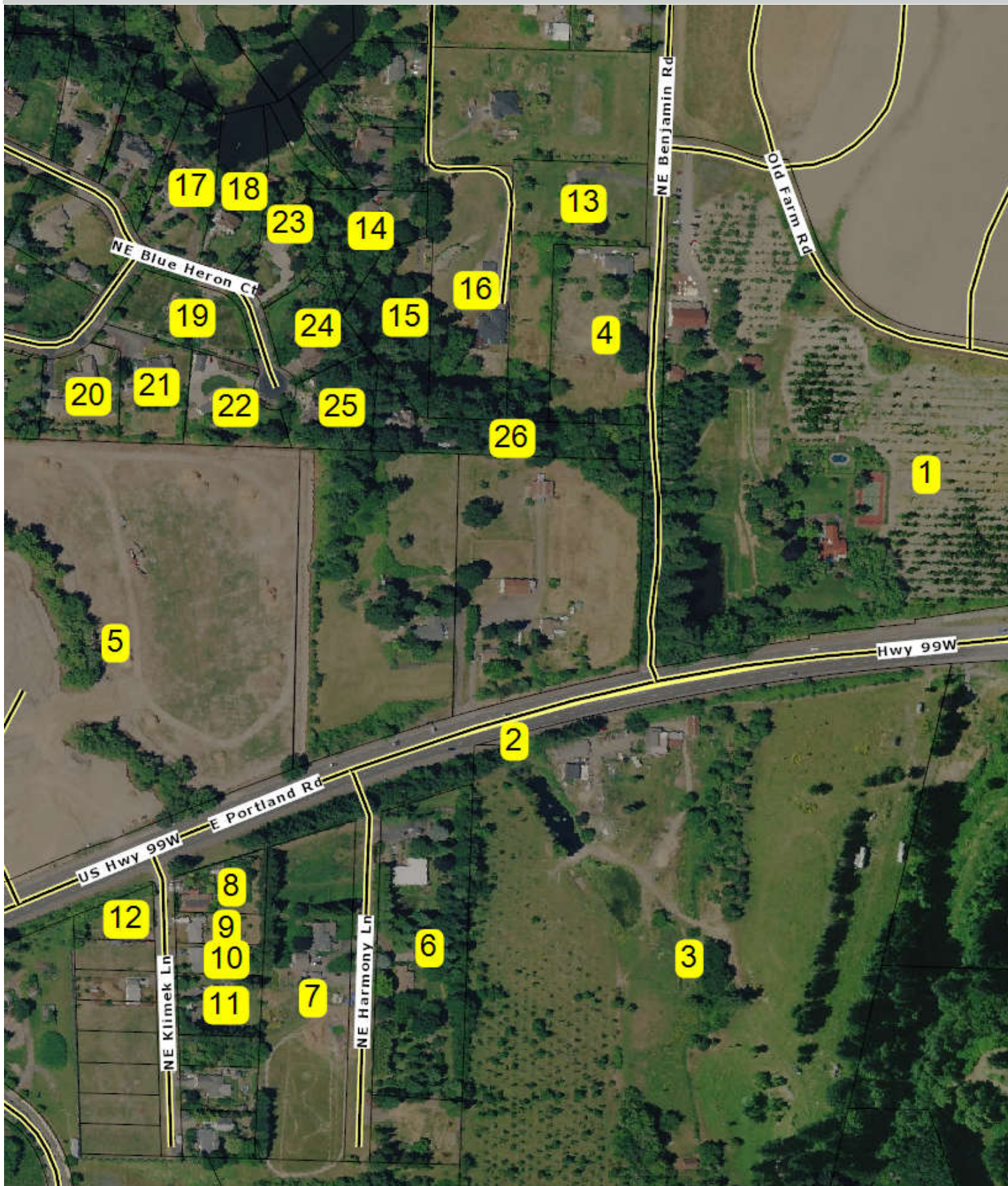
R3216AA01600
Daniel Shepherd
Vicki Shepherd
30230 NE Benjamin Rd
Newberg OR 97132



This map/plat is being furnished as an aid in locating the herein described land in relation to adjoining streets, natural boundaries and other land, and is not a survey of the land depicted. Except to the extent a policy of title insurance is expressly modified by endorsement, if any, the company does not insure dimensions, distances, location of easements, acreage or other matters shown thereon.



Walking Farm Identification Map



Farm Search Criteria

Averages

Sale Price	\$416,906.25
Loan Amt	\$379,211.33
SqFt	3,022 SqFt
Assessed Total Value	\$439,979.77
Market Total Value	\$789,412.65
Price/SqFt	\$196.26

#1

Parcel #:	27900	Tax Account:	R321500500
Owner:	McClure Charles J & Ellen R Trustees	Owner Occupied:	Yes
Site Address #:	30295 Highway 99w Newberg OR 97132	Owner Address #:	30295 Highway 99w Newberg OR 97132
Year Built:	1912	Building SqFt/Acres:	11,508 SqFt/21.53 Acres
Assessed Total Value:	\$801,399.00	Bedrooms:	7
Market Total Value:	\$1,464,372.00	Bathrooms:	4.5
Rec. Date:	12/11/2017	Total Rooms:	
Sale Date:	12/11/2017	Sale Price:	

#2

Parcel #:	27919	Tax Account:	R321500600
Owner:	Lim, Jaime	Owner Occupied:	No
Site Address #:	4904 NE Portland Rd OR 97132	Owner Address #:	4900 E Portland Rd Newberg OR 97132
Year Built:		Building SqFt/Acres:	/0.04 Acres
Assessed Total Value:	\$694.00	Bedrooms:	
Market Total Value:	\$694.00	Bathrooms:	
Rec. Date:	08/01/1981	Total Rooms:	
Sale Date:	08/01/1981	Sale Price:	\$500.00

#3

Parcel #:	27928	Tax Account:	R321500700
Owner:	Lim Family LLC	Owner Occupied:	No
Site Address #:	4900 NE Portland Rd OR 97132	Owner Address #:	922 N Killingsworth St Portland OR 97217
Year Built:	1947	Building SqFt/Acres:	3,338 SqFt/27.60 Acres
Assessed Total Value:	\$147,087.00	Bedrooms:	3
Market Total Value:	\$486,841.00	Bathrooms:	2
Rec. Date:	11/15/2011	Total Rooms:	
Sale Date:	11/15/2011	Sale Price:	

#4

Parcel #:	28703	Tax Account:	R3216AA00200
Owner:	Grage, Christopher	Owner Occupied:	Yes
Site Address #:	30170 NE Benjamin Rd Newberg OR 97132	Owner Address #:	30170 NE Benjamin Rd Newberg OR 97132
Year Built:	1949	Building SqFt/Acres:	1,797 SqFt/2.00 Acres
Assessed Total Value:	\$249,814.00	Bedrooms:	4
Market Total Value:	\$529,392.00	Bathrooms:	1
Rec. Date:	06/09/2021	Total Rooms:	
Sale Date:	06/07/2021	Sale Price:	\$710,000.00

#5

Parcel #:	29098	Tax Account:	R321601100
Owner:	Newberg Crestview LLC	Owner Occupied:	No
Site Address #:	4505 E Portland Rd Newberg OR 97132	Owner Address #:	5285 Meadows Rd Ste 171 Lake Oswego OR 97035
Year Built:	1951	Building SqFt/Acres:	2,264 SqFt/17.32 Acres
Assessed Total Value:	\$1,685,470.00	Bedrooms:	2
Market Total Value:	\$3,035,868.00	Bathrooms:	1
Rec. Date:	06/10/2020	Total Rooms:	
Sale Date:	06/10/2020	Sale Price:	\$2,200,000.00

#6
Parcel #: 32627
Owner: Trunk, John J
Site Address #: 1306 NE Harmony Ln
Newberg OR 97132
Year Built: 1983
Assessed Total Value: \$377,947.00
Market Total Value: \$521,640.00
Rec. Date: 06/02/1987
Sale Date: 06/02/1987
Tax Account: R3216DA00100
Owner Occupied: Yes
Owner Address #: 1306 NE Harmony Ln
Newberg OR 97132
Building SqFt/Acres: 1,782 SqFt/3.43 Acres
Bedrooms: 3
Bathrooms: 2
Total Rooms:
Sale Price: \$61,500.00

#7
Parcel #: 32645
Owner: Read, John
Site Address #: 1305 NE Harmony Ln
Newberg OR 97132
Year Built: 1977
Assessed Total Value: \$456,794.00
Market Total Value: \$782,509.00
Rec. Date: 05/19/2014
Sale Date: 04/28/2014
Tax Account: R3216DA00300
Owner Occupied: Yes
Owner Address #: 1305 NE Harmony Ln
Newberg OR 97132
Building SqFt/Acres: 3,703 SqFt/3.82 Acres
Bedrooms: 3
Bathrooms: 5
Total Rooms:
Sale Price: \$300,000.00

#8
Parcel #: 32654
Owner: Cannaday, Wayne
Site Address #: 1312 NE Klimek Ln
Newberg OR 97132
Year Built:
Assessed Total Value: \$90,769.00
Market Total Value: \$249,981.00
Rec. Date: 07/30/2007
Sale Date: 07/20/2007
Tax Account: R3216DA00400
Owner Occupied: Yes
Owner Address #: 1312 NE Klimek Ln
Newberg OR 97132
Building SqFt/Acres: /0.60 Acres
Bedrooms:
Bathrooms:
Total Rooms:
Sale Price: \$45,500.00

#9
Parcel #: 32663
Owner: Neill, Jerold D Sr
Site Address #: 1308 NE Klimek Ln
OR 97132
Year Built: 1950
Assessed Total Value: \$145,954.00
Market Total Value: \$313,767.00
Rec. Date: 01/01/1983
Sale Date: 01/01/1983
Tax Account: R3216DA00500
Owner Occupied: No
Owner Address #: 1102 N Springbrook Rd No 222
Newberg OR 97132
Building SqFt/Acres: 1,247 SqFt/0.35 Acres
Bedrooms: 3
Bathrooms: 1
Total Rooms:
Sale Price:

#10
Parcel #: 32672
Owner: French-Pinzon, Leo McGee
Site Address #: 1300 NE Klimek Ln
Newberg OR 97132
Year Built: 1952
Assessed Total Value: \$156,050.00
Market Total Value: \$315,953.00
Rec. Date: 11/08/2019
Sale Date: 11/06/2019
Tax Account: R3216DA00600
Owner Occupied: Yes
Owner Address #: 1300 NE Klimek Ln
Newberg OR 97132
Building SqFt/Acres: 1,140 SqFt/0.34 Acres
Bedrooms: 3
Bathrooms: 1
Total Rooms:
Sale Price:

#11
Parcel #: 32681
Owner: French-Pinzon, Leo McGee
Site Address #: 0 NE Klimek Ln
OR 97132
Year Built:
Assessed Total Value: \$42,129.00
Market Total Value: \$145,382.00
Rec. Date: 11/08/2019
Sale Date: 11/06/2019
Tax Account: R3216DA00700
Owner Occupied: No
Owner Address #: 1300 NE Klimek Ln
Newberg OR 97132
Building SqFt/Acres: /0.65 Acres
Bedrooms:
Bathrooms:
Total Rooms:
Sale Price:

#12
Parcel #: 32850 **Tax Account:** R3216DA01900
Owner: Zamora, Geovanni J **Owner Occupied:** Yes
Site Address #: 1305 NE Klimek Ln **Owner Address #:** 1305 NE Klimek Ln
Newberg OR 97132 **Building SqFt/Acres:** 1,435 SqFt/0.43 Acres
Year Built: 1964 **Bedrooms:** 3
Assessed Total Value: \$181,548.00 **Bathrooms:** 1.5
Market Total Value: \$347,494.00 **Total Rooms:**
Rec. Date: 06/29/2020 **Sale Price:**
Sale Date: 06/29/2020 \$359,000.00

#13
Parcel #: 442587 **Tax Account:** R3216AA00103
Owner: Damman Gary W & Joyce A Trustees **Owner Occupied:** Yes
For
Site Address #: 30160 NE Benjamin Rd **Owner Address #:** 30160 NE Benjamin Rd
Newberg OR 97132 **Building SqFt/Acres:** 2,522 SqFt/2.40 Acres
Year Built: 1995 **Bedrooms:** 3
Assessed Total Value: \$347,170.00 **Bathrooms:** 2.5
Market Total Value: \$559,220.00 **Total Rooms:**
Rec. Date: 10/24/2002 **Sale Price:**
Sale Date: 10/18/2002

#14
Parcel #: 456401 **Tax Account:** R3216AA01490
Owner: Perez, Anthony **Owner Occupied:** Yes
Site Address #: 13665 NE Lake Shore Dr **Owner Address #:** 13665 NE Lakeshore Dr
OR 97132 **Building SqFt/Acres:** 3,696 SqFt/1.10 Acres
Year Built: 1987 **Bedrooms:** 3
Assessed Total Value: \$476,317.00 **Bathrooms:** 2
Market Total Value: \$901,959.00 **Total Rooms:**
Rec. Date: 08/20/1998 **Sale Price:**
Sale Date: 08/18/1998 \$287,900.00

#15
Parcel #: 460263 **Tax Account:** R3216AA01590
Owner: Dichari, Saaddeddine **Owner Occupied:** Yes
Site Address #: 13660 NE Lake Shore Dr **Owner Address #:** 13660 NE Lake Shore Dr
Newberg OR 97132 **Building SqFt/Acres:** 2,713 SqFt/1.27 Acres
Year Built: 1988 **Bedrooms:** 3
Assessed Total Value: \$501,463.00 **Bathrooms:** 3
Market Total Value: \$781,604.00 **Total Rooms:**
Rec. Date: 05/04/2020 **Sale Price:**
Sale Date: 05/01/2020 \$600,000.00

#16
Parcel #: 462172 **Tax Account:** R3216AA00104
Owner: Taylor Family Trust **Owner Occupied:** Yes
Site Address #: 13700 NE Lake Shore Dr **Owner Address #:** 13700 NE Lake Shore Dr
Newberg OR 97132 **Building SqFt/Acres:** 2,853 SqFt/2.60 Acres
Year Built: 1990 **Bedrooms:** 4
Assessed Total Value: \$484,127.00 **Bathrooms:** 3
Market Total Value: \$833,734.00 **Total Rooms:**
Rec. Date: 06/01/2018 **Sale Price:**
Sale Date: 06/01/2018 \$512,200.00

#17
Parcel #: 463625 **Tax Account:** R3216AB01100
Owner: Vondrachek, Matthew P **Owner Occupied:** No
Site Address #: 4501 NE Blue Heron Ct **Owner Address #:** 17684 SW Inkster Dr
Newberg OR 97132 **Building SqFt/Acres:** 2,939 SqFt/1.00 Acres
Year Built: 1992 **Bedrooms:** 4
Assessed Total Value: \$576,658.00 **Bathrooms:** 3.5
Market Total Value: \$897,740.00 **Total Rooms:**
Rec. Date: 06/30/2020 **Sale Price:** \$610,000.00
Sale Date: 06/29/2020

#18
Parcel #: 463634 **Tax Account:** R3216AB01200
Owner: Gile, Daniel D **Owner Occupied:** Yes
Site Address #: 4505 NE Blue Heron Ct **Owner Address #:** 4505 NE Blue Heron Ct
Newberg OR 97132 **Building SqFt/Acres:** 3,646 SqFt/1.00 Acres
Year Built: 1990 **Bedrooms:** 4
Assessed Total Value: \$546,106.00 **Bathrooms:** 2.5
Market Total Value: \$914,425.00 **Total Rooms:**
Rec. Date: 10/29/2014 **Sale Price:** \$435,000.00
Sale Date: 10/23/2014

#19
Parcel #: 463643 **Tax Account:** R3216AB01300
Owner: Williams, Blake S **Owner Occupied:** Yes
Site Address #: 4500 NE Blue Heron Ct **Owner Address #:** 4500 NE Blue Heron Ct
Newberg OR 97132 **Building SqFt/Acres:** 2,556 SqFt/1.00 Acres
Year Built: 1992 **Bedrooms:** 5
Assessed Total Value: \$502,698.00 **Bathrooms:** 3
Market Total Value: \$867,890.00 **Total Rooms:**
Rec. Date: 12/31/1991 **Sale Price:** \$52,000.00
Sale Date: 12/31/1991

#20
Parcel #: 477148 **Tax Account:** R3216AB01810
Owner: Palmer Dale B & Doris Trustees For **Owner Occupied:** Yes
Site Address #: 4408 NE Birdhaven Loop **Owner Address #:** 4408 NE Birdhaven Lp
OR 97132 **Building SqFt/Acres:** 2,534 SqFt/0.90 Acres
Year Built: 1994 **Bedrooms:** 3
Assessed Total Value: \$559,353.00 **Bathrooms:** 2.5
Market Total Value: \$966,477.00 **Total Rooms:**
Rec. Date: 07/02/1990 **Sale Price:** \$43,500.00
Sale Date: 07/02/1990

#21
Parcel #: 477157 **Tax Account:** R3216AB01811
Owner: Goodfellow, Steven **Owner Occupied:** Yes
Site Address #: 4410 NE Birdhaven Loop **Owner Address #:** 4410 NE Birdhaven Lp
OR 97132 **Building SqFt/Acres:** 2,047 SqFt/0.97 Acres
Year Built: 1995 **Bedrooms:** 3
Assessed Total Value: \$383,451.00 **Bathrooms:** 2.5
Market Total Value: \$812,443.00 **Total Rooms:**
Rec. Date: 08/14/2012 **Sale Price:**
Sale Date: 08/07/2012

#22
Parcel #: 477166 **Tax Account:** R3216AB01812
Owner: Barnett, Bruce A Trustee **Owner Occupied:** No
Site Address #: 4600 NE Blue Heron Ct **Owner Address #:** 1102 N Spring Brook Rd No 268
OR 97132 **Building SqFt/Acres:** 3,234 SqFt/0.91 Acres
Year Built: 1992 **Bedrooms:** 5
Assessed Total Value: \$696,834.00 **Bathrooms:** 2.5
Market Total Value: \$1,148,751.00 **Total Rooms:**
Rec. Date: 08/12/2016 **Sale Price:**
Sale Date: 08/10/2016

#23

Parcel #:	477175	Tax Account:	R3216AB01813
Owner:	Abbe, Brian M	Owner Occupied:	Yes
Site Address #:	4507 NE Blue Heron Ct Newberg OR 97132	Owner Address #:	4507 NE Blue Heron Ct Newberg OR 97132
Year Built:	1992	Building SqFt/Acres:	3,450 SqFt/1.00 Acres
Assessed Total Value:	\$564,131.00	Bedrooms:	2
Market Total Value:	\$997,497.00	Bathrooms:	2.5
Rec. Date:	12/02/2019	Total Rooms:	
Sale Date:	11/22/2019	Sale Price:	

#24

Parcel #:	477184	Tax Account:	R3216AB01814
Owner:	Farrar, Tonna K	Owner Occupied:	Yes
Site Address #:	4509 NE Blue Heron Ct Newberg OR 97132	Owner Address #:	4509 NE Blue Heron Ct Newberg OR 97132
Year Built:	1993	Building SqFt/Acres:	3,859 SqFt/0.87 Acres
Assessed Total Value:	\$474,231.00	Bedrooms:	3
Market Total Value:	\$920,987.00	Bathrooms:	2.5
Rec. Date:	11/01/2019	Total Rooms:	
Sale Date:	11/01/2019	Sale Price:	

#25

Parcel #:	477193	Tax Account:	R3216AB01815
Owner:	Anderson, Paul N	Owner Occupied:	Yes
Site Address #:	4601 NE Blue Heron Ct Newberg OR 97132	Owner Address #:	4601 NE Blue Heron Ct Newberg OR 97132
Year Built:	1990	Building SqFt/Acres:	2,602 SqFt/0.90 Acres
Assessed Total Value:	\$478,023.00	Bedrooms:	3
Market Total Value:	\$824,074.00	Bathrooms:	2.5
Rec. Date:	10/01/1990	Total Rooms:	
Sale Date:	10/01/1990	Sale Price:	\$43,500.00

#26

Parcel #:	477228	Tax Account:	R3216AA01600
Owner:	Shepherd, Daniel D	Owner Occupied:	Yes
Site Address #:	30230 NE Benjamin Rd Newberg OR 97132	Owner Address #:	30230 NE Benjamin Rd Newberg OR 97132
Year Built:	1994	Building SqFt/Acres:	2,637 SqFt/1.36 Acres
Assessed Total Value:	\$513,257.00	Bedrooms:	3
Market Total Value:	\$904,035.00	Bathrooms:	2.5
Rec. Date:	04/22/2005	Total Rooms:	
Sale Date:	04/20/2005	Sale Price:	\$409,900.00

Attachment 2: Agency Comments

Doug Rux

From: KNECHT Casey <Casey.KNECHT@odot.oregon.gov>
Sent: Thursday, April 21, 2022 1:21 PM
To: Greg Haffner; Doug Rux
Cc: Brett Musick; Mark Lago; FERBER Arielle
Subject: RE: Yamhill County comments on Crestview Green PUD/CUP
Attachments: Crestview Green TIA Region 2 Review.pdf

This email originated from outside the City of Newberg's organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Greg and Doug,

Attached are ODOT's comments on the Crestview Green TIA. There are some minor comments on the analysis. As for the proposed mitigation at the OR-99W/Crestview/Providence intersection, ODOT would likely not support the lane reconfigurations and split phasing. The applicant could still request to make those changes, but more analysis would be needed.

Regarding the intersection of OR-99W and Benjamin, the TIA proposes full closure of Benjamin at the intersection, which would not need ODOT approval. The TIA also included some analysis of a right-in only at Benjamin, which would need ODOT approval for the turn restrictions. If the city or county would like this option to be pursued, the developer would need to provide additional analysis to determine the intersection control type and the need for deceleration lanes and/or storage.

Please contact Arielle and me with any questions. Thanks,

Casey Knecht, P.E.

Development Review Coordinator | ODOT Region 2

503-986-5170 | casey.knecht@odot.oregon.gov

From: Greg Haffner <haffnerg@co.yamhill.or.us>
Sent: Wednesday, April 6, 2022 12:05 PM
To: Doug Rux <Doug.Rux@newbergoregon.gov>
Cc: Brett Musick <Brett.Musick@newbergoregon.gov>; Mark Lago <lagom@co.yamhill.or.us>; KNECHT Casey <Casey.KNECHT@odot.oregon.gov>
Subject: Yamhill County comments on Crestview Green PUD/CUP

This message was sent from outside the organization. Treat attachments, links and requests with caution. Be conscious of the information you share if you respond.

Doug,

See Yamhill County (YC) comments on Crestview Greens Land use application.
Please let me know if you have any questions or comments.

Greg Haffner
Engineering Manager

2060 NE Lafayette Ave.
McMinnville Or 97128

503-434-7515 Ext. 3605
Direct 503-434-7365
Haffnerg@co.yamhill.or.us



From: Doug Rux <Doug.Rux@newbergoregon.gov>
Sent: Monday, March 28, 2022 4:06 PM
To: Greg Haffner <haffnerg@co.yamhill.or.us>
Cc: Brett Musick <Brett.Musick@newbergoregon.gov>; Mark Lago <lagom@co.yamhill.or.us>
Subject: RE: Crestview Green PUD/CUP

[This email originated outside of Yamhill County]

Greg,

You can send me an email or letter by April 7th with any comments you have.

Doug Rux, AICP
Community Development Director
City of Newberg
Direct: 503.537.1212
Cell: 503.550.4517
Pronouns: he/him



From: Greg Haffner <haffnerg@co.yamhill.or.us>
Sent: Monday, March 28, 2022 3:11 PM
To: Doug Rux <Doug.Rux@newbergoregon.gov>
Cc: Brett Musick <Brett.Musick@newbergoregon.gov>; Mark Lago <lagom@co.yamhill.or.us>
Subject: RE: Crestview Green PUD/CUP

This email originated from outside the City of Newberg's organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Doug,

Being fairly new to this, what is the process for Yamhill County to provide input on the TIA, and whatever else?
Looks like the Public Hearing is on Thursday, May 12th.

Thanks,

Greg Haffner

Engineering Manager

2060 NE Lafayette Ave.
McMinnville Or 97128

503-434-7515 Ext. 3605

Direct 503-434-7365

Haffnerg@co.yamhill.or.us



From: Doug Rux <Doug.Rux@newbergoregon.gov>
Sent: Friday, March 25, 2022 3:34 PM
To: Greg Haffner <haffnerg@co.yamhill.or.us>
Cc: Brett Musick <Brett.Musick@newbergoregon.gov>
Subject: Crestview Green PUD/CUP

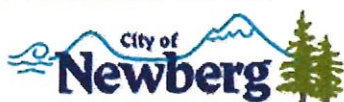
[This email originated outside of Yamhill County]

Greg,

The web site for this project can be accessed at:

<https://www.newbergoregon.gov/cd/page/crestview-green-cup22-0001pud22-0001>

Doug Rux, AICP
Community Development Director
City of Newberg
Direct: 503.537.1212
Cell: 503.550.4517
Pronouns: he/him





Oregon

Kate Brown, Governor

Department of Transportation Region 2 Tech Center

455 Airport Road SE, Building A
Salem, Oregon 97301-5397
Telephone (503) 986-2990
Fax (503) 986-2839

DATE: April 21, 2022

TO: Casey Knecht, PE
Development Review Coordinator

FROM: Arielle Ferber, PE
Traffic Analysis Engineer

SUBJECT: Crestview Green Development (Newberg, OR) – Outright Use
TIA Review Comments

ODOT Region 2 Traffic has completed our review of the submitted traffic impact analysis (dated January 2022) to address traffic impacts due to development on the northwest quadrant of Pacific Highway No. 91 (OR 99W) and Benjamin Road in the city of Newberg, with respect to consistency and compliance with ODOT's Analysis Procedures Manual, Version 2 (APM). The APM was most recently updated in April 2022. The current version is published online at: <http://www.oregon.gov/ODOT/TD/TP/Pages/APM.aspx>. As a result, we submit the following comments for the City's consideration:

Analysis items to note:

1. OR 99W between Springbrook Road and the City limits has an alternative mobility target of $v/c = 1.00$ for three hours during the average weekday conditions with a peak hour factor of 1.0 (https://www.oregon.gov/odot/Planning/OHP%20Registry/Consent_16_Attach_04_Newberg.pdf). The analysis was conducted using 30th Highest Volume (HV) and peak hour factors identified from the traffic counts (more conservative values) and just exceeded the v/c mobility target of 1.0 for one analysis hour. Therefore, it is assumed that reanalysis of the OR 99W study area intersections utilizing the average weekday conditions and a peak hour factor of 1.0 would result in all OR 99W intersections meeting the alternative mobility targets in the 2026 No Build and Build conditions.
2. Figure 5 shows the northbound approach of the OR 99W at Crestview Drive/Providence Drive intersection consisting of an exclusive right-turn lane and a shared through-left. However, the analysis applied exclusive right, through, and left-turn lanes, consistent with improvements associated with the adjacent Crestview Crossings development, currently under construction. Figure 5 should be updated to reflect the correct proposed laneage. This will have no impact on the results or conclusions of the analysis.

Proposed mitigation comments:

3. ODOT maintains jurisdiction of the Pacific Highway No. 91 (OR 99W) and Salmon River Highway No. 39 (OR 18) and ODOT approval shall be required for all proposed mitigation measures to this facility.
4. Approval for reconfiguring the southbound approach of the OR 99W at Crestview Drive/Providence Drive intersection to include an exclusive left, shared through-left, and exclusive right turn lane as well as split phasing for the northbound and southbound approaches is required under the authority of the State Traffic Roadway Engineer with support from the City and Region Traffic. However, Region Traffic would have difficulty supporting these mitigations as the intersection is projected to meet alternative mobility targets, as noted in comment #1. In addition, following completion of the Newberg-Dundee Bypass Phase 2B, OR 99W through traffic is expected to decrease significantly and improve operations at the intersection. Should the applicant choose to submit an official request to Region 2 Traffic, the request shall include an operational and queuing analysis, preliminary design layout, and a preliminary signal operations design (PSOD). The request shall also include a progression analysis to verify progression will be maintained with the OR 99W corridor signals.

Thank you for the opportunity to review this traffic impact analysis. As the analysis software files were not provided, Region 2 Traffic has only reviewed the submitted report.

This traffic impact study has been, for the most part, prepared in accordance with ODOT analysis procedures and methodologies. No further analysis work should be required. If the City determines any of the above comments will merit the need for reanalysis, we would be willing and able to assist with a second round of review.

If there are any questions regarding these comments, please contact me at (971) 208-1290 or Arielle.Ferber@ODOT.state.or.us

Doug Rux

From: Doug Rux
Sent: Saturday, April 16, 2022 7:24 PM
To: Mercedes Serra
Subject: FW: ODOT Comments for City of Newberg File CUP-22-0001/PUD22-0001 - Crestview Green

FYI

Doug Rux, AICP
Community Development Director

City of Newberg

Direct: 503.537.1212

Cell: 503.550.4517

Pronouns: he/him



From: KNECHT Casey <Casey.KNECHT@odot.oregon.gov>
Sent: Tuesday, April 12, 2022 12:08 PM
To: Doug Rux <Doug.Rux@newbergoregon.gov>
Cc: 'Greg Haffner' <haffnerg@co.yamhill.or.us>; Brett Musick <Brett.Musick@newbergoregon.gov>; Mark Lago <lagom@co.yamhill.or.us>
Subject: RE: ODOT Comments for City of Newberg File CUP-22-0001/PUD22-0001 - Crestview Green

This email originated from outside the City of Newberg's organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Below are some additional comments, mainly from our Traffic staff. I still don't have specific TIA review comments, but I did get more on the Benjamin connection:

- Full closure of Benjamin – ODOT approval would not be needed, but the County commission would likely need to take some type of formal action to close the connection.
- Conversion to RIRO or RI only – ODOT approval for turn prohibitions would be required. The State Traffic-Roadway Engineer is the approval authority, but it could be handled at the Region Traffic Engineer level provided it follows the warranting conditions in OAR 734-020-0020. We would need to see an engineering study demonstrating that the prohibitions will improve safe traffic operating conditions, or are necessary to increase the capacity of the roadways, or will otherwise expedite the movement of traffic.
- Removing turn prohibitions in the future – This would be very difficult to achieve even with lower volumes than existing. The mitigation to reestablish turning movements after they have been prohibited would likely be very costly and exceed current geometry and features. Note that this is only in regards to the intersection of Benjamin with the current OR-99W alignment; changes from future phases of the Newberg-Dundee Bypass will bring additional analysis and decisions.

Casey Knecht, P.E.

ODOT Region 2

503-986-5170

From: KNECHT Casey

Sent: Wednesday, April 6, 2022 11:03 AM

To: 'doug.rux@newbergoregon.gov' <doug.rux@newbergoregon.gov>

Subject: ODOT Comments for City of Newberg File CUP-22-0001/PUD22-0001 - Crestview Green

Doug,

The proposed development at 4813 & 4821 E Portland Road in Newberg has frontage on OR-99W (Pacific Highway West, No. 091). ODOT is still reviewing the TIA submitted by the developer and I will send comments to you when ready (likely still 1-2 weeks out). In previous discussions with city and county staff, ODOT indicated that the development should design for the future Newberg-Dundee Bypass connector roads, but that the internal road network for the development should be fully functional at opening since bypass work does not have a firm completion date. Comments on the TIA will include what changes ODOT would support at the 99W/Benjamin intersection. There have been a few ideas including a right-in right-out design, severing, and a right-in only design. Once that design has been decided, ODOT will need to review construction plans for all improvements in ODOT right-of-way.

Please contact me with any questions.

Casey Knecht, P.E.

Development Review Coordinator | ODOT Region 2

503-986-5170 | casey.knecht@odot.oregon.gov



COMMUNITY DEVELOPMENT LAND USE APPLICATION REFERRAL

REFERRAL TO: Building Official Brooks Bateman

The enclosed material has been referred to you for your information and comment. Any comments you wish to make should be returned to the Community Development Department prior to: April 7, 2022. Please refer questions and comments to Doug Rux.


NOTE: Full size plans are available at the Community Development Department Office.

APPLICANT: 3J Consulting, Inc C/O Mercedes Serra
REQUEST: Crestview Green- 14 SF & 96 Townhomes
SITE ADDRESS: 4813 & 4821 E Portland Rd
LOCATION:
TAX LOT: R3216 00900
FILE NO: CUP22-0001/ PUD22-0001
ZONE: R-1, R-2, C-2 (General Commercial)
HEARING DATE: N/A



A Copy of the Fairfield Inn Design Review can be found at: [Crestview Green CUP22-0001/PUD22-0001 | Newberg Oregon](#)

- Reviewed, no conflict.
- Reviewed; recommend denial for the following reasons:
- Require additional information to review. (Please list information required)
- Meeting requested.
- Comments. (Attach additional pages as needed)



 Reviewed By:

3.30.22

 Date:



COMMUNITY DEVELOPMENT LAND USE APPLICATION REFERRAL

REFERRAL TO: City Manager Dan Weinheimer

The enclosed material has been referred to you for your information and comment. Any comments you wish to make should be returned to the Community Development Department prior to: April 7, 2022. Please refer questions and comments to Doug Rux.

NOTE: Full size plans are available at the Community Development Department Office.

APPLICANT: 3J Consulting, Inc C/O Mercedes Serra
REQUEST: Crestview Green- 14 SF & 96 Townhomes
SITE ADDRESS: 4813 & 4821 E Portland Rd
LOCATION:
TAX LOT: R3216 00900
FILE NO: CUP22-0001/ PUD22-0001
ZONE: R-1, R-2, C-2 (General Commercial)
HEARING DATE: N/A



A Copy of the Fairfield Inn Design Review can be found at: [Crestview Green CUP22-0001/PUD22-0001 | Newberg Oregon](#)

- Reviewed, no conflict.
- Reviewed; recommend denial for the following reasons:
- Require additional information to review. (Please list information required)
- Meeting requested.
- Comments. (Attach additional pages as needed)

with warranty on PIT
[Signature]

 Reviewed By:

3/26/22

 Date:



COMMUNITY DEVELOPMENT LAND USE APPLICATION REFERRAL

The enclosed material has been referred to you for your information and comment. Any comments you wish to make should be returned to the Community Development Department prior to: April 7, 2022. Please refer questions and comments to Doug Rux.

NOTE: Full size plans are available at the Community Development Department Office.

APPLICANT: 3J Consulting, Inc C/O Mercedes Serra
REQUEST: Crestview Green- 14 SF & 96 Townhomes
SITE ADDRESS: 4813 & 4821 E Portland Rd
LOCATION:
TAX LOT: R3216 00900
FILE NO: CUP22-0001/ PUD22-0001
ZONE: R-1, R-2, C-2 (General Commercial)
HEARING DATE: N/A

A Copy of the Fairfield Inn Design Review can be found online at:
<https://www.newbergoregon.gov/cd/page/crestview-green-cup22-0001pud22-0001>

- Reviewed, no conflict.
- Reviewed; recommend denial for the following reasons:
- Require additional information to review. (Please list information required)
- Meeting requested.
- Comments. (Attach additional pages as needed)

Reviewed By:

Date:



COMMUNITY DEVELOPMENT
LAND USE APPLICATION REFERRAL

REFERRAL TO: Finance Barbara Davis

The enclosed material has been referred to you for your information and comment. Any comments you wish to make should be returned to the Community Development Department prior to: April 7, 2022. Please refer questions and comments to Doug Rux.

NOTE: Full size plans are available at the Community Development Department Office.

APPLICANT: 3J Consulting, Inc C/O Mercedes Serra

REQUEST: Crestview Green- 14 SF & 96 Townhomes

SITE ADDRESS: 4813 & 4821 E Portland Rd ← NO CITY LIENS

LOCATION: ↑ unable to locate

TAX LOT: R3216 00900

FILE NO: CUP22-0001/ PUD22-0001

ZONE: R-1, R-2, C-2 (General Commercial)

HEARING DATE: N/A



A Copy of the Fairfield Inn Design Review can be found at: [Crestview Green CUP22-0001/PUD22-0001 | Newberg Oregon](#)

- Reviewed, no conflict.
- Reviewed; recommend denial for the following reasons:
- Require additional information to review. (Please list information required)
- Meeting requested.
- Comments. (Attach additional pages as needed)

Barbara Davis
Reviewed By:

3/28/2022
Date:



**City of Newberg
Interest In Real Property**

**Internal Municipality Use Only,
Not Valid for Commercial Title Search**

This document serves as constructive notice of the
City of Newberg's interest in the real property identified below.

Property Address 4821 E PORTLAND RD

Zone C-2

Maptaxlot Number 03S02W16 00900

Search performed by **Barbara Davis** of **City of Newberg** on Mar 28, 2022 at 08:44:42 A.M. PDT

Tracking Number: 2088277

Access PIN: 3852

No items found for this property





COMMUNITY DEVELOPMENT LAND USE APPLICATION REFERRAL

The enclosed material has been referred to you for your information and comment. Any comments you wish to make should be returned to the Community Development Department prior to: April 7, 2022. Please refer questions and comments to Doug Rux.

NOTE: Full size plans are available at the Community Development Department Office.

APPLICANT: 3J Consulting, Inc C/O Mercedes Serra
REQUEST: Crestview Green- 14 SF & 96 Townhomes
SITE ADDRESS: 4813 & 4821 E Portland Rd
LOCATION:
TAX LOT: R3216 00900
FILE NO: CUP22-0001/ PUD22-0001
ZONE: R-1, R-2, C-2 (General Commercial)
HEARING DATE: N/A

A Copy of the Fairfield Inn Design Review can be found online at:
<https://www.newbergoregon.gov/cd/page/crestview-green-cup22-0001pud22-0001>

- Reviewed, no conflict.
- Reviewed; recommend denial for the following reasons:
- Require additional information to review. (Please list information required)
- Meeting requested.
- Comments. (Attach additional pages as needed)

Reviewed By:

Date:

Hello,

ODOT Rail Crossing No. P-751.00, USDOT 754149W

Thank you for forwarding the link to the development plans. While this development is fairly far away from the Benjamin Rd rail crossing it will now open up traffic from this development as well as the larger development directly adjacent to it, is the other development approximately 500 homes if I recall correctly, which is several hundred homes as well. The rail crossing at Benjamin Rd is a passive crossing and bad curvature connecting into the corner of Springbrook Road. Has the developer of both developments or City calculated the increase in traffic, AADT, across the Benjamin Rd rail crossing if the proposed road is added to Benjamin Road and what would that be? ODOT Rail suggests making the new road E Willakenzie Street an emergency only access and have the development access thru the other new development to the signalized intersection at E Crestview Drive/Providence Drive. The increase in traffic to the Benjamin Road rail crossing could cause issues with safety at the rail crossing and also could cause a lot of damage to the crossing with the angles of the current roadways to the crossing. I have observed many vehicles not stopping at the stop signs currently. With the potential increase in traffic suggest following the FHWA grade crossing handbook. The link <https://safety.fhwa.dot.gov/hsip/xings/> should give the City/developer a better idea for thresholds from going from a passive rail crossing to an active rail crossing. See the Railroad-Highway Grade Crossing Handbook pdf half way down the page. I was looking in the Railroad-Highway Grade Crossing Handbook for the threshold levels and I believe page 148 and 149 should be reviewed, and also specifically page 149 section 4.b.iv regarding AADT. "Annual average daily traffic (AADT) exceeds 2,000 in urban areas or 500 in rural areas." This would be similar to the River Road and College Street rail crossing discussion we've had in the past about adding traffic to a passive rail crossing. Without holding a diagnostic meeting this is the best information I can give at this time. I have included two pictures from the ODOT TransGIS and Google maps below to help show what we're discussing.

If you have any further questions please let me know and I will be happy to discuss more.

Thank you,

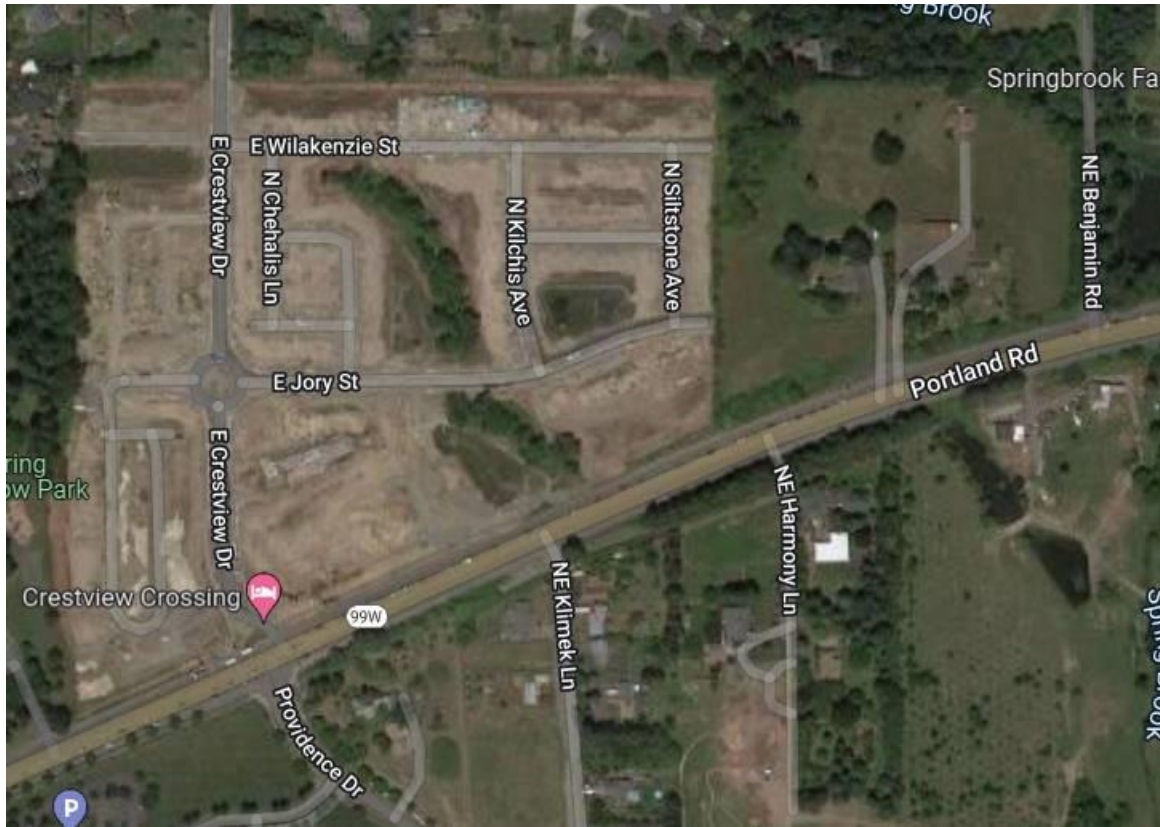
Carrie Martin

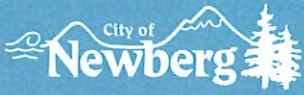
ODOT Rail

Crossing Compliance Specialist

Carrie.A.Martin@odot.oregon.gov

(Cell) 971-719-0906





COMMUNITY DEVELOPMENT LAND USE APPLICATION REFERRAL

REFERRAL TO: Police Department Chief Jeff Kosmicki

The enclosed material has been referred to you for your information and comment. Any comments you wish to make should be returned to the Community Development Department prior to: April 7, 2022. Please refer questions and comments to Doug Rux.

NOTE: Full size plans are available at the Community Development Department Office.

APPLICANT: 3J Consulting, Inc C/O Mercedes Serra
REQUEST: Crestview Green- 14 SF & 96 Townhomes
SITE ADDRESS: 4813 & 4821 E Portland Rd
LOCATION:
TAX LOT: R3216 00900
FILE NO: CUP22-0001/ PUD22-0001
ZONE: R-1, R-2, C-2 (General Commercial)
HEARING DATE: N/A



A Copy of the Fairfield Inn Design Review can be found at: [Crestview Green CUP22-0001/PUD22-0001 | Newberg Oregon](#)

- Reviewed, no conflict.
- Reviewed; recommend denial for the following reasons:
- Require additional information to review. (Please list information required)
- Meeting requested.
- Comments. (Attach additional pages as needed)



 Reviewed By:



 Date:



COMMUNITY DEVELOPMENT LAND USE APPLICATION REFERRAL

REFERRAL TO: Director of Public Works Russ Thomas

The enclosed material has been referred to you for your information and comment. Any comments you wish to make should be returned to the Community Development Department prior to: April 7, 2022. Please refer questions and comments to Doug Rux.

NOTE: Full size plans are available at the Community Development Department Office.

APPLICANT: 3J Consulting, Inc C/O Mercedes Serra
REQUEST: Crestview Green- 14 SF & 96 Townhomes
SITE ADDRESS: 4813 & 4821 E Portland Rd
LOCATION:
TAX LOT: R3216 00900
FILE NO: CUP22-0001/ PUD22-0001
ZONE: R-1, R-2, C-2 (General Commercial)
HEARING DATE: N/A



A Copy of the Fairfield Inn Design Review can be found at: [Crestview Green CUP22-0001/PUD22-0001 | Newberg Oregon](#)

- Reviewed, no conflict.
- Reviewed; recommend denial for the following reasons:
- Require additional information to review. (Please list information required)
- Meeting requested.

Comments. (Attach additional pages as needed) - ^① ALL WATER, SEWER, & STORM UTILITY CONSTRUCTION PLANS TO BE SUBMITTED TO PUBLIC WORKS ENGINEERING FOR APPROVAL PRIOR TO ANY CONSTRUCTION, & PROPER PERMITS TO BE ISSUED PRIOR TO ANY CONSTRUCTION!


 Reviewed By:

3/29/2022
 Date:

OVER
 #2
 Comment

② EASEMENTS FOR PUBLIC UTILITIES IN PRIVATE STREETS TO BE SHOWN & DEDICATED TO THE CITY PRIOR TO COMPLETION OF PROJECT.





COMMUNITY DEVELOPMENT LAND USE APPLICATION REFERRAL

REFERRAL TO: Public Works: Maintenance Vance Barton

The enclosed material has been referred to you for your information and comment. Any comments you wish to make should be returned to the Community Development Department prior to: April 7, 2022. Please refer questions and comments to Doug Rux.

NOTE: Full size plans are available at the Community Development Department Office.

APPLICANT: 3J Consulting, Inc C/O Mercedes Serra
REQUEST: Crestview Green- 14 SF & 96 Townhomes
SITE ADDRESS: 4813 & 4821 E Portland Rd
LOCATION:
TAX LOT: R3216 00900
FILE NO: CUP22-0001/ PUD22-0001
ZONE: R-1, R-2, C-2 (General Commercial)
HEARING DATE: N/A



A Copy of the Fairfield Inn Design Review can be found at: [Crestview Green CUP22-0001/PUD22-0001 | Newberg Oregon](#)

- Reviewed, no conflict.
 Reviewed; recommend denial for the following reasons:
 Require additional information to review. (Please list information required)
 Meeting requested.
 Comments. (Attach additional pages as needed)

Vance Barton
Reviewed By:

4/11/2022
Date:



COMMUNITY DEVELOPMENT LAND USE APPLICATION REFERRAL

REFERRAL TO: Public Works: Waste Water Plant April Catan

The enclosed material has been referred to you for your information and comment. Any comments you wish to make should be returned to the Community Development Department prior to: April 7, 2022. Please refer questions and comments to Doug Rux.

NOTE: Full size plans are available at the Community Development Department Office.

APPLICANT: 3J Consulting, Inc C/O Mercedes Serra
REQUEST: Crestview Green- 14 SF & 96 Townhomes
SITE ADDRESS: 4813 & 4821 E Portland Rd
LOCATION:
TAX LOT: R3216 00900
FILE NO: CUP22-0001/ PUD22-0001
ZONE: R-1, R-2, C-2 (General Commercial)
HEARING DATE: N/A



A Copy of the Fairfield Inn Design Review can be found at: [Crestview Green CUP22-0001/PUD22-0001 | Newberg Oregon](#)

- Reviewed, no conflict.
- Reviewed; recommend denial for the following reasons:
- Require additional information to review. (Please list information required)
- Meeting requested.
- Comments. (Attach additional pages as needed)

[Signature]
Reviewed By: -

3/28/22
Date:



COMMUNITY DEVELOPMENT
LAND USE APPLICATION REFERRAL

The enclosed material has been referred to you for your information and comment. Any comments you wish to make should be returned to the Community Development Department prior to: April 7, 2022. Please refer questions and comments to Doug Rux.

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HEARING DATE: N/A



A Copy of the Fairfield Inn Design Review can be found online at:
<https://www.newbergoregon.gov/cd/page/crestview-green-cup22-0001pud22-0001>

- Reviewed, no conflict.
- Reviewed; recommend denial for the following reasons:
- Require additional information to review. (Please list information required)
- Meeting requested.
- Comments. (Attach additional pages as needed)



Reviewed By: **Scott Albert - Network Engineer**
ZiPLY Fiber

3/25/22

Date:



COMMUNITY DEVELOPMENT LAND USE APPLICATION REFERRAL

REFERRAL TO: Public Works: Maintenance Superintendent Craig Pack

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- Meeting requested.
- Comments. (Attach additional pages as needed)

- Vector access

*- Tract A & B
Detention Pond
is to be privately
owned & maintained*

*- 2 stormwater
ceptors 1 Before
one after the pond
- site line issues*

Reviewed By:

4/4/22
Date:



COMMUNITY DEVELOPMENT LAND USE APPLICATION REFERRAL

REFERRAL TO: PWM Supervisor Carl Ramseyer

The enclosed material has been referred to you for your information and comment. Any comments you wish to make should be returned to the Community Development Department prior to: April 7, 2022. Please refer questions and comments to Doug Rux.

NOTE: Full size plans are available at the Community Development Department Office.

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REQUEST: Crestview Green- 14 SF & 96 Townhomes
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TAX LOT: R3216 00900
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ZONE: R-1, R-2, C-2 (General Commercial)
HEARING DATE: N/A

A Copy of the Fairfield Inn Design Review can be found at: [Crestview Green CUP22-0001/PUD22-0001 | Newberg Oregon](#)

- Reviewed, no conflict.
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- Require additional information to review. (Please list information required)
- Meeting requested.
- Comments. (Attach additional pages as needed)

Carl Ramseyer
Reviewed By:

4/5/22
Date:



COMMUNITY DEVELOPMENT LAND USE APPLICATION REFERRAL

REFERRAL TO: Yamhill Co. Roads Dept. Yamhill County Courthouse

The enclosed material has been referred to you for your information and comment. Any comments you wish to make should be returned to the Community Development Department prior to: April 7, 2022. Please refer questions and comments to Doug Rux.

NOTE: Full size plans are available at the Community Development Department Office.

APPLICANT: 3J Consulting, Inc C/O Mercedes Serra
REQUEST: Crestview Green- 14 SF & 96 Townhomes
SITE ADDRESS: 4813 & 4821 E Portland Rd
LOCATION:
TAX LOT: R3216 00900
FILE NO: CUP22-0001/ PUD22-0001
ZONE: R-1, R-2, C-2 (General Commercial)
HEARING DATE: N/A



A Copy of the Fairfield Inn Design Review can be found at: [Crestview Green CUP22-0001/PUD22-0001 | Newberg Oregon](#)

- Reviewed, no conflict.
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- Require additional information to review. (Please list information required)
- Meeting requested.
- Comments. (Attach additional pages as needed)


Reviewed By:

4-6-22
Date:



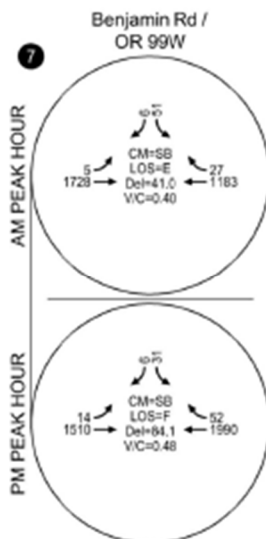
Yamhill County

Public Works Department
2060 NE Lafayette Avenue, McMinnville, OR 97128
Ph. 503.434.7515 Fax 503.472.4068 E-mail: pubwork@co.yamhill.or.us

DATE: April 6, 2022
TO: City of Newberg, Doug Rux
Crestview Greens – 14 SF & 96 Townhomes
FROM: Greg Haffner, Engineering Manager
RE: Land Use Hearing Comments for CUP22-0001/PUD22-0001

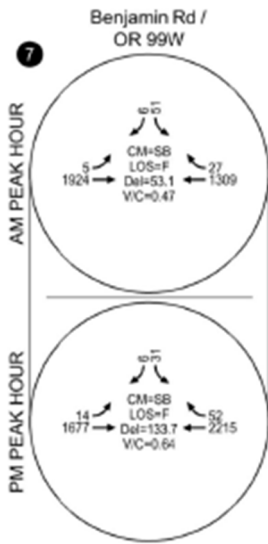
After review of the Crestview Greens TIA, and the developer's position to sever Benjamin Road from Hwy 99, we have the following comments in support of keeping a Right Only in from WB Hwy 99 with additional consideration of a Right Out onto Hwy 99 from SB Benjamin Road:

A review of the operations analysis contained in the Applicant's January 2022 Crestview Green TIA (TIA) for the OR99W / Benjamin Road intersection finds that the southbound movement on Benjamin Road experiences high delays resulting from the southbound left-turn movement. The following are the intersection traffic volumes from the TIA. **It is noted that there are no significant delays associated with the westbound right-turn movement.**



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

Figure
4



Year 2026 Background Traffic Conditions
Weekday AM and PM Peak Hours
Newberg, Oregon

Figure
6

The crash data contained in the Applicant’s TIA for the OR99W/Benjamin Road intersection finds there were a total of five (5) recorded crashes for the five years from January 1, 2015 through December 31, 2019. Based on TIA findings, the intersection crash rate is well below the respective statewide average crash rate for the intersection type, indicating there is not an intersection safety concern.

A detailed review of the intersection crash data finds that of the five crashes, four involved northbound left-turns from Benjamin Road to eastbound OR 99W, and one crash involved a westbound right-turn from OR 99W to northbound Benjamin Road.

Overall, the crash data indicates the intersection operates safely, noting the predominant crash type involves left-turn movements.

Right-Turn Lane Analysis – OR99W / Benjamin Road

Oregon Department of Transportation (ODOT) Analysis Procedures Manual (APM) Section 12.2.2 – Right-Turn Lane Criteria states, “A right-turn lane at an unsignalized intersection is to improve safety and to maximize the capacity of a roadway by reducing the speed differential between the right-turning vehicles and the other vehicles on the roadway.”

In part, the right-turn lane evaluation process indicates a right-turn lane should be installed, if Criterion 1 (Volume), 2 (Crash), or 3 (Special Cases) are met unless a subsequent evaluation eliminates it as an option. The following table summarizes the ODOT right-turn lane warrant analysis.

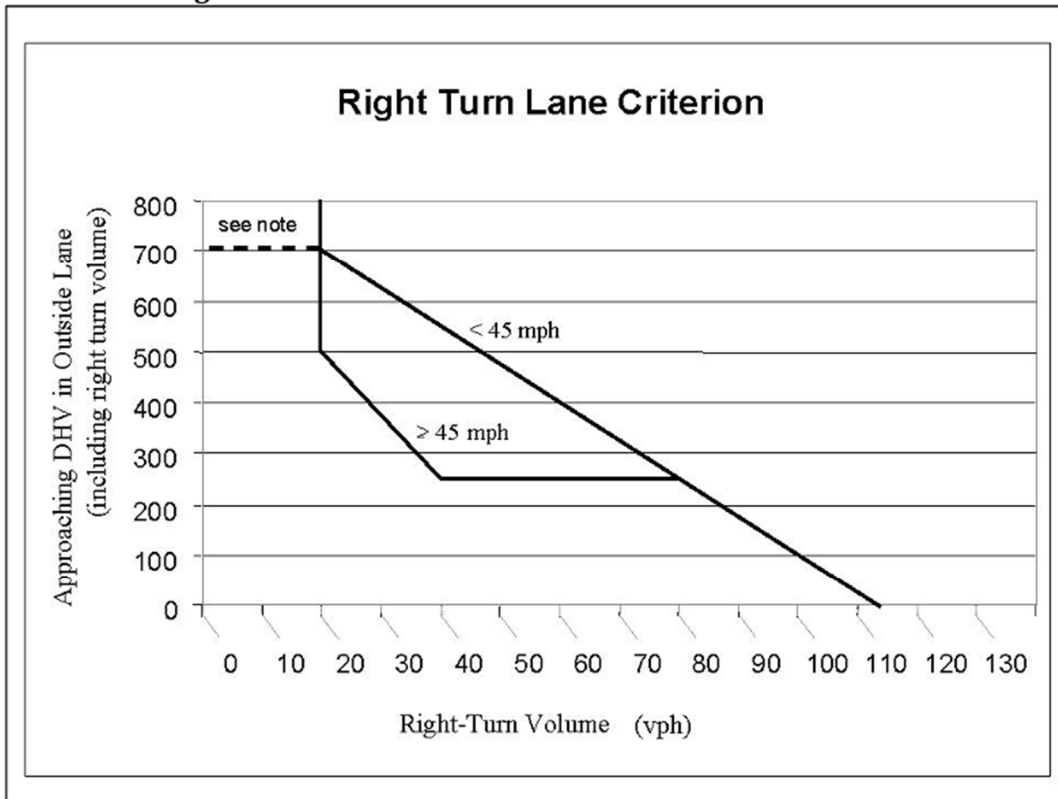
COUNTY COMMENTS RELATING TO IMPACTS TO BENJAMIN ROAD

County Comments relating to Impacts to Benjamin Road	Criterion Met?
County Comments relating to Impacts to Benjamin Road	<p>For the 2026 Background Conditions scenario, during the AM peak hour, there are ≈ 30 WB right-turning vehicles. Assuming 50% of the WB through volume is in the outside lane, the total approaching volume is ≈ 685 WB vehicles.</p> <p>During the PM peak hour, there are ≈ 55 WB right-turning vehicles. Assuming 50% of the WB through volume is in the outside lane, the total approaching volume is ≈ 1,160 WB vehicles.</p> <p>Based on the APM curve in Exhibit 12-2, and considering the high westbound approaching volume, a right-turn lane is needed. The criterion is met.</p>
County Comments relating to Impacts to Benjamin Road	<p>There is not a high crash frequency, there is not a significant history of recorded crashes that are susceptible to correction by a right-turn lane, nor do the safety benefits do not outweigh the improvement costs, but the installation of a right-turn lane could further minimize impacts to safety. Overall, the warrant criterion is not met.</p>
County Comments relating to Impacts to Benjamin Road	<p>The only applicable portion of Criterion 3 is related to geometric/safety concerns. Given that there is only one right-turn crash recorded for five years from January 1, 2015, through December 31, 2019 and there is adequate intersection sight distance, the criterion is not met.</p>

The ODOT APM Right-Turn Evaluation Guidelines state:

1. The **evaluation** should indicate that the installation of a right-turn lane will improve the overall safety and/or operation of the intersection and the roadway. If these requirements are not met, the right turn lane should not be installed or, if already in place, should be reevaluated for continued use.
2. **Alternatives Considered:** Lit all alternatives that were considered, including alternative locations. Briefly discuss alternatives to the right turn lane considered to diminish congestion/delays resulting in criteria being met.
3. **Access Management:** Address access management issues such as the long-term access management strategy for the state roadway, spacing standards, other accesses that may be located nearby, breaks in barrier/curb, etc.
4. **Land Use Concerns:** Include how the proposed right turn lane addresses land use concerns and transportation plans.
5. **Plan:** Include a plan or diagram of the proposed location of the right turn lane.
6. **Operational Requirements:** Consider storage length requirements, deceleration distance, desired alignment distance, etc. For signalized intersections, installing a right turn lane must be consistent with the requirements in the Traffic Signal Guidelines.

Exhibit 12-2 Right Turn Lane Criterion



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

Overall, Criterion 1 of the ODOT APM right-turn evaluation process is met regarding the installation of a right-turn lane given the high westbound approaching volume. However, considering the low intersection crash history (noting only one recorded crash was susceptible to correction by a right-turn lane); the future Newberg-Dundee bypass improvements will significantly reduce westbound traffic volumes on this section of OR 99W thereby making a separate right-turn lane unnecessary; and that there are environmental/wetland impacts associated with the construction of an additional right- turn lane, a separate right-turn lane is not recommended.

While the Applicant is proposing to eliminate the Benjamin Road connection to OR 99W, this creates unnecessary out-of-direction travel for many existing and future vehicle movements – including those associated with the applicant’s development. Overall, eliminating the intersection would not demonstrably benefit the roadway system, noting that it would further increase traffic volumes at the OR 99W/Crestview Drive/Providence Drive intersection which is identified as exceeding agency mobility targets.

Rather, if environmental/wetland impacts or safety issues are of concern, it is recommended that the OR 99W/Benjamin Road intersection left-turn movements be eliminated via the installation of a non-traversable median in OR 99W. With these improvements in place, it is anticipated the

intersection will function safely and efficiently, and within acceptable mobility targets while continuing to allow right-turn movements until the Newberg-Dundee bypass improvements are constructed. When those improvements are constructed, including the potential construction of the future Jory Road, the OR 99W/Benjamin Road intersection operations can be reevaluated to determine if allowing left-turn movements can be allowed.

Another thought on the OR 99W/Benjamin Road intersection issue...

If intersection left-turns are eliminated and a non-traversable median is installed in OR 99W, the Hwy 99 median area can be narrowed, and the westbound lane striping can be 'shifted over' far enough to create a separate right-turn deceleration lane (and even a right-turn acceleration lane if necessary). This solution should address any ODOT concerns that a right-turn lane is necessary for the near-term until the bypass is constructed. See draft example of the re-striping of Hwy 99.

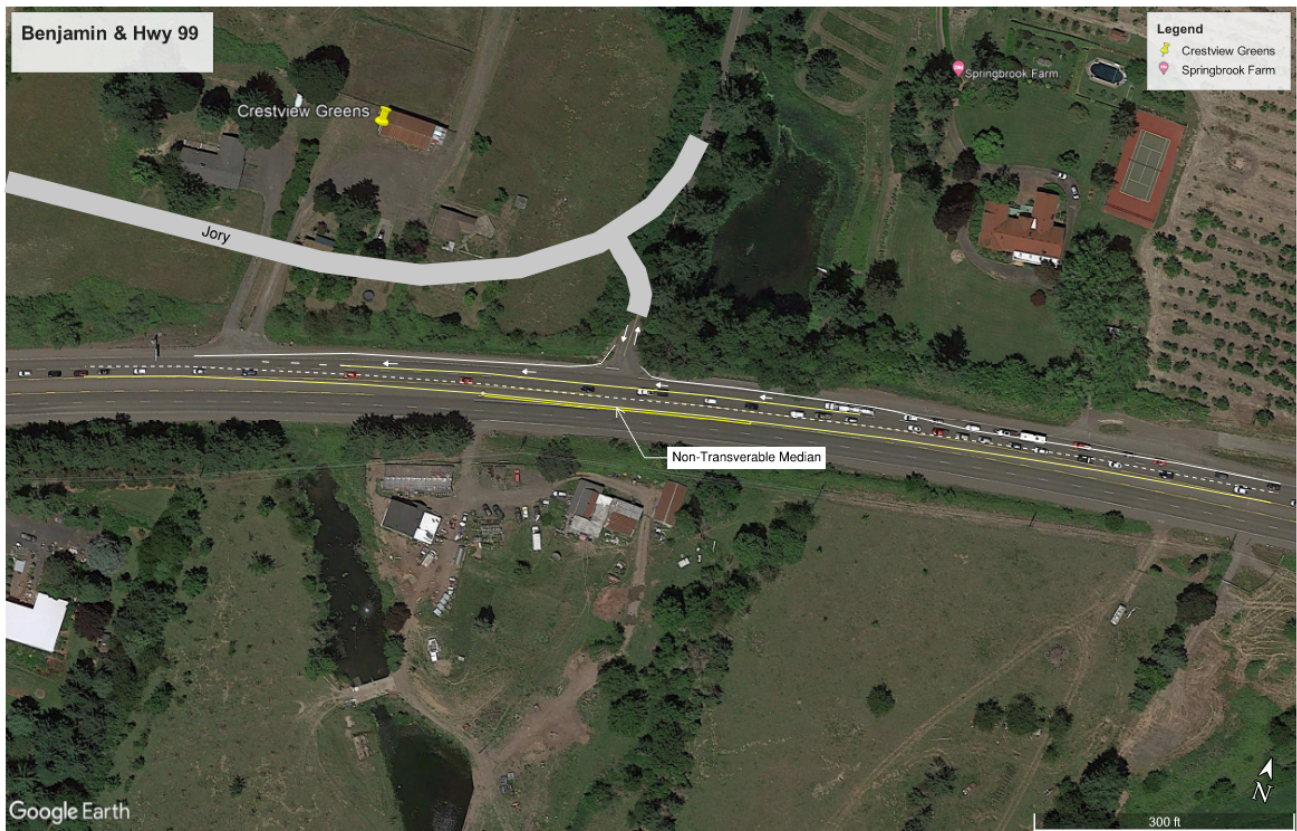


Figure 1 Hwy 99 narrowing of median to allow for a WB deceleration lane

Thank you for the opportunity to provide comments on this development project.