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8th Street Subdivision Transportation Impact Study St Helens, Oregon

Date:

September 27, 2021

Prepared for:

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RENEWS: 12.31.21

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Executive Summary

1. A 66-lot subdivision is proposed to be located on tax lot 5133-00-00700 near the northern city limits in St Helens, Oregon. accesses that will be extensions of existing N 8th Street and N 9th Street.
2. The trip generation calculations show that the proposed development is projected to generate 49 morning peak hour trips, 65 evening peak hour trips, and 624 new average weekday trips.
3. No significant trends or crash patterns were identified at any of the study intersections that would be affected by the proposed development. Accordingly, no safety mitigation is recommended per the crash data analysis.
4. Intersection sight distance is available at both site accesses on Deer Island Road. Accordingly, no sight distance related mitigation is necessary or recommended.
5. Preliminary traffic signal warrants are not projected to be met any of the unsignalized study intersections upon full buildout of the proposed development. Accordingly, no related mitigation is necessary or recommended.
6. Left-turn lanes are not projected to be met at the site access intersections upon full buildout of the proposed development. Accordingly, no related mitigation is necessary or recommended.
7. All study intersections are currently operating acceptably per jurisdictional standards and are projected to continue operating acceptably through the 2023 site buildout year.



Project Description

Introduction

A 66-lot subdivision is proposed to be located on tax lot 5133-00-00700 near the northern city limits in St Helens, Oregon. The development will have two site accesses that will be extensions of existing N 8th Street and N 9th Street.

Based on correspondence with City of St Helens and ODOT and each jurisdictions' requirements, the report conducts safety and capacity/level of service analyses at the following intersections:

1. Deer Island Road at N 9th Street (site access)
2. Deer Island Road at N 8th Street (site access)
3. Deer Island Road at US-30
4. Columbia Boulevard at 12th Street
5. Columbia Boulevard at US-30

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

Location Description

The subject property is located north of Deer Island Road and east of US-30. The proposed development includes roadway extensions of N 8th Street and N 9th Street. Figure 1 on the following page shows the site vicinity with the subject site highlighted in blue.





Figure 1: Vicinity Map

Vicinity Streets

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

Table 1: Vicinity Roadway Descriptions

Street Name	Jurisdiction	Functional Classification	Cross-Section	Speed (MPH)	Curbs & Sidewalks	On-Street Parking	Bicycle Facilities
Deer Island Road	City of St Helens	Minor Arterial	2 lanes	25 mph posted	Partial South side	Not Permitted	Both Sides
N 9 th Street	City of St Helens	Local Street	2 lanes	25 mph statutory	None	Permitted	None
N 8 th Street	City of St Helens	Local Street	2 lanes	25 mph statutory	Partial both sides	Permitted	None
US-30	ODOT	Statewide Highway	5 lanes	35-45 mph posted	West Side, Partial East Side	Not Permitted	Both Sides
12 th Street	City of St Helens	Collector	2 lanes	25 mph posted	Partial both sides	Partially Permitted	None
Columbia Boulevard	City of St Helens	Minor Arterial/Collector	2-3 lanes	20 mph posted	Both sides	Partially Permitted	Partial

Study Intersections

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

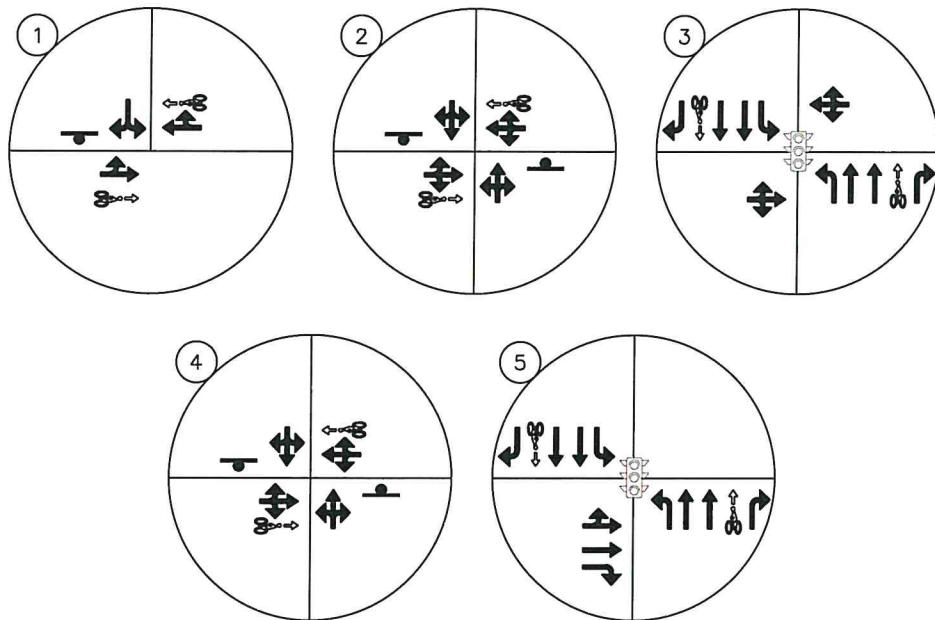
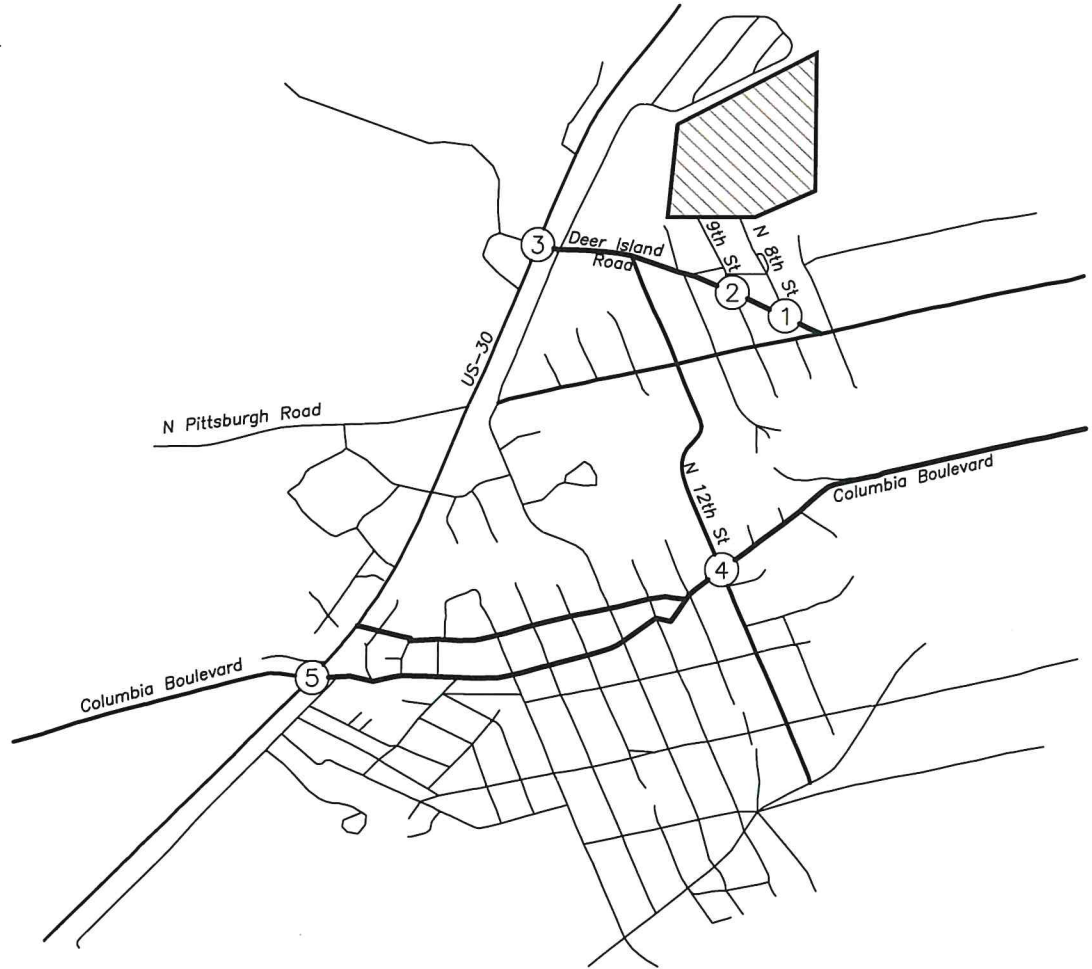
Table 2: Study Intersection Configurations

Intersection		Geometry	Traffic Control	Phasing/Stopped Approaches
1	Deer Island Road at N 9th Street (site access)	Four-Legged	Stop Controlled	NB/SB Stop-Controlled
2	Deer Island Road at N 8th Street (site access)	Three-Legged	Stop Controlled	SB Stop-Controlled
3	Deer Island Road at US-30	Four-Legged	Traffic Signal	Protected NB/SB Lefts, Permitted WB/EB Lefts
4	Columbia Boulevard at 12th Street	Four-Legged	Stop Controlled	NB/SB Stop-Controlled
5	Columbia Boulevard at US-30	Four-Legged	Traffic Signal	Protected NB/SB Lefts

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

LEGEND

-  STUDY INTERSECTION
-  STOP SIGN
-  TRAFFIC SIGNAL
-  BIKE LANE
-  PROJECT SITE
-  INTERSTATE
-  ARTERIAL ROADWAY
-  COLLECTOR ROADWAY
-  LOCAL ROADWAY



Site Trips

Trip Generation

To estimate the number of trips that are projected to be generated by the development, trip rates from the *Trip Generation Manual*¹ were used. Specifically, data from land use code 210, Single Family Detached Housing, was used to estimate the proposed development's trip generation based on the number of lots.

The trip generation calculations show that the proposed development is projected to generate 49 morning peak hour trips, 65 evening peak hour trips, and 624 new average weekday trips. The trip generation estimates are summarized in Table 3. Detailed trip generation calculations are included in the technical appendix.

Table 3: Trip Generation Summary

Land Use	ITE Code	Size	Morning Peak Hour			Evening Peak Hour			Weekday
			In	Out	Total	In	Out	Total	Total
Single Family Housing	210	66 lots	12	37	49	41	24	65	624

Trip Distribution

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

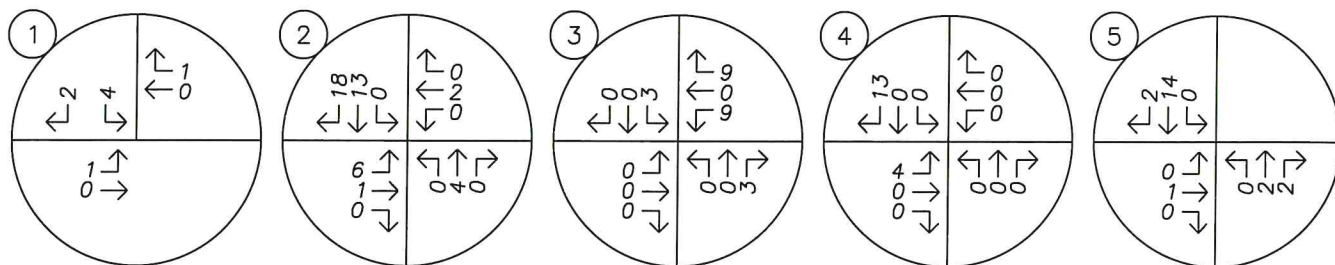
The following trip distribution is projected:

- Approximately 40 percent of trips will travel to/from the south along US-30
- Approximately 25 percent of trips will travel to/from the north along US-30
- Approximately 10 percent of trips will travel to/from the east along Columbia Boulevard
- Approximately 10 percent of trips will travel to/from local destinations within St Helens, specifically in the St Helens Street/Columbia Boulevard couplet
- Approximately 5 percent of trips will travel to/from the west along Columbia Boulevard
- Approximately 10 percent of trips will travel to/from the west along Pittsburgh Road

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

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



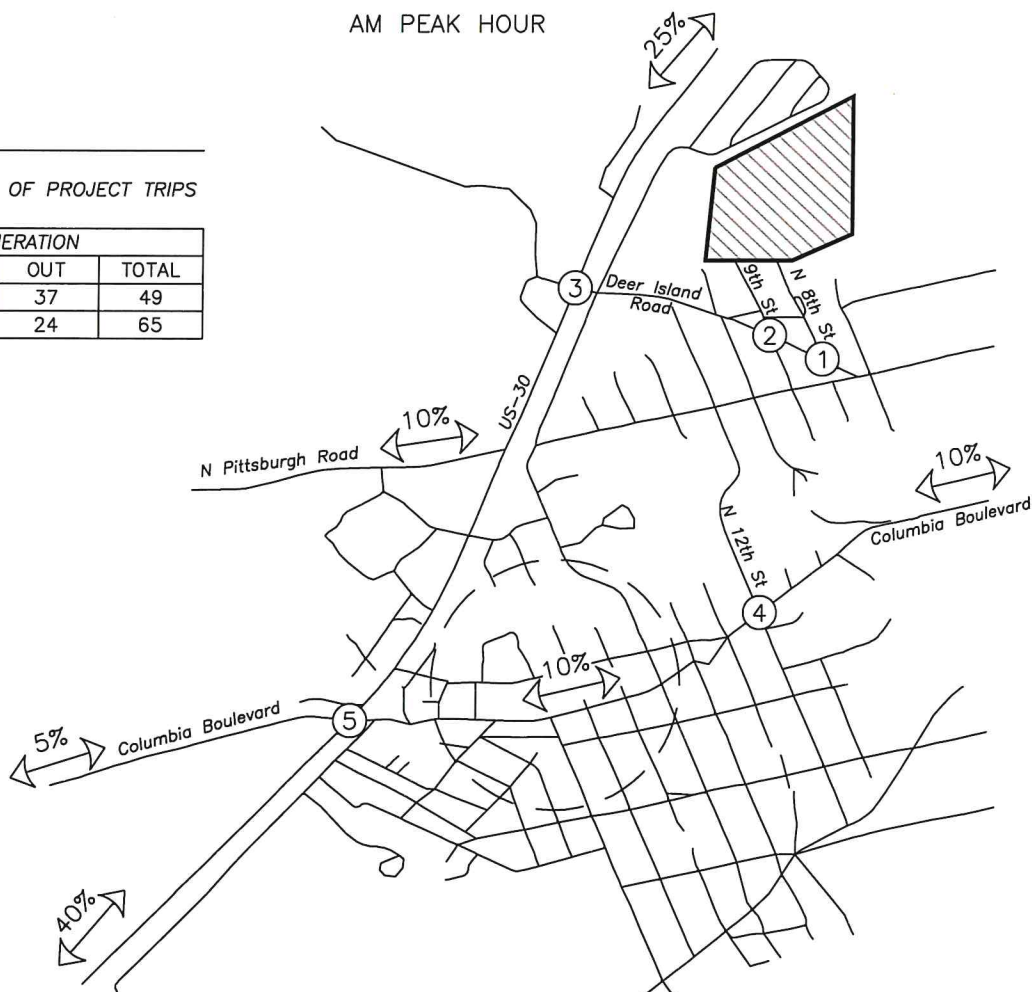


AM PEAK HOUR

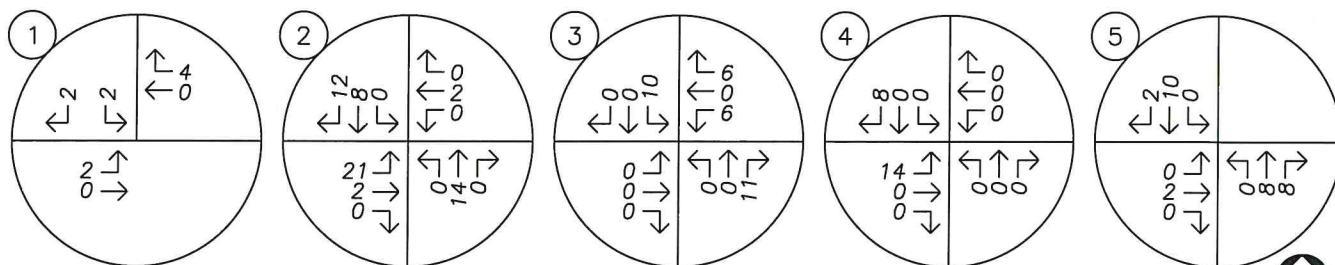
LEGEND

XX% PERCENT OF PROJECT TRIPS

TRIP GENERATION			
	IN	OUT	TOTAL
AM	12	37	49
PM	41	24	65



PM PEAK HOUR



no scale

Traffic Volumes

Existing Conditions

The ongoing COVID-19 pandemic is still causing a significant decrease in traffic due to closed or limited business operations and telecommuting. Therefore, adjustments are needed to reflect more normalized traffic conditions.

Traffic counts were collected at all study intersections during the morning (between 7:00 AM and 9:00 AM) and evening (between 4:00 PM and 6:00 PM) peak hours. To approximate year 2021 existing traffic volumes under “typical” conditions, recently collected counts were compared to counts collected at the intersection of US-30 at Columbia Boulevard in 2018 before the pandemic, which were adjusted to year 2021 volumes by adding a growth rate based on local and state methodology.

Since US-30 is under ODOT jurisdiction, traffic volumes were seasonally adjusted to reflect the 30th highest hour of traffic, as per procedures described in ODOT’s *Analysis Procedures Manual* (APM)². Using the ODOT’s Seasonal Trend Table³, a seasonal adjustment factor of 1.14 was calculated based on a Commuter seasonal trend and applied to the year 2018 traffic volumes. The adjustment factor was applied to through volumes on US-30.

A growth rate for through traffic along US-30 was derived using ODOT’s 2039 Future Volume Table in accordance with ODOT’s APM. Using data corresponding to milepost 28.58 and 29.48 of ODOT highway number 92, an average linear growth rate of 0.6 percent per year for the three-year scenario. For all other turning movements at the US-30 study intersection, a compounded growth rate of two percent per year was applied to the 2018 traffic volumes to approximate year 2021 existing conditions.

Since the year 2021 traffic counts were collected on a different date than the 2018, a seasonal adjustment factor was calculated for these counts as well. A seasonal adjustment factor of 1.02 was calculated for the recently collected counts based on a Commuter seasonal trend and applied to the year 2021 through highway volumes.

When comparing the calculated 2021 volumes to the recently collected counts, a COVID adjustment factor was calculated to be 1.35 for the morning peak hour and 1.24 for the evening peak hour. The factors were applied to the recently collected counts to estimate the year 2021 traffic volumes under “typical” conditions.

Figure 4 shows the existing traffic volumes at the study intersections during the morning and evening peak hours.

Background Conditions

To provide analysis of the impact of the proposed development on the existing transportation facilities, an estimation of future traffic volumes is required. To calculate future traffic volumes for the year 2023 conditions, the linear growth rate of 0.6 percent per year calculated using ODOT’s Future Volume Table was applied to through highway volumes. For all other turning movements at highway intersections and local intersection

² Oregon Department of Transportation, *Analysis Procedures Manual Version 2*. October 2020.

³ ODOT Seasonal Trend Table (Updated 7/20/2021)

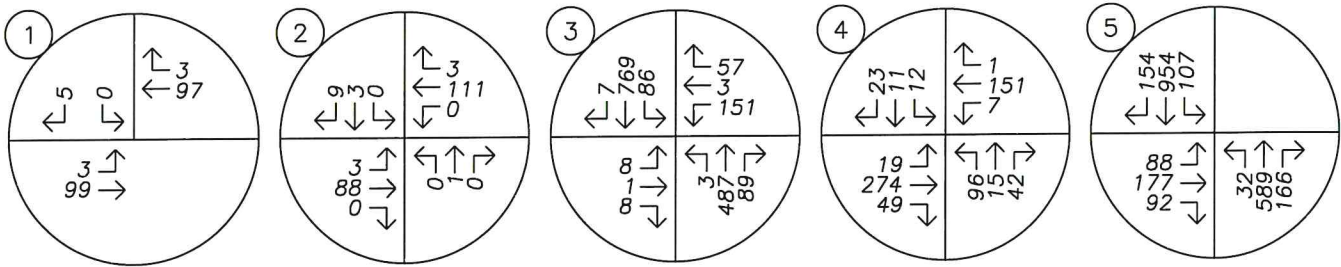
volumes, a compounded growth rate of two percent per year was applied. A build-out condition of two years was assumed.

Figure 5 shows the background traffic volumes at the study intersections during the morning and evening peak hours.

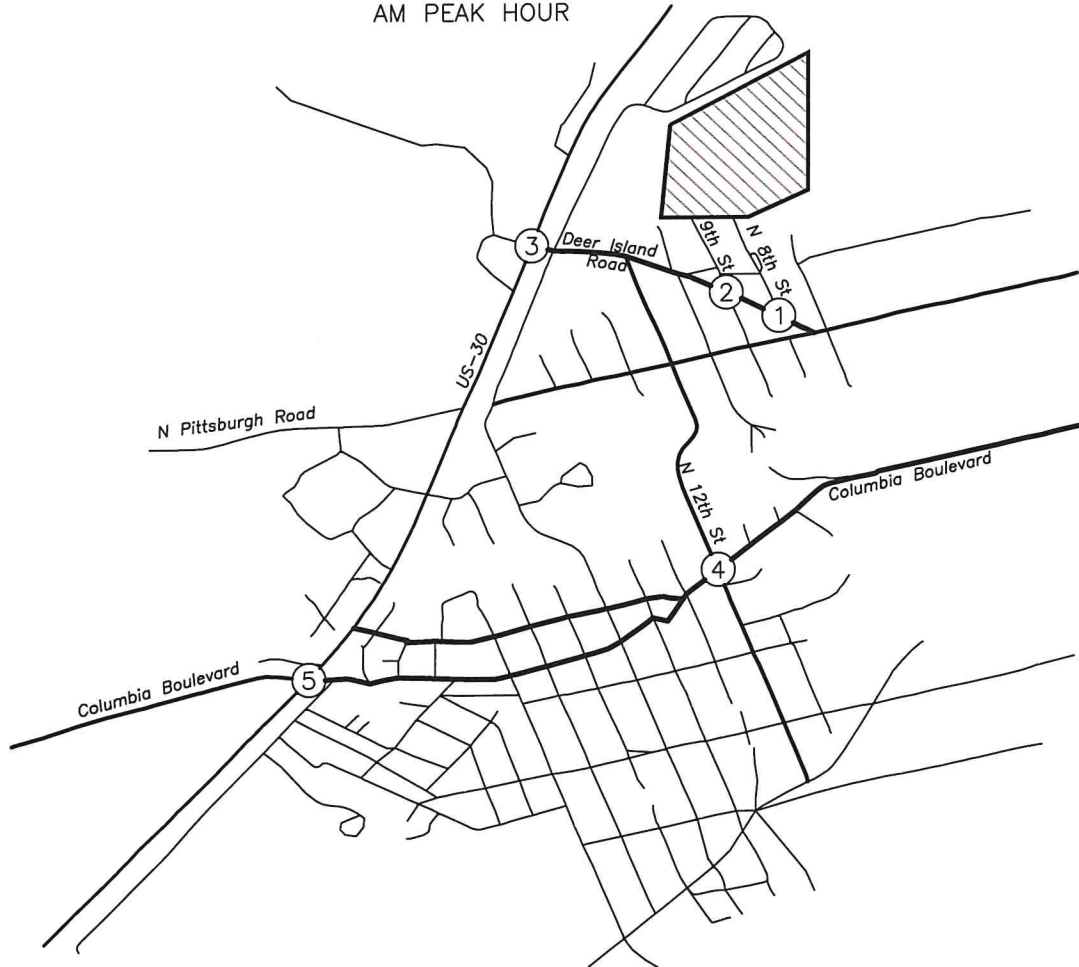
Buildout Conditions

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

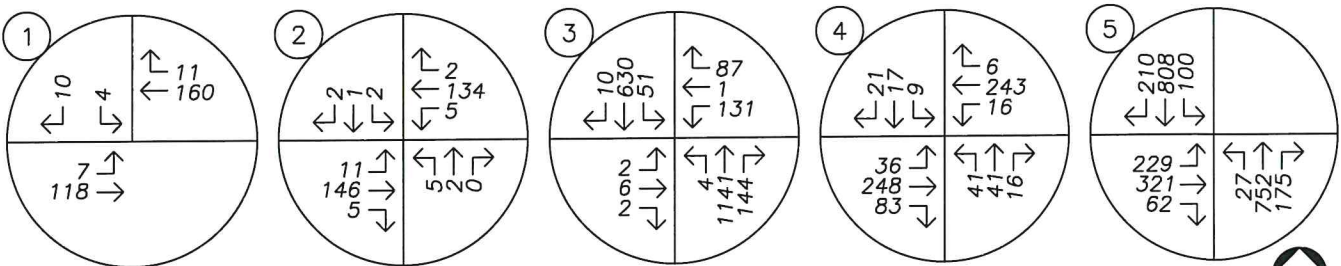
Figure 6 shows the buildout traffic volumes at the study intersections during the morning and evening peak hours.

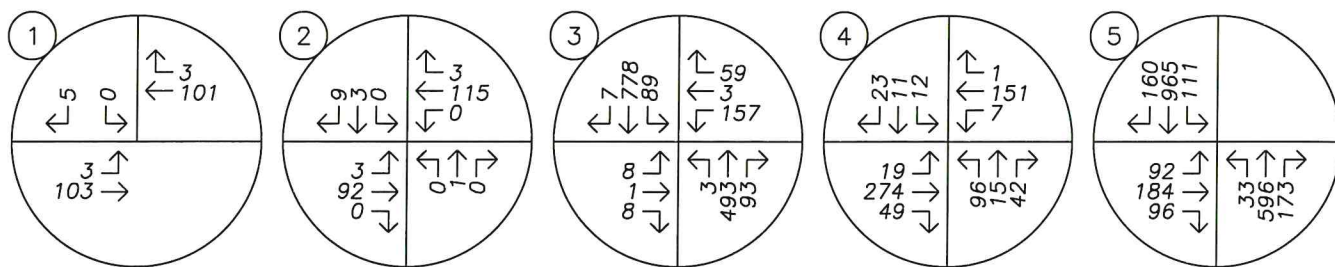


AM PEAK HOUR

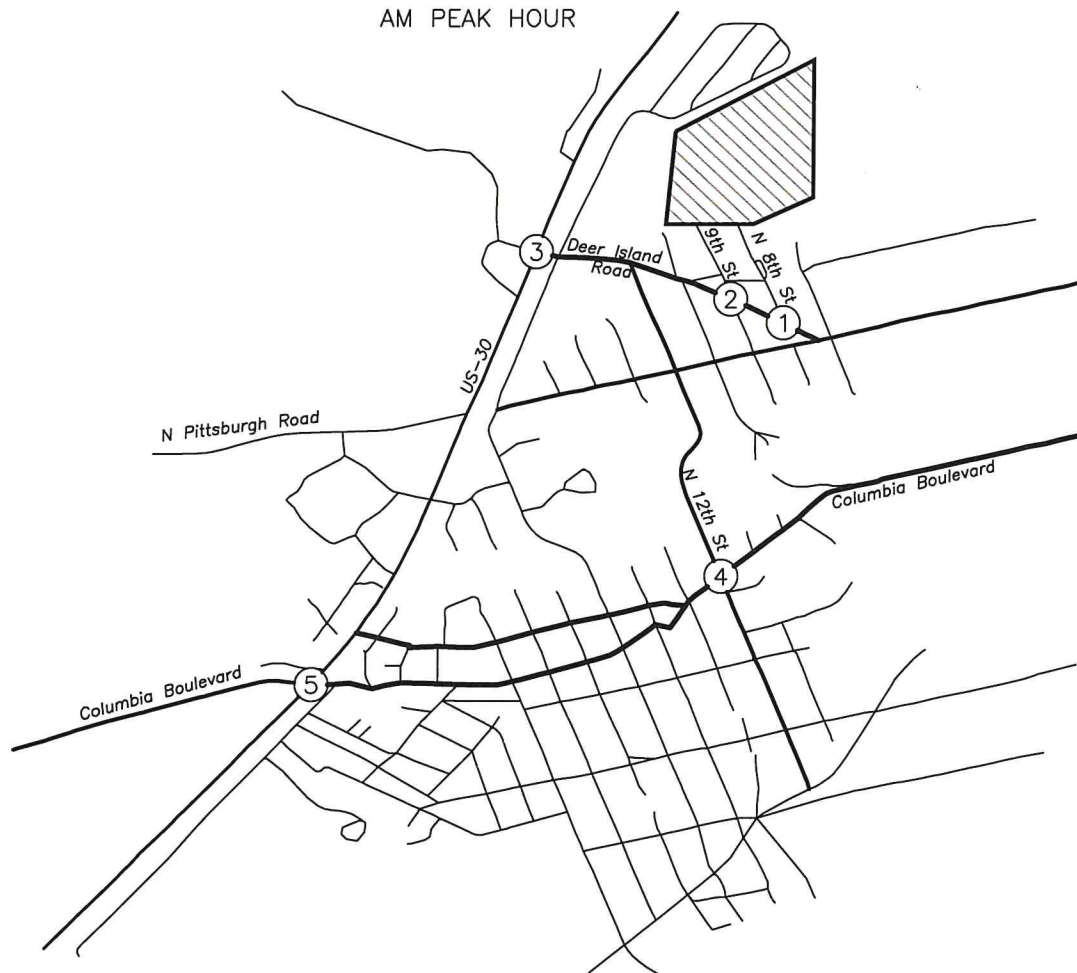


PM PEAK HOUR

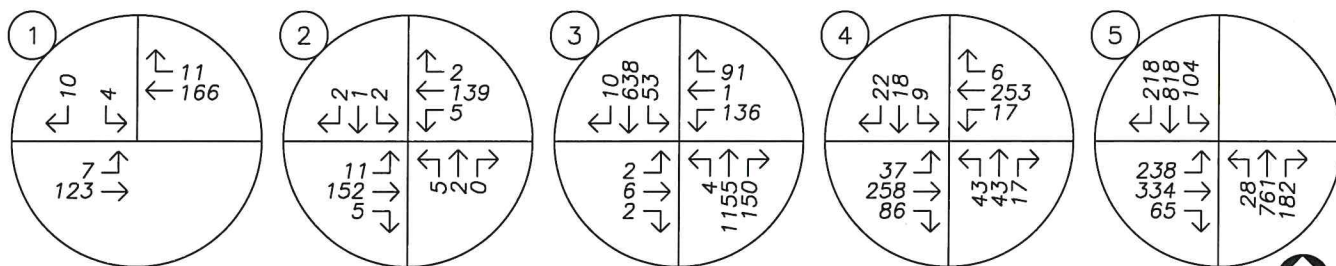




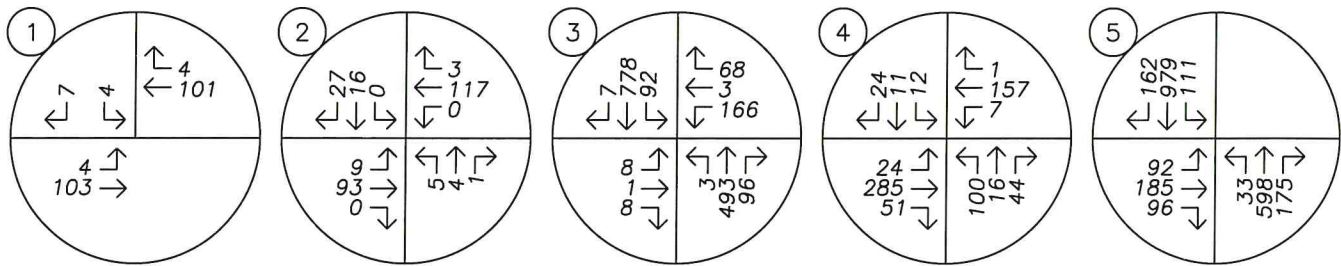
AM PEAK HOUR



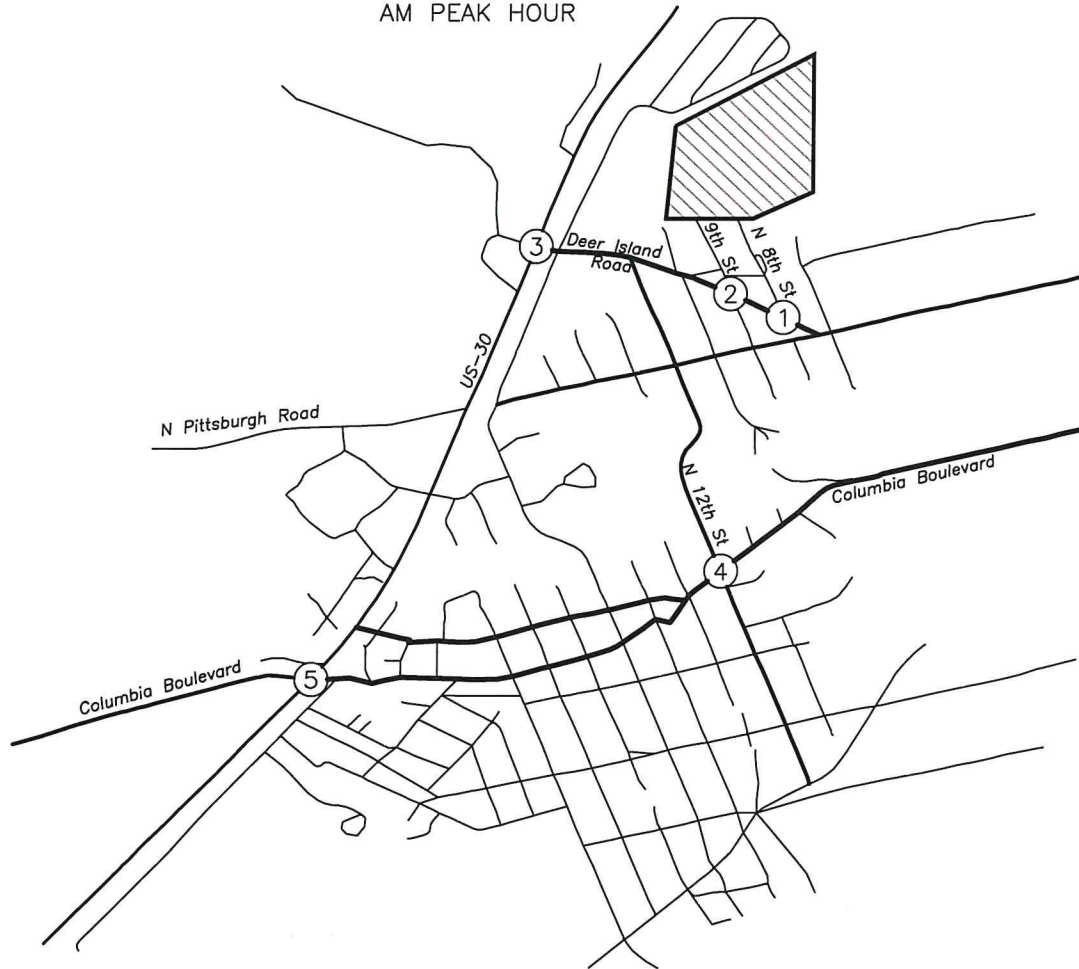
PM PEAK HOUR



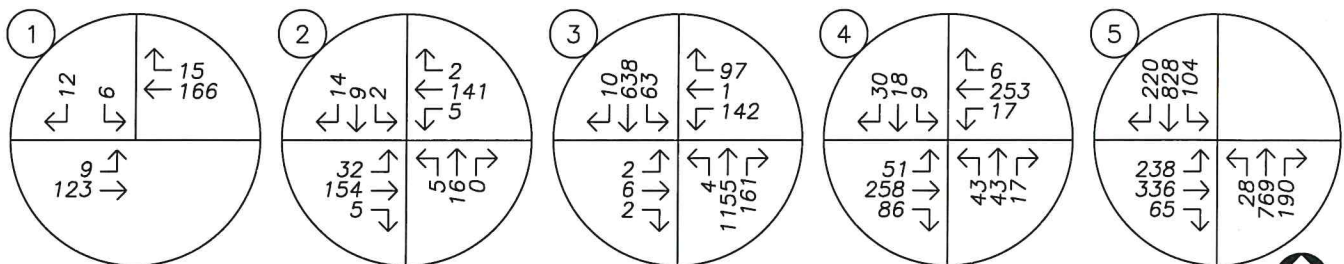
no scale



AM PEAK HOUR



PM PEAK HOUR



no scale

Safety Analysis

Crash History Review

Using data obtained from ODOT's Crash Data System, a review of approximately five years of the most recent available crash history (January 2015 through December 2019) was performed at the study intersections. The crash data was evaluated based on the number of crashes, the type of collisions, and the severity of the collisions. Crash severity is based on injuries sustained by people involved in the crash, and includes five categories:

- Property Damage Only (PDO)
- Possible Injury (Injury C)
- Non-Incapacitating Injury (Injury B)
- Incapacitating Injury (Injury A)
- Fatality or Fatal Injury

Crash rates provide the ability to compare safety risks at different intersections by accounting for both the number of crashes that have occurred during the study period and the number of vehicles that typically travel through the intersection. Crash rates were calculated using the common assumption that traffic counted during the evening peak period represents approximately 10 percent of the annual average daily traffic (ADT) at the intersection.

Since the study area includes intersections along US-30, calculated crash rates were compared with rates in ODOT's APM. According to *Exhibit 4-1: Intersection Crash Rates per MEV by Land Type and Traffic Control* of the APM, intersections which experience crash rates in excess of their respective 90th percentile crash rates should be "flagged for further analysis".

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

Table 4: Crash Type Summary

Intersection		Crash Type								Total Crashes
		Turn	Rear End	Angle	Fixed Object	Backing	Ped	Bike	Other	
1	Deer Island Road at N 9th Street	0	0	0	1	0	0	0	0	1
2	Deer Island Road at N 8th Street	0	0	0	0	0	0	0	0	0
3	Deer Island Road at US-30	1	8	0	0	0	1	0	0	10
4	Columbia Boulevard at 12th Street	0	1	0	0	0	3	0	0	4
5	Columbia Boulevard at US-30	3	8	2	1	1	0	3	0	18



Table 5: Crash Severity and Rate Summary

Intersection		Severity					Total Crashes	Peak Hour Volume	Crash Rate	ODOT 90 th %
		PDO	C	B	A	Fatal				
1	Deer Island Road at N 9th Street	1	0	0	0	0	1	310	0.18	0.408
2	Deer Island Road at N 8th Street	0	0	0	0	0	0	315	0	0.293
3	Deer Island Road at US-30	4	4	2	0	0	10	2,209	0.25	0.860
4	Columbia Boulevard at 12th Street	1	1	2	0	0	4	777	0.28	0.408
5	Columbia Boulevard at US-30	7	5	6	0	0	18	2,684	0.37	0.860

Crashes involving vulnerable users are described further below.

Deer Island Road at US-30

A pedestrian collision was reported which was caused by the pedestrian not yielding to the vehicle. The pedestrian sustained a non-incapacitating injury (Type B).

Columbia Boulevard at 12th Street

Three collisions involving pedestrians were reported at this intersection. Two pedestrian collisions were caused by vehicles not granting right-of-way to the pedestrian. One resulted in possible injury (Type C) to the pedestrian, and one resulted in non-incapacitating injury (Type B) to the pedestrian. A third pedestrian collision was caused by a reckless driver who did not stop at the stop sign. The pedestrian sustained a non-incapacitating injury (Type B).

Columbia Boulevard at US-30

Two bicycle collisions were caused vehicles completing a turning movement while driving distracted and not granting right-of-way to the cyclist. In both cases, the bicyclist involved sustained a non-incapacitating injury (Type B). A third bicycle collision was reported in which the cyclist struck the vehicle resulting in a possible injury (Type C).

Based on review of the most recent five years of available crash data, no significant trends or crash patterns were identified at any of study intersections that would be affected by the proposed development. In addition, none of the study intersections exhibit crash rates exceeding ODOT's 90th percentile rate. Accordingly, no safety mitigation is recommended per crash data analysis.

Sight Distance Evaluation

Sight distance at the proposed site access intersections of N 8th Street at Deer Island Road and N 9th Street at Deer Island Road was evaluated in accordance with the standards established in *A Policy of Geometric Design of*

*Highways and Streets*⁴. According to AASHTO, the driver's eye is assumed to be 14.5 feet from the near edge of the nearest travel lane of the intersecting street and at a height of 3.5 feet above the minor-street approach pavement. The vehicle driver's eye height along the major-street approach is assumed to be 3.5 feet above the cross-street pavement.

Deer Island Road is generally flat, with roadway grades less than 2 percent within the site vicinity. Based on the posted speed of 25 mph on Deer Island Road, the minimum recommended intersection sight distance is 280 feet.

Sight distance at N 9th Street was measured to exceed 300 feet to the east and west along Deer Island Road.

Sight distance at N 8th Street was measured to be approximately 290 feet to the east, to the intersection at West Street, and measured to exceed 300 feet to the west.

Based on the above measurements, intersection sight distance is available in either direction of the site access. Accordingly, no sight distance related mitigation is necessary or recommended.

Preliminary Traffic Signal Warrant Analysis

Traffic signal warrants were examined for all unsignalized intersections based on the methodologies in the Manual on Uniform Traffic Control Devices (MUTCD) published by the Federal Highway Administration in 2009. Volumes were used from the year 2022 buildout conditions. Warrant 1, Eight Hour Vehicular Volumes, was evaluated based on the common assumption that traffic counted during the evening peak hour represents ten percent of the ADT. Detailed information on the traffic signal warrant analysis is included in the attached appendix.

Preliminary traffic signal warrants are not projected to be met any of the unsignalized study intersections upon full buildout of the proposed development.

Left-Turn Lane Warrants

A left-turn refuge lane is primarily a safety consideration for the major-street, removing left-turning vehicles from the through traffic stream. The left-turn lane warrants were examined for the site access intersections on Deer Island Road using methodologies provided within the National Cooperative Highway Research Program's (NCHRP) Report 457. Turn lane warrants were evaluated based on the number of advancing and opposing vehicles as well as the number of turning vehicles, the travel speed, and the number of through lanes.

Left-turn lane warrants are not projected to be met at either of the study intersections under the year 2023 buildout scenario.

⁴ American Association of State Highway and Transportation Officials (AASHTO), *A Policy on Geometric Design of Highways and Streets*, 7th Edition, 2018.

Operational Analysis

Intersection Capacity Analysis

A capacity and delay analysis were conducted for each of the study intersections per the unsignalized intersection analysis methodologies in the *Highway Capacity Manual* (HCM)⁵. Intersections are generally evaluated based on the average control delay experienced by vehicles and are assigned a grade according to their operation. The level of service (LOS) of an intersection can range from LOS A, which indicates very little, or no delay experienced by vehicles, to LOS F, which indicates a high degree of congestion and delay.

Performance Standards

The operating standards adopted by the City of Scappoose and ODOT are summarized below.

City of St Helens

According to the City of St Helen's Transportation System Plan (TSP), LOS "E" is considered acceptable for the poorest operating approach at two-way stop intersections. LOS "F" is allowed in situations where a traffic signal is not warranted.

ODOT

ODOT's operating mobility target for intersections along US-30 is v/c ratio no greater than 0.80 with posted speeds over 45 mph (at Deer Island Road) and no greater than 0.85 with posted speeds equal to 35 mph or less (at Columbia Boulevard) per Table 6 of the *Oregon Highway Plan*⁶.

Delay & Capacity Analysis

The LOS, delay, and v/c results of the capacity analysis are shown in Table 6 for the evening peak hour. Detailed calculations as well as tables showing the relationship between delay and LOS are included in the appendix to this report.

⁵ Transportation Research Board, *Highway Capacity Manual 6th Edition*, 2016.

⁶ Oregon Department of Transportation, *Oregon Highway Plan*. 1999



Table 6: Capacity Analysis Summary

Intersection & Condition	AM Peak Hour			PM Peak Hour		
	LOS	Delay (s)	V/C	LOS	Delay (s)	V/C
1. Deer Island Road at N 9 th Street						
2021 Existing Conditions	A	9	0.01	B	10	0.03
2023 Background Conditions	A	9	0.01	B	10	0.03
2023 Buildout Conditions	A	9	0.02	B	10	0.03
2. Deer Island Road at N 8 th Street						
2021 Existing Conditions	B	10	0.02	B	12	0.02
2023 Background Conditions	B	10	0.02	B	12	0.02
2023 Buildout Conditions	B	11	0.06	B	14	0.06
3. Deer Island Road at US-30						
2021 Existing Conditions	B	13	0.54	B	14	0.76
2023 Background Conditions	B	13	0.55	B	14	0.78
2023 Buildout Conditions	B	14	0.57	B	15	0.80
4. Columbia Boulevard at 12 th Street						
2021 Existing Conditions	D	29	0.59	C	21	0.32
2023 Background Conditions	D	33	0.64	C	22	0.35
2023 Buildout Conditions	E	37	0.68	C	23	0.37
5. Columbia Boulevard at US-30						
2021 Existing Conditions	B	20	0.56	C	30	0.70
2023 Background Conditions	C	20	0.57	C	31	0.72
2023 Buildout Conditions	C	20	0.57	C	32	0.73

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

Conclusions

Key findings include:

- No significant trends or crash patterns were identified at any of the study intersections that would be affected by the proposed development. Accordingly, no safety mitigation is recommended per the crash data analysis.
- Intersection sight distance is available at both site accesses on Deer Island Road. Accordingly, no sight distance related mitigation is necessary or recommended.
- Preliminary traffic signal warrants are not projected to be met any of the unsignalized study intersections upon full buildout of the proposed development. Accordingly, no related mitigation is necessary or recommended.
- Left-turn lanes are not projected to be met at the site access intersections upon full buildout of the proposed development. Accordingly, no related mitigation is necessary or recommended.
- All study intersections are currently operating acceptably per jurisdictional standards and are projected to continue operating acceptably through the 2023 site buildout year.



Appendix A – Site Data

Site Plan

Trip Generation Calculations



JPA EXHIBITS

N. 8TH ST. SUBDIVISION

ST. HELENS, OREGON

PROJECT TEAM

OWNER

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JODI REED
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P.O. BOX 589
AURORA, OR 97002
(503) 678-6028

DRAWING INDEX

G-1	PLOT PLAN, PROJECT TEAM & DRAWING INDEX
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C-2	PROPOSED SITE PLAN
C-3	EROSION & SEDIMENT CONTROL PLAN
C-4	SITE CONSTRUCTION GRADING PLAN
C-5	STORMWATER MANAGEMENT PLAN
D-1	SITE CONSTRUCTION CROSS-SECTIONS
D-2	SITE CONSTRUCTION CROSS-SECTIONS & DETAIL
D-3	SITE CONSTRUCTION CROSS-SECTIONS
C-7	ALTERNATIVE PLAN (MORE IMPACT)
C-8	ALTERNATIVE PLAN (LESS IMPACT)

PLOT PLAN

SCALE: 1" = 200'-0"



DATE: 04/12/2021
ISSUED
FOR APPROVAL



Phone (503) 366-0399

N. 8TH ST. SUBDIVISION

PLOT PLAN, PROJECT TEAM, & INDEX

SCALE: NOTED

DATE: 04/01/21

BY: HBO

A-3146-G-1



TRIP GENERATION CALCULATIONS

Land Use: Single-Family Detached Housing
Land Use Code: 210
Setting/Location: General Urban/Suburban
Variable: Dwelling Units
Variable Value: 66

AM PEAK HOUR

Trip Rate: 0.74

	Enter	Exit	Total
Directional Distribution	25%	75%	
Trip Ends	12	37	49

PM PEAK HOUR

Trip Rate: 0.99

	Enter	Exit	Total
Directional Distribution	63%	37%	
Trip Ends	41	24	65

WEEKDAY

Trip Rate: 9.44

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	312	312	624

SATURDAY

Trip Rate: 9.54

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	315	315	630