



**lancaster  
moble**

## 1030 Young Street

Transportation Impact  
Analysis (Revised)

Woodburn, Oregon

Date:

April 28, 2023

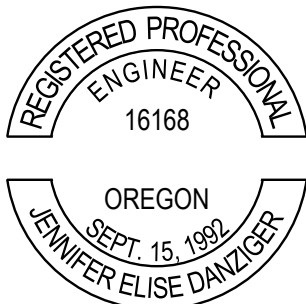
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RENEWS: 12/31/2023

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## Executive Summary

1. The proposed development will construct 94 multi-family housing units on currently undeveloped land located at 1030 Young Street in Woodburn, Oregon.
2. The trip generation calculations show that the proposed multi-family development is projected to generate 52 morning peak hour trips, 61 evening peak hour trips, and 678 weekday site trips.
3. Based on the most recent five years of crash data, one of the study intersections have crash rates that exceed the 90<sup>th</sup> percentile rates identified by ODOT for similar types of intersections and two are identified on the ODOT SPIS List. Potential intersection improvements have been identified in the Woodburn TSP at these intersections.
4. All other study intersections had no significant trends or crash patterns that were identified, and no safety mitigation is recommended per the crash data analysis.
5. Adequate sight distances are available at the proposed site access intersection to allow for safe operation along Young Street.
6. Preliminary traffic signal warrants are not projected to be met for any of the unsignalized study intersections upon full buildout of the proposed development.
7. All study intersections are currently operating acceptably per City of Woodburn and ODOT standards and are projected to continue operating acceptably through the 2025 site buildout year. No operational mitigation is necessary or recommended at these intersections.
8. In general, changes in 95<sup>th</sup> percentile queuing between the year 2025 background and buildout conditions are anticipated to be small, one or two vehicles. No queuing related mitigation is necessary or recommended.





# Project Description

## Introduction

The proposed development will construct 94 multi-family housing units on currently undeveloped land located at 1030 Young Street in Woodburn, Oregon. This report addresses the impacts of the project on the nearby street system. Based on correspondence with City of Woodburn staff, the report conducts safety and operational analyses at the following intersections:

1. OR-99E (Pacific Highway) at Young Street/OR-214
2. OR-99E (Pacific Highway) at E Cleveland Street
3. Bryan Street/Site Access at Young Street

The purpose of this study is to provide an analysis of potential traffic impacts of the proposed development on the surrounding transportation system and to recommend any required mitigative measures. Detailed information on traffic counts, trip generation calculations, safety analyses, and level of service calculations are included in the appendices to this report.

## Location Description

The subject property is located west of Pacific Highway (OR-99E), south of Young Street, and north of Cleveland Street. Surrounding land uses include residential to the west and commercial along OR-99E. The site encompasses 3.18 acres and is zoned Mixed Use Village (MUV). The project site is shown in Figure 1. A site plan is included in Appendix A.



Figure 1: Project Location (Image from City of Woodburn Online GIS)

The site will take access from Young Street. Willamette Valley Railway abuts the southern boundary of the site providing a barrier to any connection with E Cleveland Street. One site access is proposed to be aligned opposite Bryan Street.

**Vicinity Streets**

Four roadways near the site are anticipated to carry the majority of site trips to and from the project site. Table 1 provides a description of each of the vicinity roadways.

**Table 1: Vicinity Roadway Descriptions**

Street Name	Functional Classification	Travel Lanes	Speed (MPH)	Curbs & Sidewalks	On-Street Parking	Bicycle Lanes
<b>Jurisdiction: ODOT</b>						
OR-99E (Pacific Highway)	Regional Highway Major Arterial (City)	2-5	35	Partial	Not Permitted	None
OR-214 (Young Street East)	District Highway Major Arterial (City)	2-3	35	None	No Permitted	None
<b>Jurisdiction: City of Woodburn</b>						
Young Street West	Minor Arterial	3	25	Both Sides	Not Permitted	Yes
E Cleveland Street	Service Collector	2-3	25	Southern Side	Not Permitted	None
Bryan Street	Local Street	2	25	Partial	Permitted	None

*Functional classification based on Woodburn Transportation System Plan (September 2019).*

**Study Intersections**

Most of the site trips generated by the proposed multi-family development are expected to impact three existing nearby intersections of significance. The project will construct the fourth leg of the intersection of Young Street at Bryan Street.

A vicinity map displaying the project site, vicinity streets, and the study intersections with their associated lane configurations, under existing and proposed conditions, is shown in Figure 2. A summarized description of these intersections is provided in Table 2.



**Table 2: Vicinity Intersection Descriptions**

Intersection		Geometry	Traffic Control	Phasing/Stopped Approaches
1	OR-99E at Young Street	Four-Legged	Signalized	Protected/FYA NB/SB Left Turns, Permitted EB/WB Left Turns
2	OR-99E at E Cleveland Street	Three-Legged	Stop-Controlled	Eastbound Stop-Controlled
3	Young Street at Bryan Street	Three-Legged	Stop-Controlled	Southbound Stop-Controlled

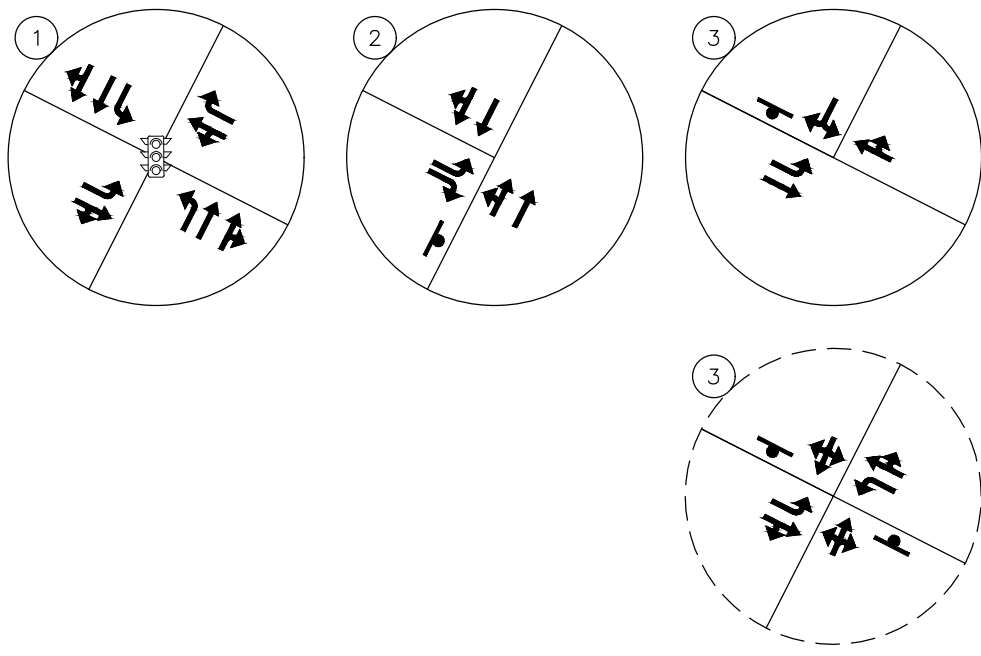
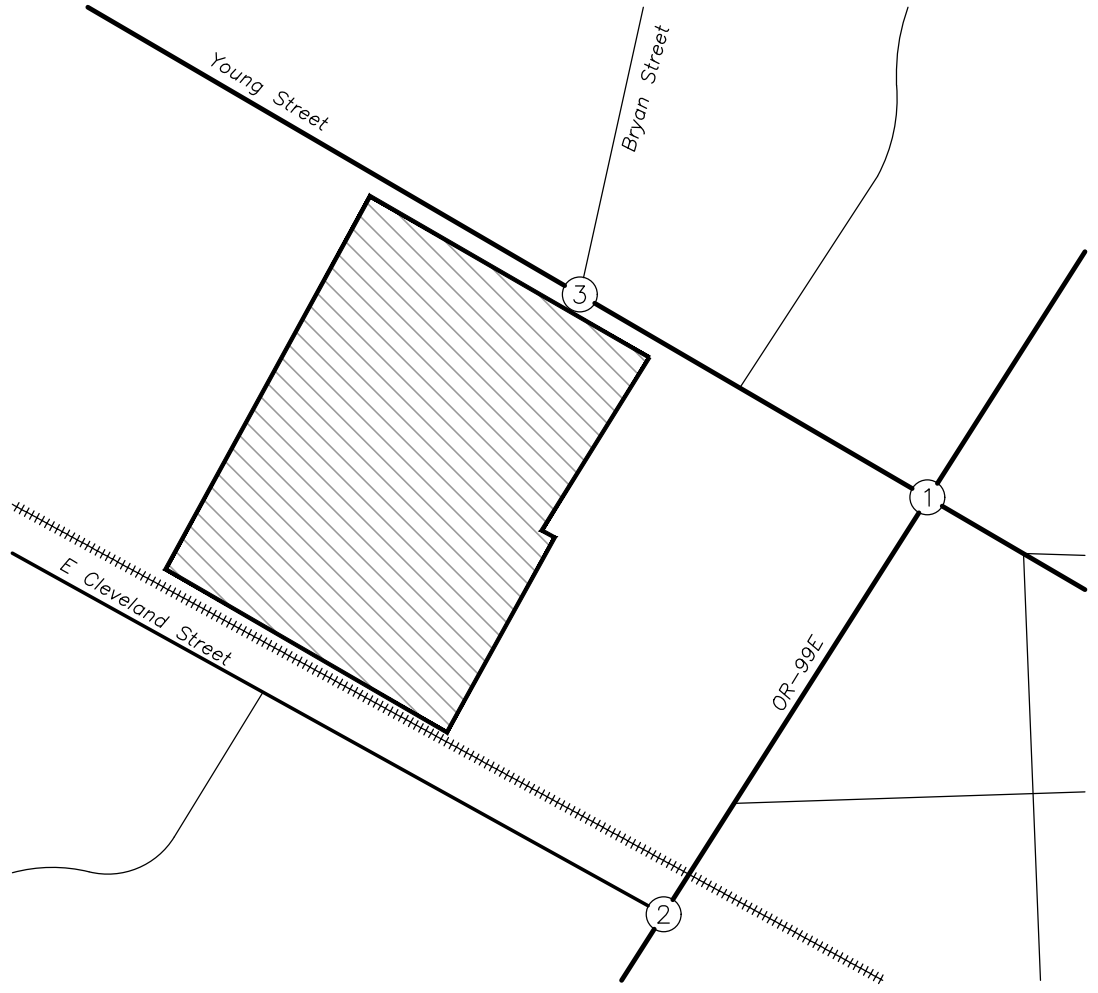
**Public Transit**

The Woodburn Transit System provides a single, fixed loop around Woodburn that starts and stops at the Downtown Transit Center, with notable stops at the Woodburn Premium Outlets, Walmart, Bi-Mart, Safeway, and Goodwill. The nearest bus stop to the site is located along the site frontage, near the access intersection at Bryan Street. Weekday service is scheduled from approximately 8:00 AM to 6:00 PM and has headways of approximately 60 minutes. Saturday service is scheduled from approximately 9:00 AM to 5:00 PM and has headways of approximately 60 minutes. Sunday service is scheduled from approximately 9:00 AM to 3:00 PM and has headways of approximately 60 minutes.



LEGEND

-  STUDY INTERSECTION
-  FUTURE INTERSECTION
-  STOP SIGN
-  TRAFFIC SIGNAL
-  PROJECT SITE
-  ARTERIAL ROADWAY
-  COLLECTOR ROADWAY
-  LOCAL ROADWAY
-  RAILROAD TRACKS



## Site Trips

### Trip Generation

The proposed development will include the construction of 94 multifamily units on currently undeveloped land. To estimate the number of trips that will be generated by the townhome development, trip equations from the *Trip Generation Manual*<sup>1</sup> were used. Land use code 220, *Multi-Family Housing (Low-Rise)*, includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have two or three floors. Land use code 221, *Multi-Family Housing (Mid-Rise)*, includes apartments and condominiums located in a building that has between four and 10 floors or living space. The proposed development consists of three floors, therefore, data from land use code 220, *Multi-Family Housing (Low-Rise)*, was used to estimate the trip generation of the project based on the number of dwelling units.

The trip generation calculations show that the proposed development is projected to generate 52 morning peak hour trips, 61 evening peak hour trips, and 678 weekday site trips. The trip generation estimates are summarized in Table 3. Detailed trip generation calculations are included in Appendix A.

**Table 3: Trip Generation Summary**

Land Use	ITE Code	Size	Morning Peak Hour			Evening Peak Hour			Weekday
			In	Out	Total	In	Out	Total	Total
Multi-Family Housing (Low-Rise)	220	94 units	12	40	52	38	23	61	678

### Trip Distribution

The directional distribution of site trips to and from the proposed development was estimated based on locations of likely trip destinations and locations of major transportation facilities in the site vicinity. The following trip distribution was estimated and used for analysis:

- Approximately 45 percent of site trips will travel to/from the north along OR-99E
- Approximately 25 percent of site trips will travel to/from the west along Young Street to access Interstate 5 northbound and school or other local destinations
- Approximately 30 percent of site trips will travel to/from the south along OR-99E

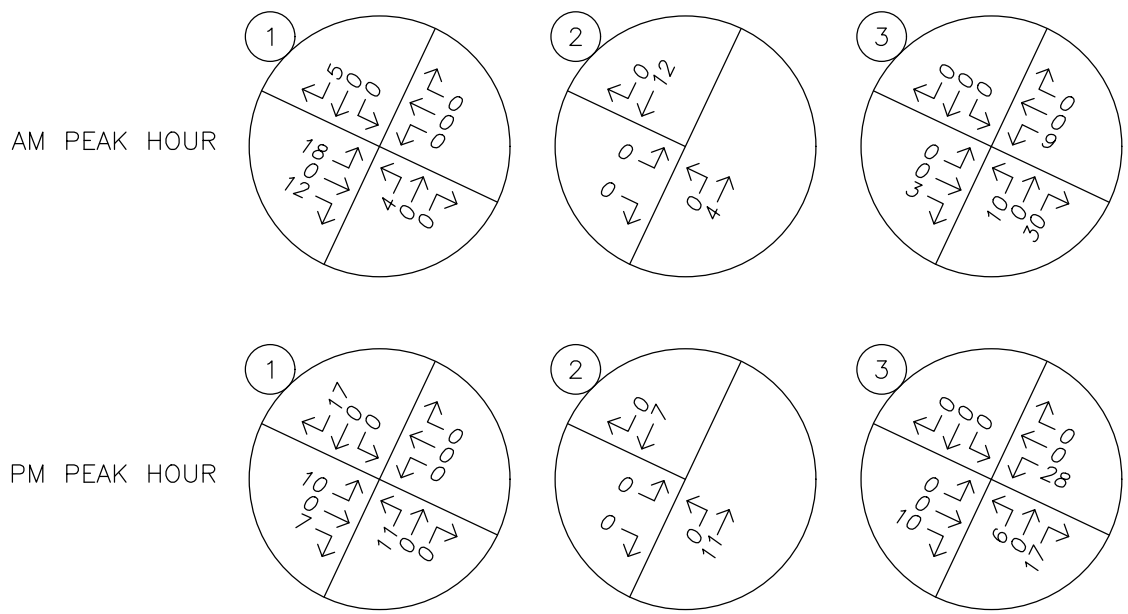
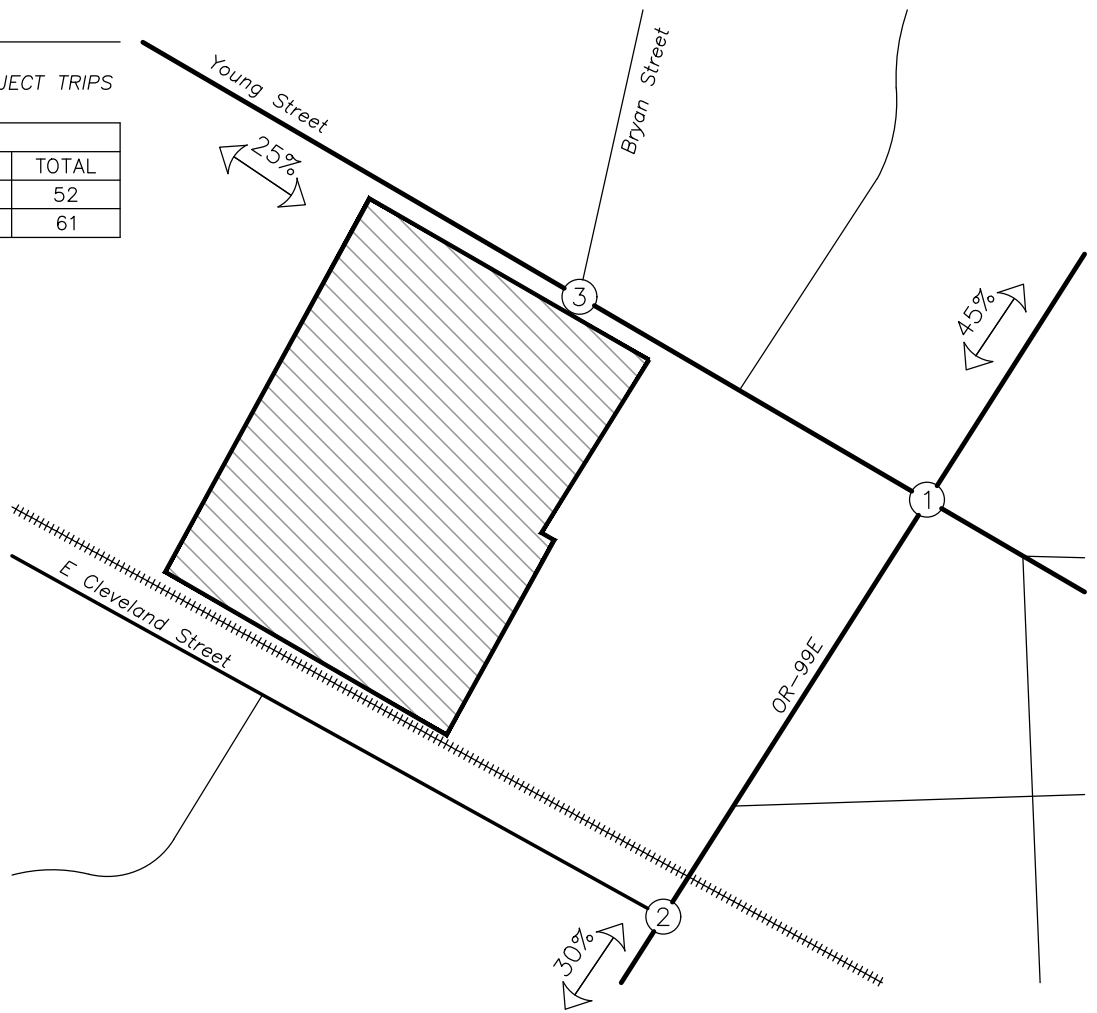
The trip distribution and assignment for the site trips generated during the morning and evening peak hours is shown in Figure 3.

<sup>1</sup> Institute of Transportation Engineers (ITE), *Trip Generation Manual*, 11<sup>th</sup> Edition, 2021.

LEGEND

XX%  
PERCENT OF PROJECT TRIPS

TRIP GENERATION			
	IN	OUT	TOTAL
AM	12	40	52
PM	38	23	61



# Traffic Volumes

## Existing Conditions

Traffic counts were collected at the study intersections along OR-99E on Tuesday, January 31, 2023, from 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM. For the intersection of Bryan Street at Young Street, peak hour through volumes along Young Street from the intersection of Young Street at OR-99E were used. For the existing turning movement counts to and from Bryan Street, peak hour observations were made during the morning and evening peak hours.

Since OR-99E is under the jurisdiction of ODOT, procedures described in ODOT's *Analysis Procedures Manual (APM)*<sup>2</sup> were used to seasonally adjust existing traffic volumes to reflect the 30<sup>th</sup> highest hour volumes in a typical year. Using a map of seasonal trends, this portion of OR-99E was determined to show a commuter trend, and a seasonal adjustment factor (SAF) of 1.215 was applied to through volumes along OR-99E. Raw count data is included in Appendix B.

Figure 4 shows the existing adjusted morning and evening peak hour traffic volumes at the study intersections.

## Background Conditions

To provide analysis of the impact of the proposed development on the nearby transportation facilities, an estimate of future traffic volumes is required. Future traffic volumes for ODOT highways are projected using growth rates calculated based on data from ODOT's future volumes table. Growth rates were applied to the existing traffic volumes over a two-year period to determine year 2025 background volumes. Table 4 summarizes the growth rates used for analysis.

**Table 4: Growth Rate Assumptions**

Facility	Growth Rate
OR-99E	1.9% per year (linear)
OR-214	1.1% per year (linear)
City of Woodburn roadways	1% per year (compounded)

In addition to the general growth, in-process trips associated with the following previously-approved developments were added to the background volumes to represent future traffic volumes at the study intersections prior to approval of the proposed multi-family development:

- Amazon Warehouse (Project Basie)
- Woodburn East Apartments
- Woodburn Place apartments (two phases)

<sup>2</sup> ODOT, *Analysis Procedures Manual* Version 2, October 2020.



- 119 N Pacific Highway Apartments

Figure 5 shows the projected year 2025 background traffic volumes at the study intersections during the morning and evening peak hours.

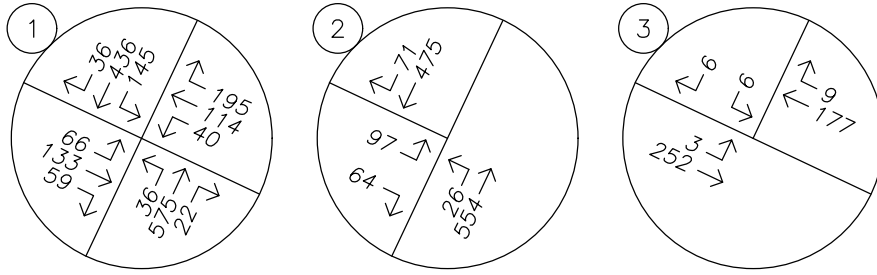
## Buildout Conditions

The peak hour trips projected to be generated by the proposed development, as described earlier within the *Site Trips* section, were added to the projected year 2025 background traffic volumes to obtain the expected 2025 site buildout volumes.

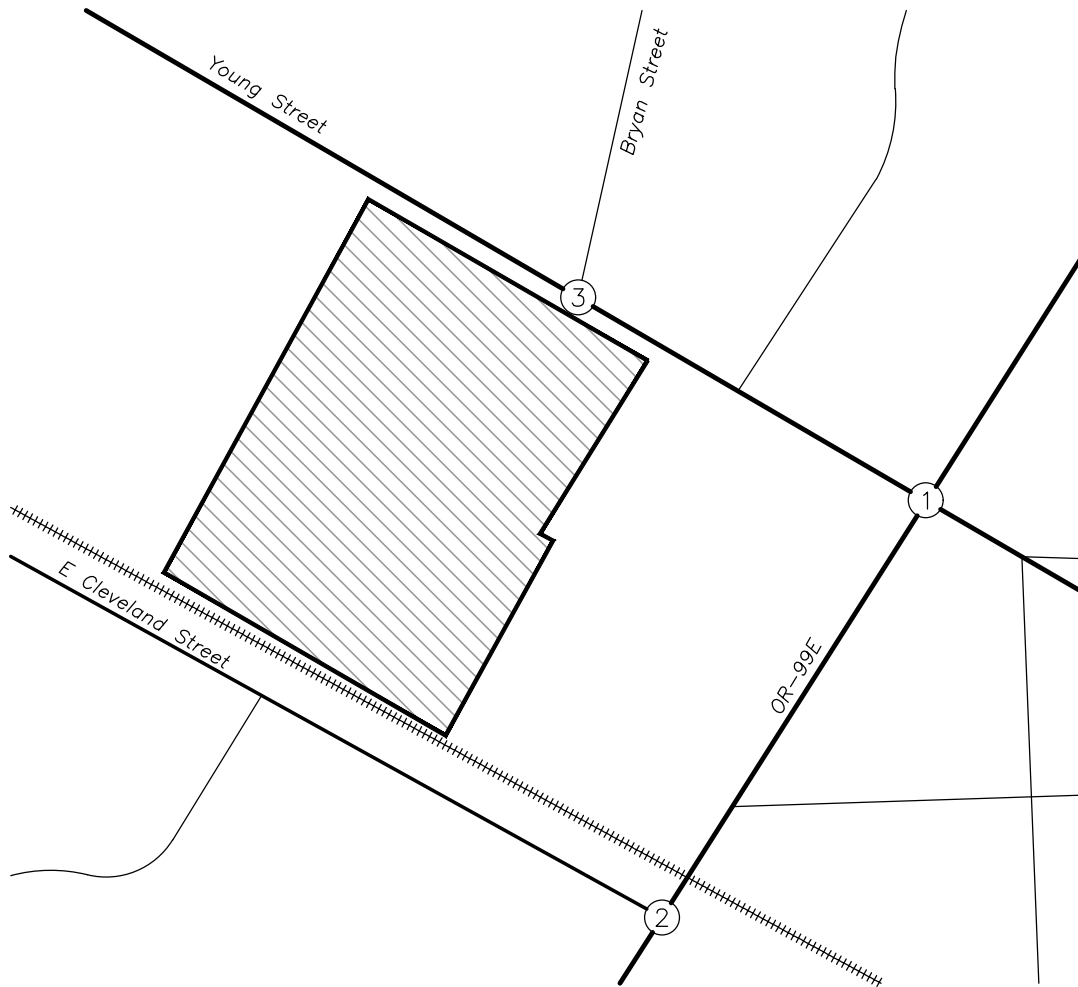
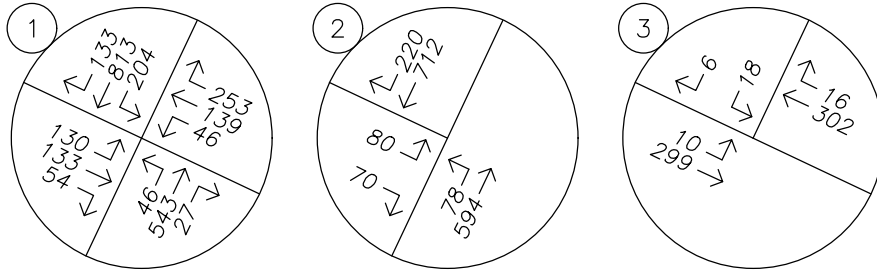
Figure 6 shows the projected year 2025 buildout traffic volumes at the study intersections during the morning and evening peak hours.



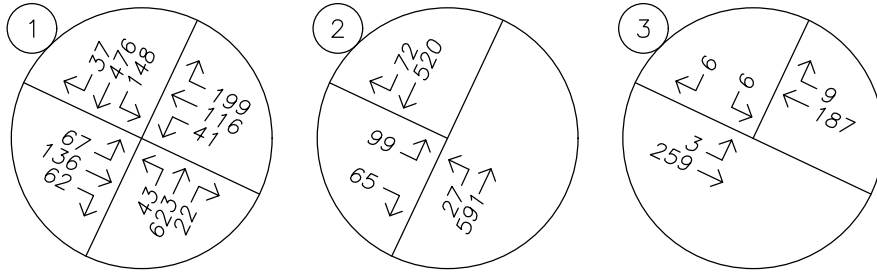
AM PEAK HOUR



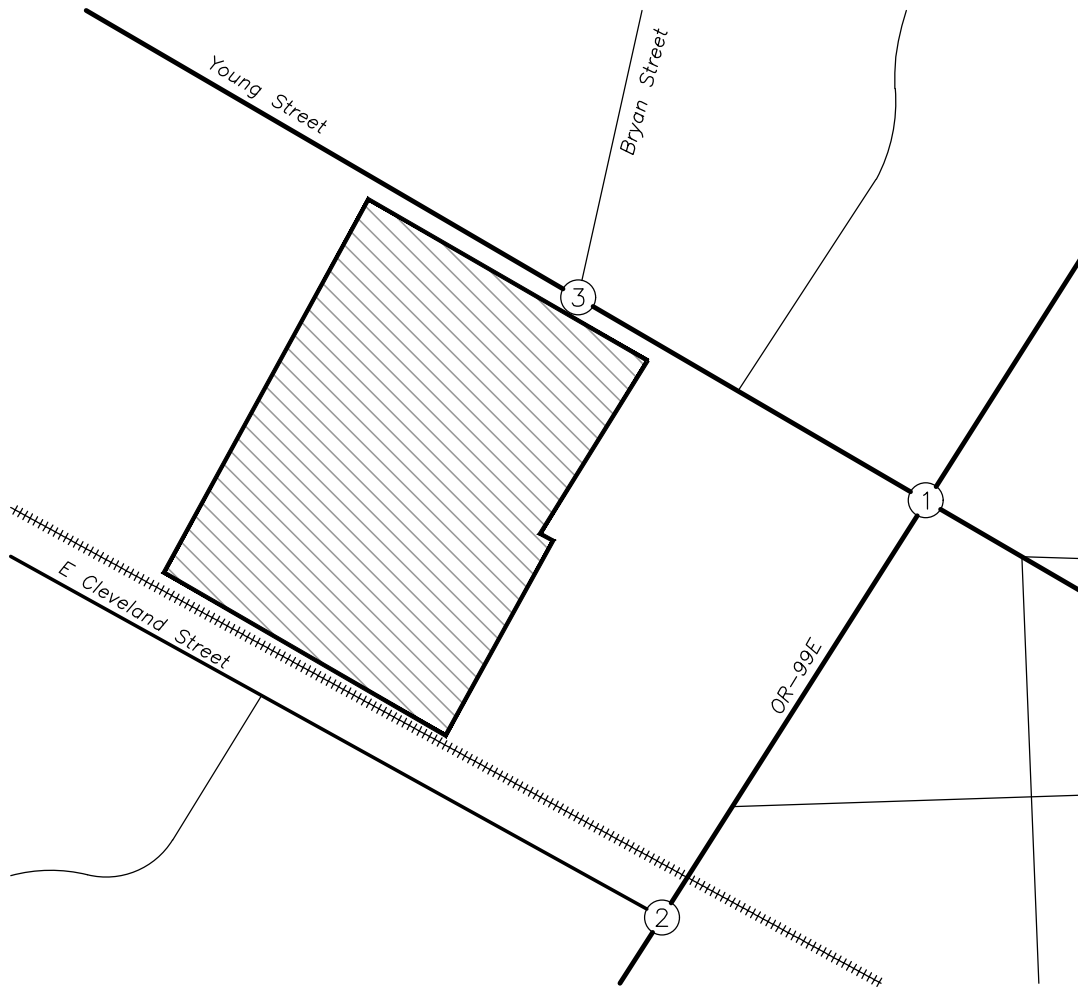
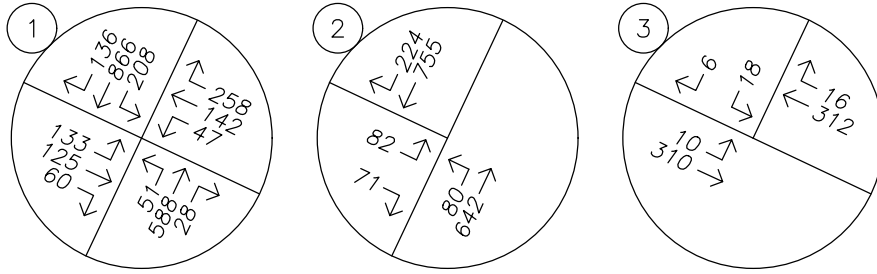
PM PEAK HOUR



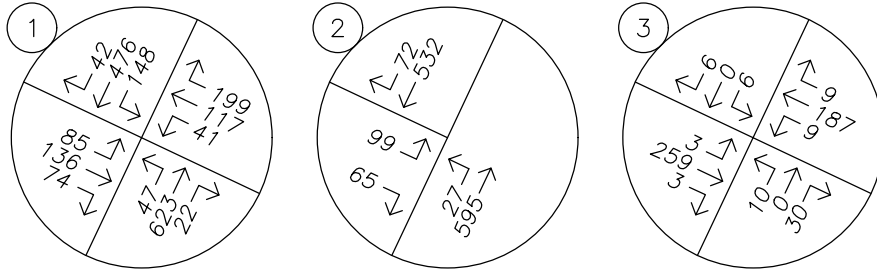
AM PEAK HOUR



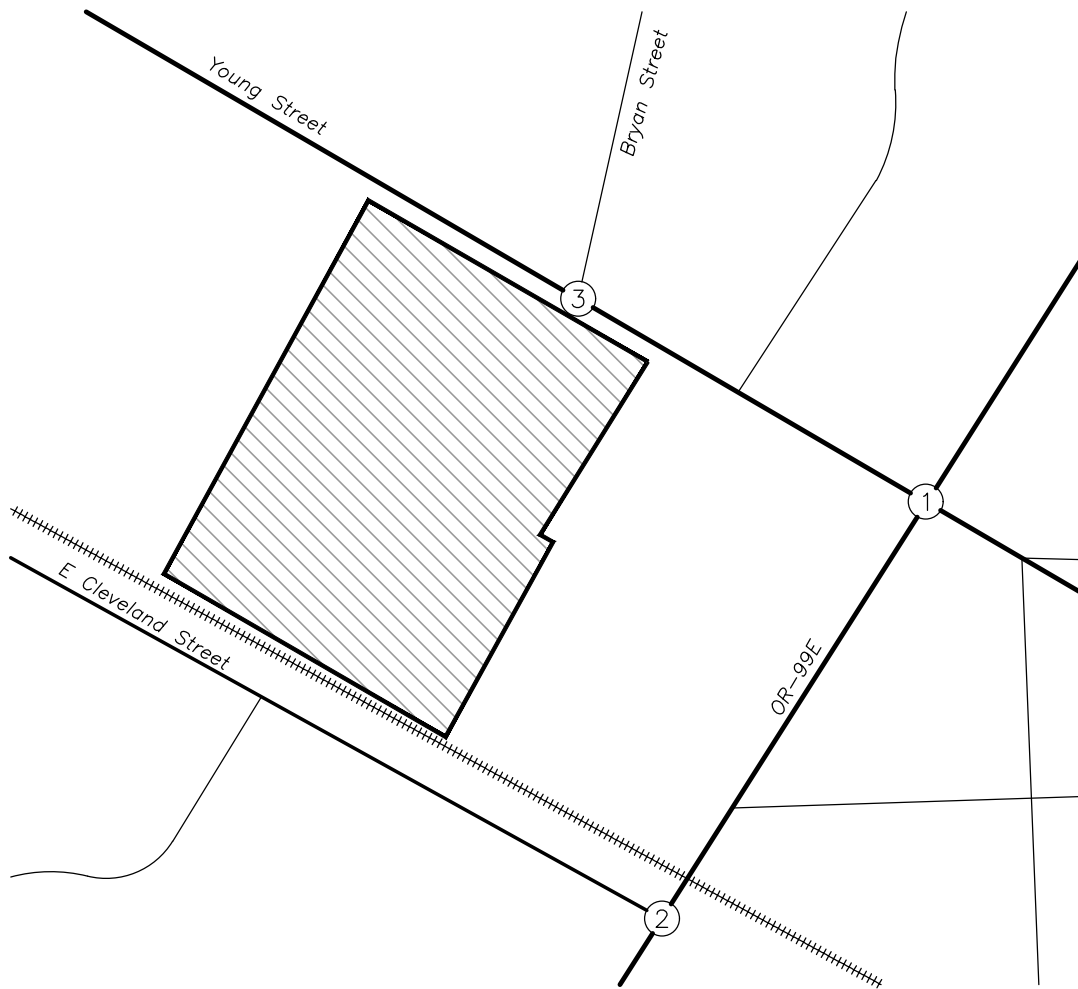
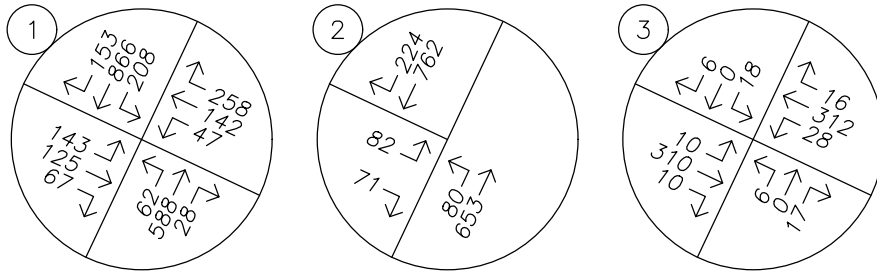
PM PEAK HOUR



AM PEAK HOUR



PM PEAK HOUR



# Safety Analysis

## Crash History Review

Using data obtained from the ODOT Crash Data System, a review of the most recent available five years of crash history (January 2016 to December 2020) was performed at the study intersections. The crash data were 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 hour represents approximately 10 percent of the annual average daily traffic (AADT) at the intersection.

Table 5 provides a summary of crash types while Table 6 summarizes crash severities and rates for each of the study intersections. Detailed crash data is included in Appendix C.

**Table 5: Crash Type Summary**

Intersection	Crash Type						Total Crashes
	Turn	Rear End	Angle	Side swipe	Fixed Object	Ped/ Bike	
1 OR-99E at Young Street	15	12	5	3	1	0	36
2 OR-99E at E Cleveland Street	28	20	0	1	2	1	52
3 Bryan Street at Young Street	0	1	0	0	0	1	2

**Table 6: Crash Severity and Rate Summary**

Intersection	Severity					Total Crashes	ADT	Crash Rate	90 <sup>th</sup> % Rate
	PDO	C	B	A	Fatal				
1 OR-99E at Young Street	17	16	3	0	0	36	25,110	0.79	0.860
2 OR-99E at E Cleveland Street	16	25	10	1	0	52	17,540	1.62	0.293
3 Bryan Street at Young Street	0	1	1	0	0	2	6,510	0.17	N/A

ODOT 90<sup>th</sup> Percentile Crash rates are from the Analysis Procedures Manual Version 2 (2019), Exhibit 4.1, p.4-3.



## Crash Severity

The intersection of OR-99E at E Cleveland Street had one crash resulting in an Injury A classification. The crash occurred when a southbound passenger vehicle was following too closely to the vehicle in front of them. The driver in the striking vehicle sustained no injury. A passenger in the struck vehicle sustained injuries classified as Injury A. The driver and another passenger in the struck vehicle reported possible injuries. The collision occurred under clear, dry, daytime conditions.

## Pedestrian and Bicycle Collisions

The intersection of OR-99E at E Cleveland Street had one crash involving a pedestrian. A southbound vehicle struck a pedestrian who was illegally in the roadway. The pedestrian sustained a possible injury consistent with injury classification C. The collision occurred under wet, rainy, and dimly lit conditions.

The intersection of Bryan Street at Young Street has one crash involving a bicyclist. A left-turning westbound vehicle which did not have right-of-way over the cyclist struck an eastbound cyclist. The pedestrian suffered injuries consistent with the classification Injury B. The collision occurred under wet, rainy, and dark conditions.

## ODOT 90<sup>th</sup> Percentile Crash Rates

Intersection crash rates were compared to the published statewide 90<sup>th</sup> percentile crash rates within ODOT's *Analysis Procedures Manual (APM)*. According to [Exhibit 4-1: Intersection Crash Rates per MEV by Land Type and Traffic Control](#) in the APM, intersections which experience crash rates in excess of 90<sup>th</sup> percentile crash rates should be "flagged for further analysis".

One of the study intersections was calculated to have a crash rate that exceeds the 90<sup>th</sup> percentile crash rate for similar intersections:

### *OR-99E at E Cleveland Street*

The intersection of OR-99E at E Cleveland Street had 52 crashes over the five-year analysis period. Twenty-eight (28) of these crashes were reported as turning movement collisions and 20 were reported as rear-end collisions. The primary cause was not yielding to the right-of-way of the through traffic. The intersection is currently unsignalized, with the eastbound approach under stop-control. OR-99E has four lanes of travel, with no center turn lane or refuge, which contributes to the frequency of rear-end collisions.

The Woodburn TSP identifies intersection capacity improvement but does not specify any safety improvements at the intersection. The capacity improvement is identified as a traffic signal (if warranted), turn lanes, or roundabout at this location in coordination with ODOT. Consideration should be given to railroad preemption and the proximity to the signalized intersection at OR-99E at Young Street. Installing a traffic signal to protect the turning movements could potentially reduce the frequency of these collisions, however, as shown in the Warrant Analysis section, due to low minor street volumes, the preliminary traffic signal warrant is not met for this intersection. Additionally, ODOT's region traffic engineer has noted installation of a traffic signal at this location would be problematic due to its close proximity to the fully controlled intersection of Young Street at OR-99E.

Restriping OR-99E to replace one of the northbound lanes with a center turn lane until the roadway widens to five lanes north of Silverton Avenue could potentially improve the safety of the intersection. Separating the left-

turn movement from the through movement could reduce the rate of rear-end collisions at the intersection. Allowing for a two-stage left-turn movement could potentially reduce the rate of turn collisions.

The proposed project is estimated to generate 18 evening peak hour trips at the study intersection, which is 0.97 percent of the total year 2025 buildout volume of 1,861 trips through the intersection. All site trips will be traveling through the intersection; none will be turning.

### **ODOT SPIS Review**

The ODOT 2020 Safety Priority Index System (SPIS) list is based on reported crash data for the years 2017 through 2019. Two of the study area intersections was listed in the worst 15 percent of the SPIS list:

- OR-99E at Young Street – 90-95<sup>th</sup> percentile
- OR-99E at E Cleveland Street – 85-90<sup>th</sup> percentile

These findings coincide with other factors in the crash review, including high crash rates and locations with crashes that resulted in an Injury A classification.

The intersection of OR-99E at E Cleveland Street is discussed in the previous section. For context regarding the intersection of OR-99E at Young Street, see below.

#### *OR-99E at Young Street*

The Woodburn TSP identifies intersection capacity improvement but does not specify any safety improvements at the intersection. The capacity improvement is identified installing a third westbound lane to provide separate left, thru, and right turn lanes in coordination with ODOT, as well as implement protected/permissive left-turn phasing for the east and westbound approaches.

The proposed project is estimated to generate 45 evening peak hour trips at the study intersection, which is 1.7 percent of the total year 2025 buildout volume of 2,662 trips through the intersection.

### **Conclusion**

Based on a review of the most recent five years of available crash data, one of the study intersections has a crash rate that exceed the 90<sup>th</sup> percentile rates identified by ODOT for similar types of intersections and both highway intersections are identified within the worst 15 percent in ODOT's SPIS database. The Woodburn TSP has projects identified at some of these locations.

All other study intersections had no significant trends or crash patterns that were identified, and no safety mitigation is recommended per the crash data analysis.

## Sight Distance Evaluation

A sight distance analysis was conducted at the site access proposed on Young Street. To evaluate the sight distance available, intersection sight distance was measured and recommended in accordance with the standards established in *A Policy on Geometric Design of Highways and Streets*<sup>3</sup>. According to AASHTO, the

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<sup>3</sup> American Association of State Highway and Transportation Officials (AASHTO), *A Policy on Geometric Design of Highways and Streets*, 7th Edition, 2018.

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 approach street pavement. The vehicle driver's eye height is assumed to be 3.5 feet above the cross-street pavement.

Based on the posted speed of 25 mph along Young Street, the minimum recommended intersection sight distance (ISD) is 295 feet and the minimum required stopping sight distance (SSD) is 155 feet.

Looking east from the proposed access, the available sight distance was measured to be 380 feet (to the intersection of Young Street at OR-99E). Looking west from the proposed access, the available sight distance was measured to be in excess of 400 feet.

### **Conclusion**

Adequate sight distances are available at the proposed site access location. No mitigation is recommended or necessary in conjunction with the proposed development.

## Warrant Analysis

Preliminary traffic signal warrants were examined for the study intersections near the site where such treatments would be applicable. Detailed information on the warrant analyses is included in Appendix C.

### **Preliminary Traffic Signal Warrants**

Preliminary traffic signal warrants were examined for all unsignalized study intersections in order to determine whether the installation of a new traffic signal will be warranted at the intersections by the 2025 site buildout year. Methodologies were based on the *Manual on Uniform Traffic Control Devices*<sup>4</sup> (MUTCD). Warrant 1, Eight-Hour Vehicular Volumes, was evaluated based on the common assumption that traffic counted during the evening peak hour represents 10 percent of the average daily traffic (ADT) and that the 8<sup>th</sup> highest hour is 5.65 percent of the daily volume.

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

## Assessment of Pedestrian, Bicycle, and Transit Modes

### **Pedestrian Facilities**

Omitting the subject site, contiguous sidewalks are provided along Young Street. Continuous sidewalks are provided along OR-99E and intermittent sidewalks are provided along Bryan Street. E Cleveland Street has sidewalks on the south side but not along the north side where the railroad line is present.

The development of the site will fill the current sidewalk gap along the southern side of the roadway, consistent with planned improvements in the TSP. Additionally, the project will construct a ped/bike path along the southern property line which connects to Young Street via paths through the center and along the western boundary of the site.

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<sup>4</sup> Federal Highway Administration, Manual on Uniform Traffic Control Devices, 2009

Pedestrians have continuous sidewalks that allow access to numerous destinations. Sidewalks along Young Street and Gatch Street provide access to Washington Elementary School. Sidewalks along Front Street and Parr Road to the Settlemier Park, Heritage Elementary School, Valor Middle School, and Centennial Park. Sidewalks along Front Street and S Settlemier Avenue provide pedestrian access into the neighborhoods, downtown Woodburn, and other schools and parks.

**Bicycle Facilities**

Bicycle lanes are provided along both sides of Young Street but other higher classification roadways currently have no bike lanes. However, neighborhood streets not listed as bicycle routes in the immediate site vicinity are typically low-stress roadways that provide alternative routes to other nearby bicycle paths. There are 104 bicycle parking spaces which will be provided on-site.

**Transit Facilities**

The nearest bus stop to the site is located along the site frontage, near the existing intersection of Bryan Street at Young Street.

**Planned Improvements**

There are two planned pedestrian and bicycle projects listed in the Woodburn TSP which will provide connections between the proposed development and existing infrastructure and enhance safety for vulnerable roadway users. These projects are listed in Table 8.

**Table 7: Active Transportation Projects in Woodburn TSP**

Project Number	Location	Description
P11	Young Street	Fill in gaps
B3	OR-99E from Lincoln Street to southern City boundary	Widen roadway and install bike lanes in coordination with ODOT





## Operational Analysis

A capacity and delay analysis was conducted for each of the study intersections per the signalized and unsignalized intersection analysis methodologies in the *Highway Capacity Manual*<sup>5</sup> (HCM). 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. The volume-to-capacity (v/c) ratio is a measure that compares the traffic volumes (demand) against the available capacity of an intersection.

The analysis was performed using the Synchro (version 11) software. The overall signalized v/c ratios were calculated following the methodologies in Chapter 16 of the ODOT APM for the critical intersection v/c ratio. This methodology was performed for all signalized intersections.

## Performance Standards

All study intersections must comply with adopted operating standards, and intersection performance measures used for operating standards vary by roadway jurisdiction. The following agency mobility standards are applicable in the study area:

- The **City of Woodburn** has the following mobility standards per the Woodburn Development Ordinance<sup>6</sup>:
  - For an unsignalized intersection, the minimum v/c ratio shall be 0.95 or lower for the major movement through the intersection, or if pre-development already operating at higher v/c, then at no higher v/c.
- **ODOT** has the following mobility targets in the study area per the Oregon Highway Plan<sup>7</sup>:
  - OR-99E is a regional highway inside the urban growth boundary, with a posted speed of 35 mph. For non-MPOs outside of STAs, the target v/c ratio is 0.90.

## Delay & Capacity Analysis

The v/c, delay, and LOS results of the capacity analysis are shown in Table 9 for the morning and evening peak hours. Detailed calculations as well as tables showing the relationship between delay and LOS are included in Appendix D.

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<sup>5</sup> Transportation Research Board, *Highway Capacity Manual*, 6<sup>th</sup> Edition, 2016.

<sup>6</sup> City of Woodburn, *Woodburn Development Ordinance*, Amended by Ordinance 2603, effective June 30, 2022 (LA 21-02)

<sup>7</sup> Oregon Department of Transportation, *Oregon Highway Plan*, Table 6: Volume to Capacity Ratio Targets for Peak Hour Operating Conditions, 1999 Including amendments November 1999 through May 2015

**Table 8: Capacity Analysis Summary**

Intersection & Condition	Mobility Standard	AM Peak Hour			PM Peak Hour		
		V/C	LOS	Delay (s)	V/C	LOS	Delay (s)
<b>1. OR-99E at Young Street<sup>1</sup></b>							
2023 Existing Conditions	0.90	0.60	B	14	0.61	B	16
2025 Background Conditions		0.63	B	14	0.63	B	16
2025 Buildout Conditions		0.65	B	15	0.64	B	17
<b>2. OR-99E at E Cleveland Street</b>							
2023 Existing Conditions	0.90	0.40	D	27	0.80	F	111
2025 Background Conditions <sup>2</sup>		0.45	D	32	0.81	F	116
2025 Buildout Conditions <sup>2</sup>		0.46	D	43	0.84	F	124
<b>3. Young Street at Site Access/Bryan Street</b>							
2023 Existing Conditions	0.95	0.02	A	10	0.04	B	11
2025 Background Conditions		0.02	A	10	0.04	B	11
2025 Buildout Conditions		0.06	B	10	0.05	B	12

*Table Notes:*

1. The overall signalized v/c ratio for this intersection was calculated following the methodologies in Chapter 16 of the ODOT APM for the critical intersection v/c ratio.
2. The peak hour factor for this intersection was increased to a minimum of 0.95 due to the substantial increase in background traffic.

All study intersections are currently operating acceptably per City of Woodburn and ODOT standards and are projected to continue operating acceptably through the 2025 site buildout year. No operational mitigation is necessary or recommended at these intersections.

## Queuing Analysis

An analysis of projected queuing was conducted for the study intersections. The 95<sup>th</sup> percentile queue lengths were estimated based on the same Synchro/SimTraffic simulations used for the delay calculations. The 95<sup>th</sup> percentile queue is a statistical measurement which indicates there is a 5 percent chance that the queue may exceed this length during the analysis period; however, given this is a probability, the 95<sup>th</sup> percentile queue length may theoretically never be met or observed in the field.

The 95<sup>th</sup> percentile queue lengths reported in the simulation are presented in Table 9 for the morning and evening peak hours. All queues more than 5 feet longer than a multiple of 25 were rounded up to the nearest 25 feet, equivalent to an average vehicle length. Those that were 5 feet or less than a multiple of 25 were rounded down since 5 feet is equivalent to the space between queued vehicles. Detailed queuing analysis reports are included in Appendix D.



Table 9: 95<sup>th</sup> Percentile Queuing Analysis Summary

Intersection/Movement	Available Storage (ft)	2025 Background Queue (ft)		2025 Buildout Queue (ft)	
		Morning	Evening	Morning	Evening
<b>1. OR-99E at Young Street</b>					
EB Left	95	125	150	125	150
WB Right	100	150	150	150	150
NB Left	110	100	125	125	125
SB Left	145	150	175	150	175
<b>2. OR-99E at E Cleveland Street</b>					
EB Left	165	100	225	100	225
NB Left-Through	N/A	75	250	100	225
SB Through-Right	N/A	25	25	25	25
<b>3. Young Street at Bryan Street/Site Access</b>					
EB Left-Through-Right	N/A	-	25	25	25
WB Left-Through-Right	N/A	-	-	25	50
NB Left-Through-Right	N/A	-	-	50	50
SB Left-Through-Right	N/A	50	50	50	50

*BOLDED values indicate 95<sup>th</sup> percentile queue lengths that exceed available storage.*

In general, changes in 95<sup>th</sup> percentile queuing between the year 2025 background and buildout conditions are anticipated to be small, one or two vehicles.

Based on the queuing evaluation, no queuing related mitigation is necessary or recommended.



## Conclusions

The impacts of the proposed multi-family development were analyzed. Key findings include:

- Based on the most recent five years of crash data, one of the study intersections have crash rates that exceed the 90<sup>th</sup> percentile rates identified by ODOT for similar types of intersections and two are identified on the ODOT SPIS List. Potential intersection improvements have been identified in the Woodburn TSP at these intersections.
- All other study intersections had no significant trends or crash patterns that were identified, and no safety mitigation is recommended per the crash data analysis.
- Adequate sight distances are available at the proposed site access intersection to allow for safe operation along Young Street.
- Preliminary traffic signal warrants are not projected to be met for any of the unsignalized study intersections upon full buildout of the proposed development.
- All study intersections are currently operating acceptably per City of Woodburn and ODOT standards and are projected to continue operating acceptably through the 2025 site buildout year. No operational mitigation is necessary or recommended at these intersections.
- In general, changes in 95<sup>th</sup> percentile queuing between the year 2025 background and buildout conditions are anticipated to be small, one or two vehicles. No queuing related mitigation is necessary or recommended.

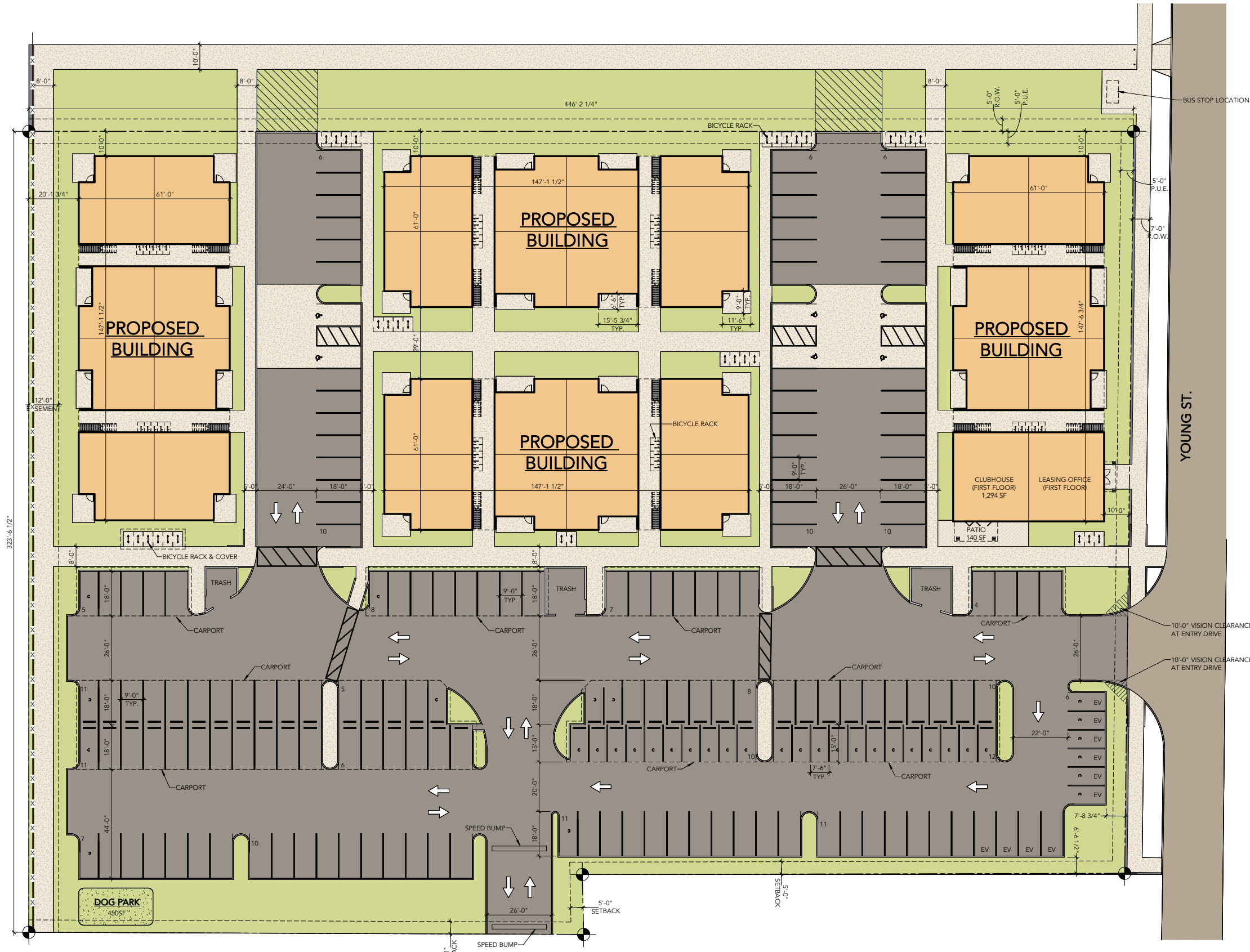


## Appendix A – Site Information

Site Plan

Trip Generation Calculations





**SITE PLAN GENERAL NOTES:**

- REFER TO LANDSCAPE PLANS FOR ADDITIONAL PEDESTRIAN WALKS AND PLANTING INFORMATION.
- ANY GRADING AND UTILITIES (BOTH EXISTING AND NEW) ARE SHOWN FOR REFERENCE ONLY - REFER TO CIVIL DRAWINGS.
- SITE PAVEMENT MATERIAL AND DESIGN PER CIVIL. MAX. SPACE BETWEEN JOINTS TO BE 10'-0".
- REFER TO PLUMBING DRAWINGS FOR HOSE BIB LOCATIONS.
- LIGHTING TO BE INSTALLED AT PATHS ALONG THE REQUIRED EXIT WAYS - REFER TO ELECTRICAL SITE PLAN.
- ALL GROUND MOUNTED UTILITY EQUIPMENT SHALL BE SCREENED FROM THE STREET AND THE BUILDING WITH LANDSCAPE - VERIFY LOCATION WITH EACH UTILITY PROVIDER AND COORDINATE WITH LANDSCAPING AS NEEDED.
- ANY WALL PACK LIGHTING PROVIDED TO BE SHIELDED.
- THE RUNNING SLOPE OF WALKING SURFACES SHALL NOT BE STEEPER THAN 1:20. THE CROSS SLOPE OF A WALKING SURFACE SHALL NOT BE STEEPER THAN 1:48.
- PARKING SPACES AND ACCESS AISLES SHALL HAVE A SURFACE SLOPES NOT STEEPER THAN 1:50 (2%) PER IBC.
- ANY RETAINING WALLS, BERMS, SWALES, ETC. SHOWN FOR REFERENCE ONLY - REFER TO CIVIL DRAWINGS.
- ALL WALL MOUNTED UTILITIES AND ASSOCIATED EQUIPMENT SHALL BE PAINTED TO MATCH ADJACENT BUILDING COLOR.

**SITE PLAN LEGEND**

(NOTE: SEE AD SHEETS FOR ADDITIONAL GENERAL LEGEND INFORMATION)

OBJECT/PATTERN	DESCRIPTION(S)
---	- PROPERTY LINE
---	- SETBACK LINES
---	- ROOF OUTLINE
---	- FENCE LINE
---	- ACCESSIBLE PATH FROM BUILDING TO PUBLIC WAY
[Orange Box]	- BUILDING FOOTPRINT
[Green Box]	- AMENITY SPACE
[Hatched Box]	- GRASSCRETE FIRE ACCESS DRIVE
[Circle with Dot]	- PROPERTY DATUM POINT
[Circle]	- REMOVABLE BOLLARDS
[Circle with EV]	- ELECTRIC VEHICLE CHARGING STATION AT PARKING LOCATION

**SITE INFORMATION**

LOT AREA	138,679 SF
ZONE	MUV - MIXED USE VILLAGE
USES	MULTI-FAMILY HOUSING
# UNITS	94
MAX. LOT WIDTH	446'-2 1/4"
MAX. LOT DEPTH	323'-6 1/2"

**UNITS**

TYPE	AREA (SF)	COUNT
1-BEDROOM	788	48
2-BEDROOM	984	46

**BUILDING COVERAGE**

DESCRIPTION	AREA (SF)	% OF SITE
BUILDING FOOTPRINT	35,996	26 %
PAVING	64,439	46 %
SIDEWALKS	13,420	10 %
LANDSCAPE AREA	24,824	18 %
COMMON AREA	39,538	29 %
IMPROVED COMMON AREA	450 DOG PARK, 140 PATIO	- %
INTERIOR IMPROVED*	1,294	- %
<b>TOTAL SITE AREA</b>	<b>138,679</b>	

\* BASED 12 SF / DWELLING UNIT

**PARKING SCHEDULE**

DESCRIPTION	# REQUIRED	# PROVIDED
STANDARD STALLS	-	152
COMPACT STALLS**	-	38
COVERED STALLS***	94	97
EV CHARGING STALLS	9	10
<b>TOTAL ON-SITE PARKING</b>	<b>188*</b>	<b>190</b>

\* BASED ON PARKING RATIO OF 2 / DWELLING UNIT

\*\* BASED ON 20% ALLOWED TO BE COMPACT STALLS

\*\*\* BASED ON 1/2 OF PARKING STALLS REQUIRED TO BE COVERED

**BICYCLE SCHEDULE**

DESCRIPTION	# REQUIRED	# PROVIDED
STANDARD STALLS	52	52
COVERED STALLS	52	52
<b>TOTAL ON-SITE PARKING</b>	<b>104</b>	<b>104</b>

**SITE PLAN**

SCALE: 1" = 20'-0"



PROJECT/ LOCATION:

**WEST COAST HOME SOLUTIONS**

WOODBURN, OREGON

TITLE:

SITE PLAN

**LU 1.0**

DATE:

03/02/23

# Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

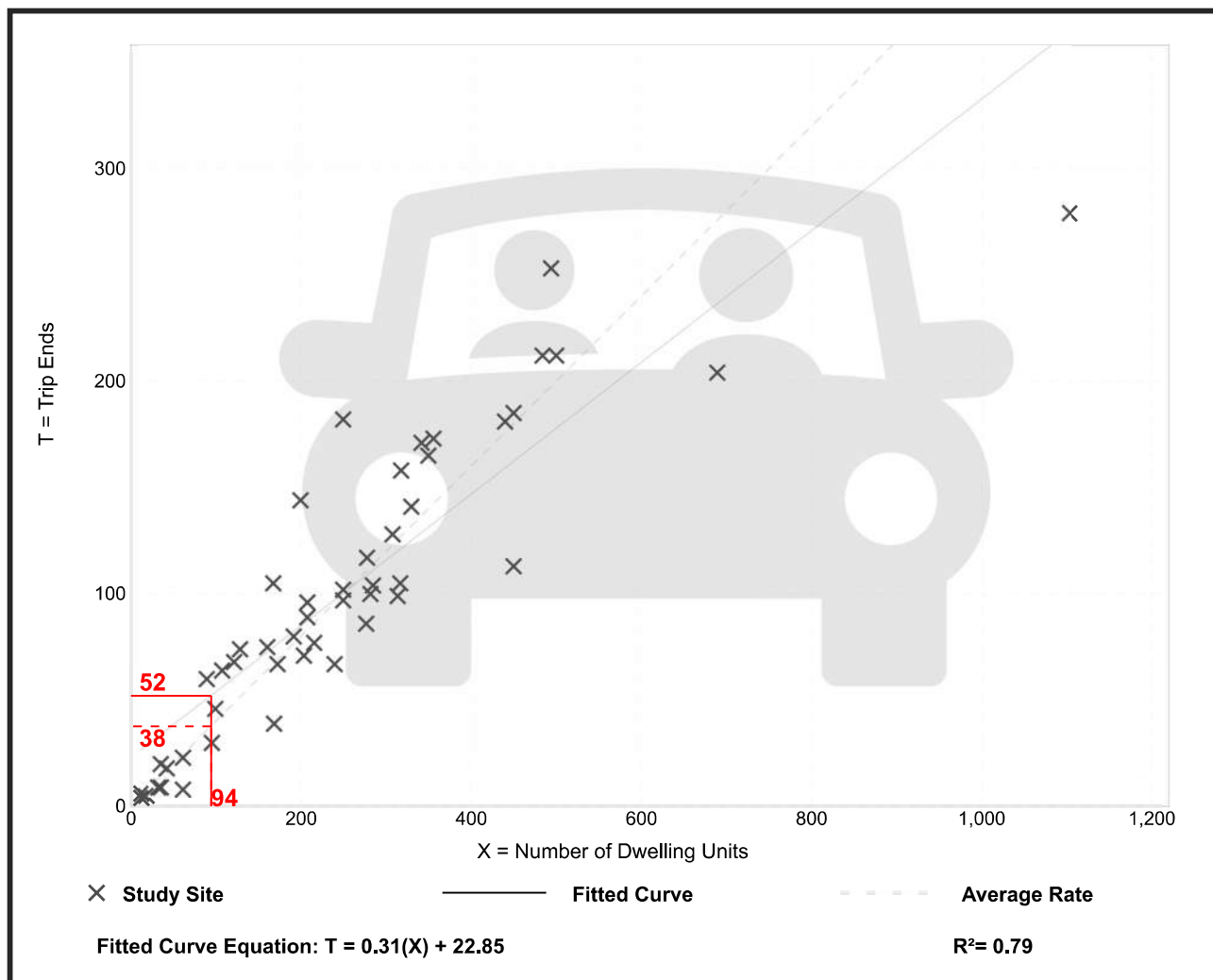
**Vehicle Trip Ends vs: Dwelling Units**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 7 and 9 a.m.**

**Setting/Location: General Urban/Suburban**  
 Number of Studies: 49  
 Avg. Num. of Dwelling Units: 249  
 Directional Distribution: 24% entering, 76% exiting

## Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.40	0.13 - 0.73	0.12

## Data Plot and Equation



# Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

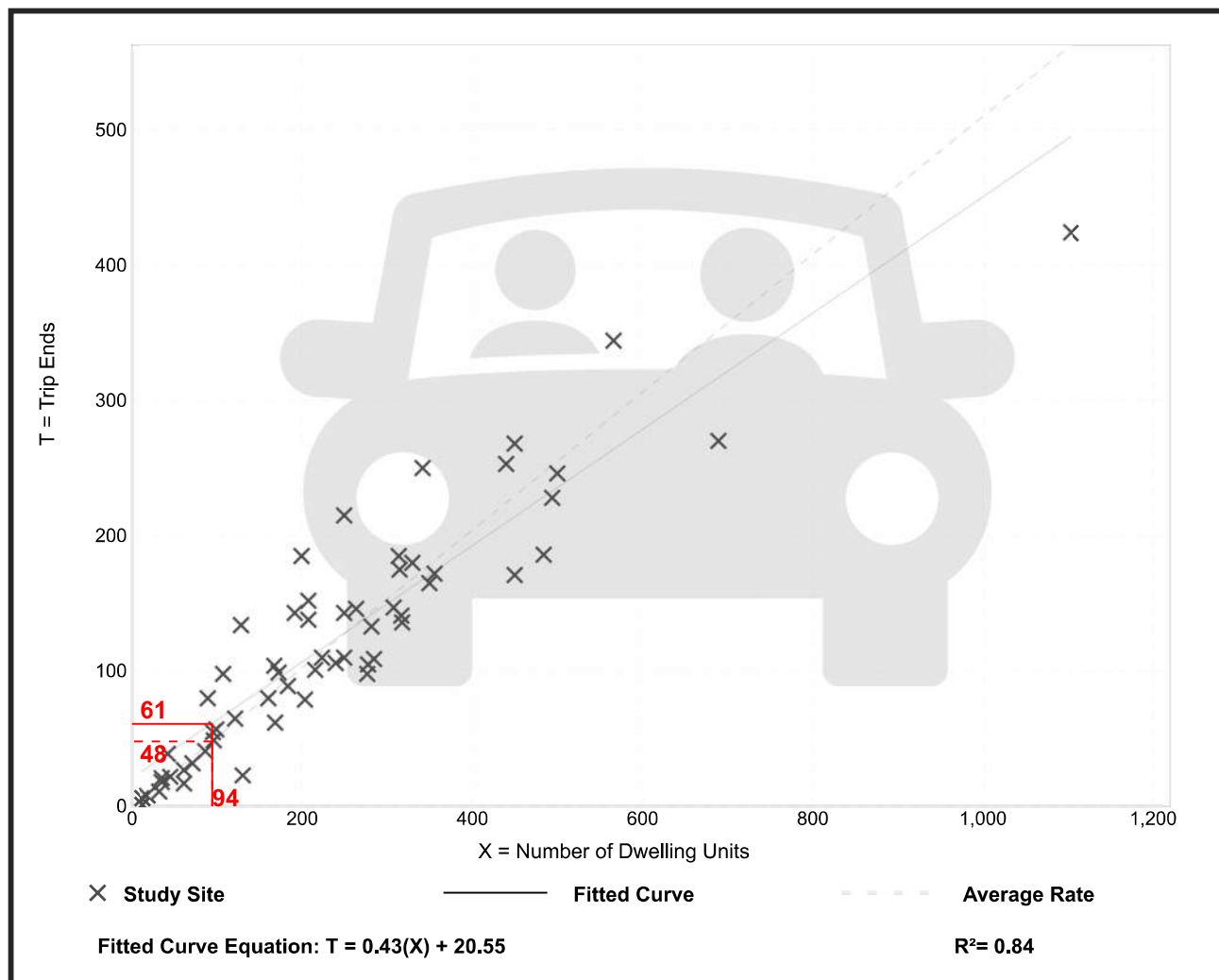
**Vehicle Trip Ends vs: Dwelling Units**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 4 and 6 p.m.**

**Setting/Location: General Urban/Suburban**  
 Number of Studies: 59  
 Avg. Num. of Dwelling Units: 241  
 Directional Distribution: 63% entering, 37% exiting

## Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.51	0.08 - 1.04	0.15

## Data Plot and Equation





# Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

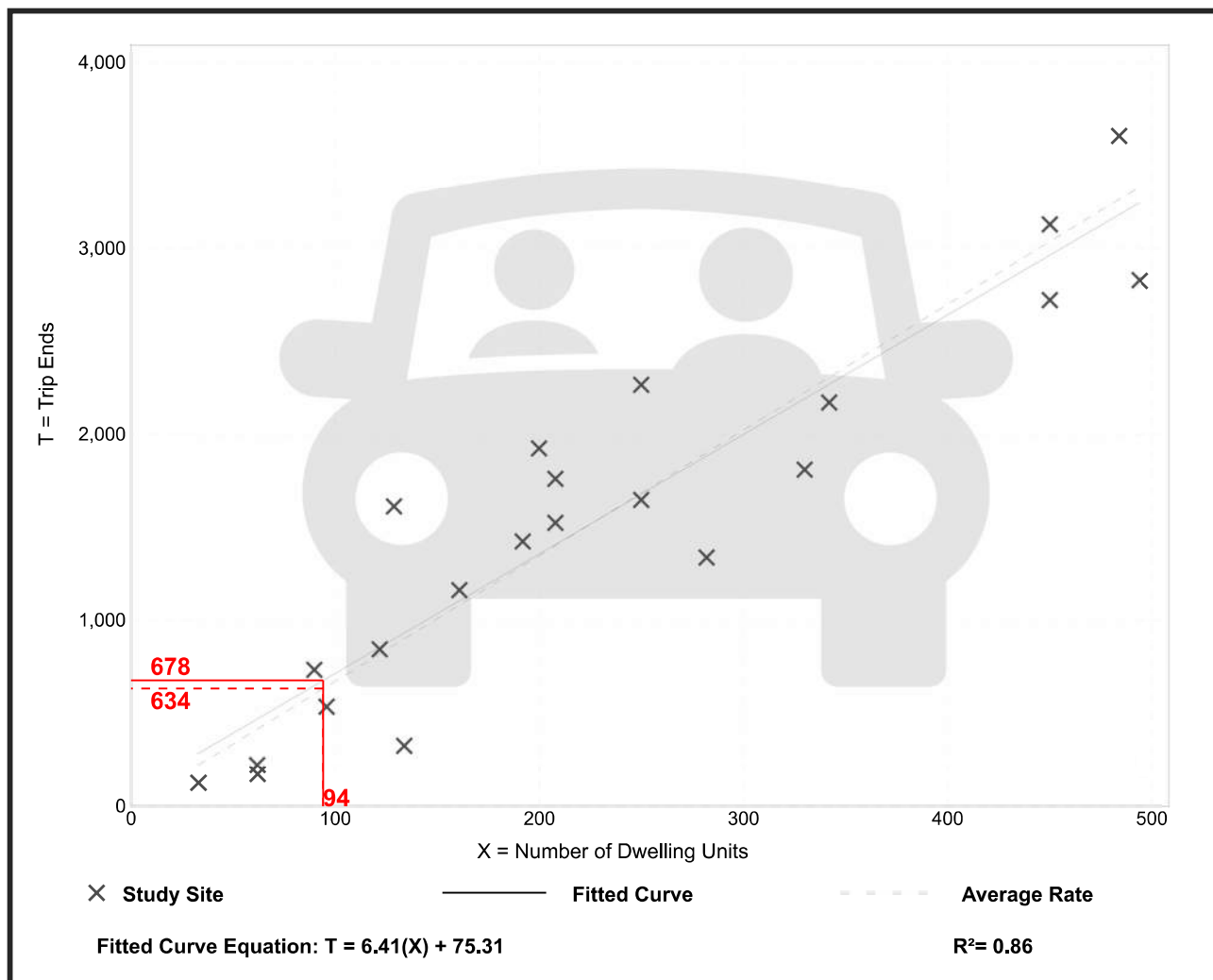
Vehicle Trip Ends vs: Dwelling Units  
On a: Weekday

Setting/Location: General Urban/Suburban  
Number of Studies: 22  
Avg. Num. of Dwelling Units: 229  
Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
6.74	2.46 - 12.50	1.79

## Data Plot and Equation



## Appendix B – Volumes

Traffic Counts

In-Process Trips





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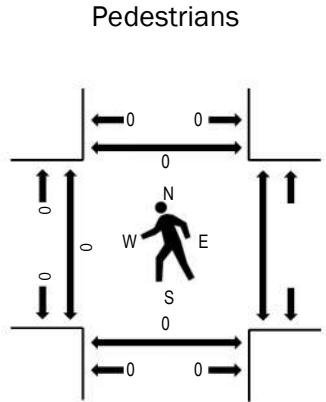
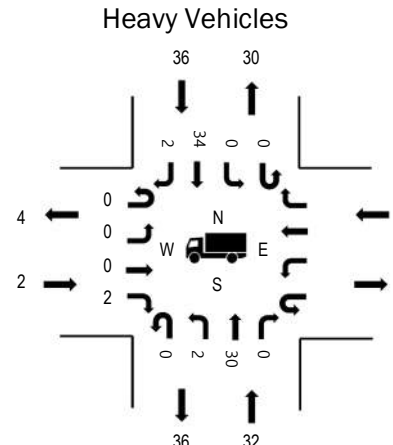
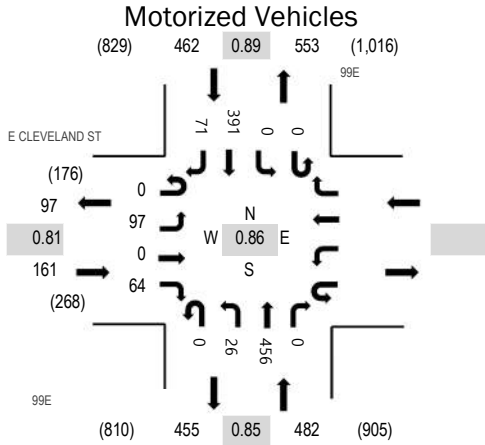
Location: 1 99E & E CLEVELAND ST AM

Date: Tuesday, January 31, 2023

Peak Hour: 07:00 AM - 08:00 AM

Peak 15-Minutes: 07:35 AM - 07:50 AM

**Peak Hour**



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	1.2%	0.81
WB		
NB	6.6%	0.85
SB	7.8%	0.89
All	6.3%	0.86

**Traffic Counts - Motorized Vehicles**

Interval Start Time	E CLEVELAND ST				99E				99E				Total	Rolling Hour				
	Eastbound				Westbound				Northbound						Southbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
7:00 AM	0	10	0	10					0	2	37	0	0	0	33	5	97	1,105
7:05 AM	0	9	0	5					0	1	29	0	0	0	34	2	80	1,097
7:10 AM	0	9	0	4					0	1	36	0	0	0	23	4	77	1,103
7:15 AM	0	5	0	4					0	4	45	0	0	0	29	10	97	1,092
7:20 AM	0	9	0	5					0	4	32	0	0	0	35	7	92	1,056
7:25 AM	0	7	0	5					0	2	40	0	0	0	26	1	81	1,042
7:30 AM	0	11	0	3					0	2	28	0	0	0	39	4	87	1,042
7:35 AM	0	8	0	6					0	2	32	0	0	0	34	4	86	1,030
7:40 AM	0	8	0	7					0	1	44	0	0	0	40	7	107	1,009
7:45 AM	0	11	0	10					0	1	60	0	0	0	34	11	127	976
7:50 AM	0	7	0	2					0	3	37	0	0	0	31	6	86	925
7:55 AM	0	3	0	3					0	3	36	0	0	0	33	10	88	903
8:00 AM	0	5	0	5					0	2	42	0	0	0	29	6	89	897
8:05 AM	0	6	0	6					0	3	36	0	0	0	30	5	86	
8:10 AM	0	4	0	1					0	0	29	0	0	0	28	4	66	
8:15 AM	0	5	0	1					0	1	32	0	0	0	20	2	61	
8:20 AM	0	6	0	3					0	3	37	0	0	0	27	2	78	
8:25 AM	0	5	0	4					0	2	43	0	0	0	22	5	81	
8:30 AM	0	6	0	4					0	1	31	0	0	0	29	4	75	
8:35 AM	0	4	0	2					0	1	27	0	0	0	22	9	65	
8:40 AM	0	8	0	4					0	2	26	0	0	0	29	5	74	
8:45 AM	0	10	0	2					0	2	27	0	0	0	32	3	76	
8:50 AM	0	1	0	3					0	5	36	0	0	0	13	6	64	
8:55 AM	0	5	0	7					0	3	32	0	0	0	32	3	82	
Count Total	0	162	0	106					0	51	854	0	0	0	704	125	2,002	
Peak Hour	0	97	0	64					0	26	456	0	0	0	391	71	1,105	

### Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

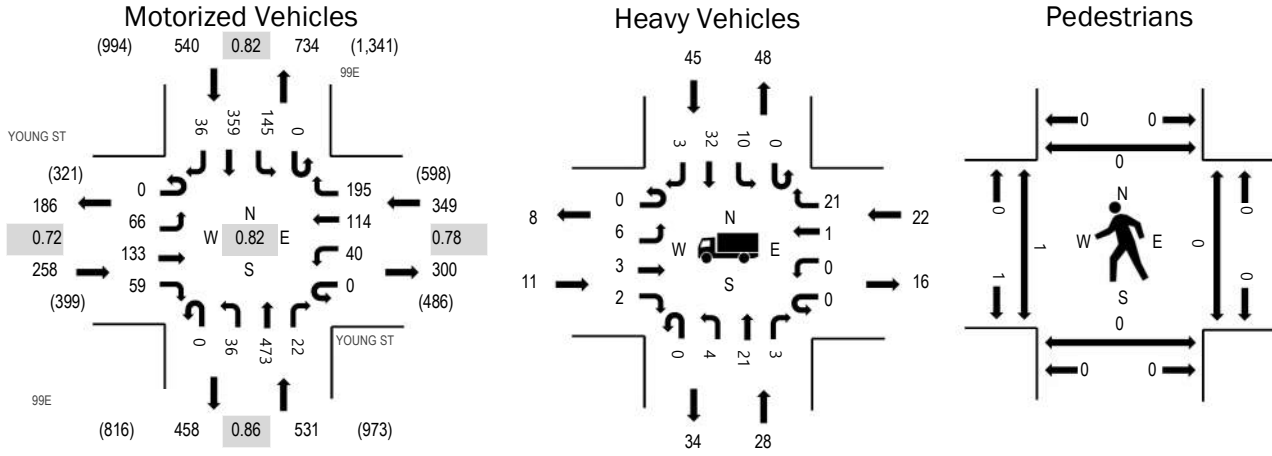
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	0	2		3	5	7:00 AM	0	0		0	0	7:00 AM	0	0		0	0
7:05 AM	1	1		4	6	7:05 AM	0	0		0	0	7:05 AM	0	0		0	0
7:10 AM	0	5		2	7	7:10 AM	0	0		0	0	7:10 AM	0	0		0	0
7:15 AM	0	2		2	4	7:15 AM	0	0		0	0	7:15 AM	0	0		0	0
7:20 AM	0	4		1	5	7:20 AM	0	0		0	0	7:20 AM	0	0		0	0
7:25 AM	0	3		2	5	7:25 AM	0	0		0	0	7:25 AM	0	0		0	0
7:30 AM	0	1		4	5	7:30 AM	0	0		0	0	7:30 AM	0	0		0	0
7:35 AM	0	1		2	3	7:35 AM	0	0		0	0	7:35 AM	0	0		0	0
7:40 AM	0	7		5	12	7:40 AM	0	0		0	0	7:40 AM	0	0		0	0
7:45 AM	1	0		5	6	7:45 AM	0	0		0	0	7:45 AM	0	0		0	0
7:50 AM	0	4		0	4	7:50 AM	0	0		0	0	7:50 AM	0	0		0	0
7:55 AM	0	2		6	8	7:55 AM	0	0		0	0	7:55 AM	0	0		0	0
8:00 AM	0	5		5	10	8:00 AM	0	0		0	0	8:00 AM	0	0		0	0
8:05 AM	0	3		6	9	8:05 AM	0	0		0	0	8:05 AM	0	0		0	0
8:10 AM	0	1		1	2	8:10 AM	0	0		0	0	8:10 AM	0	0		0	0
8:15 AM	0	4		2	6	8:15 AM	0	0		0	0	8:15 AM	0	0		0	0
8:20 AM	0	5		2	7	8:20 AM	0	0		0	0	8:20 AM	0	0		0	0
8:25 AM	0	7		3	10	8:25 AM	0	0		0	0	8:25 AM	0	0		0	0
8:30 AM	0	5		5	10	8:30 AM	1	0		1	1	8:30 AM	0	0		0	0
8:35 AM	0	2		3	5	8:35 AM	0	0		0	0	8:35 AM	0	0		0	0
8:40 AM	0	5		6	11	8:40 AM	0	0		0	0	8:40 AM	0	0		0	0
8:45 AM	0	0		4	4	8:45 AM	0	0		0	0	8:45 AM	0	0		0	0
8:50 AM	1	6		0	7	8:50 AM	0	0		0	0	8:50 AM	0	0		0	0
8:55 AM	1	7		5	13	8:55 AM	0	0		0	0	8:55 AM	0	0		0	0
Count Total	4	82		78	164	Count Total	1	0		0	1	Count Total	0	0		0	0
Peak Hour	2	32		36	70	Peak Hour	0	0		0	0	Peak Hour	0	0		0	0



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**Location:** 2 99E & YOUNG ST AM  
**Date:** Tuesday, January 31, 2023  
**Peak Hour:** 07:00 AM - 08:00 AM  
**Peak 15-Minutes:** 07:40 AM - 07:55 AM

**Peak Hour**



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	4.3%	0.72
WB	6.3%	0.78
NB	5.3%	0.86
SB	8.3%	0.82
All	6.3%	0.82

**Traffic Counts - Motorized Vehicles**

Interval Start Time	YOUNG ST Eastbound				YOUNG ST Westbound				99E Northbound				99E Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
7:00 AM	0	3	7	6	0	1	12	12	0	5	48	0	0	7	31	2	134	1,678
7:05 AM	0	2	11	7	0	3	12	18	0	1	31	1	0	10	27	2	125	1,666
7:10 AM	0	5	10	3	0	3	4	10	0	1	39	3	0	9	20	3	110	1,660
7:15 AM	0	5	12	2	0	4	2	14	0	4	41	1	0	12	29	3	129	1,643
7:20 AM	0	3	4	7	0	4	5	6	0	3	44	1	0	11	30	0	118	1,618
7:25 AM	0	5	9	4	0	5	12	21	0	3	39	2	0	13	24	5	142	1,599
7:30 AM	0	5	8	4	0	2	12	13	0	4	24	1	0	18	33	1	125	1,563
7:35 AM	0	7	11	10	0	5	8	11	0	1	36	4	0	13	25	1	132	1,549
7:40 AM	0	7	17	5	0	3	13	36	0	5	38	1	0	11	32	4	172	1,521
7:45 AM	0	9	20	4	0	3	12	19	0	5	60	3	0	18	33	5	191	1,456
7:50 AM	0	8	11	5	0	2	14	11	0	2	38	2	0	12	38	6	149	1,379
7:55 AM	0	7	13	2	0	5	8	24	0	2	35	3	0	11	37	4	151	1,322
8:00 AM	0	6	7	2	0	3	9	17	0	3	44	2	0	4	24	1	122	1,286
8:05 AM	0	2	7	6	0	2	8	10	0	1	35	0	0	13	32	3	119	
8:10 AM	0	3	3	2	0	4	10	15	0	1	28	1	0	6	20	0	93	
8:15 AM	0	0	3	1	0	1	2	18	0	3	35	3	0	13	19	6	104	
8:20 AM	0	5	6	1	0	1	5	9	0	4	31	0	0	9	28	0	99	
8:25 AM	0	2	5	3	0	0	4	15	0	4	41	1	0	5	24	2	106	
8:30 AM	0	9	7	1	0	5	3	7	0	1	34	1	0	13	27	3	111	
8:35 AM	0	4	6	3	0	1	5	15	0	2	28	0	0	10	27	3	104	
8:40 AM	0	4	5	3	0	2	5	15	0	1	27	0	0	9	33	3	107	
8:45 AM	0	3	4	0	0	1	6	12	0	0	39	1	0	12	32	4	114	
8:50 AM	0	11	6	1	0	3	8	9	0	1	30	2	0	3	14	4	92	
8:55 AM	0	4	5	1	0	0	8	11	0	7	29	2	0	12	31	5	115	
Count Total	0	119	197	83	0	63	187	348	0	64	874	35	0	254	670	70	2,964	
Peak Hour	0	66	133	59	0	40	114	195	0	36	473	22	0	145	359	36	1,678	

### Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	0	1	1	5	7	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:05 AM	1	1	3	5	10	7:05 AM	0	0	0	0	0	7:05 AM	0	0	0	0	0
7:10 AM	0	5	1	2	8	7:10 AM	0	0	0	0	0	7:10 AM	0	0	0	0	0
7:15 AM	0	2	2	2	6	7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	0	0
7:20 AM	0	4	2	2	8	7:20 AM	0	0	0	0	0	7:20 AM	0	0	0	0	0
7:25 AM	0	3	4	4	11	7:25 AM	0	0	0	0	0	7:25 AM	0	0	0	0	0
7:30 AM	3	1	0	3	7	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:35 AM	1	1	0	4	6	7:35 AM	0	0	0	0	0	7:35 AM	1	0	0	0	1
7:40 AM	0	4	5	6	15	7:40 AM	0	0	0	0	0	7:40 AM	0	0	0	0	0
7:45 AM	2	1	0	0	3	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0
7:50 AM	4	3	2	6	15	7:50 AM	0	0	0	0	0	7:50 AM	0	0	0	0	0
7:55 AM	0	2	2	6	10	7:55 AM	0	0	0	0	0	7:55 AM	0	0	0	0	0
8:00 AM	0	5	3	7	15	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:05 AM	1	2	1	6	10	8:05 AM	0	0	0	0	0	8:05 AM	1	0	0	0	1
8:10 AM	0	1	1	2	4	8:10 AM	0	0	0	0	0	8:10 AM	0	0	0	0	0
8:15 AM	1	4	1	3	9	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	1	1
8:20 AM	2	4	2	4	12	8:20 AM	0	0	0	0	0	8:20 AM	0	0	0	0	0
8:25 AM	0	8	3	5	16	8:25 AM	0	0	0	0	0	8:25 AM	0	0	0	0	0
8:30 AM	1	4	3	7	15	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:35 AM	0	2	1	3	6	8:35 AM	0	0	0	0	0	8:35 AM	0	0	1	0	1
8:40 AM	0	4	2	5	11	8:40 AM	0	0	0	0	0	8:40 AM	0	0	0	1	1
8:45 AM	1	1	4	7	13	8:45 AM	0	0	0	0	0	8:45 AM	0	0	0	0	0
8:50 AM	0	3	2	0	5	8:50 AM	0	0	0	0	0	8:50 AM	0	0	0	0	0
8:55 AM	2	6	0	7	15	8:55 AM	0	0	0	0	0	8:55 AM	0	0	0	0	0
Count Total	19	72	45	101	237	Count Total	0	0	0	0	0	Count Total	2	0	1	2	5
Peak Hour	11	28	22	45	106	Peak Hour	0	0	0	0	0	Peak Hour	1	0	0	0	1



### Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	1	3		5	9	4:00 PM	0	0		0	0	4:00 PM	0	0		0	0
4:05 PM	0	3		3	6	4:05 PM	0	0		0	0	4:05 PM	0	0		0	0
4:10 PM	0	3		1	4	4:10 PM	0	0		0	0	4:10 PM	0	0		0	0
4:15 PM	0	1		3	4	4:15 PM	0	0		0	0	4:15 PM	0	0		0	0
4:20 PM	0	1		0	1	4:20 PM	0	0		0	0	4:20 PM	0	0		0	0
4:25 PM	0	2		1	3	4:25 PM	0	0		0	0	4:25 PM	0	0		0	0
4:30 PM	0	1		3	4	4:30 PM	0	0		0	0	4:30 PM	0	0		0	0
4:35 PM	0	1		2	3	4:35 PM	0	0		0	0	4:35 PM	0	0		0	0
4:40 PM	0	1		1	2	4:40 PM	0	0		0	0	4:40 PM	0	0		0	0
4:45 PM	0	0		4	4	4:45 PM	0	0		0	0	4:45 PM	0	0		0	0
4:50 PM	0	0		0	0	4:50 PM	0	0		0	0	4:50 PM	0	0		0	0
4:55 PM	0	0		4	4	4:55 PM	0	0		0	0	4:55 PM	0	0		0	0
5:00 PM	0	1		2	3	5:00 PM	0	0		0	0	5:00 PM	0	0		0	0
5:05 PM	0	1		1	2	5:05 PM	0	0		0	0	5:05 PM	0	0		0	0
5:10 PM	0	0		2	2	5:10 PM	0	0		0	0	5:10 PM	0	0		0	0
5:15 PM	0	1		0	1	5:15 PM	0	0		0	0	5:15 PM	0	0		0	0
5:20 PM	0	0		2	2	5:20 PM	0	0		0	0	5:20 PM	0	0		0	0
5:25 PM	0	2		1	3	5:25 PM	0	0		0	0	5:25 PM	0	0		0	0
5:30 PM	0	1		0	1	5:30 PM	0	0		0	0	5:30 PM	0	0		0	0
5:35 PM	0	1		3	4	5:35 PM	0	0		0	0	5:35 PM	0	0		0	0
5:40 PM	0	0		3	3	5:40 PM	0	0		0	0	5:40 PM	1	0		0	1
5:45 PM	1	4		3	8	5:45 PM	0	0		0	0	5:45 PM	0	0		0	0
5:50 PM	0	2		0	2	5:50 PM	0	0		0	0	5:50 PM	0	0		0	0
5:55 PM	1	3		1	5	5:55 PM	0	0		0	0	5:55 PM	0	0		0	0
Count Total	3	32		45	80	Count Total	0	0		0	0	Count Total	1	0		0	1
Peak Hour	0	14		24	38	Peak Hour	0	0		0	0	Peak Hour	0	0		0	0





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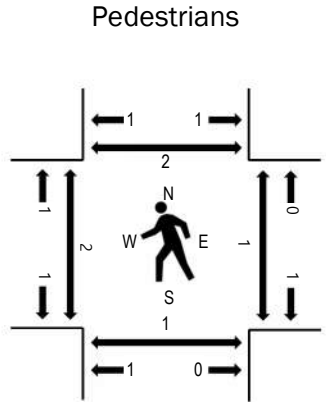
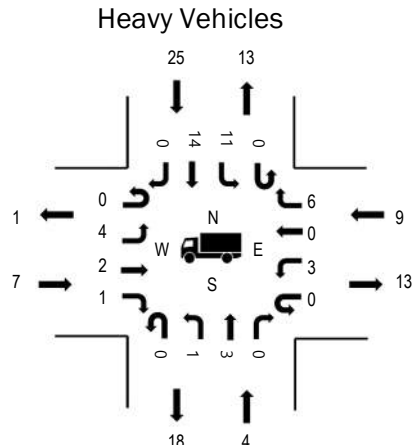
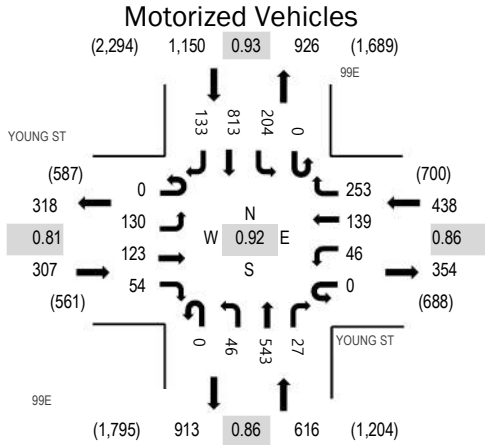
Location: 2 99E & YOUNG ST PM

Date: Tuesday, January 31, 2023

Peak Hour: 04:30 PM - 05:30 PM

Peak 15-Minutes: 04:40 PM - 04:55 PM

Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	2.3%	0.81
WB	2.1%	0.86
NB	0.6%	0.86
SB	2.2%	0.93
All	1.8%	0.92

Traffic Counts - Motorized Vehicles

Interval Start Time	YOUNG ST Eastbound				YOUNG ST Westbound				99E Northbound			99E Southbound				Total	Rolling Hour	
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru			Right
4:00 PM	0	9	10	4	0	3	9	16	0	2	41	1	0	19	72	4	190	2,476
4:05 PM	0	8	8	4	0	4	7	22	0	3	40	0	0	18	71	7	192	2,484
4:10 PM	0	11	16	6	0	5	7	14	0	9	56	1	0	15	84	7	231	2,484
4:15 PM	0	3	10	3	0	4	9	13	0	6	69	0	0	13	74	9	213	2,502
4:20 PM	0	10	3	2	0	3	5	17	0	5	48	2	0	22	76	8	201	2,483
4:25 PM	0	9	8	4	0	3	5	11	0	5	39	2	0	13	52	11	162	2,471
4:30 PM	0	8	13	7	0	7	12	15	0	1	44	2	0	21	68	9	207	2,511
4:35 PM	0	11	3	4	0	4	7	29	0	7	45	4	0	11	64	10	199	2,484
4:40 PM	0	7	11	5	0	1	13	33	0	6	49	5	0	16	62	14	222	2,492
4:45 PM	0	11	12	3	0	3	13	25	0	3	63	2	0	16	86	19	256	2,451
4:50 PM	0	5	4	2	0	3	12	25	0	5	49	3	0	17	67	12	204	2,345
4:55 PM	0	11	8	7	0	5	10	20	0	5	50	1	0	12	58	12	199	2,319
5:00 PM	0	11	9	5	0	7	11	23	0	3	34	1	0	16	66	12	198	2,283
5:05 PM	0	18	11	5	0	8	10	20	0	5	42	1	0	14	50	8	192	
5:10 PM	0	18	16	5	0	6	17	21	0	2	43	3	0	23	84	11	249	
5:15 PM	0	7	11	5	0	0	15	17	0	4	36	4	0	23	64	8	194	
5:20 PM	0	9	12	4	0	0	5	7	0	3	44	1	0	19	76	9	189	
5:25 PM	0	14	13	2	0	2	14	18	0	2	44	0	0	16	68	9	202	
5:30 PM	0	11	8	2	0	0	6	11	0	2	50	0	0	22	58	10	180	
5:35 PM	0	13	9	12	0	3	12	12	0	7	20	4	0	26	71	18	207	
5:40 PM	0	9	8	4	0	1	4	7	0	3	40	4	0	19	64	18	181	
5:45 PM	0	8	6	6	0	2	5	6	0	1	38	1	0	12	52	13	150	
5:50 PM	0	10	6	2	0	2	12	9	0	5	35	3	0	22	61	11	178	
5:55 PM	0	6	4	2	0	2	7	4	0	8	38	0	0	19	64	9	163	
Count Total	0	237	219	105	0	78	227	395	0	102	1,057	45	0	424	1,612	258	4,759	
Peak Hour	0	130	123	54	0	46	139	253	0	46	543	27	0	204	813	133	2,511	

### Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	0	2	2	8	12	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	3	1	2	3	9	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	0	4	3	2	9	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	0	2	0	2	4	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	0	1	1	0	2	4:20 PM	0	0	0	0	0	4:20 PM	1	0	0	0	1
4:25 PM	1	2	0	3	6	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	1	1	1	3	6	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	1	1
4:35 PM	0	1	1	1	3	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	0	0	1	2	3	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	1	1
4:45 PM	1	0	1	3	5	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	0	0	0	2	2	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	1	0	0	3	4	4:55 PM	0	0	1	0	1	4:55 PM	0	0	0	0	0
5:00 PM	1	1	1	4	7	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	1	1
5:05 PM	1	0	1	2	4	5:05 PM	0	0	0	0	0	5:05 PM	0	1	1	0	2
5:10 PM	1	0	1	2	4	5:10 PM	0	0	0	0	0	5:10 PM	2	0	0	1	3
5:15 PM	0	0	0	0	0	5:15 PM	0	0	1	0	1	5:15 PM	0	0	0	0	0
5:20 PM	0	0	0	1	1	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	1	1	2	2	6	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	1	1	0	1	3	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	1	0	4	5	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	1	1
5:40 PM	1	0	0	2	3	5:40 PM	0	0	0	0	0	5:40 PM	1	0	0	0	1
5:45 PM	1	2	0	4	7	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	2	2	0	1	5	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	1	2	0	3	6	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	17	24	17	58	116	Count Total	0	0	2	0	2	Count Total	4	1	1	5	11
Peak Hour	7	4	9	25	45	Peak Hour	0	0	2	0	2	Peak Hour	2	1	1	4	8

## Trip Generation Estimate

Trip generation estimates are typically based on data derived from *Trip Generation, 10<sup>th</sup> Edition*, published by the Institute of Transportation Engineers (ITE). Project Basie will be used for storage and consolidation of products prior to their larger regional and local distribution and would be considered a “sortable” facility. The ITE land use that most closely matches this function is “High-Cube Fulfillment Center Warehouse” (Land Use 155). Table 9 provides the estimated trip generation using ITE data.

**Table 9 - Estimated Trip Generation (ITE) – High Cube Fulfillment Center (Sortable)**

Land Use	ITE Code	Size	Weekday Trips	Weekday AM Peak Hour Trips			Weekday PM Peak Hour Trips		
				Total	In	Out	Total	In	Out
High-Cube Fulfillment Center Warehouse	155	3,849,000 sq. ft.	23,640	1,705	853	852	3,959	1,980	1,979

In reviewing Table 9, it is important to note that these ITE rates are based on one or two study sites (depending on the analysis period) with a facility square footage that is significantly smaller than the proposed 3.849 million square foot Project Basie facility. In consultation with the Project Basie tenant, it was determined that the application of the Land Use 155 rates would significantly overestimate the daily and peak hour trip profile of the site.

Instead, the Project Basie tenant supplied a detailed employee and truck arrival/departure profile that was developed specifically for the proposed site, taking into consideration the size of the building, its geographic location and relation to other in-network distribution facilities, the finite processing capabilities of the facility, internal automation technology, anticipated employee levels, and site-specific work schedules. These variables are based on operational experience at other facilities with similar functions nationwide. A detailed summary of this profile is included in *Appendix G* along with additional trip generation information requested by City of Woodburn staff. As shown, the proposed site is anticipated to be a 24-hour facility with multiple shift change patterns. In particular, there are two key shift change periods that are anticipated to occur near the typical weekday AM and PM peak periods:

- 6:30-7:30 AM which accounts for the peak arrival period for the dayshift.
- 5:30-6:30 PM which accounts for peak dayshift departure period and the peak nightshift arrival period.

These shift change periods represent what ITE defines as “the Peak Hour of the Generator”. The resulting trip profile is summarized in Table 10 below.

**Table 10 - Project Basie - Peak Hour of the Generator Trip Generation Estimate**

Land Use	Size	Trip Type	Weekday Daily Trips	Weekday AM Peak Hour of Generator Trips (6:30-7:30 AM)			Weekday PM Peak Hour of Generator Trips (5:30-6:30 PM)		
				Total	In	Out	Total	In	Out
Project Basie	937 employees per shift	Employees	3,558	676	648	28	1,156	573	583
		Trucks	612	26	13	13	20	10	10
		<b>Total</b>	<b>4,170</b>	<b>702</b>	<b>661</b>	<b>41</b>	<b>1,176</b>	<b>583</b>	<b>593</b>

Source: Tenet supplied employee and freight arrival/departure schedule. See Appendix G.

Note: The trip generation profile in Table 10 is consistent with the proposed 3.849 million square foot facility. The square footage identified in the 4/16/21 Scoping Memo was incorrectly stated.

In addition to the Peak Hour of the Generator, the traffic counts along the OR 219 study corridor revealed that Woodburn’s street system has different peak time periods than reflected in Table 10. In particular, the weekday AM peak hour in Woodburn has been found to occur from 7:00-8:00 AM while the weekday PM system peak hour has been found to occur from 4:30-5:30 PM. The resulting trip profile for the proposed building during these times is shown in Table 11.

**Table 11 - Project Basie - Peak Hour of the System Trip Generation Estimate**

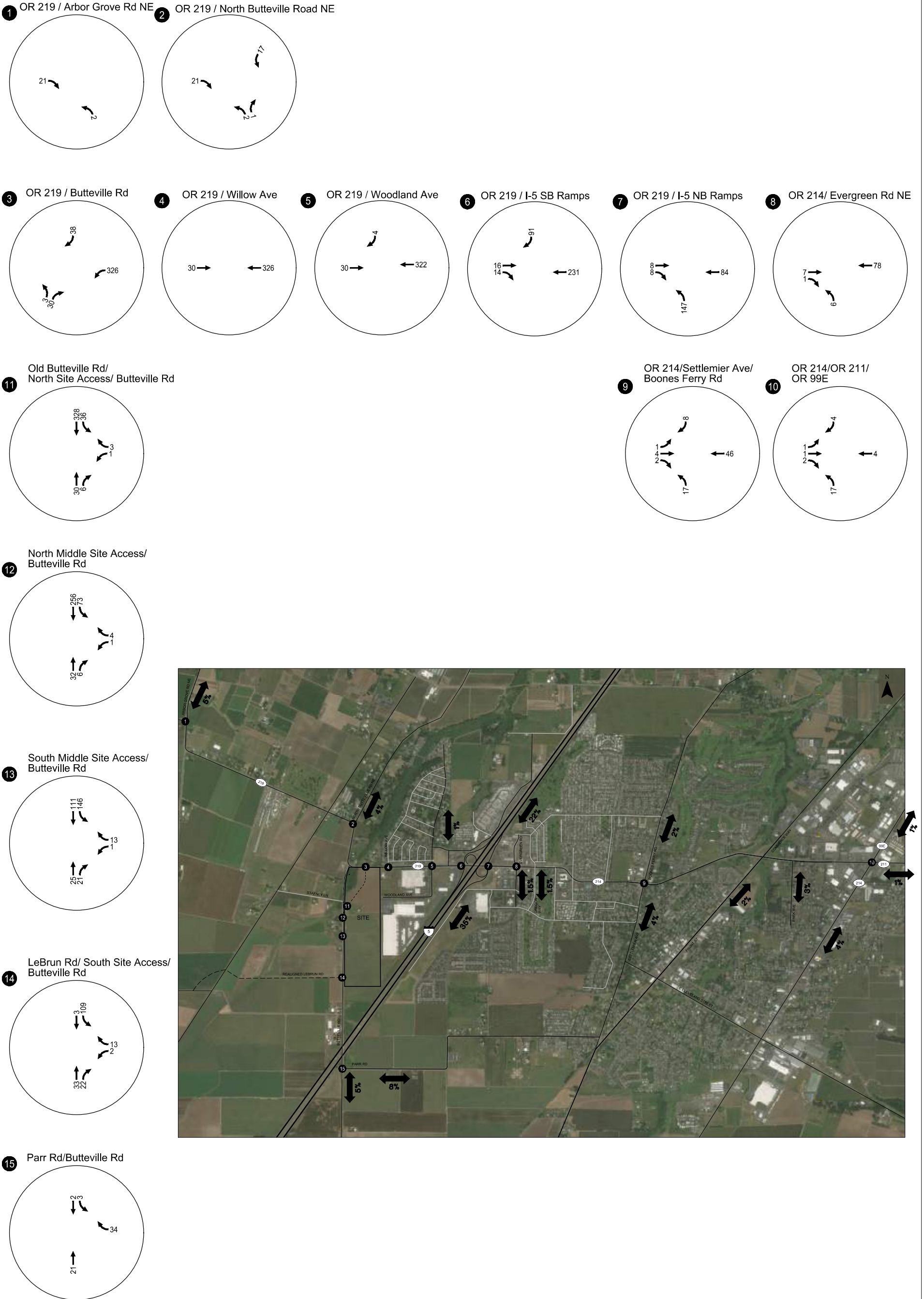
Land Use	Size	Trip Type	Weekday Daily Trips	Weekday AM Peak Hour of the System Trips (7:00-8:00 AM)			Weekday PM Peak Hour of the System Trips (4:30-5:30 PM)		
				Total	In	Out	Total	In	Out
Project Basie	937 employees per shift	Employees	3,558	427	404	23	154	93	61
		Trucks	612	30	15	15	22	11	11
		<b>Total</b>	<b>4,170</b>	<b>457</b>	<b>419</b>	<b>38</b>	<b>176</b>	<b>104</b>	<b>72</b>

Source: Tenet supplied employee and freight arrival/departure schedule. See Appendix G.

Note: The trip generation profile in Table 11 is consistent with the proposed 3.849 million square foot facility. The square footage identified in the 4/16/21 Scoping Memo was incorrectly stated.

### Site Trip Distribution/Trip Assignment

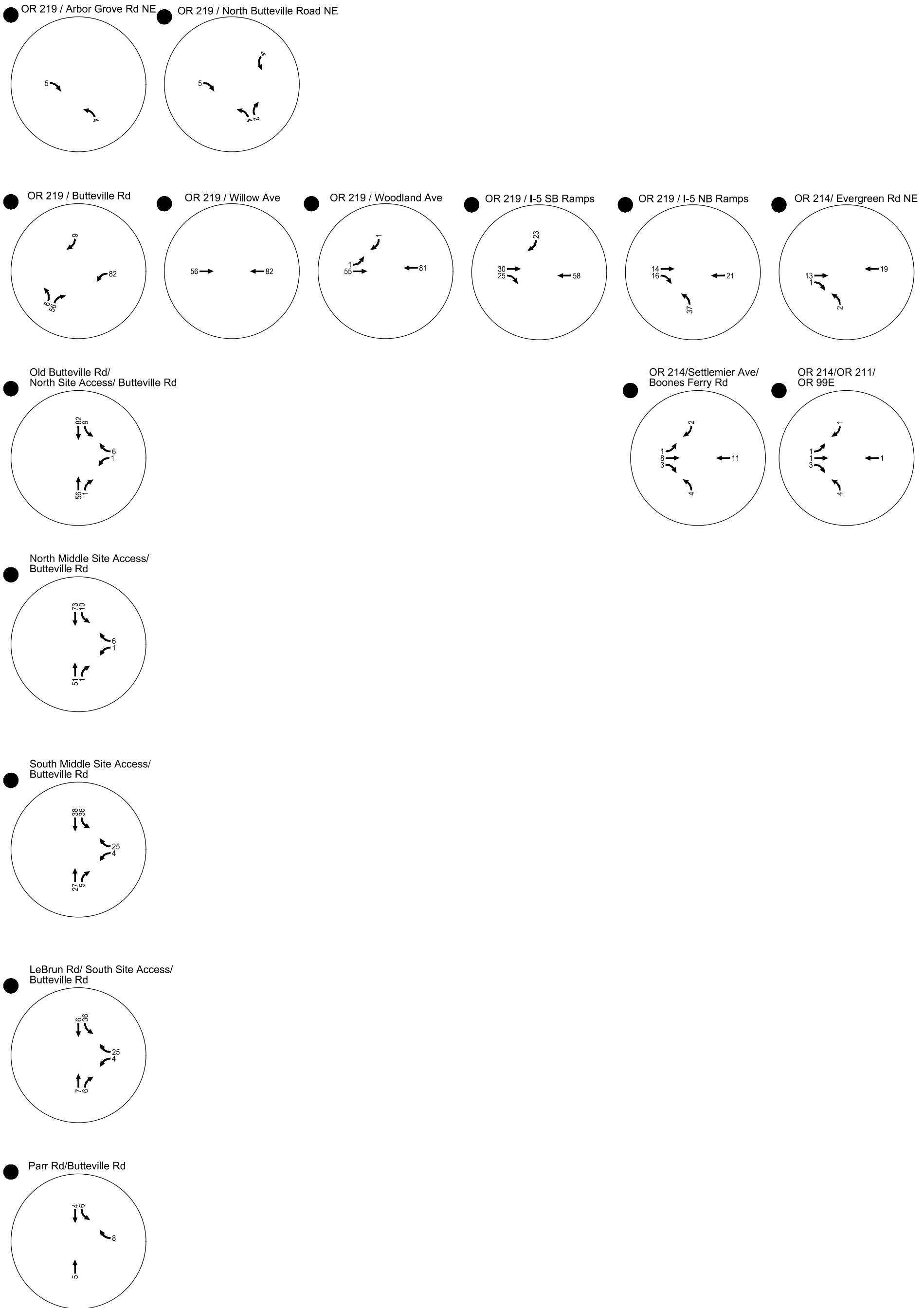
A trip distribution pattern was identified for the proposed fulfillment center, taking into consideration the number of anticipated jobs that will be provided by the development, the site’s location with respect to both the city and other population centers in the Willamette Valley. In addition to these factors, US Census OnTheMap (<https://onthemap.ces.census.gov/>) data was consulted which identifies statistics about the origins of workers who are employed in the Woodburn area (see Appendix H for a more detailed summary of the census employee origin data for Woodburn). Using a combination of these factors and based on preliminary scoping feedback from City, County, and ODOT staff, a refined trip distribution pattern was developed for the site. The trip distribution pattern and resulting assignment of weekday AM and PM peak period site-generated trips to the study intersections and site driveways is illustrated in Figures 13-16.



**Site-Generated Trips**  
**System Peak Hour (7:00 AM to 8:00 AM)**  
**Woodburn, OR**

Figure  
**13**

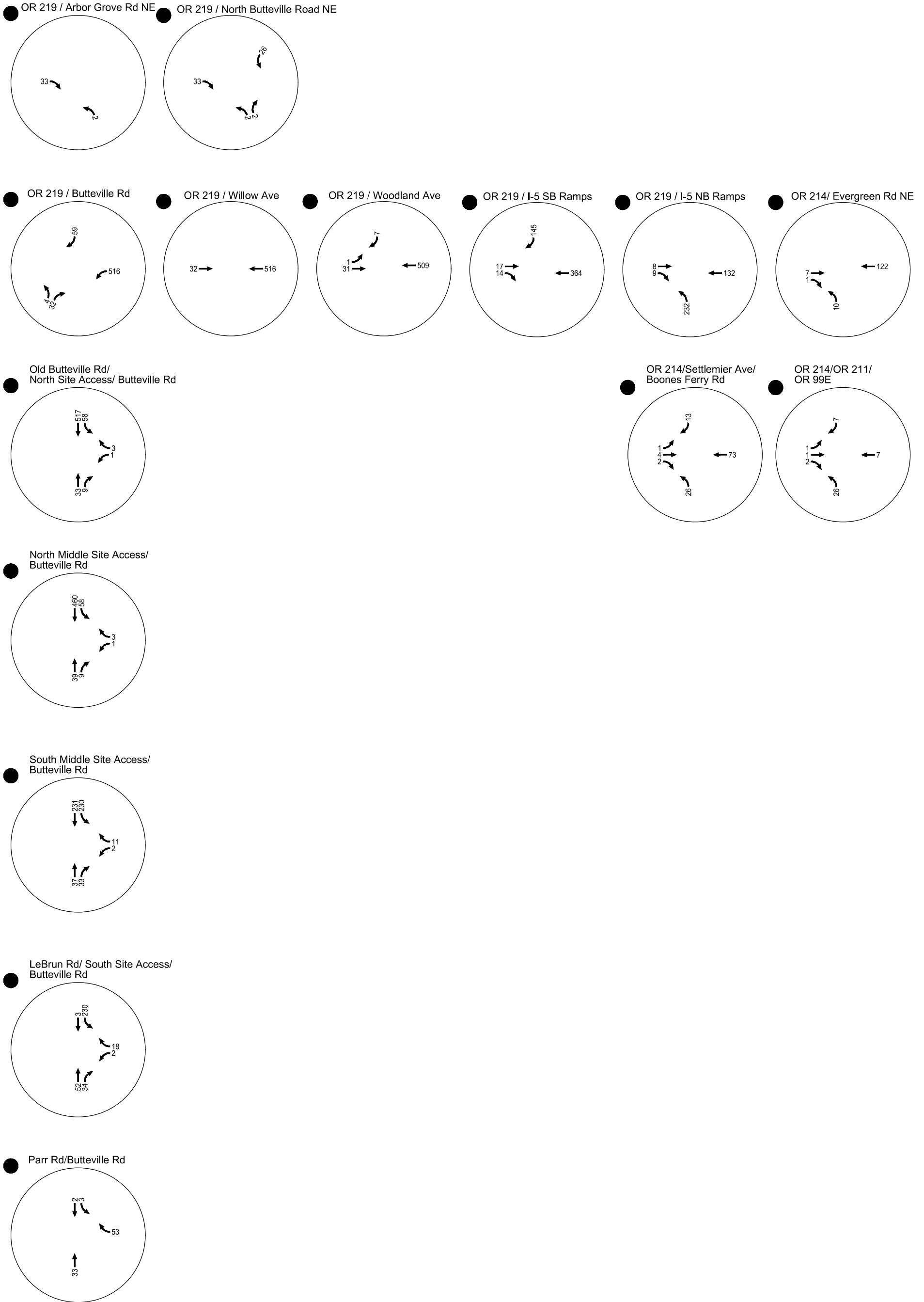
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**Site-Generated Trips**  
**System Peak Hour (4:30 PM to 5:30 PM)**  
**Woodburn, OR**

Figure  
**14**

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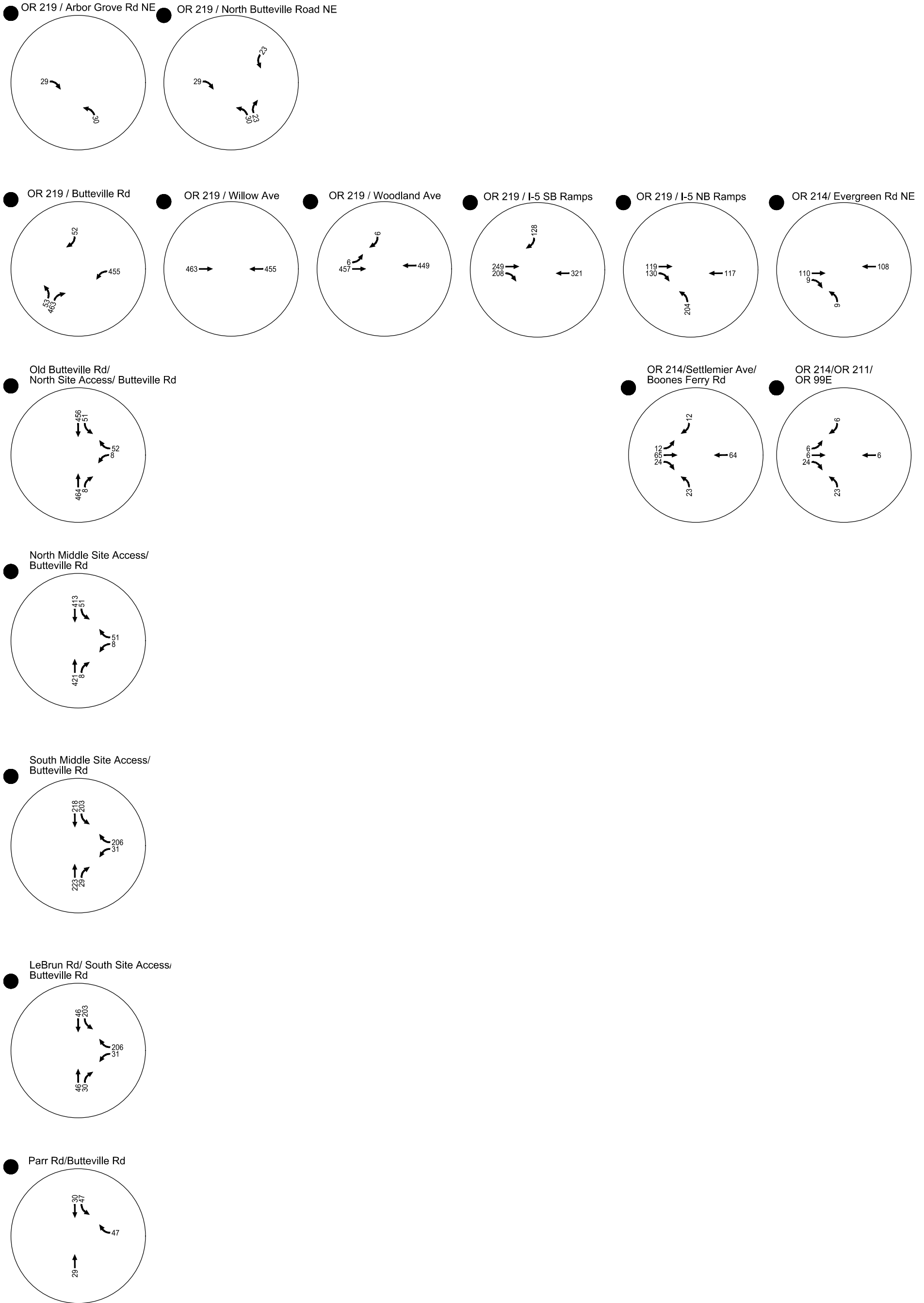


Site-Generated Trips  
Peak Hour of Generator (6:30 AM to 7:30 AM)  
Woodburn, OR

Figure  
15

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Site-Generated Trips  
Peak Hour of Generator (5:30 PM to 6:30 PM)  
Woodburn, OR

Figure  
16

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## CHAPTER 4: PROJECT IMPACTS

This chapter reviews impacts the proposed development may have on the study area transportation system. The focus of the impact analysis is on the following study intersections:

- 1 N Pacific Hwy (99E)/ Molalla Rd (OR 211)
- 2 Molalla Rd (OR 211)/ Safeway Driveway
- 3 Molalla Rd (OR 211)/ June Way/ Woodburn Place Apartments Phase 2 Site Access
- 4 Molalla Rd (OR 211)/ Woodburn Place Apartments Phase 1 Site Access
- 5 Molalla Rd (OR 211)/ Cooley Road

### Trip Generation

Trip generation is used to estimate the number of vehicle trips added to the roadway network by a development during a specified period. In this case, the AM and PM peak hour periods are studied. Trip generation estimates are established using data and methodology provided by the Institute of Transportation Engineers (ITE).<sup>3</sup>

Trip generation values for the proposed development are estimated using the ITE Trip Generation Manual, 11th Edition, and the Land Use Code 221: Multifamily Housing (Mid-Rise) Not Close to Rail Transit. Trip generation values are provided in **Table 8**.

**Table 9: Trip Generation Summary**

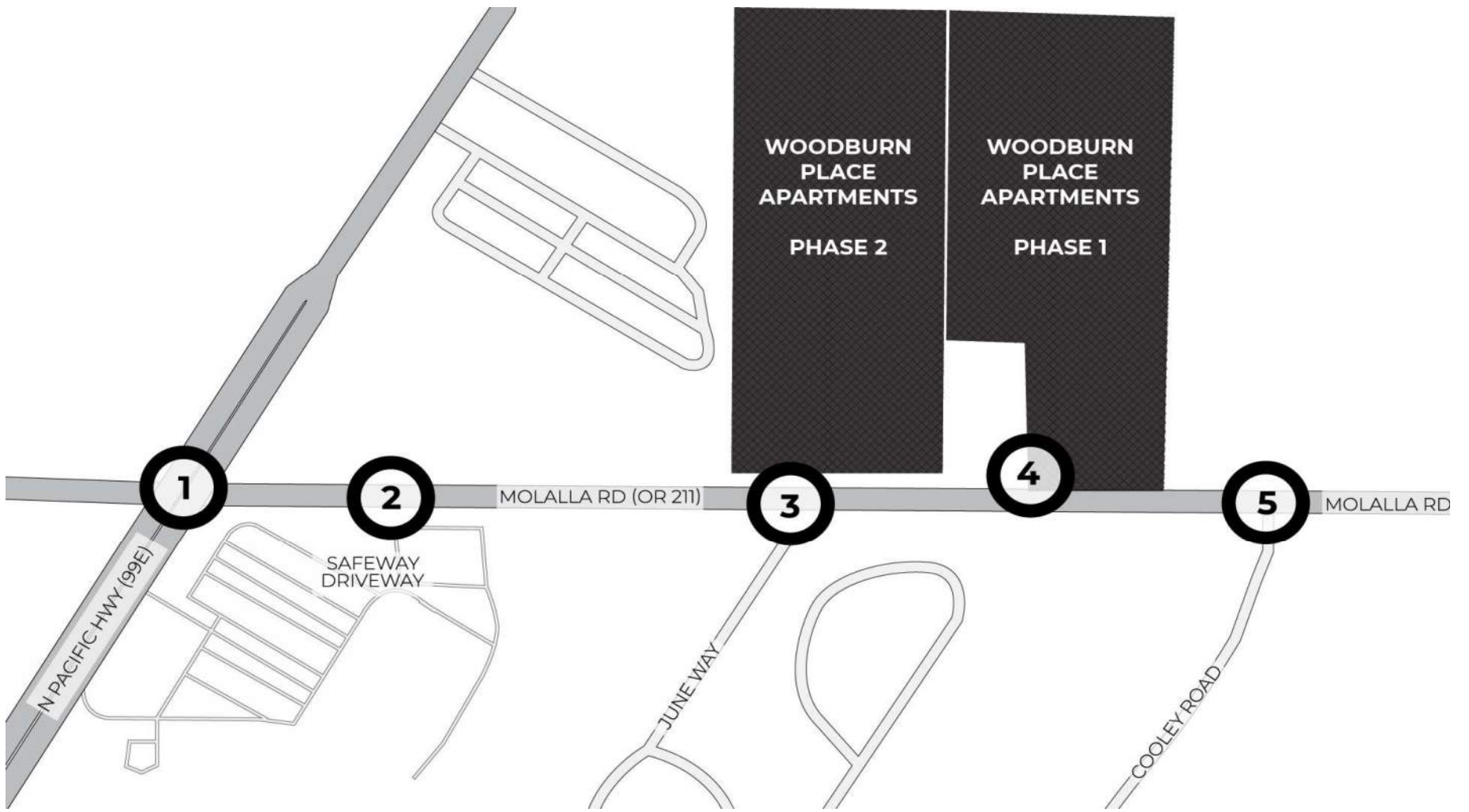
Land Use (ITE Codes)	Dwelling Units	Time Period	Trip Generation Rate	Peak Hour Trips		
				In	Out	Total
Multi-Family Mid-Rise Not Close to Rail Transit (LUC 221)	258	AM Peak	Equation	23	79	102
<b>TOTAL AM PEAK HOUR</b>				<b>23</b>	<b>79</b>	<b>102</b>
Multi-Family Mid-Rise Not Close to Rail Transit (LUC 221)	258	PM Peak	Equation	62	39	101
<b>TOTAL PM PEAK HOUR</b>				<b>62</b>	<b>39</b>	<b>101</b>

### Trip Distribution

Trip distribution provides an estimation of where trips from the development originate and end on the study area network. This is represented as percentages where large portions of the trips generated enter and exit the project study area. The trip distribution percentages are included in **Appendix D**. **Figures 6 and 7** show the trips generated by the study distributed on the network.

<sup>3</sup> *Trip Generation, 11<sup>th</sup> Edition*, Institute of Transportation Engineers, 2021.  
Enloe Consulting, LLC

**Figure 6: Site Generated Volumes AM Peak Hour**



1   99E / Molalla Rd	
<p>0 0 6</p>	<p>20 28 20</p>

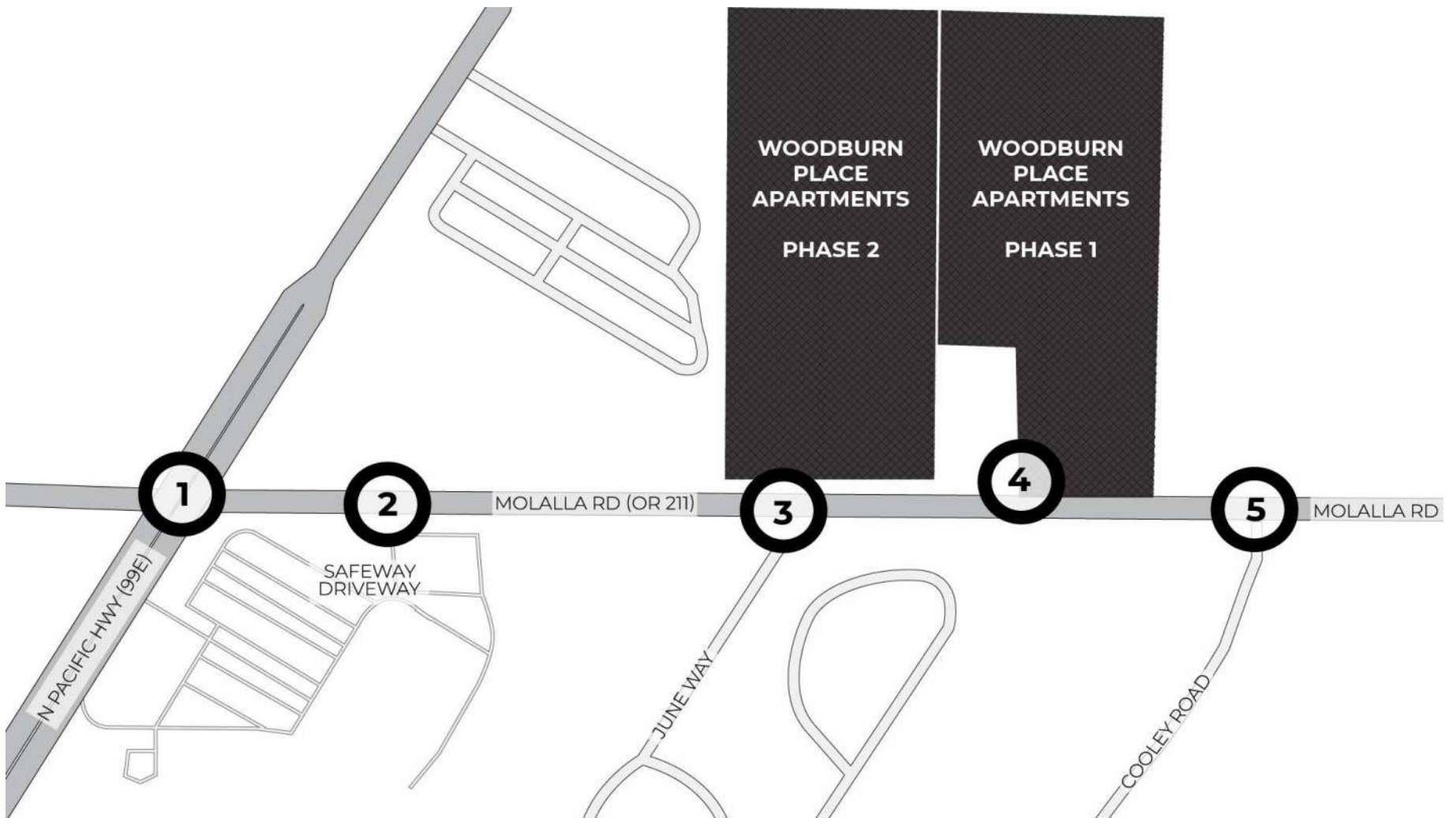
2   Molalla Rd / Safeway Driveway	
<p>20 0</p>	<p>68 0</p>

3   Molalla Rd / June Way	
<p>68 2 9</p>	<p>2 0 0</p>

4   Molalla Rd / Phase 1 Apt Access	
<p>0 0</p>	<p>0 2</p>

5   Molalla Rd / Cooley Rd	
<p>0 0 0</p>	<p>0 1 0</p>

**Figure 7: Site Generated Volumes PM Peak Hour**



1   99E / Molalla Rd	
0 0 15	10
	14
	10
0	0 0 16
22	
0	

2   Molalla Rd / Safeway Driveway	
	34
	0
53	
0	0 0

3   Molalla Rd / June Way	
34 1 4	7
	0
	0
53	0 2 0
0	
0	

4   Molalla Rd / Phase 1 Apt Access	
0 0	0
	7
0	
4	

5   Molalla Rd / Cooley Rd	
0 0 0	0
	4
	0
0	3 0 0
2	
2	

Figure 8: Trip Distribution

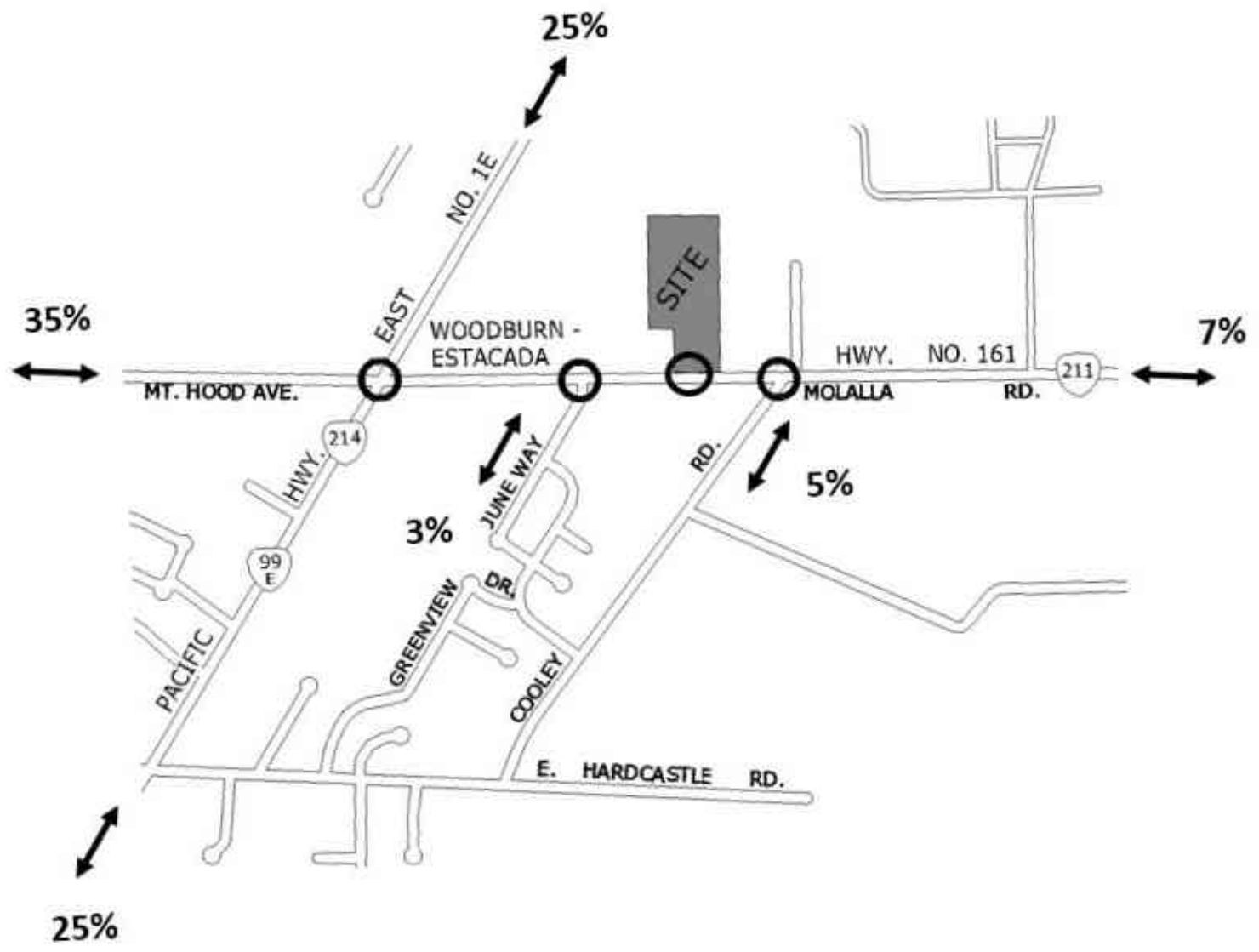
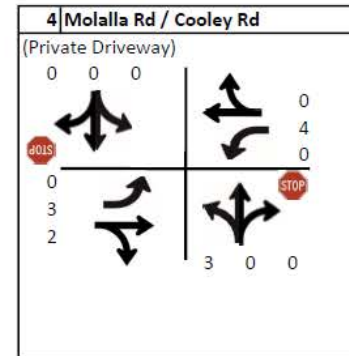
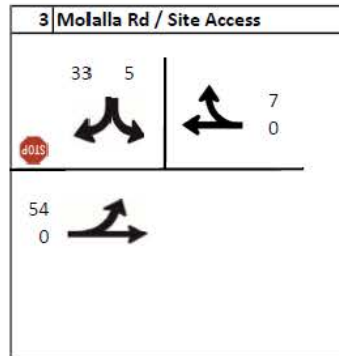
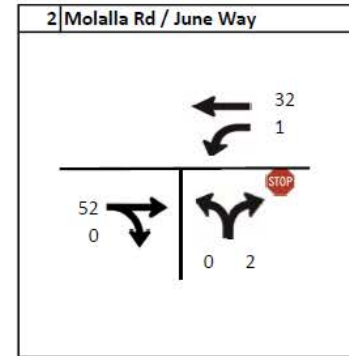
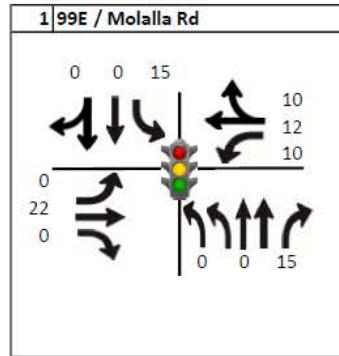
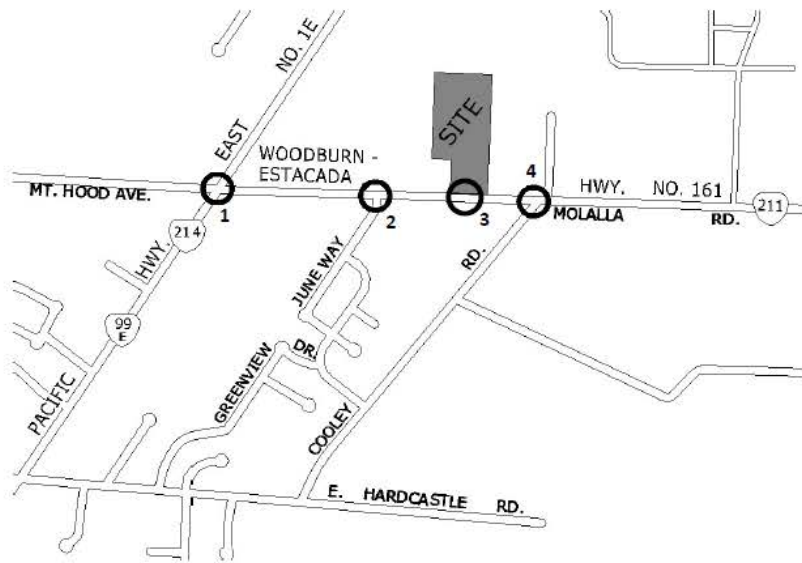




Figure 10: PM Peak Hour Site Generated Volumes





May 26, 2022

Woodburn Realestate, LLC  
Attention: Baset Shagrun  
3000 Market Street, Suite 510  
Salem, Oregon 97301

Re: **Woodburn Apartments – Woodburn, Oregon**  
*Traffic Impact Analysis*

Woodburn File Numbers DR 22-05 and VAR 22-06  
C&A Project Number 20220501.00

Dear Mr. Shagrun,

This Traffic Impact Analysis (TIA) letter supports the proposed Woodburn Apartments development land use actions and addresses the City of Woodburn and the Oregon Department of Transportation (ODOT) Traffic Impact Study requirements. The following items are specifically addressed:

1. Property Description and Proposed Land Use Actions
2. Study Parameters
3. Development Trip Generation
4. Development Access
5. Summary

## **1. PROPERTY DESCRIPTION AND PROPOSED LAND USE ACTIONS**

The subject property is located at 119 N Pacific Highway in Woodburn, Oregon. It is described as tax lot 7500 on the Marion County Assessor's Map 051W17BC.

The property size is 1.37 acres (59,740 square feet) and is undeveloped. The property is currently zoned Mixed-Use Village (MUV). The proposed 35-unit residential apartment development is an allowed use in the MUV zone designation. The property has direct access to N Pacific Highway (OR 99E).



## 2. STUDY PARAMETERS

Transportation materials contained in the April 14, 2022 letter from the City of Woodburn to Jim Toporek (Studio 3 Architecture) regarding the status of the Woodburn Apartments project state,

*"D. TIA: Per [Woodburn Development Ordinance (WDO)] 3.04.05, a traffic impact analysis (TIA) is required if the proposal generates more than 100 peak hour trips or 1,000 daily trips (ODOT requires a TIA if the proposal generates 50 peak hour trips or 300 daily trips). Applicant must either submit a traffic memo calculating and describing why a TIA is not required for this project or if one is, submit a TIA. Consult with the City Engineer and ODOT regarding TIA standards and requirements."*

Based on materials presented in the *Development Trip Generation* section of this analysis, only a traffic memo is necessary to address City requirements. Subsequent email correspondence with the Oregon Department of Transportation (ODOT) staff states,

*"Based on trip generation, a memo will be fine for the site. The one concern that would have been good to see in a TIA is left turn storage in the TWLTL for vehicles waiting to turn into the site. The highway approach is situated in the best location (farthest away from the railroad crossing). But left-turn storage will start where the TWLTL begins to taper. It would be helpful for our decision if the memo had a small mention of queueing and what that is expected to look like."*

## 3. DEVELOPMENT TRIP GENERATION

Trip generation for the proposed 35-unit residential apartment development is estimated using the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 11<sup>th</sup> Edition, and practices from the *ITE Trip Generation Handbook*, 3<sup>rd</sup> Edition and is presented in the following table.

TABLE 1 – DEVELOPMENT TRIP GENERATION									
Land Use	ITE Code	Size	Daily	AM Peak Hour			PM Peak Hour		
				Enter	Exit	Total	Enter	Exit	Total
Multifamily Housing (Low-Rise)	220	35 DU	300 <sup>1</sup>	8	26	34 <sup>1</sup>	22	14	36 <sup>1</sup>

<sup>1</sup> Trip generation estimated using the *Fitted Curve* per recommended practice in the *ITE Trip Generation Handbook*, 3<sup>rd</sup> Edition.

As identified in the table above, 35 residential dwellings generate 300 daily, 34 AM, and 36 PM peak hour trips. Considering Woodburn TIA requirements, the development generates fewer than 100 peak hour or 1,000 daily trips. Therefore, City analysis thresholds are not met. Subsequent discussions with ODOT staff further indicate that only a memorandum documenting trip generation is necessary.



#### 4. DEVELOPMENT ACCESS

Based on the attached site plan, the proposed development access to N Pacific Highway (OR 99E) is located at the northeast property corner, as far north from the OR 99E/ Silverton Avenue intersection and the railroad crossing as possible.

OR 99E is five lanes wide at the proposed access location, including a center two-way left-turn lane (TWLTL), and tapers to four lanes without a TWLTL to the south. As a result, there is queue storage for approximately two northbound vehicles turning left into the proposed development. Given there are estimated to be 8 AM and 22 PM peak hour vehicle trips entering the development from both the north and southbound directions, it is anticipated that the northbound TWLTL queue storage area will safely accommodate development queues.

Overall, based on the proposed site plan, the development will be designed and constructed to Woodburn Development Ordinance standards.

#### 5. SUMMARY

The following conclusions are based on the materials contained in this analysis.

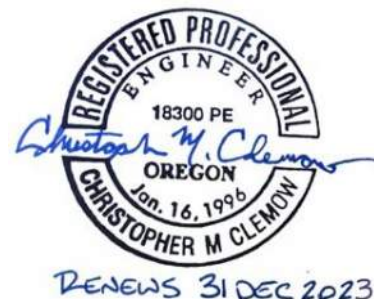
1. The subject property is located at 119 N Pacific Highway in Woodburn, Oregon. It is described as tax lot 7500 on the Marion County Assessor's Map 051W17BC.
2. The property size is 1.37 acres (59,740 square feet) and is undeveloped. The property is currently zoned Mixed-Use Village (MUV) and the proposed development is an allowed use.
3. The proposed 35-unit residential apartment development generates 300 daily, 34 AM, and 36 PM peak hour trips. Based on agency requirements, transportation impact analysis thresholds are not met and only a memorandum documenting trip generation is necessary.
4. The proposed development access to N Pacific Highway (OR 99E) is located at the northeast property corner, as far north from the OR 99E/ Silverton Avenue intersection and the railroad crossing as possible.
5. There is queue storage for approximately two northbound vehicles turning left into the proposed development. Given there are estimated to be 8 AM and 22 PM peak hour vehicle trips entering the development from both the north and southbound directions, it is anticipated that the northbound TWLTL queue storage area will safely accommodate development queues.
6. Based on the proposed site plan the site will be designed and constructed to Woodburn Development Ordinance standards.

Sincerely,



Christopher M. Clemow, PE, PTOE  
Transportation Engineer

Attachments: Site Plan



## Appendix C - Safety

Crash History Data

Left-Turn Lane Warrant Analysis

Preliminary Signal Warrant Analysis



















TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

URBAN NON-SYSTEM CRASH LISTING

CITY OF WOODBURN, MARION COUNTY

PACIFIC HY 99E and YOUNG ST, City of Woodburn, Marion County, 01/01/2016 to 12/31/2020

15 - 16 of 36 Crash records shown.

SER#	S P R J S W DATE	CLASS	CITY STREET	INT-TYPE	SPCL USE	MOVE	A S												
INVEST	E A U I C O DAY	DIST	FIRST STREET	RD CHAR	(MEDIAN) INT-REL	OFFRD WTHR	CRASH	TRLR QTY	MOVE	PRTC	INJ	G E LICNS	PED	ERROR	ACT	EVENT	CAUSE		
RD DPT	E L G N H R TIME	FROM	SECOND STREET	DIRECT	LEGS TRAF-	RNDBT SURF	COLL	OWNER	FROM	P#	TYPE	SVRTY	E X RES	LOC	ERROR	ACT	EVENT	CAUSE	
UNLOC?	D C S V L K LAT	LONG	LRS	LOCTN	(#LANES) CONTL	DRVWY LIGHT	SVRTY	V# TYPE	TO	P#	TYPE	SVRTY	E X RES	LOC	ERROR	ACT	EVENT	CAUSE	
03950	N N N # N N 09/21/2017	14	PACIFIC HY 99E	INTER	CROSS N	N	CLR	S-OTHER	01 NONE	9	U-TURN							08	
	E r r o r																		
CITY	TH		YOUNG ST	CN		TRF SIGNAL	N	DRY	TURN	N/A	NE-NE				000			00	
N	4P			03	0		N	DAY	PDO	PSNGR CAR		01 DRVR	NONE	00	Unk UNK		000	000	00
N	45 8 13.29	-122 50 38.07	008100100S00																00
	# E r r o r									02 NONE	9	TURN-L							
									N/A		NE-SE				000			00	
									PSNGR CAR			01 DRVR	NONE	00	Unk UNK		000	000	00
																			00
03276	N N N # N N 09/02/2018	14	PACIFIC HY 99E	INTER	CROSS N	N	CLR	O-1 L-TURN	01 NONE	0	TURN-L							02	
	E r r o r																		
CITY	SU		YOUNG ST	CN		TRF SIGNAL	N	DRY	TURN	PRVTE	SW-NW				000			00	
N	12P			01	0		N	DAY	INJ	PSNGR CAR		01 DRVR	NONE	26	M NONE		028,004	000	02
N	45 8 13.29	-122 50 38.07	008100100S00																
	# E r r o r											02 NONE	0	STRGHT					
									PRVTE		NE-SW				000			00	
									PSNGR CAR			01 DRVR	INJB	34	M OR-Y		000	000	00
															OR<25				00
	# E r r o r											02 NONE	0	STRGHT					
									PRVTE		NE-SW				000			000	00
									PSNGR CAR			02 PSNG	INJB	29	F		000	000	00

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.





















03/10/2023

## TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

## CRASH SUMMARIES BY YEAR BY COLLISION TYPE

PACIFIC HY 99E and YOUNG ST, City of Woodburn, Marion County, 01/01/2016 to 12/31/2020

COLLISION TYPE	FATAL	MAJOR	MODERATE	MINOR	PROP	TOTAL	PEOPLE	MAJOR	MODERATE	MINOR
	CRASHES	INJURY CRASHES	INJURY CRASHES	INJURY CRASHES	DAMAGE ONLY		KILLED	INJURIES	INJURIES	INJURIES
<b>YEAR: 2020</b>										
ANGLE	0	0	0	1	0	1	0	0	0	2
REAR-END	0	0	0	1	2	3	0	0	0	1
SIDESWIPE - OVERTAKING	0	0	0	0	1	1	0	0	0	0
TURNING MOVEMENTS	0	0	0	1	2	3	0	0	0	2
<b>2020 TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>5</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>
<b>YEAR: 2019</b>										
ANGLE	0	0	0	1	0	1	0	0	0	3
REAR-END	0	0	1	0	1	2	0	0	1	0
TURNING MOVEMENTS	0	0	0	0	2	2	0	0	0	0
<b>2019 TOTAL</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>3</b>
<b>YEAR: 2018</b>										
REAR-END	0	0	0	1	1	2	0	0	0	1
TURNING MOVEMENTS	0	0	1	1	0	2	0	0	2	1
<b>2018 TOTAL</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>
<b>YEAR: 2017</b>										
ANGLE	0	0	1	2	0	3	0	0	1	5
REAR-END	0	0	0	1	4	5	0	0	0	1
SIDESWIPE - OVERTAKING	0	0	0	1	1	2	0	0	0	1
TURNING MOVEMENTS	0	0	0	3	2	5	0	0	0	4
<b>2017 TOTAL</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>7</b>	<b>7</b>	<b>15</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>11</b>
<b>YEAR: 2016</b>										
FIXED / OTHER OBJECT	0	0	0	1	0	1	0	0	0	1
TURNING MOVEMENTS	0	0	0	2	1	3	0	0	0	3
<b>2016 TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>1</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>
<b>FINAL TOTAL</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>16</b>	<b>17</b>	<b>36</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>25</b>

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirements, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.





















































03/10/2023

## TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

## CRASH SUMMARIES BY YEAR BY COLLISION TYPE

PACIFIC HY 99E and CLEVELAND ST, City of Woodburn, Marion County, 01/01/2016 to 12/31/2020

COLLISION TYPE	FATAL	MAJOR	MODERATE	MINOR	PROP	TOTAL	PEOPLE	MAJOR	MODERATE	MINOR
	CRASHES	INJURY CRASHES	INJURY CRASHES	INJURY CRASHES	DAMAGE ONLY		KILLED	INJURIES	INJURIES	INJURIES
<b>YEAR: 2020</b>										
FIXED / OTHER OBJECT	0	0	0	0	1	1	0	0	0	0
PEDESTRIAN	0	0	0	1	0	1	0	0	0	1
TURNING MOVEMENTS	0	0	2	3	0	5	0	0	3	7
<b>2020 TOTAL</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>4</b>	<b>1</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>YEAR: 2019</b>										
REAR-END	0	0	1	6	1	8	0	0	1	10
TURNING MOVEMENTS	0	0	1	2	1	4	0	0	1	3
<b>2019 TOTAL</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>8</b>	<b>2</b>	<b>12</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>13</b>
<b>YEAR: 2018</b>										
FIXED / OTHER OBJECT	0	0	0	1	0	1	0	0	0	1
REAR-END	0	0	0	1	1	2	0	0	0	1
TURNING MOVEMENTS	0	0	0	2	4	6	0	0	0	2
<b>2018 TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>5</b>	<b>9</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>
<b>YEAR: 2017</b>										
REAR-END	0	0	1	2	2	5	0	0	2	2
TURNING MOVEMENTS	0	0	2	3	2	7	0	0	3	6
<b>2017 TOTAL</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>5</b>	<b>4</b>	<b>12</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>8</b>
<b>YEAR: 2016</b>										
REAR-END	0	1	2	2	1	6	0	1	2	7
TURNING MOVEMENTS	0	0	1	2	3	6	0	0	1	4
<b>2016 TOTAL</b>	<b>0</b>	<b>1</b>	<b>3</b>	<b>4</b>	<b>4</b>	<b>12</b>	<b>0</b>	<b>1</b>	<b>3</b>	<b>11</b>
<b>FINAL TOTAL</b>	<b>0</b>	<b>1</b>	<b>10</b>	<b>25</b>	<b>16</b>	<b>52</b>	<b>0</b>	<b>1</b>	<b>13</b>	<b>44</b>

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirements, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.



## Preliminary Traffic Signal Warrant Analysis

Project: Young Street  
 Date: 3/16/2023  
 Scenario: 2025 Buildout PM Peak Hour

Major Street:	Young Street	Minor Street:	Bryan Street	
Number of Lanes:	1	Number of Lanes:	1	
				Total
PM Peak		PM Peak	18	Rights
Hour Volumes:	669	Hour Volumes:	13	RT Discount
			0%	

Warrant Used:

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

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

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

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
<i>Warrant 1</i>			
<i>Condition A: Minimum Vehicular Volume</i>			
Major Street	6,690	8,850	
Minor Street*	180	2,650	<b>No</b>
<i>Condition B: Interruption of Continuous Traffic</i>			
Major Street	6,690	13,300	
Minor Street*	180	1,350	<b>No</b>
<i>Combination Warrant</i>			
Major Street	6,690	10,640	
Minor Street*	180	2,120	<b>No</b>

\* Minor street right-turning traffic volumes reduced by 00%.



## Preliminary Traffic Signal Warrant Analysis

Project: Young Street TIS  
 Date: 3/16/2023  
 Scenario: 2025 Buildout PM Peak Hour

Major Street:	OR-99E	Minor Street:	Cleveland Street	
Number of Lanes:	2	Number of Lanes:	1	
AM Peak Hour Volumes:	1700	AM Peak Hour Volumes:	153	Total Rights RT Discount
			71	
			100%	

Warrant Used:

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

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

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

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
<i>Warrant 1</i>			
<i>Condition A: Minimum Vehicular Volume</i>			
Major Street	17,000	10,600	
Minor Street*	820	2,650	<b>No</b>
<i>Condition B: Interruption of Continuous Traffic</i>			
Major Street	17,000	15,900	
Minor Street*	820	1,350	<b>No</b>
<i>Combination Warrant</i>			
Major Street	17,000	12,720	
Minor Street*	820	2,120	<b>No</b>

\* Minor street right-turning traffic volumes reduced by 100%.

## Appendix D - Operations

Synchro Reports

SimTraffic Reports



# HCM 6th Signalized Intersection Summary

## 1: OR 99E & Young Street

03/13/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	133	59	40	114	195	36	575	22	145	436	36
Future Volume (veh/h)	66	133	59	40	114	195	36	575	22	145	436	36
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	1841	1841	1841	1811	1811	1811	1682	1682	1682	1641	1641	1641
Adj Flow Rate, veh/h	80	162	72	49	139	238	44	701	27	177	532	44
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	4	4	4	6	6	6	5	5	5	8	8	8
Cap, veh/h	311	329	146	163	367	418	420	1023	39	411	1135	94
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	0.05	0.33	0.33	0.11	0.39	0.39
Sat Flow, veh/h	990	1207	537	237	1348	1535	1602	3137	121	1563	2916	241
Grp Volume(v), veh/h	80	0	234	188	0	238	44	357	371	177	284	292
Grp Sat Flow(s),veh/h/ln	990	0	1744	1585	0	1535	1602	1598	1660	1563	1559	1597
Q Serve(g_s), s	3.4	0.0	5.2	0.1	0.0	6.2	0.8	9.0	9.0	3.3	6.3	6.3
Cycle Q Clear(g_c), s	8.8	0.0	5.2	5.3	0.0	6.2	0.8	9.0	9.0	3.3	6.3	6.3
Prop In Lane	1.00		0.31	0.26		1.00	1.00		0.07	1.00		0.15
Lane Grp Cap(c), veh/h	311	0	475	530	0	418	420	521	541	411	607	622
V/C Ratio(X)	0.26	0.00	0.49	0.35	0.00	0.57	0.10	0.69	0.69	0.43	0.47	0.47
Avail Cap(c_a), veh/h	758	0	1262	1232	0	1111	570	1777	1847	966	2239	2295
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	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.9	0.0	14.1	13.7	0.0	14.5	9.5	13.5	13.5	9.4	10.6	10.6
Incr Delay (d2), s/veh	0.4	0.0	0.8	0.4	0.0	1.2	0.1	1.6	1.5	0.7	0.6	0.6
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(50%),veh/ln	0.7	0.0	1.9	1.5	0.0	2.0	0.2	2.4	2.5	0.7	1.4	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.3	0.0	14.9	14.1	0.0	15.7	9.6	15.1	15.1	10.1	11.1	11.1
LnGrp LOS	B	A	B	B	A	B	A	B	B	B	B	B
Approach Vol, veh/h		314			426			772			753	
Approach Delay, s/veh		15.8			15.0			14.8			10.9	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.6	19.6		17.1	6.7	22.5		17.1				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	21.5	51.5		33.5	6.5	66.5		33.5				
Max Q Clear Time (g_c+I1), s	5.3	11.0		10.8	2.8	8.3		8.2				
Green Ext Time (p_c), s	0.4	4.1		1.9	0.0	3.2		2.1				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay				13.7								
HCM 6th LOS				B								



Intersection						
Int Delay, s/veh	2.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	97	64	26	554	475	71
Future Vol, veh/h	97	64	26	554	475	71
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	165	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	2	2	2	2
Mvmt Flow	105	70	28	602	516	77

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	912	297	593	0	-	0
Stage 1	555	-	-	-	-	-
Stage 2	357	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.14	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.22	-	-	-
Pot Cap-1 Maneuver	277	705	979	-	-	-
Stage 1	544	-	-	-	-	-
Stage 2	685	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	265	705	979	-	-	-
Mov Cap-2 Maneuver	265	-	-	-	-	-
Stage 1	521	-	-	-	-	-
Stage 2	685	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.7	0.6	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	979	-	265	705	-	-
HCM Lane V/C Ratio	0.029	-	0.398	0.099	-	-
HCM Control Delay (s)	8.8	0.2	27.3	10.7	-	-
HCM Lane LOS	A	A	D	B	-	-
HCM 95th %tile Q(veh)	0.1	-	1.8	0.3	-	-

HCM 6th TWSC  
3: Young Street & Bryan Street

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Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	↷
Traffic Vol, veh/h	3	252	177	9	6	6
Future Vol, veh/h	3	252	177	9	6	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	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	2	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	274	192	10	7	7

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	202	0	-	0	477 197
Stage 1	-	-	-	-	197 -
Stage 2	-	-	-	-	280 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1370	-	-	-	547 844
Stage 1	-	-	-	-	836 -
Stage 2	-	-	-	-	767 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1370	-	-	-	545 844
Mov Cap-2 Maneuver	-	-	-	-	675 -
Stage 1	-	-	-	-	833 -
Stage 2	-	-	-	-	767 -

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	9.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1370	-	-	-	750
HCM Lane V/C Ratio	0.002	-	-	-	0.017
HCM Control Delay (s)	7.6	0	-	-	9.9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

# HCM 6th Signalized Intersection Summary

## 1: OR 99E & Young Street

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	133	54	46	139	253	46	543	27	204	813	133
Future Volume (veh/h)	130	133	54	46	139	253	46	543	27	204	813	133
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	1870	1870	1870	1870	1870	1870	1723	1723	1723	1723	1723	1723
Adj Flow Rate, veh/h	141	145	59	50	151	275	50	590	29	222	884	145
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	327	370	150	159	421	464	285	1108	54	472	1183	194
Arrive On Green	0.29	0.29	0.29	0.29	0.29	0.29	0.05	0.35	0.35	0.12	0.42	0.42
Sat Flow, veh/h	961	1264	514	271	1439	1585	1641	3175	156	1641	2815	462
Grp Volume(v), veh/h	141	0	204	201	0	275	50	304	315	222	514	515
Grp Sat Flow(s),veh/h/ln	961	0	1778	1711	0	1585	1641	1637	1695	1641	1637	1640
Q Serve(g_s), s	7.7	0.0	5.2	0.0	0.0	8.4	1.1	8.4	8.4	4.5	15.0	15.0
Cycle Q Clear(g_c), s	12.5	0.0	5.2	4.8	0.0	8.4	1.1	8.4	8.4	4.5	15.0	15.0
Prop In Lane	1.00		0.29	0.25		1.00	1.00		0.09	1.00		0.28
Lane Grp Cap(c), veh/h	327	0	520	580	0	464	285	571	591	472	688	689
V/C Ratio(X)	0.43	0.00	0.39	0.35	0.00	0.59	0.18	0.53	0.53	0.47	0.75	0.75
Avail Cap(c_a), veh/h	684	0	1181	1187	0	1053	424	1348	1396	930	1783	1786
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	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.8	0.0	16.0	15.8	0.0	17.1	11.8	14.7	14.7	9.6	13.8	13.8
Incr Delay (d2), s/veh	0.9	0.0	0.5	0.4	0.0	1.2	0.3	0.8	0.7	0.7	1.6	1.6
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(50%),veh/ln	1.7	0.0	2.0	2.0	0.0	3.0	0.3	2.4	2.5	1.1	4.1	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.7	0.0	16.4	16.2	0.0	18.3	12.1	15.5	15.4	10.3	15.5	15.5
LnGrp LOS	C	A	B	B	A	B	B	B	B	B	B	B
Approach Vol, veh/h		345			476			669			1251	
Approach Delay, s/veh		18.6			17.4			15.2			14.6	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.2	24.2		21.0	7.2	28.2		21.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	22.5	46.5		37.5	7.5	61.5		37.5				
Max Q Clear Time (g_c+I1), s	6.5	10.4		14.5	3.1	17.0		10.4				
Green Ext Time (p_c), s	0.5	3.3		2.0	0.0	6.7		2.3				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay				15.7								
HCM 6th LOS				B								

Intersection						
Int Delay, s/veh	6.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	80	70	78	594	712	220
Future Vol, veh/h	80	70	78	594	712	220
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	165	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	2	2	2	2
Mvmt Flow	87	76	85	646	774	239

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1387	507	1013	0	-	0
Stage 1	894	-	-	-	-	-
Stage 2	493	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.14	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.22	-	-	-
Pot Cap-1 Maneuver	136	516	680	-	-	-
Stage 1	365	-	-	-	-	-
Stage 2	585	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	109	516	680	-	-	-
Mov Cap-2 Maneuver	109	-	-	-	-	-
Stage 1	294	-	-	-	-	-
Stage 2	585	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	65.1	2.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	680	-	109	516	-	-
HCM Lane V/C Ratio	0.125	-	0.798	0.147	-	-
HCM Control Delay (s)	11	0.9	110.5	13.2	-	-
HCM Lane LOS	B	A	F	B	-	-
HCM 95th %tile Q(veh)	0.4	-	4.5	0.5	-	-

HCM 6th TWSC  
 3: Young Street & Bryan Street

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Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	10	299	302	16	18	6
Future Vol, veh/h	10	299	302	16	18	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	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	2	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	325	328	17	20	7

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	345	0	0	684	337
Stage 1	-	-	-	337	-
Stage 2	-	-	-	347	-
Critical Hdwy	4.12	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	3.518	3.318
Pot Cap-1 Maneuver	1214	-	-	414	705
Stage 1	-	-	-	723	-
Stage 2	-	-	-	716	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1214	-	-	409	705
Mov Cap-2 Maneuver	-	-	-	582	-
Stage 1	-	-	-	715	-
Stage 2	-	-	-	716	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	11.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1214	-	-	-	609
HCM Lane V/C Ratio	0.009	-	-	-	0.043
HCM Control Delay (s)	8	0	-	-	11.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

# HCM 6th Signalized Intersection Summary

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	133	125	60	47	142	258	51	588	28	208	866	136
Future Volume (veh/h)	133	125	60	47	142	258	51	588	28	208	866	136
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	1870	1870	1870	1870	1870	1870	1723	1723	1723	1723	1723	1723
Adj Flow Rate, veh/h	145	136	65	51	154	280	55	639	30	226	941	148
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	316	352	168	156	420	467	273	1169	55	457	1230	193
Arrive On Green	0.29	0.29	0.29	0.29	0.29	0.29	0.05	0.37	0.37	0.12	0.43	0.43
Sat Flow, veh/h	954	1196	572	280	1427	1585	1641	3183	149	1641	2834	445
Grp Volume(v), veh/h	145	0	201	205	0	280	55	328	341	226	543	546
Grp Sat Flow(s),veh/h/ln	954	0	1767	1707	0	1585	1641	1637	1696	1641	1637	1643
Q Serve(g_s), s	8.6	0.0	5.5	0.0	0.0	9.2	1.2	9.7	9.7	4.8	17.1	17.1
Cycle Q Clear(g_c), s	13.9	0.0	5.5	5.3	0.0	9.2	1.2	9.7	9.7	4.8	17.1	17.1
Prop In Lane	1.00		0.32	0.25		1.00	1.00		0.09	1.00		0.27
Lane Grp Cap(c), veh/h	316	0	520	576	0	467	273	601	623	457	711	713
V/C Ratio(X)	0.46	0.00	0.39	0.36	0.00	0.60	0.20	0.55	0.55	0.49	0.76	0.77
Avail Cap(c_a), veh/h	623	0	1089	1102	0	976	393	1250	1295	872	1653	1659
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	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.5	0.0	17.1	17.0	0.0	18.4	12.3	15.3	15.3	10.0	14.6	14.6
Incr Delay (d2), s/veh	1.0	0.0	0.5	0.4	0.0	1.2	0.4	0.8	0.8	0.8	1.7	1.7
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(50%),veh/ln	1.9	0.0	2.2	2.2	0.0	3.3	0.4	2.9	3.0	1.2	4.9	4.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.6	0.0	17.6	17.4	0.0	19.7	12.7	16.0	16.0	10.8	16.3	16.3
LnGrp LOS	C	A	B	B	A	B	B	B	B	B	B	B
Approach Vol, veh/h		346			485			724			1315	
Approach Delay, s/veh		20.1			18.7			15.8			15.4	
Approach LOS		C			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.6	26.9		22.4	7.5	30.9		22.4				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	22.5	46.5		37.5	7.5	61.5		37.5				
Max Q Clear Time (g_c+I1), s	6.8	11.7		15.9	3.2	19.1		11.2				
Green Ext Time (p_c), s	0.5	3.7		2.0	0.0	7.3		2.4				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay				16.6								
HCM 6th LOS				B								

Intersection						
Int Delay, s/veh	6.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	82	71	80	642	755	224
Future Vol, veh/h	82	71	80	642	755	224
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	165	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	2	2	2	2
Mvmt Flow	86	75	84	676	795	236

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1419	516	1031	0	-	0
Stage 1	913	-	-	-	-	-
Stage 2	506	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.14	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.22	-	-	-
Pot Cap-1 Maneuver	130	509	670	-	-	-
Stage 1	356	-	-	-	-	-
Stage 2	576	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	104	509	670	-	-	-
Mov Cap-2 Maneuver	104	-	-	-	-	-
Stage 1	284	-	-	-	-	-
Stage 2	576	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	71.2	2	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	670	-	104	509	-	-
HCM Lane V/C Ratio	0.126	-	0.83	0.147	-	-
HCM Control Delay (s)	11.1	0.9	121.3	13.3	-	-
HCM Lane LOS	B	A	F	B	-	-
HCM 95th %tile Q(veh)	0.4	-	4.7	0.5	-	-

HCM 6th TWSC  
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Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	10	310	312	16	18	6
Future Vol, veh/h	10	310	312	16	18	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	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	2	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	337	339	17	20	7

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	356	0	-	0	707 348
Stage 1	-	-	-	-	348 -
Stage 2	-	-	-	-	359 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1203	-	-	-	402 695
Stage 1	-	-	-	-	715 -
Stage 2	-	-	-	-	707 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1203	-	-	-	398 695
Mov Cap-2 Maneuver	-	-	-	-	573 -
Stage 1	-	-	-	-	707 -
Stage 2	-	-	-	-	707 -

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	11.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1203	-	-	-	599
HCM Lane V/C Ratio	0.009	-	-	-	0.044
HCM Control Delay (s)	8	0	-	-	11.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1



# HCM 6th Signalized Intersection Summary

## 1: OR 99E & Young Street

04/27/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	136	62	41	116	199	43	623	22	148	476	37
Future Volume (veh/h)	67	136	62	41	116	199	43	623	22	148	476	37
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	1841	1841	1841	1811	1811	1811	1682	1682	1682	1641	1641	1641
Adj Flow Rate, veh/h	82	166	76	50	141	243	52	760	27	180	580	45
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	4	4	4	6	6	6	5	5	5	8	8	8
Cap, veh/h	299	330	151	156	362	423	409	1076	38	396	1170	91
Arrive On Green	0.28	0.28	0.28	0.28	0.28	0.28	0.05	0.34	0.34	0.11	0.40	0.40
Sat Flow, veh/h	983	1195	547	233	1314	1535	1602	3147	112	1563	2932	227
Grp Volume(v), veh/h	82	0	242	191	0	243	52	386	401	180	308	317
Grp Sat Flow(s),veh/h/ln	983	0	1742	1547	0	1535	1602	1598	1662	1563	1559	1600
Q Serve(g_s), s	3.8	0.0	5.8	0.1	0.0	6.7	1.0	10.3	10.3	3.5	7.3	7.3
Cycle Q Clear(g_c), s	9.7	0.0	5.8	5.9	0.0	6.7	1.0	10.3	10.3	3.5	7.3	7.3
Prop In Lane	1.00		0.31	0.26		1.00	1.00		0.07	1.00		0.14
Lane Grp Cap(c), veh/h	299	0	480	519	0	423	409	546	568	396	622	639
V/C Ratio(X)	0.27	0.00	0.50	0.37	0.00	0.57	0.13	0.71	0.71	0.45	0.49	0.50
Avail Cap(c_a), veh/h	695	0	1183	1143	0	1042	537	1667	1734	907	2100	2156
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	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.2	0.0	15.0	14.5	0.0	15.4	9.6	14.1	14.1	9.9	11.1	11.1
Incr Delay (d2), s/veh	0.5	0.0	0.8	0.4	0.0	1.2	0.1	1.7	1.6	0.8	0.6	0.6
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(50%),veh/ln	0.8	0.0	2.2	1.6	0.0	2.2	0.2	2.8	2.9	0.8	1.7	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.7	0.0	15.9	14.9	0.0	16.6	9.7	15.8	15.7	10.7	11.7	11.7
LnGrp LOS	B	A	B	B	A	B	A	B	B	B	B	B
Approach Vol, veh/h		324			434			839			805	
Approach Delay, s/veh		16.8			15.9			15.4			11.5	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.9	21.4		18.1	7.0	24.2		18.1				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	21.5	51.5		33.5	6.5	66.5		33.5				
Max Q Clear Time (g_c+I1), s	5.5	12.3		11.7	3.0	9.3		8.7				
Green Ext Time (p_c), s	0.4	4.5		1.9	0.0	3.5		2.1				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay				14.4								
HCM 6th LOS				B								

Intersection						
Int Delay, s/veh	3.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	99	65	27	591	520	72
Future Vol, veh/h	99	65	27	591	520	72
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	165	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	2	2	2	2
Mvmt Flow	108	71	29	642	565	78

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	983	322	643	0	0
Stage 1	604	-	-	-	-
Stage 2	379	-	-	-	-
Critical Hdwy	6.8	6.9	4.14	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.22	-	-
Pot Cap-1 Maneuver	249	680	938	-	-
Stage 1	514	-	-	-	-
Stage 2	668	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	237	680	938	-	-
Mov Cap-2 Maneuver	237	-	-	-	-
Stage 1	489	-	-	-	-
Stage 2	668	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	23.8	0.6	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	938	-	237	680	-	-
HCM Lane V/C Ratio	0.031	-	0.454	0.104	-	-
HCM Control Delay (s)	9	0.2	32.2	10.9	-	-
HCM Lane LOS	A	A	D	B	-	-
HCM 95th %tile Q(veh)	0.1	-	2.2	0.3	-	-

HCM 6th TWSC  
3: Young Street & Bryan Street

04/27/2023

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↔		↕	
Traffic Vol, veh/h	3	259	187	9	6	6
Future Vol, veh/h	3	259	187	9	6	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	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	2	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	282	203	10	7	7

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	213	0	-	0	496 208
Stage 1	-	-	-	-	208 -
Stage 2	-	-	-	-	288 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1357	-	-	-	533 832
Stage 1	-	-	-	-	827 -
Stage 2	-	-	-	-	761 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1357	-	-	-	531 832
Mov Cap-2 Maneuver	-	-	-	-	666 -
Stage 1	-	-	-	-	825 -
Stage 2	-	-	-	-	761 -

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	10
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1357	-	-	-	740
HCM Lane V/C Ratio	0.002	-	-	-	0.018
HCM Control Delay (s)	7.7	0	-	-	10
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

# HCM 6th Signalized Intersection Summary

## 1: OR 99E & Young Street

04/27/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷			↶	↷	↶	↷		↶	↷	
Traffic Volume (veh/h)	85	136	74	41	117	199	47	623	22	148	476	42
Future Volume (veh/h)	85	136	74	41	117	199	47	623	22	148	476	42
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	1841	1841	1841	1811	1811	1811	1682	1682	1682	1641	1641	1641
Adj Flow Rate, veh/h	104	166	90	50	143	243	57	760	27	180	580	51
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	4	4	4	6	6	6	5	5	5	8	8	8
Cap, veh/h	308	337	183	157	382	461	392	1056	37	381	1131	99
Arrive On Green	0.30	0.30	0.30	0.30	0.30	0.30	0.05	0.34	0.34	0.11	0.39	0.39
Sat Flow, veh/h	982	1123	609	238	1274	1535	1602	3147	112	1563	2899	254
Grp Volume(v), veh/h	104	0	256	193	0	243	57	386	401	180	311	320
Grp Sat Flow(s),veh/h/ln	982	0	1731	1512	0	1535	1602	1598	1662	1563	1559	1595
Q Serve(g_s), s	5.2	0.0	6.4	0.2	0.0	6.9	1.2	11.1	11.2	3.8	8.0	8.1
Cycle Q Clear(g_c), s	11.8	0.0	6.4	6.6	0.0	6.9	1.2	11.1	11.2	3.8	8.0	8.1
Prop In Lane	1.00		0.35	0.26		1.00	1.00		0.07	1.00		0.16
Lane Grp Cap(c), veh/h	308	0	520	540	0	461	392	536	557	381	608	622
V/C Ratio(X)	0.34	0.00	0.49	0.36	0.00	0.53	0.15	0.72	0.72	0.47	0.51	0.51
Avail Cap(c_a), veh/h	638	0	1101	1058	0	976	504	1562	1624	849	1967	2013
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	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.1	0.0	15.1	14.5	0.0	15.3	10.5	15.3	15.3	10.8	12.2	12.3
Incr Delay (d2), s/veh	0.6	0.0	0.7	0.4	0.0	0.9	0.2	1.8	1.8	0.9	0.7	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(50%),veh/ln	1.1	0.0	2.4	1.7	0.0	2.3	0.3	3.2	3.3	0.9	2.0	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.7	0.0	15.9	14.9	0.0	16.3	10.6	17.2	17.1	11.7	12.9	12.9
LnGrp LOS	C	A	B	B	A	B	B	B	B	B	B	B
Approach Vol, veh/h		360			436			844			811	
Approach Delay, s/veh		17.3			15.6			16.7			12.6	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.2	22.2		20.3	7.3	25.1		20.3				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	21.5	51.5		33.5	6.5	66.5		33.5				
Max Q Clear Time (g_c+I1), s	5.8	13.2		13.8	3.2	10.1		8.9				
Green Ext Time (p_c), s	0.4	4.5		2.1	0.0	3.5		2.1				

### Intersection Summary

HCM 6th Ctrl Delay	15.3
HCM 6th LOS	B

Intersection						
Int Delay, s/veh	3.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	99	65	27	595	532	72
Future Vol, veh/h	99	65	27	595	532	72
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	165	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	2	2	2	2
Mvmt Flow	108	71	29	647	578	78

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	999	328	656	0	-	0
Stage 1	617	-	-	-	-	-
Stage 2	382	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.14	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.22	-	-	-
Pot Cap-1 Maneuver	244	674	927	-	-	-
Stage 1	506	-	-	-	-	-
Stage 2	665	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	232	674	927	-	-	-
Mov Cap-2 Maneuver	232	-	-	-	-	-
Stage 1	481	-	-	-	-	-
Stage 2	665	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	24.5	0.6	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	927	-	232	674	-	-
HCM Lane V/C Ratio	0.032	-	0.464	0.105	-	-
HCM Control Delay (s)	9	0.2	33.3	11	-	-
HCM Lane LOS	A	A	D	B	-	-
HCM 95th %tile Q(veh)	0.1	-	2.3	0.3	-	-

HCM 6th TWSC  
 3: Site Access/Bryan Street & Young Street

04/27/2023

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	259	3	9	187	9	10	0	30	6	0	6
Future Vol, veh/h	3	259	3	9	187	9	10	0	30	6	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	2	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	282	3	10	203	10	11	0	33	7	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	213	0	0	285	0	0	522	523	284	534	519	208
Stage 1	-	-	-	-	-	-	290	290	-	228	228	-
Stage 2	-	-	-	-	-	-	232	233	-	306	291	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1357	-	-	1277	-	-	465	459	755	457	461	832
Stage 1	-	-	-	-	-	-	718	672	-	775	715	-
Stage 2	-	-	-	-	-	-	771	712	-	704	672	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1357	-	-	1277	-	-	457	453	755	433	455	832
Mov Cap-2 Maneuver	-	-	-	-	-	-	609	577	-	582	575	-
Stage 1	-	-	-	-	-	-	716	670	-	773	709	-
Stage 2	-	-	-	-	-	-	758	706	-	672	670	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.3			10.4			10.4		
HCM LOS							B			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	712	1357	-	-	1277	-	-	685
HCM Lane V/C Ratio	0.061	0.002	-	-	0.008	-	-	0.019
HCM Control Delay (s)	10.4	7.7	0	-	7.8	0	-	10.4
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1

HCM 6th Signalized Intersection Summary  
 1: OR 99E & Young Street

04/27/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	143	125	67	47	142	258	62	588	28	208	866	153
Future Volume (veh/h)	143	125	67	47	142	258	62	588	28	208	866	153
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	1870	1870	1870	1870	1870	1870	1723	1723	1723	1723	1723	1723
Adj Flow Rate, veh/h	155	136	73	51	154	280	67	639	30	226	941	166
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	313	353	189	155	425	488	265	1187	56	449	1205	213
Arrive On Green	0.31	0.31	0.31	0.31	0.31	0.31	0.05	0.37	0.37	0.11	0.43	0.43
Sat Flow, veh/h	954	1145	615	282	1379	1585	1641	3183	149	1641	2781	490
Grp Volume(v), veh/h	155	0	209	205	0	280	67	328	341	226	554	553
Grp Sat Flow(s),veh/h/ln	954	0	1760	1661	0	1585	1641	1637	1696	1641	1637	1634
Q Serve(g_s), s	10.0	0.0	6.1	0.1	0.0	9.8	1.6	10.4	10.4	5.2	19.1	19.1
Cycle Q Clear(g_c), s	16.3	0.0	6.1	6.2	0.0	9.8	1.6	10.4	10.4	5.2	19.1	19.1
Prop In Lane	1.00		0.35	0.25		1.00	1.00		0.09	1.00		0.30
Lane Grp Cap(c), veh/h	313	0	542	580	0	488	265	610	632	449	709	709
V/C Ratio(X)	0.50	0.00	0.39	0.35	0.00	0.57	0.25	0.54	0.54	0.50	0.78	0.78
Avail Cap(c_a), veh/h	562	0	1002	1006	0	902	363	1155	1197	822	1528	1526
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	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.3	0.0	17.9	17.7	0.0	19.2	13.3	16.2	16.2	10.7	16.0	16.0
Incr Delay (d2), s/veh	1.2	0.0	0.4	0.4	0.0	1.1	0.5	0.7	0.7	0.9	1.9	1.9
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(50%),veh/ln	2.3	0.0	2.4	2.4	0.0	3.5	0.5	3.2	3.3	1.4	5.7	5.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.5	0.0	18.3	18.1	0.0	20.2	13.8	16.9	16.9	11.6	17.9	17.9
LnGrp LOS	C	A	B	B	A	C	B	B	B	B	B	B
Approach Vol, veh/h		364			485			736			1333	
Approach Delay, s/veh		21.4			19.3			16.7			16.8	
Approach LOS		C			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.0	29.1		24.8	8.0	33.1		24.8				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	22.5	46.5		37.5	7.5	61.5		37.5				
Max Q Clear Time (g_c+I1), s	7.2	12.4		18.3	3.6	21.1		11.8				
Green Ext Time (p_c), s	0.5	3.7		2.0	0.0	7.5		2.4				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay				17.8								
HCM 6th LOS				B								

Intersection						
Int Delay, s/veh	7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	82	71	80	653	762	224
Future Vol, veh/h	82	71	80	653	762	224
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	165	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	2	2	2	2
Mvmt Flow	86	75	84	687	802	236

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1432	519	1038	0	-	0
Stage 1	920	-	-	-	-	-
Stage 2	512	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.14	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.22	-	-	-
Pot Cap-1 Maneuver	127	507	665	-	-	-
Stage 1	353	-	-	-	-	-
Stage 2	572	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	101	507	665	-	-	-
Mov Cap-2 Maneuver	101	-	-	-	-	-
Stage 1	281	-	-	-	-	-
Stage 2	572	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	75.6	2	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	665	-	101	507	-	-
HCM Lane V/C Ratio	0.127	-	0.855	0.147	-	-
HCM Control Delay (s)	11.2	0.9	129.5	13.3	-	-
HCM Lane LOS	B	A	F	B	-	-
HCM 95th %tile Q(veh)	0.4	-	4.8	0.5	-	-



HCM 6th TWSC  
 3: Site Access/Bryan Street & Young Street

04/27/2023

Intersection												
Int Delay, s/veh	1.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	310	10	28	312	16	6	0	17	18	0	6
Future Vol, veh/h	10	310	10	28	312	16	6	0	17	18	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	2	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	337	11	30	339	17	7	0	18	20	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	356	0	0	348	0	0	776	781	343	782	778	348
Stage 1	-	-	-	-	-	-	365	365	-	408	408	-
Stage 2	-	-	-	-	-	-	411	416	-	374	370	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1203	-	-	1211	-	-	315	326	700	312	328	695
Stage 1	-	-	-	-	-	-	654	623	-	620	597	-
Stage 2	-	-	-	-	-	-	618	592	-	647	620	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1203	-	-	1211	-	-	302	312	700	294	314	695
Mov Cap-2 Maneuver	-	-	-	-	-	-	482	470	-	474	467	-
Stage 1	-	-	-	-	-	-	647	616	-	613	578	-
Stage 2	-	-	-	-	-	-	593	574	-	623	613	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0.6			11			12.4		
HCM LOS							B			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	626	1203	-	-	1211	-	-	515
HCM Lane V/C Ratio	0.04	0.009	-	-	0.025	-	-	0.051
HCM Control Delay (s)	11	8	0	-	8	0	-	12.4
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0.2

Intersection: 1: OR 99E & Young Street

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	120	277	310	125	121	276	267	166	215	192
Average Queue (ft)	57	119	122	87	38	161	134	76	88	68
95th Queue (ft)	115	215	247	143	105	249	218	137	167	144
Link Distance (ft)		567	489			491	491		448	448
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	95			100	110			145		
Storage Blk Time (%)	3	13	10	3	0	18		0	1	
Queuing Penalty (veh)	6	11	24	6	0	9		1	2	

Intersection: 2: OR 99E & E Cleveland Street

Movement	EB	EB	NB	NB	SB
Directions Served	L	R	LT	T	TR
Maximum Queue (ft)	115	61	115	21	11
Average Queue (ft)	57	32	20	1	0
95th Queue (ft)	101	55	72	17	6
Link Distance (ft)		879	561	561	491
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	165				
Storage Blk Time (%)	0				
Queuing Penalty (veh)	0				

Intersection: 3: Young Street & Bryan Street

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	27	34
Average Queue (ft)	1	10
95th Queue (ft)	13	34
Link Distance (ft)	184	241
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 61
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Intersection: 1: OR 99E & Young Street

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	120	257	308	125	134	250	228	169	342	364
Average Queue (ft)	78	107	133	92	44	130	119	91	141	171
95th Queue (ft)	129	210	254	150	107	219	197	163	262	293
Link Distance (ft)		567	489			491	491		448	448
Upstream Blk Time (%)									0	0
Queuing Penalty (veh)									0	0
Storage Bay Dist (ft)	95			100	110			145		
Storage Blk Time (%)	10	10	14	4		11		1	4	
Queuing Penalty (veh)	19	15	38	7		6		5	9	

Intersection: 2: OR 99E & E Cleveland Street

Movement	EB	EB	NB	NB	SB	SB
Directions Served	L	R	LT	T	T	TR
Maximum Queue (ft)	189	462	292	231	9	46
Average Queue (ft)	127	149	108	41	0	5
95th Queue (ft)	225	481	244	167	8	26
Link Distance (ft)		879	561	561	491	491
Upstream Blk Time (%)		1				
Queuing Penalty (veh)		0				
Storage Bay Dist (ft)	165					
Storage Blk Time (%)	35	0				
Queuing Penalty (veh)	26	0				

Intersection: 3: Young Street & Bryan Street

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	49	52
Average Queue (ft)	3	21
95th Queue (ft)	21	46
Link Distance (ft)	184	241
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 127
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Intersection: 1: OR 99E & Young Street

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	119	261	279	125	134	291	257	164	221	193
Average Queue (ft)	61	115	101	80	45	164	136	73	86	73
95th Queue (ft)	116	212	202	138	114	259	227	137	170	150
Link Distance (ft)		572	489			491	491		448	448
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	95			100	110			145		
Storage Blk Time (%)	3	12	8	3	0	18		0	1	
Queuing Penalty (veh)	8	12	18	5	0	10		1	3	

Intersection: 2: OR 99E & E Cleveland Street

Movement	EB	EB	NB	NB	SB
Directions Served	L	R	LT	T	TR
Maximum Queue (ft)	124	57	123	47	7
Average Queue (ft)	56	32	25	2	0
95th Queue (ft)	101	52	83	27	4
Link Distance (ft)		879	561	561	491
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	165				
Storage Blk Time (%)	0				
Queuing Penalty (veh)	0				

Intersection: 3: Site Access/Bryan Street & Young Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	15	30	58	35
Average Queue (ft)	1	2	24	12
95th Queue (ft)	7	15	51	37
Link Distance (ft)	179	572	320	242
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 57
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Intersection: 1: OR 99E & Young Street

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	120	302	322	125	134	272	236	169	387	360
Average Queue (ft)	83	120	130	94	52	134	123	91	166	191
95th Queue (ft)	134	238	254	152	116	224	202	169	303	330
Link Distance (ft)		572	489			491	491		448	448
Upstream Blk Time (%)									0	0
Queuing Penalty (veh)									0	0
Storage Bay Dist (ft)	95			100	110			145		
Storage Blk Time (%)	11	11	13	4	0	10		1	6	
Queuing Penalty (veh)	23	16	35	8	0	7		4	14	

Intersection: 2: OR 99E & E Cleveland Street

Movement	EB	EB	NB	NB	SB	SB
Directions Served	L	R	LT	T	T	TR
Maximum Queue (ft)	190	634	248	196	9	41
Average Queue (ft)	144	238	106	29	0	4
95th Queue (ft)	233	674	223	133	7	23
Link Distance (ft)		879	561	561	491	491
Upstream Blk Time (%)		0				
Queuing Penalty (veh)		0				
Storage Bay Dist (ft)	165					
Storage Blk Time (%)	50	0				
Queuing Penalty (veh)	37	0				

Intersection: 3: Site Access/Bryan Street & Young Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	48	69	46	39
Average Queue (ft)	4	13	20	18
95th Queue (ft)	24	46	46	44
Link Distance (ft)	179	572	320	242
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 144