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TRAFFIC IMPACT ANALYSIS

To

City of Woodburn

For

Phased Speculative Industrial
(Weisz 50 Acres)

Dated

April 20, 2022

(Revised July 21, 2022)

(Revised November 15, 2022)

Project Number

2220085.00



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I. INTRODUCTION

This Transportation Impact Analysis (TIA) has been prepared in support of the proposed speculative Industrial development for a 29.57-acre property in Woodburn, Oregon. The site is identified as Marion County Tax Map 052W14 Tax Lot 00800. The initial application included development plans in two discrete phases for an approximately 50-acre area in two parcels, but while review was pending, the applicant sold the western “Phase 2” 21.15-acres of the property (tax lot 801) to another entity. The new owner will be responsible for submitting development plans for that property in the future. This report (November 2022) has been revised to omit projected trip generation and impacts for the “Phase 2” site, and the proposed development and use of the 29.57-acre eastern site are referred to as “Phase 1” in this report.

The site is within the Urban Growth Boundary (UGB), within City Limits, and within the I-5 Interchange Management Area (IMA) Sub Area D. The site is approximately 29.57 acres. When wetlands and Right-of-Way (ROW) dedication are accounted for, there is 27.43 buildable acres that are part of the Southwest Industrial Reserve (SWIR). Figure 1 in Appendix A presents a vicinity map indicating the project location.

Project Description

The proposed project, referred to as “Phase 1,” will include an approximately 513,193 square foot (SF) single-story industrial building with on-site trailer storage/fleet parking. No tenant has been identified at this time. (Phase 2 initially consisted of Tax Lot 00801 to the west, but due to an ownership change it will be developed under a separate application at some unknown future date. This report contains some references to Phase 2, such as in the context of explaining how future street extensions and connectivity will be achieved.)

The development of Phase 1 will include a half-street extension of Evergreen Road south from its present terminus along the property’s east frontage. The extension is proposed to intersect Parr Road at an existing curve (angle point) at the southeast corner of the property, subject to County and City approval. In addition, a half-street construction of a new Local Industrial Street extending west from that new Evergreen-Parr Road intersection along the full southern frontage of the Phase 1 site to a driveway at the southwest corner of the site. Development of Phase 2 would further extend this Local Industrial Street to intersect with an extension of Stacy Allison Way.

Access for Phase 1 is proposed to include two driveways on the extension of Evergreen Road and two driveways on the new Industrial Road. All four driveways will be for exclusive use of the proposed site. This will provide access and circulation by way of both Evergreen Road and Parr Road to distribute site-generated traffic among multiple routes; however, no cross-circulation or shared driveways will exist between the proposed project and Phase 2 due to separate ownership and site security needs.

Site access and circulation are designed to segregate passenger vehicle and semi-tractor-trailer truck movements as much as possible for safety and smooth operations. Concentrating truck-trailer docking and other movements in the corridors north and south of the buildings reduces potential for movement conflicts with passenger vehicles because parking and circulation for the latter are concentrated at the east, between the building and Evergreen Road, and in a north-south oriented corridor at the west end of the site.

Phase 1 passenger vehicles will primarily use a centrally located full-movement driveway on Evergreen Road along the east property boundary and trucks approaching southbound on Evergreen Road will generally enter the site at the north full-movement driveway. The driveways on the new Industrial road

will be located at the west end of Phase 1 for passenger vehicle access to a smaller parking area and truck egress, and just west of the Parr Road intersection for truck access.

Figure 2 presents the proposed site plan for Phase 1.

Scope of Analysis

This TIA has been prepared in accordance with Woodburn Development Ordinance (WDO), Sections 2.05.02 and 3.04.05, and ODOT's *Analysis Procedures Manual* (APM), Version 2. Per WDO Section 2.05.02, the City requires a TIA for developments within the IMA estimated to generate more than 20 peak hour trips. The site is subject to a trip budget as specified in this section of the WDO. Sub-area D totals 106 buildable acres and has a maximum of 1,199 peak hour vehicle trips.

This study includes a summary of base year traffic conditions, crash review, proposed trip generation, and an analysis of intersection operations, sight distance, and queuing. A TIA scoping letter dated January 12, 2022, was submitted to City and ODOT staff, with supplemental trip generation information emailed on January 19, 2022, for a similar development. The analysis is based on the scoping documents and on incompleteness comments from the City of Woodburn and ODOT. These documents are included in the appendix.

Study Area

The City does not publish guidelines for determining a TIA study area; however, in a pre-application meeting on October 13, 2021, the City requested the TIA be consistent with the Allison Way Apartments TIA prepared by Lancaster Mobley on May 1, 2020, and that we include an additional four (4) intersections. We reviewed the Project Basie TIA prepared by Kittelson on July 6, 2021, and included it in our study area evaluation. An additional six (6) intersections were added to the study based on scoping comments provided by ODOT and OTAK for the City of Woodburn. The study area includes the following intersections:

- OR 219/Butteville Road
- OR 219/Woodland Avenue
- OR 214/I-5 Southbound Ramps
- OR 214/I-5 Northbound Ramps
- OR 214/Evergreen Road
- OR 214/Oregon Way
- OR 214/Settlemier Avenue
- OR 214/99 E
- Evergreen Road/Stacy Allison Way
- Evergreen Road/Hayes Street
- Settlemier Avenue/Hayes Street
- Evergreen Road/Hooper Street
- Evergreen Road/Parr Road (new intersection)
- Boones Ferry Road/Settlemier Avenue/Parr Road
- Stubb Road/Parr Road
- Butteville Road/Parr Road

Although the site is allotted a vehicle budget for the OR 219/I-5 Interchange Management Area Sub Area D, ODOT has requested analysis of the interchange be included to provide an update on operation.

While staff suggested analysis of the intersection of OR 214 with Lawson Avenue, this intersection is limited to right turns on the Lawson approach and no site trips from Phase 1 are expected to travel this route with the planned roadways at occupancy. If Stacy Allison Way is connected between Phase 2 and its current terminus south of Hooper Street, which is a condition of approval for the Allison Way Apartments, some trips may travel this route.

Analysis Scenarios

The TIA reviews AM and PM peak hour conditions at the study area intersections for the following scenarios for the system peaks hours:

- 2022 Base Year
- 2025 Pre-Development without project
- 2025 Post-Development Phase 1 without Evergreen-Parr Connection
- 2025 Post-Development Phase 1 with Evergreen-Parr Connection
- 2025 Post-Development Phase 1 with Kalugin Housing Complex

The project has no identified tenant, so the analysis is based on ITE trip generation data for an assumed/anticipated mix of potential future tenants; analysis periods include the typical morning and afternoon peak hours, which occur between 7-9 AM and 4-6 PM.

II. EXISTING CONDITIONS

The existing conditions analysis is based on a current year inventory of transportation facilities and historic traffic data from 2021 and 2022. Adjustments of 1% were made to 2021 counts to estimate 2022 conditions and reach a consistent base year for existing conditions.

Site Conditions

The project site is located in Woodburn, Oregon, within the Woodburn Urban Growth Boundary (UGB). The approximately 29.57-acre site comprises Marion County Tax Lot 800. The site has a Comprehensive Plan designation of Medium Density Residential (RM). The site is currently vacant.

Vehicular Transportation Facilities

The study area presented in this TIA includes roadways under City of Woodburn, Marion County, and ODOT jurisdiction. Figure 3 presents the existing lane configurations and traffic control devices for the study area intersections.

TABLE 1 – ROADWAY CHARACTERISTICS

Roadway	Jurisdiction	Functional Classification	Posted Speed (mph)	Travel Lanes	Bike Lanes	On-Street Parking	Sidewalks
Hillsboro-Silverton Highway (OR 214/OR 219)	ODOT	Minor and Principal Arterial/ District Highway	35/30	2/4	Yes	No	Yes
Woodland Avenue	City	Major Collector	25	2/3	Yes	No	Yes
Interstate 5	ODOT	Freeway	65	6	No	No	No
Butteville Road	County	Major Collector	Not Posted (55)	2	No	No	No
Evergreen Road	City	Major Collector/Local Street	25	2	No	No	Portions
Oregon Way	City	Major Collector/Access Street	25	2	No	Yes	No
Highway 99 E	ODOT	Principal Arterial/Minor Arterial	45	4	Yes	No	Yes
Stacy Allison Way	City	Local Street	25	2	No	No	Portions
Hayes Street	City	Major Collector	25	2	Portions	Yes	Portions
Hooper Street	City	Local Street	25	2	Yes	No	Yes
Parr Road	City/County	Major Collector	25	2	No	No	Portions
Settlemier Avenue/Boones Ferry Road	City/County	Minor Arterial	25	2	No	Yes	Portions
Stubb Road	County	Access Street	25	2	No	No	Yes

As noted in Table 1, Hillsboro-Silverton Highway (OR 214/219) is a state highway facility. West of the I-5 interchange this highway is designated OR 219. At the I-5 interchange and eastward, this highway is designated OR 214. The posted speed limit is 30 mph between I-5 and Highway 99E.

Pedestrian and Bicycle Facilities

Sidewalks and bike lanes are available on Evergreen Road north of the site and most roadways within the study area. Sidewalks will be provided along street frontages of the site including the Evergreen Road extension and the Industrial Road at the south end of the site. Roadways to the south and east of the site are rural in nature and do not have sidewalks or bicycle lanes currently but will be provided as development occurs.

Transit Facilities

The study area is typically served by the Woodburn Transit System (WTS) with nearby stops at NE Harvard Drive and NE Stacy Allison Way, and at the Memorial Transit Center at NE Evergreen Road and OR 219. Under normal conditions, service throughout the City is provided between 7:00 AM and 7:00 PM, Monday through Friday; however, currently, all WTS “Fixed Routes” are suspended due to COVID-19 and the study area is without transit service except for “Dial-a-Ride” service. The pre-COVID-19 WTS map and schedule are provided in Appendix C for reference.

Base Year Traffic Counts

Turning movement counts for the AM and PM peak hours from 2021 and 2022 were used in this analysis. For ODOT intersections, the APM requires a system-wide peak, which is generally 7:00 to 8:00 AM and 4:30 to 5:30 PM. Given the distance between intersections and intervening access to retail areas, coordinating these volumes into a system-wide peak would be difficult. Further, given different months, years, and time of peak hour (off by as much as one hour for adjacent intersections), selecting a system peak is difficult. Instead, we have selected the peak hour of the intersection during normal peaks, between 7-9 AM and 4-6 PM. While some intersections near the I-5 interchange have slightly higher volumes for peak hours just outside these time periods, it is likely due to commuters traveling to Portland or Salem. We are following ITE recommendations to use the peak of the adjacent street between these hours.

Figure 4 presents the AM and PM peak hour volumes from 2021 adjusted by 1% per year for a base year of 2022 or actual 2022 count. The raw traffic volume summaries are provided in the appendix for reference. Volumes at the future Evergreen Road/Parr Road intersection were estimated from the volumes on Parr Road at Stubb Road. The intersection of Evergreen Road and Hooper Street was estimated to be 10% of the volume at the south approach of the Hayes Street intersection, with about half of trips turning to and from Hooper Street and half turning to and from Sweetwater Avenue to access the Paradise Pointe subdivision on the west side of Evergreen Road.

Seasonal Adjustment

Hillsboro-Silverton Highway (OR 219) is a state facility. Per ODOT’s APM, a seasonal adjustment must be applied to base year traffic volumes on the state highway.

Seasonal adjustments were originally applied to match the adjustments in each TIA report referenced. A seasonal adjustment factor of 1.13 was applied to historical traffic counts from April of 2021, 1.05 for counts collected in May of 2021, and 1.39 for counts collected in February of 2022. The 2021 counts are consistent with the counts and trip generation prepared for the 2021 Project Basie TIA.

Applying the standard seasonal adjustment factor of 1.39 to the February of 2022 highway movements, however, will lead to an imbalance between the adjacent intersections. In order to correct for the

imbalance, the City's Consulting Engineer and ODOT agreed in an August 17, 2022 email that applying a 1.13 seasonal adjustment factor to the I-5 interchange and all of the highway intersections west, and a 1.05 seasonal adjustment factor to all the highway intersections east of I-5 would be an appropriate measure. The emails with City's Consulting Engineer and ODOT regarding the seasonal adjustment factor modification are included in the Appendix for reference.

These adjustments estimate conditions for the 30th hour of annual traffic. The seasonal adjustment calculations are included in the Appendix for reference.

Figure 5 presents the 2022 seasonally adjusted traffic volumes for the AM and PM peak hours.

Crash Analysis

Historical crash data reported for the study area intersections were evaluated for safety. Crash data for the 5-year period of 2015 through 2019 were obtained from ODOT's online crash data system and used to review crash patterns and estimate a crash rate. Data for 2020 was not yet complete at the time of this analysis.

The crash evaluation for the study area intersections is summarized in Table 2. The raw crash data is provided in Appendix E for reference, along with ODOT SPIS data for the last three years and rate calculation summaries.

TABLE 2 – INTERSECTION CRASH DATA

Intersection (Traffic Control Type)	Crash Type								Severity				Total Crashes	Crash Rate	ODOT 90th Percentile
	Angle	Turn	Rear-End	Side- Swipe	Fixed Object	Other	Ped	Bike	PDO	Injury Type C & B	Injury Type A	Fatal			
OR 219/Butteville Road (3ST)	0	2	4	0	1	0	0	0	4	3	0	0	7	0.38	0.475
OR 219/Woodland Avenue (4SG)	1	4	1	0	0	0	0	1	3	4	0	0	7	0.24	0.860
OR 219/I-5 Southbound (3SG)	4	2	25	1	0	1	0	0	7	25	1	0	33	0.63	0.509
OR 214/I-5 Northbound (3SG)	15	10	10	0	0	0	0	0	16	19	0	0	35	0.63	0.509
OR 214/Evergreen Road (4SG)	12	40	10	0	1	1	0	0	33	29	2	0	64	1.31	0.860
OR 214/Oregon Way (4SG)	6	18	4	0	0	1	0	0	15	13	1	0	29	0.70	0.860
OR 214/ Settlemier Avenue/Boones Ferry Road (4SG)	0	2	6	0	0	0	1	0	2	7	0	0	9	0.20	0.860
OR 214/99 E (4 SG)	1	4	15	0	1	0	1	0	7	14	1	0	22	0.39	0.860
Evergreen Road/Stacy Allison Way (3ST)	5	0	2	0	0	0	1	0	4	4	0	0	8	0.50	0.293
Evergreen Road/Hayes Street (4ST)	1	0	0	0	1	0	0	0	1	1	0	0	2	0.11	0.408
Settlemier Avenue/Hayes Street (4ST)	0	0	1	0	1	0	1	0	1	2	0	0	2	0.10	0.860
Evergreen Road/Hooper Street (3ST)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.408
Settlemier Avenue/Boones Ferry Road/Parr Road (4ST)	1	4	1	0	1	0	0	0	3	4	0	0	7	0.47	0.408
Parr Road/Stubb Road (3ST)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.475
Butteville Road/Parr Road (3ST)	3	1	2	0	2	0	0	0	1	7	0	0	8	0.89	0.475

4SG: Four-leg, signalized

4ST: Four-leg, minor stop-control

3SG: Three-leg, minor stop-control

3ST: Three-leg, minor stop-control

ADT: Average Daily Traffic

Intersection Crash Rates

When evaluating the relative safety of an intersection, consideration is given not only to the total number and types of crashes occurring, but also to the number of vehicles entering the intersection. This concept, referred to as a “crash rate,” is usually expressed in terms of the number of crashes occurring per one million entering vehicles (MEV) for the intersection per year.

ODOT publishes 90th percentile rates for various intersection types (rural vs. urban, signalized vs. stop controlled, etc.) in order to better identify locations with high rates. When an intersection is found to have a crash rate higher than 90% of similar type intersections, further review is recommended to identify patterns of crashes and potential opportunities to improve safety through mitigation.

The intersection crash rate is calculated by dividing the average number of crashes per year by the MEV per year. A daily traffic volume was estimated by dividing the PM peak hour volume by a peak-to-daily, or k-factor, of 0.098 taken from ODOT traffic data on Evergreen Road just south of OR 214.

Crash Data Summary

One (1) intersection has reported rates of 1.0 crashes/MEV and several others have rates higher than ODOT’s 90th percentile rate for their intersection characteristics. Each of these intersections is addressed in more detail below to identify patterns and potential corrective measures. Locations with bicycle and pedestrian crashes, and those with fatalities and severe type A injuries, are also noted.

OR 219/Woodland Avenue

The OR 214/Woodland Avenue intersection does not have a high crash rate but had one (1) bicycle related crash that resulted in a suspected injury (Type C). It was reportedly caused when a passenger vehicle did not yield the right-of-way (ROW) to the bicyclist.

OR 219/I-5 Southbound

The OR 219/I-5 southbound Interchange had 33 crashes reported during the five-year period, with a resulting crash rate of 0.63 compared to a 90th percentile of 0.509 for its intersection type. Two-thirds (22/33) of these crashes were reported as rear-end collisions on the southbound off-ramp. The leading cause was either following too closely or failing to avoid the vehicles ahead.

There were a small percentage of angle type crashes (4/33), but one of them did result in an incapacitating injury (Type A). It was reportedly caused when a reckless driver in a passenger vehicle disregarded the traffic signal.

Rear-end collisions are typical of a freeway off-ramp where vehicles are slowing from high speeds, so the crashes do not indicate a pattern atypical of other similar intersections. Advanced warning or supplemental signs could help mitigate some of the southbound rear-end collisions reported at this intersection.

OR 219/I-5 Northbound

The OR 219/I-5 northbound Interchange reportedly had 35 crashes during the five-year period that was reviewed with a crash rate of 0.63 compared to a 90th percentile of 0.509 for its intersection type. A

majority (20/35) of these crashes were reported as angle or turning movement crash types, with no fatal or Injury Type A noted. No specific pattern was identified with regard to direction or cause, so no mitigation measures are recommended.

OR 214/Evergreen Road

The OR 214/Evergreen Road intersection reportedly had 64 crashes, of which two-thirds (40/60) were turning movement type crashes. Two (2) incapacitating injuries (Type A) included one reportedly involving a turning movement type crash cause by a driver not yielding, and the other a driver disregarding the traffic signal and causing an angle type crash. This intersection is also over the ODOT 90th percentile crash rate of 0.86 for its type, at 1.31. To improve safety, ODOT has removed the permitted left turn phasing (flashing yellow left-turn arrow) and now only provides protected (green arrow) signal indication. No other specific patterns were identified that could be addressed with further mitigation measures. No mitigation is recommended.

OR 214/Oregon Way

The crash rate is not over the ODOT 90th percentile at OR 214/Oregon Way, but there was one Type A injury involving a vehicle turning left across OR 214, likely during the permitted left turn phase. ODOT has removed the permitted left turn phasing (flashing yellow left-turn arrow) and now provides only protected (green arrow) signal indication at this location. No further mitigation is recommended.

OR 214/OR 99E

The crash rate is below the ODOT 90th percentile at OR 214/OR 99E. No further mitigation is recommended.

NE Butteville Road/Parr Road

The NE Butteville Road/Parr Road intersection had two (2) suspected injuries (Type B). Two crashes were single vehicles hitting a fixed object. This intersection is also over the ODOT 90th percentile crash rate for its rural type at 0.89. An existing sight distance limitation to the north has been noted by Marion County, and an intersection improvement is identified on the County's Capital Improvement Plan but is currently unfunded.

It should be noted there was one (1) incapacitating injury (Type A). However, this crash was a result of a driver running into a ditch due to a "phantom car" and is not intersection related. Therefore, this crash is not included in the crash table or rates.

Settlemier Avenue/Boones Ferry Road/Parr Road

The Settlemier Avenue/Parr Road intersection's crash rate of 0.47 is also slightly over the ODOT 90th percentile crash rate, but given the low volumes and low number of crashes, no pattern is apparent that can be mitigated.

ODOT SPIS Summary

SPIS scores are reported along segments of OR 214/219. ODOT's APM states that SPIS analysis should include any segment/intersection that is within the top 95th percentile. Below, the beginning and ending

mile points for segments in the 95th percentile is reported along with the intersections that are within those mile points. A summary of the number of crashes, SPIS score, and severity by year is provided below:

2018 SPIS

- Mile Point 36.95 – 37.12 (OR-214/ Evergreen Road)

There were a reported 26 crashes. None of the crashes were reported as fatal. 1 was a Type A (Incapacitating Injury), 8 were Type B (Visible Injury), and 17 were Type C (Possible Injury). The intersection was in the 95th percentile and SPIS score of 76.03.
- Mile Point 39.0 – 39.28 (OR-214/99E)

There were a reported 30 crashes. None of the crashes were reported as fatal. 3 were Type A (Incapacitating Injury), 6 were Type B (Visible Injury), and 21 were Type C (Possible Injury). The intersection was in the 95th percentile with a SPIS score of 77.42.

2019 SPIS

- Mile Point 36.95 – 37.12 (OR-214/ Evergreen Road)

There were a reported 22 crashes. None of the crashes were reported as fatal. 1 was a Type A (Incapacitating Injury), 3 were Type B (Visible Injury), and 18 were Type C (Possible Injury). The intersection was in the 95th percentile with a SPIS score of 73.78.
- Mile Point 37.04 – 37.23 (OR-214/Oregon Way)

There were a reported 24 crashes. None of the crashes were reported as fatal. 1 was a Type A (Incapacitating Injury), 9 were Type B (Visible Injury), and 14 were Type C (Possible Injury). The intersection was in the 95th percentile with a SPIS score of 74.14.
- Mile Point 39.0 – 39.28 (OR-214/99E)

There were a reported 30 crashes. None of the crashes were reported as fatal. 3 were Type A (Incapacitating Injury), 6 were Type B (Visible Injury), and 19 were Type C (Possible Injury). The intersection was in the 95th percentile with a SPIS score of 75.78.

2020 SPIS

- Mile Point 36.95 – 37.12 (OR-214/ Evergreen Avenue)

There were a reported 25 crashes. None of the crashes were reported as fatal. 1 was a Type A (Incapacitating Injury), 3 were Type B (Visible Injury), and 21 were Type C (Possible Injury). The intersection was in the 95th percentile with a SPIS score of 74.20.
- Mile Point 37.04 – 37.23 (OR-214/Oregon Way)

There were a reported 26 crashes. None of the crashes were reported as fatal. 2 were Type A (Incapacitating Injury), 8 were Type B (Visible Injury), and 16 were Type C (Possible Injury). The intersection was in the 95th percentile with a SPIS score of 75.06.

Additional review of crashes along OR-214 west of the Lawson Avenue intersection, which is limited to right turns by a raised median in OR-214, was performed. The crashes reported west of Lawson Avenue are rear end crashes that would be typical of spill back from the signal at Evergreen Road, and not related to Lawson Avenue. Additionally, ODOT has eliminated the flashing yellow left-turn phase at the Evergreen Road intersection, which should reduce the occurrence of angled crashes at the signal for left-turning vehicles.

The Oregon Way intersection traffic signal was recently modified to remove the permitted left-turn phasing for vehicles turning from OR-214. This was done to address safety concerns, and will likely reduce the crash rate at this intersection.

ODOT notes that Evergreen Road at Stacey Allison Way is above the ODOT 90th percentile crash rate of 0.293 for similar intersection classifications, with a rate of 0.50 per Million Entering Vehicles (MEV). This intersection is under the jurisdiction of the City of Woodburn, which has not requested additional analysis of crashes. In the TIA, the crash rate is well below the 1.00 MEV rate often used to assess high crash locations.

III. PRE-DEVELOPMENT CONDITIONS

The 2025 pre-development condition reflects a build-out year scenario without the proposed development. This scenario includes traffic from an adjusted base year 2022 condition with seasonal adjustment factors, background traffic growth to year 2025, and in-process traffic from other approved developments that have not yet been constructed.

Planned Transportation Improvements

The City's current public works projects and conditions of approval for in-process projects were reviewed to evaluate any upcoming capacity or safety improvements in the study area.

The City is planning improvements along the West Hayes Street corridor from Settlemier Avenue to Cascade Drive, including installation of a traffic signal at the Settlemier intersection.

The City Transportation Plan calls for several roadways to be extended along the site frontages:

- Evergreen Road is to be extended south to Parr Road.
- Stacy Allison Way is to be extended south from its existing terminus at Hooper Street south to the City limits at the new Industrial Street aligned with Parr Road.
- A new Industrial Street is called for along the south side of the site, extending between Parr Road and the future Stacy Allison Way extension.

ODOT recently removed permitted left turn phasing (flashing yellow) on OR 214 at the intersections of Oregon and Evergreen. This was done to improve safety at the intersections.

The Port of Willamette project will be installing flashing beacons on Butteville Road to improve safety as vehicles approach the intersection with Parr Road.

Marion County lists improvements at the Butteville Road intersection with Parr Road in the Capital Improvement Plan but it is currently unfunded. The 2005 project cost is \$800,000, which was estimated to be \$1,306,531 in 2021 costs for a proportionate share analysis for the Basie project, which is paying a 10.2% share or \$133,266 based on daily traffic volumes. Marion County is currently reviewing costs for intersection improvements.

A speed zone study is required to be prepared by the Basie project after occupancy and will be submitted for review by ODOT. This has the potential to reduce the speed limit on Butteville Road between OR 219 and Parr Road.

The Basie project is relocating Butteville Road to the east of its current alignment to create a new roundabout intersection with OR 219. This project is expected to be operational by 2024, so is included in the pre- and post-development scenarios.

Background Traffic Growth

Background traffic growth is applied to base year volumes to forecast future traffic demand. The future growth rate on OR 214/219 was established using ODOT's 2040 Future Volume Table which estimates a 0.38% annual growth rate for OR 214/219 between the I-5 interchange and Woodland Avenue. As a conservative estimate, we applied a 1% annual growth rate to seasonally adjusted, base year traffic

volumes to estimate 2025 pre-development conditions. Background growth was applied to all movements at all intersections.

Figure 6 presents the three years of background growth traffic volumes for the AM and PM peak hours that is applied to 2025 pre-development conditions.

In-Process Traffic

In-process traffic volumes account for developments that have been approved or that are under construction at the time base year traffic counts are conducted. These traffic volumes account for traffic that will be added to the external roadway network before build-out of the proposed development. In-process trips for the following developments were added to the 2025 background traffic volumes:

- Project Basie
- Allison Way Apartments
- Woodland Crossing Apartments
- Woodburn Senior Living Apartments
- Smith Creek Development
- Port of Willamette
- Woodburn/Mollala Eastside Apartments
- Schultz Farm

Trip distribution and assignment data for these eight (8) projects is provided in Appendix F. While some of the Smith Creek subdivision has been constructed and occupied, we have not reduced the added in-process trips to account for the number of residential units occupied at the time of the counts.

All in-process trips are for the standard peak hour occurring between 7-9 AM and 4-6 PM. While the Basie project creates new peak hours outside that range, without a specific tenant for the subject site, we are assuming the peak hour of the site is concurrent with the standard peak hour range.

Figure 7 presents the total AM and PM peak hour in-process trips for the approved developments listed above.

A special case is the Kalugin residential subdivision project, in the early stages of an application. It is planned to be located at the southeast corner of the future Parr Road/Evergreen Road intersection. Because the proposed Weisz project is further along in the land use review process and expected to be approved first, we are not including Kalugin as part of the in-process project trips for the pre-development and post-development initial analysis. We will include trips from Kalugin in an alternate scenario for the purpose of confirming future intersection configuration/coordination along Parr and Evergreen Roads.

Pre-Development Traffic

The 2025 pre-development analysis scenario is a combination of base year of 2022 volumes, seasonally adjusted per ODOT APM standards, a 1% annual background growth rate over three (3) years, and in-process traffic. The pre-development traffic without the project trips indicates conditions anticipated prior to addition of the proposed development. Figure 8 presents the 2025 pre-development traffic volumes.

IV. SITE DEVELOPMENT

The trip-making characteristics of the project are described below. Because no tenant has been identified, we have selected a mix of Warehouse and High-Cube Parcel Hub Warehouse uses for this analysis. It provides a reasonable assumption for the potential trip generation of a range of tenant types and mixes.

At the time of tenant improvements, the actual trip generation estimate will be assessed and compared to the assumptions in this report. When trip estimates are within the assumptions of this report, no further analysis would be required. If trip estimates exceed the assumptions of this report, a supplemental analysis may be required. Where proportionate fee contributions are required for mitigation, the fee should be based on actual tenant trip estimates.

Trip Generation

Trip generation estimates for the proposed project were developed using the Institute of Transportation Engineers' (ITE) *Trip Generation Manual*, 11th Edition. The ITE land uses that best match the potential tenant type are a mix of half High-Cube Parcel Hub Warehouse Land Use Code (LUC) 156 and half Warehouse LUC 150.

Table 3 presents the trip generation estimates for a Phase 1 building of up to 515,000 SF, assuming the mix of uses. In addition to the total number of vehicles, we have provided an estimate of both passenger vehicles and trucks based on information available in the *Trip Generation Manual*.

TABLE 3 – PHASE 1 TRIP GENERATION ESTIMATES									
Land Use	ITE LUC	Size	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
High-Cube Parcel Hub	156	257.50 KSF	90	90	180	112	53	165	1,192
Warehouse	150	257.50 KSF	42	13	55	16	41	57	445
Total Vehicle Trips			132	103	235	128	94	222	1,637
Passenger Vehicles			118	89	207	116	83	199	1,333
Trucks			14	14	28	12	11	23	304

Transportation Demand Management

The trip generation assumptions used in this analysis do not account for potential Transportation Demand Management (TDM) strategies. Without a specific tenant or tenants, the owners cannot commit to specific strategies, but will consider the following when tenants are selected:

- Carpool/rideshare
- Transit subsidies
- Bicycle storage facilities/showers
- Flexible work schedules/shift changes outside typical peak hours

Trip Distribution and Traffic Assignment

The project trip distribution was assumed to be like other nearby projects, such as Allison Way Apartments, Project Basie on the west side of Interstate 5, and comments from the City and ODOT. The assumptions are as follows for passenger vehicles:

- 25% to/from the north along I-5
- 35% to/from the south along I-5
- 10% to/from the north/west along OR 219
- 15% to/from the northeastern area of Woodburn and communities beyond
- 8% to/from the southeast area of Woodburn and communities beyond
- 2% to/from the Smith Creek development to the east of the site
- 5% to/from the south along Butteville Road

Trucks are anticipated to primarily travel to and from Interstate 5, so the routing will be different than passenger vehicles:

- 65% to/from the north along I-5
- 35% to/from the south along I-5

For vehicles traveling between the site and I-5, some may find using Butteville Road to be a more attractive route, especially when approaching the site from the north on I-5 or for travel from the site heading south on I-5. This occurs because right turn movements to and from the freeway will have less delay than the alternate route using Evergreen Road, and travel speeds along Butteville Road are higher even though the travel distance is longer. The specific assignment of trips is presented in the figures for each scenario and time period.

Development Scenarios

Phase 1 assumes the extension of Evergreen Road south to Parr Road and construction of the new Industrial Road along the south end of the site to the limit of Phase 1 development.

Because the Evergreen Road extension requires Marion County approval and there are right-of-way limits on the northeast and southwest corners of the future intersection with Parr Road, we have included a Phase 1 analysis scenario where the Parr Road connection is not made at build-out and all trips route north from the site on Evergreen Road.

Phase 1

Figure 9¹ presents the Phase 1 trip assignment for passenger vehicles and trucks assuming no Phase 1 connection of Evergreen Road to Parr Road – all vehicles would travel to and from the site on Evergreen Road.

¹ Figures 9 through 19 are thematic diagrams that may include multiple sub-lettered items in order to provide sufficient detail; “Figure _” refers to each set collectively.² Marion County Partition Plat 2021-009 divided Tax Lot 800 into two parcels, so it is now identified as Tax Lots 800 and 801. The WDO was not amended to reflect that administrative change by the Marion County Assessor. This has no effect on the size or the boundary of the property.

Figure 10 presents Phase 1 Post Development volumes without the Evergreen Road connection to Parr Road. It includes site trips from Figure 9 added to pre-development volumes from Figure 8.

With the Evergreen Road connection to Parr Road, site trips will route differently, but there will be some existing trips also using the new extension. Figures 11 presents these trip reroutes which were accounted for by adjusting per the City's 2040 Transportation model.

Figure 12 presents the Phase 1 trip assignment for passenger vehicles and trucks assuming Evergreen Road forms an intersection with Parr Road.

Figure 13 presents Phase 1 Post-Development volumes with the Evergreen Road connection to Parr Road. It includes the Evergreen reroute from Figure 11, site trips from Figure 12 and pre-development volumes from Figure 8.

Kalugin Scenario

At the City's request, we have included a scenario for post-development conditions with the assumption that the Kalugin subdivision will be developed. Figure 14 shows the Kalugin subdivision trip assignment estimates based on the trip generation and distribution information provided by the Kalugin applicant's traffic engineer. These trips are added to Phase 1 Post-Development volumes in Figure 13 to estimate the volumes presented in Figure 15.

Interchange Management Area Overlay District

Section 2.05.02 of the WDO is intended "to preserve the long-term capacity of the I-5/OR 214 interchange." The code implements a trip budget for commercial and industrial parcels located within the Interchange Management Area (IMA) Overlay District. According to the *Woodburn Development Ordinance* (WDO) amended April 13, 2020, the site is located in Sub-area D of the Interchange Management Area (IMA) District Overlay.

Sub-area D is comprised of Tax Lots 052W14 00800, 00900, 01000, and 01100². Table 2.05A of the WDO states the four (4) lots comprise Sub-area D. These four (4) lots have approximately 106 buildable acres and an allotted vehicle trip budget of 1,199 maximum peak hour vehicle trips. The project will use 235 of these peak hour vehicle trips, which is less than its proportionate share of 334 peak hour trips based on an area of 29.57 acres.

Additionally, per WDO Section 2.05.02, proposed developments within the IMA Subarea D that are estimated to generate more than 20 peak hour trips are required to submit a TIA. The site is subject to a trip budget as specified in this section of the WDO as the trip budget applies to commercial and industrial parcels, and the SWIR-zoned subject site will be developed for industrial use.

² Marion County Partition Plat 2021-009 divided Tax Lot 800 into two parcels, so it is now identified as Tax Lots 800 and 801. The WDO was not amended to reflect that administrative change by the Marion County Assessor. This has no effect on the size or the boundary of the property.

Construction Traffic Impacts

Trip generation impacts of construction traffic were requested to be addressed by the City but are not typically included in these reports. The applicant has indicated construction traffic will be encouraged to use Butteville Road to access the site from the south instead of using Evergreen Road. The site can be accessed from Parr Road for construction without the connection of Evergreen Road. The number of trips and the time of day they will be traveling will depend on the construction schedule and is unknown at this time.

V. SITE ACCESS AND CIRCULATION

The on-site evaluation of traffic access and circulation is presented below.

Site Access

Access for Phase 1 is proposed to include two (2) driveways on the extension of Evergreen Road and two (2) driveways on the new Industrial Road. Phase 1 passenger vehicles will primarily use a centrally located full-movement driveway along the east property boundary and trucks will generally enter the site at the north full-movement driveway. The driveways on the new Industrial Road will be located at the west end of Phase 1 for passenger vehicle access to a smaller parking area and truck egress, and just west of the Parr Road intersection for truck access.

Sight Distance Evaluation

Intersection sight distance was evaluated at the site access locations along Evergreen Road and the new Industrial Road. The City follows recommendations in the American Association of State Highway and Transportation Officials' (AASHTO) *A Policy on Geometric Design of Highways and Streets*, 7th Edition, which is the generally accepted industry standard. Marion County has its own standards for sight distance published in the *Department of Public Works Engineering Standards*, last updated in April of 1990. Both intersection sight distance (ISD) and stopping sight distance (SSD) have been reviewed based on roadway design speed.

Intersection sight distance is intended to allow minor-road vehicles "to accelerate from a stop and complete a left turn without unduly interfering with major-road traffic operations."³ The sight distance recommendations and requirements are based on roadway design speeds and adjustments for grades greater than 3%. Sight distance measurements are evaluated based on an eye height of 3.5 feet, and an observation point located 14.5 feet from the edge of the approaching travel lane.

Stopping sight distance is required for an approaching vehicle to stop safely when an obstruction is located in the lane. At minimum, the required SSD must be provided to allow approaching vehicles to stop in the event a vehicle enters the lane and does not advance.

Site Driveways

The design speed for Evergreen Road extension was assumed to be the same as the existing portions of Evergreen Road which has a posted speed of 25 mph. The ROW that will be dedicated for the extension is relatively level. Therefore, it is assumed no adjustment for grade should be applied to the sight distance calculation. A time gap of 7.5 seconds for passenger cars completing a left turn from stop on a minor approach (driveway) was assumed.

Based on these parameters, the recommended ISD along Evergreen Road and the new proposed Industrial Road from the site driveways is 280 feet for left turns (looking both right and left) and 240 feet for right turns (looking left). The required SSD on Evergreen Road is 155 feet for vehicles approaching in both directions. Both ISD and SSD requirements are met by all access points on Evergreen and the proposed industrial road.

³ *A Policy on Geometric Design of Highways and Streets*, 7th Edition, Section 9.5.3.2.1

Butteville Road at Parr Road Intersection

Both City of Woodburn and Marion County staff have noted the Butteville Road overcrossing of I-5 has limited sight distance to and from the intersection with Parr Road. There is no posted speed along Butteville Road, so 55 mph is assumed for a rural roadway. Project Basie is conditioned to conduct a speed study and submit to ODOT for consideration of a reduced speed, but this is not required until after occupancy. The slope of Butteville is approximately 4% from the crest at the overcrossing to Parr Road, and the slope of Parr Road approaching the intersection is approximately 5%.

AASHTO recommends left-turn from stop crossing the equivalent of a two-lane highway (Case B1) should have 1.0 seconds added to the “Time Gap” in their calculations to account for the 5% upgrade on Parr Road, when the grade is beyond the standard 3% or less. All right-turn from stop (Case B2) have had 0.5 seconds added to the “Time Gap” in their calculations to account and the 5% upgrade that is beyond the standard 3% or less.

Based on the above factors, the recommended minimum ISD for passenger cars is 690 feet for Case B1 and 570 feet for Case B2. The recommended minimum ISD for combination trucks is 1,015 feet for Case B1 and 890 feet for Case B2.

The available sight distance is approximately 500 feet to the north from the intersection, which is less than the recommended ISD for combination trucks making a left turn from a minor road. The left-turn from a stop ISD for combination trucks is the most conservative of AASHTO’s sight distance recommendations.

The recommended minimum Stopping Sight Distance (SSD) distances are based on passenger cars. However, adjustments are not typically made for trucks due to increase sight distance due to their greater eye height. *A Policy on Geometric Design of Highways and Streets, 7th Edition, Section 3.2.2.3*, provides an equation for calculating the “braking distance at grade.” The braking distance is added to AASHTO’s standard 2.5 seconds of reaction time for the average driver to notice an object and start to brake. At a speed of 55 mph and 4% downgrade, the calculation results in an SSD of 530 feet, for both passenger cars and combination trucks.

Butteville Road at Parr Road is under the jurisdiction of Marion County, with sight distance recommendations in section IV Table 4 of the Engineering Standards. The preferred ISD at a speed of 55 mph is 550 feet, without an adjustment required for grades. SSD needs to be calculated with the equation provided in section IV due to the 4% downgrade on Butteville Road. At a speed of 55 mph and 4% downgrade, the calculation results in an SSD of 610 feet. With available sight distance at 500 feet, neither of these distances are met.

A reduction in the speed limit would reduce the required distance but would need to be a significant reduction under existing geometric conditions. Passenger vehicle standards would more easily be met, for example at 40 mph under County standards. Other options for addressing sight distance include providing a left turn lane, installing a roundabout, raising the intersection grade, or moving Parr Road to the south, all of which are costly measures.

VI. OPERATIONAL ANALYSIS

Two (2) aspects of operational analysis were evaluated at the study area intersections: 1) intersection operations analysis, which evaluates how well an intersection processes traffic demand; and 2) queuing analysis, which compares intersection queues with available storage for different travel lanes.

Intersection Operation Analysis

Intersection operations are generally measured by three (3) mobility standards: volume-to-capacity (v/c) ratio, level-of-service (LOS), and delay (measured in seconds). Signalized intersections are measured by one overall v/c ratio, LOS, and delay. Two-way, stop-controlled (TWSC) intersections are typically measured by a single v/c ratio, LOS, and delay representative of the worst stopped movement. All-way, stop-controlled (AWSC) intersections are also measured for the worst stopped movement to be consistent with City standards.

Performance Measures

Most intersections lie within City limits, but OR 214 and OR 219 are under ODOT jurisdiction. The intersections of Butteville/Parr, Parr/Stubb, and future Evergreen/Parr are under Marion County jurisdiction.

City of Woodburn

The City's adopted TSP includes mobility targets for intersections under City jurisdiction. The following mobility standards apply:

- LOS E for signalized intersections
- 1.0 v/c for signalized intersections
- 0.90 v/c for the critical movement for unsignalized intersections

Marion County

The County's policy and Procedure for TIA requirements specify the following mobility standards:

- Signalized, Roundabouts, and All-Way-Stop-Controlled (AWSC) intersections
 - Intersectional LOS D or better
 - LOS E or better for all individual movements
 - 0.85 v/c for all individual movements
- Unsignalized intersections (LOS F is acceptable for relatively low volumes)
 - LOS E and v/c of 0.90 or better for critical movements
 - LOS F is acceptable for low volume intersections

ODOT

The *Oregon Highway Plan* (OHP) designates OR 214 as a district highway with posted speeds of 30-35 mph between Woodland Avenue and Highway 99E. Based on the classification and posted speeds, Table 6 of the OHP establishes a v/c target of 0.95 for all intersections in this highway segment.

The OHP v/c target is 0.90 for OR 219 at Butteville Road due to the higher speed limit of 55 mph, for a district highway within the Urban Growth Boundary (UBG), and has a maximum speed of 55 mph.

Highway 99E is classified as a Regional Highway, so the OHP v/c target for the intersection with OR 214 is 0.90.

Methodology

The intersection capacity analyses were conducted in accordance with ODOT's APM and using ODOT's current Synchro template, which assumes a 1,750 vehicle/hour/lane saturation flow rate as well as other specific parameters. Signal timing plans were obtained from ODOT for the intersections along OR 214 and OR 219.

Intersection operations were analyzed with the use of Synchro 11 software, which utilizes the Transportation Research Board's (TRB) *Highway Capacity Manual* (HCM) 6 and earlier methodologies. Because the HCM 6 methodology does not provide intersection volume to capacity ratios (v/c) and does not accurately address shared lanes and U-turns at some study area intersections, the 2000 methodology was also used in these cases.

The critical movements (either overall intersection for signalized and roundabout control, or worst movement for TWSC and AWSC) for the AM and PM peak hours are provided in Table 5. Synchro intersection operation summaries are presented in Appendix G for reference.

In accordance with ODOT's APM Section 5.9.3, Peak Hour Factors (PHF) were adjusted for future year scenarios where existing PHF may not properly reflect future conditions. Under future conditions, when adjusting PHF, engineering judgement must be carefully used. The planning level adjustments provided in the APM are as follows:

1. 0.95 for major arterial-major arterial.
2. 0.92 for major arterial-minor arterial.
3. 0.90 for minor arterial-minor arterial.
4. 0.88 for minor arterial-collector.
5. 0.85 for collector-collector or lower classification.

The following 3 intersections have their PHF's during the AM peak hour adjusted for future scenarios. The intersections of OR 219/Butteville Road were adjusted from 0.80 to 0.88 due to the anticipated increase in industrial trips from project Baise and the proposed project. Additionally, OR 219/Woodland Avenue was adjusted from 0.85 to 0.88 for the same reasons as the Butteville Road intersection. OR 214/OR 99E was adjusted from 0.91 to 0.95 due to the expectation that there will be an increase in traffic at this intersection under future conditions.

No other intersections during the AM peak hour met the adjustment conditions set forth in section 5.9.3 of the APM or were deemed to merit adjustments for future scenarios. None of the PM peak hour scenarios met the adjustment conditions set forth in section 5.9.3 of the APM or were deemed to merit adjustments for future scenarios.

Table 4 presents 2022 conditions with seasonally adjusted volumes along OR 214 and OR 219, pre-development conditions, and post-development conditions with the addition of site trips under two scenarios. The current proposal is to extend Evergreen Road to connect with Parr Road with Phase 1 which would allow site trips to travel along Parr Road to the east and west. If the connection cannot be made with Parr Road, all site trips would need to travel to and from the site on Evergreen Road to the north. Both scenarios are presented in Table 4 for comparison.

**TABLE 4 – PHASE 1 - PEAK HOUR INTERSECTION OPERATIONS
SYSTEM PEAK (7-8 AM, 5-6 PM TIME PERIODS)**

Intersection (Traffic Control Type)	Mobility Target (Jurisdiction)	Peak Hour	Analysis Results (v/c-LOS-Delay (in seconds))			
			Seasonally Adjusted	Pre- Development	Post-Development w/o Parr Connection	Post-Development w/ Parr Connection
OR 219/Butteville Road (Future Roundabout)	ODOT V/C-0.90 LOS E	AM	0.49-C-17.4	0.42-A-7.6	0.42-A-7.6	0.46-A-8.3
		PM	0.66-E-39.6	0.25-A-5.2	0.26-A-5.1	0.29-A-5.6
OR 219/Woodland Avenue (4SG)	ODOT V/C-0.95	AM	0.36-B-18.6	0.55-C-22.4	0.56-C-22.5	0.57-C-22.7
		PM	0.53-C-23.2	0.60-C-26.4	0.61-C-26.6	0.61-C-27.1
OR 219/I-5 Southbound (3SG)	ODOT V/C-0.95	AM	0.37-A-9.3	0.52-B-10.8	0.55-B-11.0	0.53-B-11.5
		PM	0.53-B-12.5	0.67-B-15.8	0.69-B-16.2	0.67-B-16.4
OR 214/I-5 Northbound (3SG)	ODOT V/C-0.95	AM	0.40-B-13.3	0.61-B-15.0	0.65-B-15.4	0.62-B-15.2
		PM	0.56-B-17.3	0.77-C-23.2	0.81-C-24.5	0.79-C-23.6
OR 214/Evergreen Road (4SG)	ODOT V/C-0.95	AM	0.59-C-24.7	0.81-D-40.4	0.85-D-95.6	0.82-D-41.6
		PM	0.72-D-35.5	0.94-E-58.8	0.96-E-68.6	0.93-E-61.9
OR 214/Oregon Way (4SG)	ODOT V/C-0.95	AM	0.38-A-9.4	0.47-B-11.3	0.48-B-11.4	0.48-B-11.4
		PM	0.58-B-19.7	0.63-B-19.5	0.63-B-19.4	0.63-B-19.5
OR 214/ Settlemier Avenue/Boones Ferry Road (4SG)	ODOT V/C-0.95	AM	0.81-C-29.2	0.95-E-56.5	0.96-E-58.6	0.96-E-58.6
		PM	0.83-D-37.2	0.96-E-57.1	0.97-E-58.5	0.97-E-58.5
OR 214/99 E (4SG)	ODOT V/C-0.90	AM	0.66-C-26.2	0.74-C-29.9	0.75-C-30.1	0.75-C-30.1
		PM	0.89-D-51.8	1.01-F-83.4	1.01-F-84.6	1.01-F-84.6
Evergreen Road/Stacy Allison Way (TWSC)	City V/C-0.90	AM	0.13-B-12.3	0.31-C-20.4	0.35-C-24.1	0.32-C-21.7
		PM	0.34-C-15.1	0.69-E-40.0	0.80-F-56.5	0.74-E-46.6
Evergreen Road/Hayes Street (AWSC)	City V/C-0.90	AM	0.42-B-11.2	1.15-F-109.5	1.34-F-212.8	1.22-F-137.6
		PM	0.56-C-15.5	1.35-F-179.9	1.69-F-287.2	1.49-F-228.4
Settlemier Avenue/Hayes Street (TWSC)	City V/C-0.90	AM	0.53-F-84.4	0.81-F-177.2	0.96-F-212.0	0.87-F-201.9
		PM	0.44-F-60.8	0.74-F-142.8	1.03-F-182.6	0.77-F-155.5
Evergreen Road/Hooper Street (TWSC)	City V/C-0.90	AM	0.02-A-9.0	0.16-A-9.8	0.20-B-11.4	0.18-B-10.8
		PM	0.02-A-9.0	0.12-A-9.8	0.15-B-11.3	0.13-B-10.4
Evergreen Road/Northern Access	City V/C-0.90	AM	N/A	N/A	0.03-B-10.2	0.01-A-9.5
		PM	N/A	N/A	0.02-B-10.1	0.01-A-9.5
Evergreen Road/South Access	City V/C-0.90	AM	N/A	N/A	0.11-A-9.3	0.06-A-9.0
		PM	N/A	N/A	0.10-A-9.2	0.06-A-9.0
Evergreen Road/Parr Road (AWSC)	County V/C-0.90	AM	N/A	N/A	N/A	0.27-A-8.9
		PM	N/A	N/A	N/A	0.20-A-8.2
Industrial Road/East Access	City LOS-E	AM	N/A	N/A	N/A	0.03-A-9.1
		PM	N/A	N/A	N/A	0.03-A-9.1
Industrial Road/West Access	City LOS-E	AM	N/A	N/A	N/A	0.04-A-8.9
		PM	N/A	N/A	N/A	0.03-A-8.8
Parr Road/Stubb Road (TWSC)	County LOS-E	AM	0.02-A-9.7	0.01-A-9.8	0.02-B-10.2	0.02-B-10.3
		PM	0.01-A-9.2	0.02-A-9.7	0.02-A-9.7	0.03-A-9.9
Boones Ferry Road/Settlemier Avenue/Parr Road (AWSC)	City V/C-0.90	AM	0.31-B-10.7	0.35-B-11.6	0.37-B-12.0	0.37-B-12.2
		PM	0.41-B-13.4	0.45-B-14.8	0.47-B-15.0	0.47-C-15.3
Butteville Road/Parr Road (TWSC)	County 0.90	AM	0.06-B-10.0	0.11-B-10.4	0.11-B-10.4	0.20-B-11.2
		PM	0.14-B-11.0	0.17-B-11.7	0.17-B-11.8	0.27-B-12.8

Phase 1 impacts are as follows:

ODOT facilities

Two ODOT intersections will fall below operation standards – OR 214/Settlemier and OR 214/Highway 99E. Other projects have been required to pay a proportionate share towards mitigation and/or analysis. The site's Phase 1 PM peak hour impact is 0.99% at the Settlemier intersection and 0.28% at the Highway 99E intersection. The percentages do not change without the Evergreen Road connection to Parr Road.

Other Traffic Impact Studies have found similar results for the OR 214/Settlemier intersection and have suggested a five-lane section of OR 214 may be appropriate. The intersection currently has a single through lane and dedicated left and right turn lanes on all approaches, so additional through lanes are likely the next level of improvement.

Without the Evergreen Road connection to Parr Road, the OR 214/Evergreen intersection will operate at a v/c of 0.96 during the PM peak hour. Otherwise, ODOT jurisdictional intersections along the highway should meet the 0.95 v/c limit or better.

Marion County facilities

All three public street intersections are expected to operate at acceptable levels of service with Phase 1 site trips, regardless of the connection of Evergreen Road to Parr Road.

City facilities

With Phase 1 trips, the City intersection of Hayes Street/Settlemier Avenue will operate below standards without the Evergreen Road/Parr Road Connection. The City is planning to install a traffic signal at the Settlemier Avenue/Hayes Street, which will address the capacity constraint under the stop controlled and offset alignment.

With Phase 1 trips, the City intersection of Evergreen Road/Hayes Street will operate below standards. The Evergreen Road/Hayes Street intersection is currently all way stop controlled and left turn lanes were added as mitigation for the impacts of the Smith Creek Development. Still, long delays are expected even without the addition of Phase 1 site trips.

The City has been collecting a proportionate share towards analysis or mitigation, which would likely be a traffic signal. The site's phase 1 impact increases from 4.2% with the Parr Road connection to 10.5% without the connection to Parr Road.

Intersection Queuing Analysis

An intersection queuing analysis was conducted for key study area intersections for the AM and PM peak hours. The 95th percentile queues were estimated using SimTraffic software. Queue demand results were rounded up to the nearest 25 feet to represent average vehicle spacing lengths.

Because queues are based on an average of five (5) traffic simulations using random arrivals, some fluctuation in results can be anticipated, particularly for movements that are near or projected to be over capacity.

Methodology

Available queue storage lengths were estimated using Google Earth Pro software and rounded to the nearest five (5) feet. For turn lanes, two (2) available storage values are stated: the first represents the striped storage; the second is the effective storage, or the length physically available regardless of striping, such as a center turn lane upstream of a striped left-turn lane at an intersection. Although through travel lanes have no storage defined by striping, two (2) values are reported for storage: the first is the distance to an upstream driveway; the second is the distance to an upstream public street intersection.

Findings

The AM and PM peak hour 95th percentile queues are presented in the table below. In general, the longest queues are along the OR 214/OR 219 approaches and may block vehicles from entering right or left turn lanes. No mitigation measures are recommended based on this analysis. SimTraffic output sheets are provided in the appendix.

TABLE 6 – 95TH PERCENTILE QUEUING ANALYSIS

Intersection (Traffic Control Type)	Approach/ Movement	Striped/Effective Storage (feet)	Queue in Feet (AM/PM)	Queue in Feet (AM/PM)
			2025 Post Development w/o Parr Connection	2025 Post Development w/ Parr Connection
OR 219/Butteville Road (Roundabout)	EBT+R	+500	100/250	75/275
	WBL	+500	225/125	250/150
	WBT	+500	75/50	75/50
	NB	+500	25/50	25/50
OR 219/Woodland Avenue (4SG)	EBL	225	50/100	50/200
	EBT	400	125/250	125/550
	EBR	140	25/25	25/75
	WBL+U	225	125/100	125/100
	WBT	+500	225/200	225/225
	WBR	95	75/125	50/125
	NBL	110/140	25/25	25/25
	NT+R	+500	75/100	75/125
	SBL	+500	125/325	125/450
	SBL+T+R	+500	175/400	175/475
	EBT	+500	125/750	125/925
OR 219/I-5 Southbound (3SG)	EBR	+500	0/325	0/400
	WBT	+500	175/500	150/500
	WBR	+500	0/0	0/0
	SBL	+500	100/175	100/375
	SBR	400	50/150	50/150
OR 214/I-5 Northbound (3SG)	EBT	+500	175/525	175/750
	WBT	+500	225/225	250/225
	NBL	+500	150/550	150/475
	NBL+R	+500	275/625	275/625
	NBR	275	250/575	225/600
50OR 214/Evergreen Road (4SG)	EBL+U	175	200/275	200/300
	EBT	350/+500	300/475	325/500
	EBR	250	175/400	200/425
	WBL+U	375	375/550	275/525
	WBT+R	165/+500	350/575	350/675
	NBL+T	100/+500	425/425	425/350
	NBR	100/225	475/475	475/425
	SBL	70/85	25/75	50/75
	SBT	150/350	50/75	50/75
	SBR	60	50/50	50/75
OR 214/Oregon Way (4SG)	EBL+U	300/350	75/175	100/175
	EBT+R	+500	225/275	225/75
	WBL+U	150/200	25/225	25/75
	WBT+R	300/+500	225/250	225/425
	NBL	150/190	50/50	50/25
	NBT+R	+500	50/75	50/25
	SBL	50	25/75	25/50
	SBT+R	200/+500	50/100	50/75
Butteville Road/Parr Road (TWSC)	WBT+R	+500	50/50	50/50
	NBT+R	+500	0/0	0/0
	SBT+L	+500	25/25	50/50

All site driveways will provide a minimum throat depth of 40 feet to accommodate to passenger vehicles, with driveways on Evergreen Road providing a minimum of 100 feet.

With low volumes at the new intersection of Parr Road with Evergreen Road and the new industrial street, operation as an all-way stop approach will result in short vehicle queues. Each approach will have more than 200 feet of storage available in a single lane.

Warrant Analysis

Traffic signals have been suggested as potential mitigation for the Evergreen Road intersections at Hayes Street and Stacy Allison way, as well as roundabouts. Peak hour signal Warrant 3 from the *Manual on Uniform Traffic Control Devices* (MUTCD) was reviewed using the estimated Post-Development volume data. Only the PM peak hour volumes meet the thresholds for considering installation of a traffic signal. A review of Warrant 2 for Four Hour volumes indicates warrants are likely met for four or more hours of a day at both locations with the addition of in-process and site trips. With volume data limited to the AM and PM peak hour periods, we are not able to review midday volumes for either Warrant 1 or 2, but it appears Warrant 1 for Eight Hours would not be met for either location. Warrant analysis volumes and graphs are included in the Appendix.

Left turn lane warrants have been reviewed for the intersection of Butteville Road with Parr Road based on ODOT recommendations in the *Analysis Procedures Manual*. With the addition of both in-process and site trips, AM peak hour left turn volumes will be 82, and PM peak hour left turn volumes will be 117. Given the opposing plus advancing volumes is above 300 vehicles, the ODOT recommendation is to provide a left turn lane on Butteville Road. A copy of the Left Turn Lane Criterion graph is included in the appendix.

All way stop control warrants as presented in the MUTCD were reviewed for the intersection of Parr Road with the new Evergreen Extension. The volume warrants required the total intersection to be 500 vehicles per hour or higher for each of eight hours of the day. The estimated volumes based on full buildout of Phase 1 are 460 during the AM peak hour and 351 during the PM peak hour. Given these are the peak hours of the day, it is unlikely any other hours of the day would meet the 500-vehicle threshold. With the Kalugin subdivision trips added, the AM volume increases to 499 and the PM volume to 401. Although the volumes are below the threshold recommended for all-way stop control, they are not significantly less than the recommendation and we have suggested this traffic control due to the offset alignment required with initial intersection construction. Providing all-way stop control allows vehicles to maneuver through the intersection with the offset.

VII. MITIGATION AND RECOMMENDATIONS

A number of intersections will fall below operational standards either with pre-development conditions, or with the addition of site trips. At most intersections, the City has collected a proportionate share or mitigation fee towards analysis and/or mitigation measures, and we recommend the project pay a similar proportionate share. Other intersections have more specific recommendations.

Butteville Road at Parr Road

The intersection of Butteville Road with Parr Road is anticipated to operate at acceptable levels in its current geometric configuration with a single lane on each approach and stop control on the Parr Road approach. However, the left turn volume from southbound Butteville Road to Parr Road meets ODOT warrant analysis for installation of a left turn lane, and the intersection has a crash rate in the top 10% for its type which may be related to the limited sight distance across the overpass. It should be noted that two of the eight reported crashes over the past five years involved single vehicles hitting fixed objects and may not have been related to the existing geometry.

The proximity of Parr Road to the end of the overpass structure is only 255 feet, and does not allow sufficient distance for lane tapers to develop a left turn lane with the current 55 mph speed, nor could it be developed with a reduction to a 35 mph design speed.

Two recent projects have been conditioned to either make improvements or contribute a proportionate share towards improvements. The Basie project is contributing a proportionate share of \$133,266 towards the intersection improvement noted in the Marion County Capital Improvement Plan. The Port of Willamette project will be installing flashing beacons on Butteville Road to improve safety as vehicles approach the intersection with Parr Road.

A similar proportionate share calculation for the project is estimated to be \$167,455. This assumes 784 daily trips added to the intersection on top of the 4,790 estimated trips in 2023 and 543 trips from project Basie ($784/(784 + 4,790 + 543) = 12.82\%$). Approximately 47.9% of the Phase 1,1637 daily trips are expected to travel through the intersection.

In addition, the Basie project is required to conduct a speed study on Butteville Road between Parr Road and OR 219 and submit a request to revise the posted speed to ODOT. A reduction in the posted speed would improve the safety of the roadway and intersection with existing limited sight lines.

Other options considered to address the sight distance limitation and safety include installation of a roundabout, relocation of the intersection to the south approximately 300 feet, and limiting the intersection to right turns by installing a median. A roundabout may fit within the existing right-of-way, but would require a significant amount of fill to raise the grade to provide a relatively flat roundabout. Relocation of the intersection would require obtaining right-of-way and crossing an existing pipeline. Limiting turns at the intersection would affect circulation in the area and require out of direction travel.

Marion County is currently reviewing mitigation costs for the intersection improvements.

Evergreen Road at Parr Road

This new intersection has right-of-way limitations on the southwest and northeast corners such that an offset alignment of the east Parr Road approach and west Industrial Road approach will be required. We

are recommending an all-way stop control to best address the offset. A review of warrants indicates the volumes are likely below the threshold.

Evergreen Road with Stacy Allison Way

A traffic signal is the likely long-term solution at this location where long delays are expected on the Stacy Allison Way approach. The project could contribute a proportionate share towards the cost of a traffic signal. Alternatively, striping the southbound approach to provide a dedicated right turn lane would improve operation and mitigate site impacts. Such a change would require removal of the existing left turn lanes on Evergreen Road.

The following recommendations are made for development of Phase 1, assuming the Evergreen Road connection to Parr Road. These recommendations would be revised as discussed in the report should the Evergreen Road connection to Parr Road not be made.

- Extend Evergreen Road south to Parr Road as a two-lane Collector roadway (half width).
- Install an all-way stop control at the new Evergreen Road/Parr Road intersection with a single lane on each approach, subject to Marion County and/or City approval.
- Construct a local industrial classification roadway (half width) along the south side of the Phase 1 frontage.
- Participate in mitigation at the Butteville/Parr intersection, which could include a proportionate share of 12.82% for Phase 1, or \$167,455 based on the County's project cost.
- Provide proportionate share contributions at the following intersections based on the PM peak hour volumes:
 - 0.99% at OR 214/Settlemier
 - 0.28% at OR 214/Highway 99E
 - 4.19% at Evergreen Road/Hayes Street