

Highpoint Street & SR 164 (Griffin Ave) (MP 13.56)

Intersection Control Evaluation September 2025



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Highpoint Street & SR 164 (Griffin Ave) (MP 13.56)

Intersection Control Evaluation (ICE)
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INTRODUCTION

This document provides the Intersection Control Evaluation (ICE) completed for the intersection of Highpoint Street and State Route 164 (SR 164) in Enumclaw, WA. WSDOT requested the ICE process begin as a result of the City's requirement for the proposed *Enumclaw Emblem* project to extend Highpoint Street from south of SR 164 to its current terminus at the southeast corner of the *Enumclaw Emblem* site. This ICE evaluates several intersection control alternatives at the Highpoint Street / SR 164 (Griffin Ave) intersection with incorporation of the *Enumclaw Emblem* project and 12 other known pipeline development projects in the area.

Full buildout of the proposed *Enumclaw Emblem* project consists of the development of up to 216 multifamily (low-rise) residential dwelling units (i.e. garden style apartments), 45 single-family attached dwelling units (townhomes), and 15,000 square feet (SF) of commercial retail use. A site plan is included in **Appendix A**. Existing uses on the site that would be removed as part of the proposed project include two single-family detached homes and a day care center (per King County parcel records). Based on information provided by the applicant, the day care center (Trinity Lutheran Preschool) enrolled a maximum of 16 students prior to its closure in June 2024.

Preliminary discussions with WSDOT were used to establish a scope of work and alternatives for evaluation in this ICE. Based on these discussions, four (4) potential intersection control alternatives were identified at the Highpoint Street / SR 164 (Griffin Ave) intersection consistent with criteria established in the WSDOT *Design Manual* section 1300.05(3).

STEP 1: BACKGROUND AND PROJECT NEEDS

This document provides the Intersection Control Evaluation (ICE) completed for the intersection of Highpoint Street / SR 164 (Griffin Ave) located in Enumclaw, WA. The analysis was completed to evaluate potential improvements at the intersection. Four (4) potential intersection control alternatives were identified and evaluated consistent with criteria established in the WSDOT *Design Manual* section 1300.05(1) for an ICE. The analysis presented in this ICE is consistent with the *Enumclaw Emblem Updated Traffic Impact Analysis* (TENW, July 2025), which represents the most recent cumulative traffic volume forecasts at the Highpoint Street / SR 164 intersection. Step 1 of this evaluation establishes the various performance metrics and targets, includes documentation of existing conditions, and identifies the intersection control alternatives being considered.

Performance Metrics and Targets

Consistent with criteria established in the WSDOT *Design Manual* section 1300.05(1), the following criteria and methodology were evaluated at Highpoint Street / SR 164 (Griffin Ave) to assess the ICE alternatives at the intersection:

1. Existing Conditions: street characteristics, traffic volumes, and non-motorized facilities were observed and documented under existing conditions.
2. Context Sensitive and Sustainable Design: the effects on the aesthetic, social, economic, and environmental values, needs, constraints, and opportunities in a larger community setting were evaluated and compared for each ICE alternative.
3. Operational Considerations: right-of-way requirements, safety performance, and design vehicles were evaluated for each ICE alternative.

4. Bicycle and Pedestrian Facilities: the potential need for additional non-motorized facilities was considered for each alternative based on existing pedestrian and bicycle activity and facilities.
5. Transit Services: potential impacts to existing and future transit services were considered for each alternative.
6. LOS and Delay Analysis: level of service (LOS), volume to capacity ratios (V/C), and vehicle queuing analyses were completed for future With Project weekday AM and PM peak hour conditions.
7. Compatibility with City and State Improvement Plans: compatibility with City and State improvement plans was considered for each alternative.

Existing Roadways

North of SR 164, Highpoint Street is an existing north-south local access road with a posted speed limit of 25 MPH. State Route 164 (SR 164) is a major arterial state route highway located entirely in King County. SR 164 connects Auburn to Enumclaw. SR 164 has one travel lane in each direction with a center two-way left-turn lane east of the Highpoint Street intersection. SR 164 has a posted speed limit of 35 MPH at the location of the Highpoint Street / SR 164 (Griffin Ave) intersection and a posted speed limit of 45 MPH approximately 0.05 miles to the west of the intersection.



The intersection of Highpoint Street / SR 164 (Griffin Ave) is an existing three leg intersection with SR 164 running in the east/west direction and Highpoint Street running in the north/south direction. The intersection is currently unsignalized with SR 164 (Griffin Ave) free flow and Highpoint Street stop-controlled. Existing channelization at the intersection includes a single shared lane in each direction. The level of service (LOS) standard at the intersection is LOS D. According to WSDOT, average annual daily traffic (AADT) on SR 164

(Griffin Ave) west of the intersection is approximately 10,000 vehicles per day based on counts collected in 2023.

Existing Bicycle and Pedestrian Facilities

Existing pedestrian facilities in the immediate vicinity of the Highpoint Street / SR 164 (Griffin Ave) intersection include sidewalks on both sides of SR 164 (Griffin Ave) east of the Highpoint Street / SR 164 (Griffin Ave) intersection, sidewalks on the north side of SR 164 along the *Enumclaw Emblem* project frontage, and sidewalks on the east side of Highpoint Street (north of SR 164). Paved shoulders currently exist on both sides of SR 164 (Griffin Ave). There are no existing bicycle facilities in the project site vicinity. Based on existing weekday AM and PM peak period traffic counts conducted in December 2024, pedestrian and bicycle activity in the vicinity is minimal.

Existing Transit Service

Transit service in the City of Enumclaw is provided by King County Metro Transit. The closest existing transit stop is located approximately 600 feet (0.11 miles) east of the project site on SR 164 (Griffin Ave) and provides access to DART Route 915. DART Route 915 currently provides weekday and Saturday service along SR 164 (Griffin Ave) between Auburn and Enumclaw.

Crash History

Crash history is summarized for the five-year period from 2020 to 2024 at the Highpoint Street / SR 164 (Griffin Ave) intersection. Crash data was provided by WSDOT.

It should be noted that "Under 23 U.S. Code § 148 and 23 U.S. Code § 409, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data."

A summary of the total, yearly average, and crashes per million entering vehicles (MEV) are provided in **Table 1**. A summary of crashes by severity over the five-year period are provided in **Table 2**. A summary of crashes by type over the five-year period are provided in **Table 3**. The detailed crash history is included in **Appendix B**.

Table 1
Crash Data Summary by Year, January 1, 2020 to December 31, 2024

Intersection	2020	2021	2022	2023	2024	Five-Year Total Crashes	Average Annual Crash Frequency	Daily Entering Vehicles ¹	Crashes per MEV ²
Highpoint Street / SR 164 (Griffin Ave)	1	0	1	0	0	2	0.40	10,830	0.10

Source: WSDOT Crash Data.

¹ Estimated based on assumption that PM peak hour volumes = 10% of daily entering vehicles.

² MEV = Million Entering Vehicles.

Table 2
Crash Data Summary by Severity, January 21, 2020 to December 31, 2024

Intersection	Fatal	Serious Injury	Suspected Minor / Possible Injury	No Injury/ Property Damage Only	Five-Year Total Crashes
Highpoint Street / SR 164 (Griffin Ave)	0	0	1	1	2

Source: WSDOT Crash Data.

Table 3
Crash Data Summary by Type, January 21, 2020 to December 31, 2024

Intersection	Crash Type							Five-Year Total Crashes
	Angle (Left/Right)	Angle (T)	Sideswipe	Rear-end	Parked Veh / Fixed Object	Ped/ Bike	Other	
Highpoint Street / SR 164 (Griffin Ave)	0	1	0	1	0	0	0	2

Source: WSDOT Crash Data.

A review of the crash data shows that one (1) crash at the intersection resulted from an angle (Angle-T) crash, which was reported to result in a suspected minor injury. The other crash resulted from a rear-end crash and was reported to result in no apparent injury.

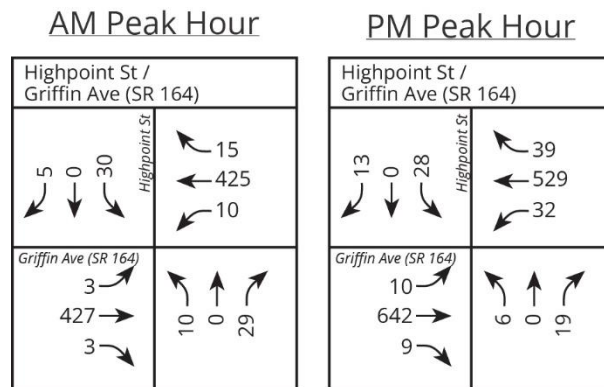
Traffic Volumes

Year 2030 Baseline (without project) peak hour traffic volumes were estimated by applying a 1.5% annual background growth rate to the existing 2024 volumes, consistent with the *Enumclaw Emblem Updated Traffic Impact Analysis* (TENW, July 2025). In addition to the background growth rate, trips from the following pipeline development projects were included in the future baseline volumes:

- Crystal Mountain MHC
- Holdener Phase 1
- Stevenson Meadows
- Gateway Enumclaw
- Battersby Plat
- Mountainview Multifamily
- The Grainery
- The Grainery II
- Pickle Farm
- Rare Homes
- Watson Street Apartments
- Mazatlan

It is assumed that the City will require the *Enumclaw Emblem* project to provide an extension of Highpoint Street along the eastern edge of the project site between SR 164 and its current terminus at the southern *Enumclaw Emblem* property line. As a result of existing property line and right-of-way constraints, the Highpoint Street extension (south of SR 164) is proposed to be offset from Highpoint Street (north of SR 164) by approximately 30 feet (measured centerline to centerline) as shown in **Appendix A**. The project will also provide two site access driveways on the Highpoint Street extension.

The 2030 With Project traffic volumes were determined by adding the trip assignment from the proposed development (per the *Enumclaw Emblem Updated Traffic Impact Analysis* (TENW, July 2025) to the future 2030 Baseline traffic volumes. The resulting 2030 With Project traffic volumes used for this analysis are shown below:



Highpoint Street Intersection Control Evaluation and Initial Screening

The following section details the four (4) intersection control alternatives that were identified for preliminary consideration at the Highpoint Street / SR 164 (Griffin Ave) intersection. It should be noted that the proposed *Enumclaw Emblem* project would provide street lighting (illumination) along their project frontage on SR 164 (Griffin Ave) and on the Highpoint Street extension under each Alternative.

A) No Action Alternative

The No Action Alternative would maintain the existing channelization and two-way stop-control at the intersection and not include any roadway widening on SR 164 (Griffin Ave).

Based on review of the City of Enumclaw *2015 Comprehensive Plan*, WSDOT has plans to upgrade SR 164 (Griffin Ave) to major arterial standards, which would include extending the existing two-way left-turn lane east of the intersection to 228th Ave SE. Therefore, the No Action Alternative does not pass initial screening as it does not align with City/State's goals/objectives along this corridor.

B) Two-Way Stop Control (TWSC) with Roadway Widening Alternative

The Two-Way Stop Control with Roadway Widening Alternative would widen SR 164 (Griffin Ave) to accommodate a new center two-way left-turn lane. This alternative would install upgraded curb ramps, marked crosswalks, and advance signage. A preliminary concept design of the TWSC with Roadway Widening Alternative is included in **Appendix C**.

C) Traffic Signal with Roadway Widening Alternative

The Traffic Signal with Roadway Widening Alternative would widen SR 164 (Griffin Ave) to accommodate eastbound and westbound left-turn lanes and install a traffic signal at the Highpoint Street / SR 164 (Griffin

Ave) intersection. Traffic signal warrants were conducted at this intersection during the AM and PM peak hours for future year 2030 conditions with the *Enumclaw Emblem* project. Based on the results of the signal warrant analyses, a signal would not be warranted at the Highpoint Street / SR 164 (Griffin Ave) intersection. Therefore, the Traffic Signal Alternative does not pass initial screening. The signal warrant calculations are included in **Appendix D**.

D) Roundabout Alternative

The Roundabout Alternative would install a roundabout at the Highpoint Street / SR 164 (Griffin Ave) intersection while maintaining existing channelization. This alternative would install crosswalks with median refuge islands on each leg of the intersection. A preliminary concept design of the Roundabout Alternative is included in **Appendix E**.

Based on a review of the four (4) preliminary intersection control alternatives, the following two (2) alternatives pass initial screening and were evaluated:

- Two-Way Stop Control (TWSC) with Roadway Widening
- Roundabout

STEP 2: FEASIBILITY

Right-Of-Way (ROW)

As of July 2025, the City, applicant, and Sacred Heart Catholic Church (adjacent property east of *Enumclaw Emblem*) came to an agreement to align the Highpoint Street extension with the existing north leg of the Highpoint Street / SR 164 (Griffin Ave) intersection. Therefore, with this alignment, both Alternatives would require some right-of-way acquisition from the Sacred Heart Catholic Church. However, aside from the right-of-way acquisition required to align the Highpoint Street extension, preliminary design of the TWSC with Roadway Widening Alternative anticipates that no additional third-party right-of-way acquisition would be required to complete the improvements.

Preliminary design of the Roundabout Alternative anticipates that the improvement would require third-party right-of-way acquisition from two additional property owners on the northeast and northwest corners of the intersection, plus additional right-of-way dedication from the *Enumclaw Emblem* and Sacred Heart Catholic Church property owners. Not only would a roundabout increase impacts to all adjacent property owners, but the Roundabout Alternative would also require complete reconstruction of the intersection in comparison to the TWSC with Roadway Widening Alternative.

Environmental

The increase in traffic at the Highpoint Street / SR 164 (Griffin Ave) intersection by 2030 may result in minor increases in emissions and fuel consumption under both ICE alternatives. However, there are no known environmental constraints at the intersection that would prevent either of the alternatives from being feasible.

The Roundabout Alternative, due to its increased vehicular delay and queuing on SR 164 (Griffin Ave), may result in a higher emissions impact than the TWSC with Roadway Widening Alternative which would maintain free-flow operations on the State Route.

Both Alternatives would require short-term construction to complete the intersection improvements. However, the Roundabout Alternative would require complete reconstruction of the intersection and result in significantly more construction than the TWSC with Roadway Widening Alternative.

While the construction of either Alternative may result in short-term construction impacts on the community, both Alternatives require low levels of long-term maintenance and are therefore expected to have low long-term impacts on the environment.

Compatibility with City/State Improvement Plans

Based on a review of the City of Enumclaw *2015 Comprehensive Plan*, there are three (3) planned improvements along SR 164. These improvements include widening the SR 164 corridor from 228th Ave SE to west City Limits, constructing pedestrian improvements on SR 164 between Farrelly Street to Laframboise Street when warranted, and upgrading SR 164 to major arterial standards. There are no planned improvements for a roundabout at or near the Highpoint Street / SR 164 (Griffin Ave) intersection. As a result, the TWSC with Roadway Widening Alternative would align best with City/State goals, objectives, and plans for the SR 164 corridor.

It should be noted that SR 164 improvements were removed from the City's most recent *2024 Comprehensive Plan*; however, WSDOT has plans to study this corridor from Dogwood to Highpoint Street in the future. Additionally, with a two-way left-turn lane on SR 164 east and west of Highpoint Street, the TWSC with Roadway Widening Alternative is still the most practical and beneficial improvement at this location.

Bicycle and Pedestrian Facilities

Minimal pedestrian and bicycle activity is currently experienced at the Highpoint Street / SR 164 (Griffin Ave) intersection during the AM and PM peak hours based on the counts included in this analysis which were conducted in December 2024.

The TWSC with Roadway Widening Alternative would include minor widening on SR 164 to accommodate a two-way left-turn lane. Additionally, upgraded curb ramps, marked crosswalks, and advance signage would be installed under this Alternative.

The Roundabout Alternative would include complete reconstruction of the Highpoint Street / SR 164 (Griffin Ave) intersection. Additionally, marked crosswalks with median refuge islands on each leg of the intersection would be installed under this Alternative.

The proposed *Emblem Enumclaw* project would construct sidewalk along their project frontage on SR 164 (Griffin Ave) and along the Highpoint Street extension under each Alternative. Both Alternatives are anticipated to improve pedestrian safety by reducing the potential for crashes along SR 164 (Griffin Ave).

Transit Services

Transit service in the City of Enumclaw is provided by King County Metro Transit. The closest existing transit stop is located approximately 600 feet (0.11 miles) east of the project site on Griffin Ave (SR 164) and provides access to DART Route 915. DART Route 915 currently provides weekday and Saturday service along SR 164 (Griffin Ave) between Auburn and Enumclaw. Neither Alternative is expected to impact on existing transit services at the Highpoint Street / SR 164 (Griffin Ave) intersection.

STEP 3: OPERATIONAL AND SAFETY PERFORMANCE ANALYSIS

Operational Analysis

Level of service (LOS), queuing, and volume to capacity (V/C) analyses were completed for future year 2030 weekday AM and PM peak hour conditions with the *Enumclaw Emblem* project for both Alternatives.

LOS, queuing, and volume to capacity calculations were based on *Synchro 12* and *Sidra 10* traffic analysis software. The LOS methodology, queue, and volume to capacity calculations are included in **Appendix F**.

Tables 4 and 5 summarize the future year 2030 LOS, queuing, and volume to capacity results at the Highpoint Street / SR 164 (Griffin Ave) intersection for both Alternatives. The reported queues are estimated 95th percentile queues that are exceeded only 5 percent of the time.

Table 4
Future 2030 Peak Hour LOS and Queue Summary
TWSC with Roadway Widening Alternative

Intersection / Movement	AM Peak Hour				PM Peak Hour			
	LOS	Delay (sec)	V/C	95 th % Queue (ft)	LOS	Delay (sec)	V/C	95 th % Queue (ft)
Highpoint St / SR 164 (Griffin Ave)								
Northbound Approach	B	12.8	0.09	<25'	C	15.5	0.07	<25'
Eastbound Left-Turn	A	8.4	0.00	0'	A	8.7	0.01	0'
Westbound Left-Turn	A	8.4	0.01	0'	A	9.2	0.04	<25'
Southbound Approach	C	16.5	0.11	<25'	C	20.5	0.16	25'

Table 5
Future 2030 Peak Hour LOS and Queue Summary
Roundabout Alternative

Intersection / Approach	AM Peak Hour				PM Peak Hour			
	LOS	Delay (sec)	V/C	95 th % Queue (ft)	LOS	Delay (sec)	V/C	95 th % Queue (ft)
Highpoint St / SR 164 (Griffin Ave)	A	5.2			A	5.3		
Northbound Approach	B	11.5	0.05	<25'	B	11.2	0.06	<25'
Eastbound Approach	A	4.7	0.41	75'	A	4.8	0.52	100'
Westbound Approach	A	5.2	0.42	75'	A	5.3	0.60	125'
Southbound Approach	A	8.2	0.05	<25'	A	9.4	0.04	<25'

As shown in **Tables 4 and 5**, both ICE alternatives result in acceptable Level of Service during both the AM and PM peak hours, meeting the applicable LOS standards for SR 164 (LOS D or better) with V/C ratios less than 1.0 and minimal queuing for every approach. It should be noted that there is expected to be a minor increase in vehicular delay and queuing on SR 164 (Griffin Ave) under the Roundabout Alternative when compared to free-flow conditions under the TWSC with Roadway Widening Alternative.

Safety Analysis

For each of the two (2) ICE alternatives, quantitative safety analyses were completed for future year 2030 conditions.

Safety performance calculations were based on methodology and procedures outlined in the latest Highway Safety Manual (HSM), 1st Edition using spreadsheet tools provided by the Federal Highway Administration (FHWA). These spreadsheets utilize statistical safety performance functions (SPFs) to evaluate the safety performance of intersections and road segments based on the geometric features, traffic volumes, and context of the site. The spreadsheet yields predicted, observed, and expected crash rates which can be used to gauge the safety performance of a site and quantify the impact of potential improvements. Predicted average crash frequency is the calculated rate based on the geometric design, traffic control features, and traffic volume of a site. Observed crash frequency is the observed average crash rate based on historical crash data at the site. The expected crash frequency is calculated using Empirical-Bayesian statistical methodologies to combine the observed and predicted crash rates for a site. The safety analysis worksheets used in this exercise are included in **Appendix G**.

Additionally, Crash Modification Factors (CMFs) provided by WSDOT and sourced from the CMF Clearinghouse and HSM were used to compare the relative safety performance of each ICE alternative. CMFs are crash rate adjustment factors that allow the user to quantify the impact of a given improvement on predicted or expected safety performance. CMFs can be used to predict the change in crash rates caused by the implementation of an improvement such as converting a two-way stop controlled (TWSC) intersection into a roundabout (RAB). The quality and applicability of CMFs varies, but they can generally be used to analyze specific crash types (e.g. angle) and severities (e.g. minor injury) or all crash types and severities and account for the context (urban/suburban/rural) of the analysis location.

Predicted Future Safety Performance

The predicted future year 2030 safety performance of the Highpoint Street / SR 164 (Griffin Ave) intersection with both ICE alternatives implemented is summarized in **Table 6**. All CMFs are intended for use in an urban context, which is intended for use in an urban setting. The CMFs used in this analysis were derived from the *WSDOT CMF Short List* for all crash types and all severity types:

- Install Two-Way Left-Turn Lane (for TWSC with Roadway Widening Alternative)
 - All Crash Types – 0.80 (CMF #2341, *CMF Clearinghouse*)
- Stop Control to Single Lane Roundabout (for Roundabout Alternative)
 - All Crash Types – 0.61 (CMF #233, *WSDOT CMF Short List*)

As indicated by the CMFs, both the TWSC with Roadway Widening and Roundabout Alternatives are expected to improve intersection safety. This is because the TWSC with Roadway Widening Alternative would provide a new turn lane and refuge for vehicles that do not exist today, and the Roundabout Alternative is expected to slow speeds and reduce conflicts at the intersection. Additionally, both Alternatives would provide lighting at the Highpoint Street / SR 164 (Griffin Ave) intersection. All CMFs are intended for use in an urban context. All CMFs obtained from the CMF Clearinghouse have a 3-star rating or higher per WSDOT's requirements.

The predicted future year 2030 safety performance of the Highpoint Street / SR 164 (Griffin Ave) intersection is summarized in **Table 6**.

Table 6
2030 Buildout – Safety Analysis Results

Intersection	Predicted Annual Crash Rates		
	Base Condition ¹	TWSC with Roadway Widening Alternative	Roundabout Alternative
1. Highpoint Street / SR 164 (Griffin Ave)	1.4	1.1	0.9

1. The Base Condition (two-way stop control without roadway widening) was used to evaluate the potential safety benefit for each alternative.

As shown in **Table 6**, implementation of either the TWSC with Roadway Widening or Roundabout Alternatives would be expected to yield a positive impact to the safety performance at the Highpoint Street / SR 164 (Griffin Ave) intersection.

Multimodal Safety and Operations

For each of the proposed ICE alternatives, the safety of multimodal users is expected to improve. The Roundabout Alternative would install crosswalks with median refuge islands on each leg, allowing pedestrians to only have to cross 1-lane at a time, but a total of 2 lanes. Per FHWA statistics, modern roundabouts result in lower speeds and fewer conflict points when compared to other at-grade intersection traffic control alternatives (i.e. all-way stop control or signalization). Additionally, the marked crosswalks provide pedestrians with the priority over entering vehicles, minimizing pedestrian delay.

The TWSC with Roadway Widening Alternative would install upgraded curb ramps, marked crosswalks, and advance signage, consistent with the guidance outlined in the FHWA *Field Guide for Selecting Countermeasures at Uncontrolled Pedestrian Crossing Locations* (Table 1 Application of Pedestrian Crash Countermeasures by Roadway Feature) included in **Appendix H**. With a marked crossing on SR 164 (Griffin Ave), pedestrians would need to cross three (3) lanes of travel, and with a marked crossing on Highpoint Street, pedestrians would need to cross two (2) lanes of travel.

The proposed project would provide street lighting (illumination) along their project frontage on SR 164 (Griffin Ave) which is expected to improve the visibility of pedestrians at night. Per FWHA, one of the factors contributing to the fatality rate at night is lack of lighting and crossing the street becomes more challenging with less light.

It should be noted that neither of the two (2) crashes that were reported over the most recent 5-year period at the existing Highpoint Street / SR 164 (Griffin Ave) intersection were reported to involve pedestrians or result in serious injury crashes. Additionally, both crashes were reported during daylight.

Overall, both the TWSC with Roadway Widening and Roundabout Alternatives are expected to improve multimodal safety and operations.

STEP 4: ALTERNATIVES EVALUATION

A qualitative discussion comparing the various impacts and operational performance targets for the TWSC with Roadway Widening and Roundabout Alternatives is provided in **Table 7**.

Table 7
Comparison of Impacts and Performance

Impact/Performance Measure	Discussion
Right-of-way	Both Alternatives would require some right-of-way acquisition from the Sacred Heart Catholic Church to align the Highpoint intersection. However, the Roundabout Alternative would require third-party right-of-way acquisition from two additional property owners on the northeast and northwest corners of the intersection.
Environmental	The increase in traffic at the Highpoint Street / SR 164 (Griffin Ave) intersection by 2030 may result in minor increases in emissions and fuel consumption under both ICE alternatives.
Compatibility with City/State Improvement Plans	WSDOT has plans to study this corridor from Dogwood to Highpoint Street in the future. However, there are no planned improvements for a roundabout at or near the Highpoint Street / SR 164 (Griffin Ave) intersection. With a two-way left-turn lane on SR 164 east and west of Highpoint Street, the TWSC with Roadway Widening Alternative is still the most practical and beneficial improvement at this location.
Bike & Pedestrian Facilities	Both Alternatives would provide pedestrian enhancements at the intersection including marked crosswalks, improved curb ramps, and lighting.
Transit	There is no existing transit service within close proximity to the Highpoint Street / SR 164 (Griffin Ave) intersection.
Vehicle LOS & Queuing	Both Alternatives meet the applicable LOS standards for SR 164 (LOS D or better) with V/C ratios less than 1.0 and minimal queuing for every approach.
Safety	Both Alternatives are expected to yield a positive impact to the safety performance at the Highpoint Street / SR 164 (Griffin Ave) intersection.

STEP 5: SELECTION

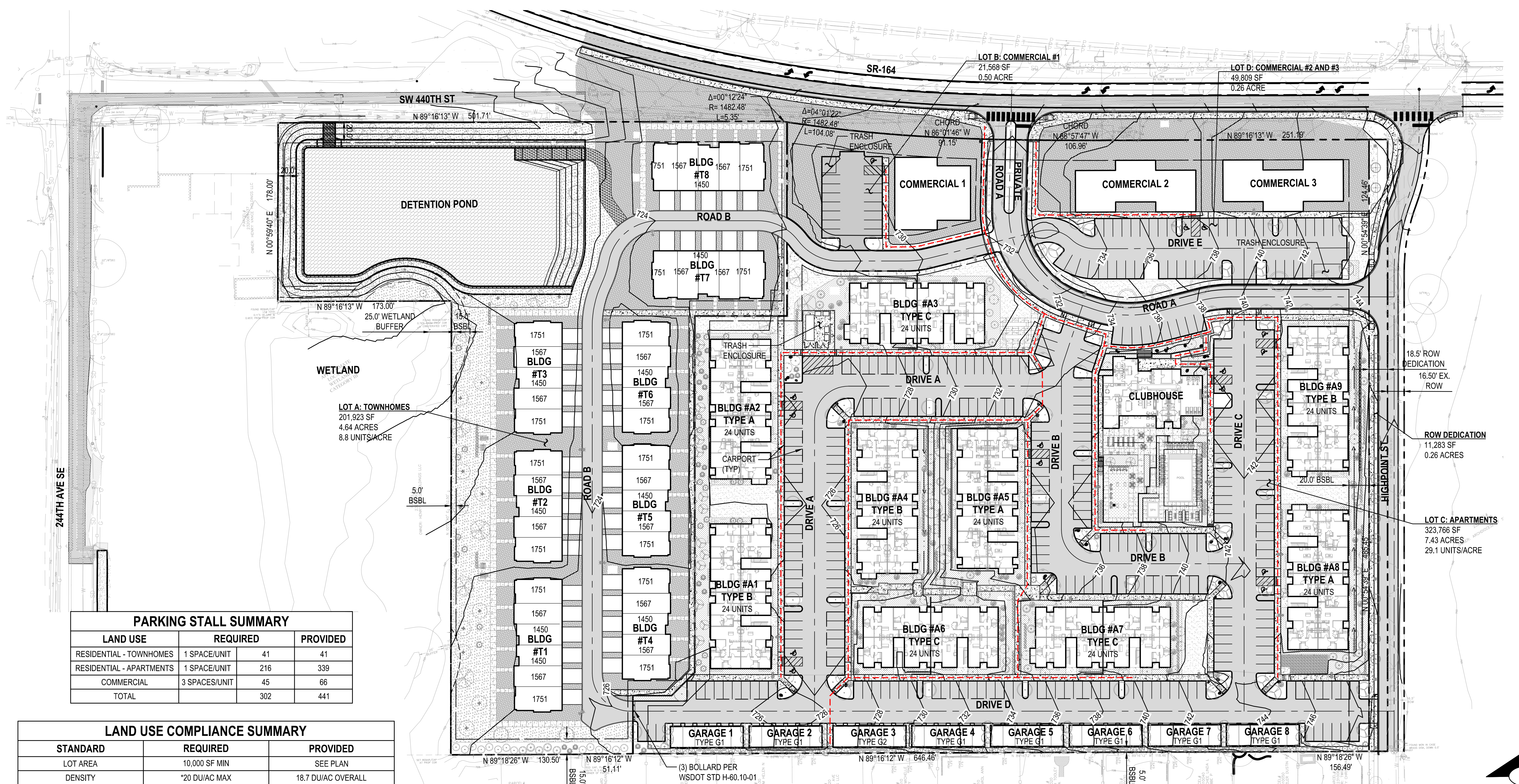
Based on the analysis presented in this Intersection Control Evaluation (ICE), either the TWSC with Roadway Widening Alternative or the Roundabout Alternative would provide adequate intersection control. However, the TWSC with Roadway Widening Alternative represents a more practical and proportionate improvement when considering the anticipated impacts of the proposed development. It offers a lower-cost solution and avoids right-of-way impacts, making it a context-sensitive alternative given the scale of improvements needed.



Appendix A

Site Plan

NW 1/4 OF SW 1/4, SEC 23, TWP 20N, RGE 06E, W.M.



PARKING STALL SUMMARY

LAND USE	REQUIRED	PROVIDED
RESIDENTIAL - TOWNHOMES	1 SPACE/UNIT	41
RESIDENTIAL - APARTMENTS	1 SPACE/UNIT	339
COMMERCIAL	3 SPACES/UNIT	66
TOTAL		441

LAND USE COMPLIANCE SUMMARY

STANDARD	REQUIRED	PROVIDED
LOT AREA	10,000 SF MIN	SEE PLAN
DENSITY	*20 DU/AC MAX	18.7 DU/AC OVERALL
LOT WIDTH	30 FT MIN	SEE PLAN
LOT WIDTH (AT BUILDING)	70 FT MIN	SEE PLAN
FRONT YARD SETBACK	20 FT MIN	20 FT
SIDE YARD SETBACK	5 FT MIN	5 FT
REAR YARD SETBACK	15 FT MIN	15 FT
LOT COVERAGE	45% MAX	26.00%
BUILDING HEIGHT	35 FT MAX (W/ GABLE)	35 FT
ACCESSORY BUILDING HEIGHT	18 FT MAX	18 FT
OPEN SPACE	43,200 SF	51,200 SF

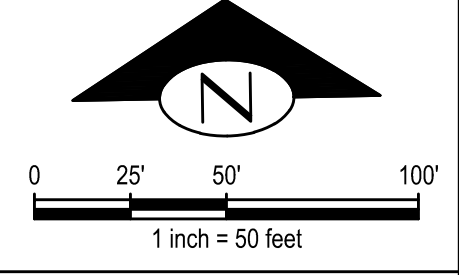
*RESIDENTIAL DENSITY COMPLIES WITH EMC 19.38.340(B)

BUILDING TYPE

BUILDING TYPE	SQUARE FOOTAGE
TYPE A	23,684 SF
TYPE B	24,584 SF
TYPE C	22,856 SF
CLUBHOUSE	5,110 SF
GARAGES	1,595 SF
COMMERCIAL	5,000 SF

LEGEND

- PROPERTY LINE / ROW LINE
- ROADWAY CENTERLINE
- BUILDING OUTLINE
- CURB
- WETLAND BUFFER
- BSBL
- ADA COMPLIANT ROUTE
- SIGN POST
- ASPHALT PAVING
- CONCRETE PAVEMENT
- ASPHALT GRIND & OVERLAY



This approval is for design concept only. The plans appear to be in conformity with the City of Enumclaw design standards for construction. This approval should not be construed as authorizing construction not in accordance with applicable City Standards. The owner and/or owners representatives shall be responsible for compliance with all applicable standards. The City reserves the right to require revisions to approved plans and/or construction and modifications to assure compliance with the City of Enumclaw design standards for construction at any time that it is discovered that the proposed construction does not otherwise meet with applicable construction standards. The owner is required to provide designs and plans in accordance with applicable City standards and assure that construction is accomplished in accordance with those standards. The owner and/or developer, as the case may be, may be required to make necessary approved field revision to correct any errors or omissions found to exist on the approved plans.

APPROVED FOR CONSTRUCTION

Dwayne Walker, PE
City Engineer
City of Enumclaw

Date: _____

Plans reviewed by: _____

Z:\24000001-24099999\2400398 Enumclaw Apartments\CAD\Design\Engineering\C1.00 EA.SP.dwg
 R:\C\Wall
 Sep 12, 2025 - 8:04am

NO.	DATE	BY	CHD.	APPR.	REVISION
0	1/15/2025	CP	JSF	JSF	LDA SUBMITTAL
1	07/02/2025	CP	JSF	JSF	LDA RESUBMITTAL #1

DRAWN BY: _____ DESIGNED BY: _____
 CHECKED BY: _____ APPROVED BY: _____
 DATE: _____

CALL TWO BUSINESS DAYS BEFORE YOU DIG 1-800-424-5555

SCALE: _____

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QUARTERRA MULTIFAMILY MIXED-USE
 ENUMCLAW, WA

SITE PLAN

SHEET **C1.00**

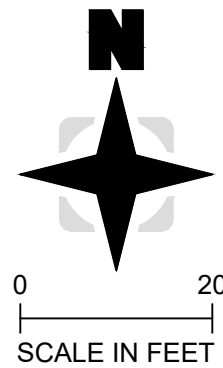
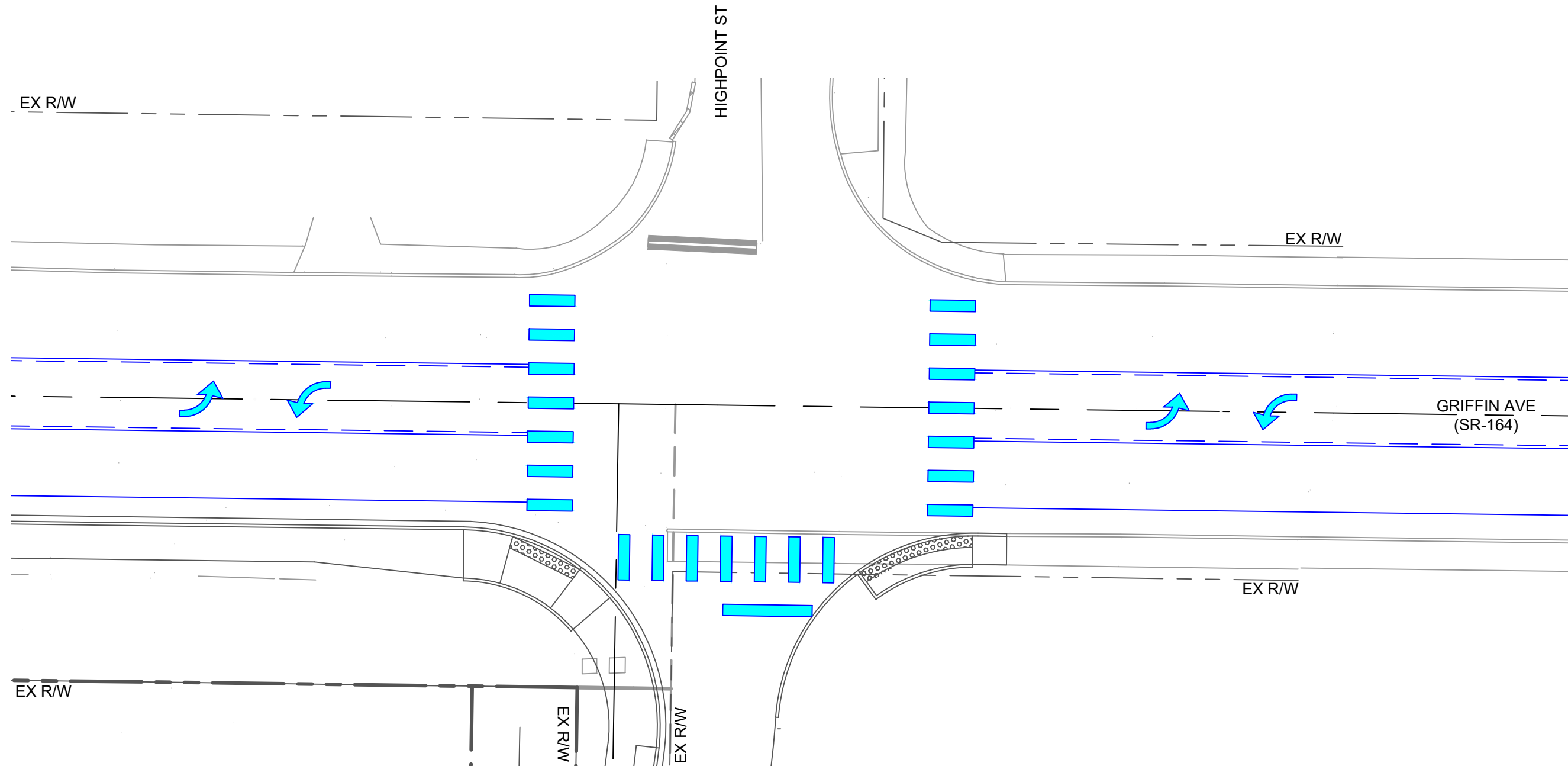
Appendix B

WSDOT Crash Data


JURISDICTION	COUNTY	CITY	PRIMARY TRAFFIC WAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DIST FROM REF POINT	Mi or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	MILEPOST	A/B	SR ONLY HISTORY / SUSPENS E IND	REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	# FAT	# VEH	# PEDS	# BIKES	FIRST COLLISION TYPE / OBJECT STRUCK	VEHICLE 1 ACTION	VEHICLE 2 ACTION	VEHICLE 1 COMPASS DIRECTION FROM	VEHICLE 1 COMPASS DIRECTION TO	VEHICLE 2 COMPASS DIRECTION FROM	VEHICLE 2 COMPASS DIRECTION TO
State Route 164	King	Enumclaw	164				13.56	No		13.56		No	EA77638	10/18/2020	15:38	Suspected Minor Injury	1	0	2	0	0	From same direction - both going straight - one stopped - rear-end	Going Straight Ahead	Stopped for Traffic	West	East	Vehicle Stopped	Vehicle Stopped
State Route	King	Enumclaw	164				13.56	No		13.56		No	EA77638	10/18/2020	15:38	Suspected Minor Injury	1	0	2	0	0	Entering at angle	Making Left Turn	Going Straight Ahead	North	South	East	West

Appendix C

Preliminary Concept Design
(TWSC with Roadway Widening Alternative)



PRELIMINARY - FOR DISCUSSION ONLY

DATE: 09/11/2025	TREVOR TAKARA, P.E. PROJECT MANAGER TAKARA@TENW.COM 206-914-3843	 520 KIRKLAND WAY, SUITE 100, KIRKLAND, WA, 98033	QUARTERRA MULTIFAMILY MIXED-USE ENUMCLAW, WASHINGTON	SHEET 1
			HIGHPOINT IMPROVEMENTS CONCEPT	OF 1

Appendix D

Signal Warrant Analysis

Signal Warrant Analysis for Highpoint St & SR 164 (Griffin Ave)

Warrant 3 - AM Peak Hour
Condition A

This warrant is met if all three of the following conditions exist for the same 1 hour (any four consecutive 15-minute periods) of an average day:

1. The total stopped delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equals or exceeds: 4 vehicle-hours for a one-lane approach; or 5 vehicle-hours for a two-lane approach

Highpoint St & SR 164 (Griffin Ave), SB approach (1 lane)

Control Delay (sec/veh) =	16.5	sec/veh	**Based on results from HCM 7th analysis
Stopped Delay (sec/veh) =	12.7	sec/veh	
Total Volume (veh/hr) =	35	veh/hour	
Vehicle-Hours =	0.12	veh-hours	

CONDITION 1 MET =

2. The volume on the same minor-street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes.

Highpoint St & SR 164 (Griffin Ave), SB approach volume 39

CONDITION 2 MET =

3. The total entering volume serviced during the hour equals or exceeds 650 vehicle per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.

Highpoint St & SR 164 (Griffin Ave), Total entering volume 957

CONDITION 3 MET =

WARRANT MET =

NOTE:

This signal warrant shall be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Signal Warrant Analysis for Highpoint St & SR 164 (Griffin Ave)

Warrant 3 - PM Peak Hour
Condition A

This warrant is met if all three of the following conditions exist for the same 1 hour (any four consecutive 15-minute periods) of an average day:

1. The total stopped delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equals or exceeds: 4 vehicle-hours for a one-lane approach; or 5 vehicle-hours for a two-lane approach

Highpoint St & SR 164 (Griffin Ave), SB approach (1 lane)			
Control Delay (sec/veh) =	20.5	sec/veh	**Based on results from HCM 7th analysis
Stopped Delay (sec/veh) =	15.8	sec/veh	
Total Volume (veh/hr) =	41	veh/hour	
Vehicle-Hours =	0.18	veh-hours	
CONDITION 1 MET =	<input type="text" value="NO"/>		

2. The volume on the same minor-street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes.

Highpoint St & SR 164 (Griffin Ave), SB approach volume	41
CONDITION 2 MET =	<input type="text" value="NO"/>

3. The total entering volume serviced during the hour equals or exceeds 650 vehicle per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.

Highpoint St & SR 164 (Griffin Ave), Total entering volume	1,327
CONDITION 3 MET =	<input type="text" value="YES"/>

WARRANT MET =	NO
----------------------	-----------

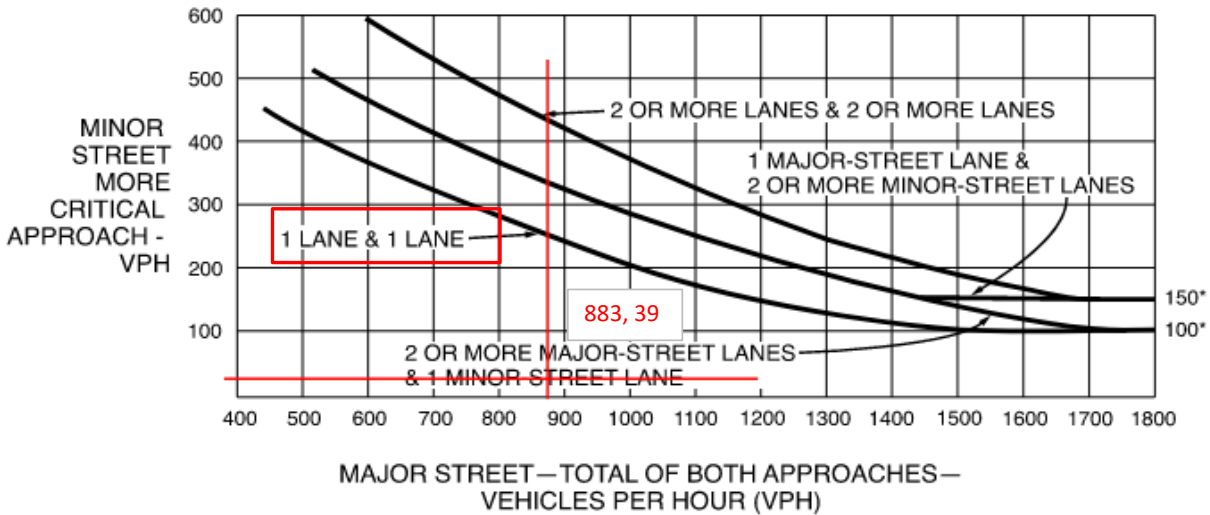
NOTE:

This signal warrant shall be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Signal Warrant Analysis for Highpoint St & SR 164 (Griffin Ave)

*Warrant 3 - AM Peak Hour
Condition B*

Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane

WARRANT MET² = NO

Notes:

- ¹ The highest hourly minor/major approach volumes as shown in the data for Warrant 3.
- ² The signal warrant is satisfied when the conditions given below exist for one hour of an average day.

MUTCD Warrant Requirements

Warrant 3: Peak Hour - Condition B

The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor street approach (one direction only) for 1 hour of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes.

NOTE:

This signal warrant shall only be applied in unusual cases. Such cases include, but are not limited to, office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Signal Warrant Analysis for Highpoint St & SR 164 (Griffin Ave)

Warrant 3 - PM Peak Hour
Condition B

Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane

WARRANT MET² = NO

Notes:

- ¹ The highest hourly minor/major approach volumes as shown in the data for Warrant 3.
- ² The signal warrant is satisfied when the conditions given below exist for one hour of an average day.

MUTCD Warrant Requirements

Warrant 3: Peak Hour - Condition B

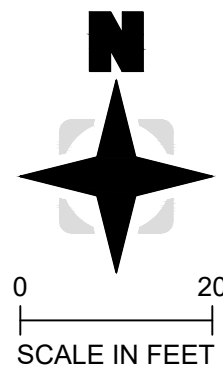
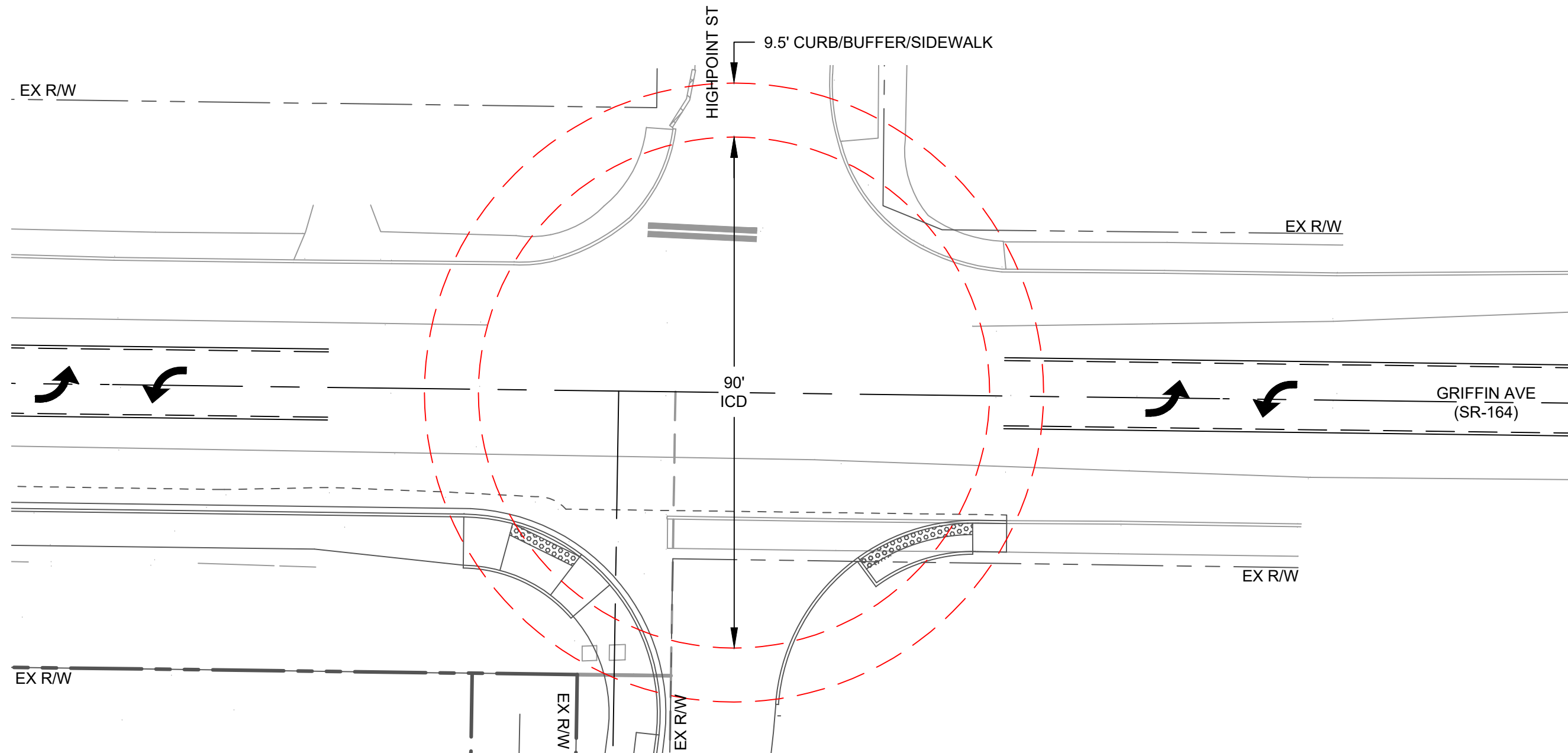
The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor street approach (one direction only) for 1 hour of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes.

NOTE:


This signal warrant shall only be applied in unusual cases. Such cases include, but are not limited to, office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Appendix E

Preliminary Concept Design (Roundabout Alternative)



PRELIMINARY - FOR DISCUSSION ONLY

DATE: 09/11/2025	TREVOR TAKARA, P.E. PROJECT MANAGER TAKARA@TENW.COM 206-914-3843	 TENW 520 KIRKLAND WAY, SUITE 100, KIRKLAND, WA, 98033	QUARTERRA MULTIFAMILY MIXED-USE ENUMCLAW, WASHINGTON	SHEET 1
			HIGHPOINT ROUNDABOUT CONCEPT	OF 1

Appendix F

Level of Service (LOS) Methodology and Calculations

Level of Service Methodology

Level of Service (LOS) generally refers to the degree of congestion at an intersection. It is a measure of vehicle operating speed, travel time, travel delays, and driving comfort. A letter scale from A to F generally describes intersection LOS.

Signalized Intersection LOS represents the average control delay (sec/veh) and can be reported for the overall intersection, for each approach, and for each lane group (additional v/c ratio criteria apply to lane group LOS only). The table below outlines the HCM (7th Edition) LOS criteria for signalized intersections.

LOS Criteria for Signalized Intersections ¹

Control Delay (sec/veh)	Level of Service ²	General Description ³
≤ 10	A	Exceptionally Favorable Progression (or very short cycle lengths) – Most vehicles arrive during the green indication and travel through the intersection without stopping.
> 10 to ≤ 20	B	Highly Favorable Progression (or short cycle lengths) – While more vehicles than LOS A stop, most vehicles still pass through the intersection without stopping.
> 20 to ≤ 35	C	Favorable Progression (or moderate cycle lengths) – Individual cycle failures begin to appear, but many vehicles still pass through the intersection without stopping.
> 35 to ≤ 55	D	Ineffective Progression (or long cycle lengths) – Many vehicles stop and individual cycle failures are noticeable.
> 55 to ≤ 80	E	Unfavorable Progression (and long cycle lengths) – Individual cycle failures are frequent.
> 80	F	Very Poor Progression (and long cycle lengths) – Most cycles fail to clear the queue at this level.

¹ Source: Highway Capacity Manual 7th Edition, Transportation Research Board, 2022.

² If the volume-to-capacity (v/c) ratio for a lane group exceeds 1.0, LOS F is assigned to the individual lane group. For approach-based and intersection-wide assessments at signals, LOS is defined solely by control delay.

³ Individual cycle failures: one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle.

Synchro 12 and/or HCM 2000 LOS methodology may be used when HCM 7th Edition methodology is not supported at an intersection (i.e., intersection geometry and/or custom phasing) or jurisdictional standards require use of an alternative methodology.

Unsignalized Intersection LOS (two-way stop control, all-way stop control, and roundabouts) is based on the average control delay. For two-way stop-controlled intersections, the LOS criteria apply to each controlled minor-street approach, controlled minor-street lane group, and controlled major-street movement (additional v/c ratio criteria apply to lane group LOS only). LOS is not calculated for major-street approaches or for the intersection as a whole at two-way stop-controlled intersections. For all-way stop-controlled intersections and roundabouts, LOS can be reported for the overall intersection, for each approach, and for each lane group (additional v/c ratio criteria apply to lane group LOS only). The table below outlines the HCM (7th Edition) LOS criteria for unsignalized intersections based on these methodologies.

Note: LOS reported for WSDOT roundabouts use signalized intersection delay criteria, per *WSDOT Sidra Policy Settings*.

LOS Criteria for Unsignalized Intersections¹

Control Delay (sec/veh)	Level of Service ²
≤ 10	A
> 10 to ≤ 15	B
> 15 to ≤ 25	C
> 25 to ≤ 35	D
> 35 to ≤ 50	E
> 50	F

¹ Source: Highway Capacity Manual 7th Edition, Transportation Research Board, 2022.

² If the volume-to-capacity (v/c) ratio for a lane group exceeds 1.0, LOS F is assigned to the individual lane group. For approach-based and intersection-wide assessments at unsignalized intersections, LOS is defined solely by control delay.



2030 With Project
(TWSC with Roadway Widening Alternative)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	427	3	10	425	15	10	0	29	30	0	5
Future Volume (vph)	3	427	3	10	425	15	10	0	29	30	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			-4%			0%			0%	
Storage Length (ft)	50		0	50		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		400			1316			208			445	
Travel Time (s)		7.8			25.6			5.7			12.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	7%	7%	7%	5%	5%	5%	2%	2%	2%	9%	9%	9%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized

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	427	3	10	425	15	10	0	29	30	0	5
Future Vol, veh/h	3	427	3	10	425	15	10	0	29	30	0	5
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	50	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	-	-	1	-	-	1	-	-
Grade, %	-	4	-	-	-4	-	0	-	-	0	-	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	7	7	7	5	5	5	2	2	2	9	9	9
Mvmt Flow	3	474	3	11	472	17	11	0	32	33	0	6

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	489	0	0	478
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.17	-	-	4.15
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.263	-	-	2.245
Pot Cap-1 Maneuver	1049	-	-	1069
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1049	-	-	1069
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.06	0.19	12.82	16.46
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	504	1049	-	-	1069	-	-	353
HCM Lane V/C Ratio	0.086	0.003	-	-	0.01	-	-	0.11
HCM Ctrl Dly (s/v)	12.8	8.4	-	-	8.4	-	-	16.5
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.4



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	642	9	32	529	39	6	0	19	28	0	13
Future Volume (vph)	10	642	9	32	529	39	6	0	19	28	0	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			-4%			0%			0%	
Storage Length (ft)	50		0	50		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		390			1316			251			445	
Travel Time (s)		7.6			25.6			6.8			12.1	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	2%	2%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized

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	10	642	9	32	529	39	6	0	19	28	0	13
Future Vol, veh/h	10	642	9	32	529	39	6	0	19	28	0	13
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	50	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #		0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	4	-	-	-4	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	1	1	1	2	2	2	2	2	2	5	5	5
Mvmt Flow	11	690	10	34	569	42	6	0	20	30	0	14

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	611	0	0	700
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.11	-	-	4.12
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.209	-	-	2.218
Pot Cap-1 Maneuver	973	-	-	897
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	973	-	-	897
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.13	0.49	15.47	20.46
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)		371	973	-	-	897	-	277
HCM Lane V/C Ratio		0.073	0.011	-	-	0.038	-	0.159
HCM Ctrl Dly (s/v)		15.5	8.7	-	-	9.2	-	20.5
HCM Lane LOS		C	A	-	-	A	-	C
HCM 95th %tile Q(veh)		0.2	0	-	-	0.1	-	0.6



2030 With Project
(Roundabout Alternative)

LANE LEVEL OF SERVICE

Lane Level of Service

 Site: [6-AM-WP] Highpoint St / SR 164 (Griffin Ave) - AM Peak Hour (2030 With Project)

Output produced by SIDRA INTERSECTION Version: 10.0.3.210

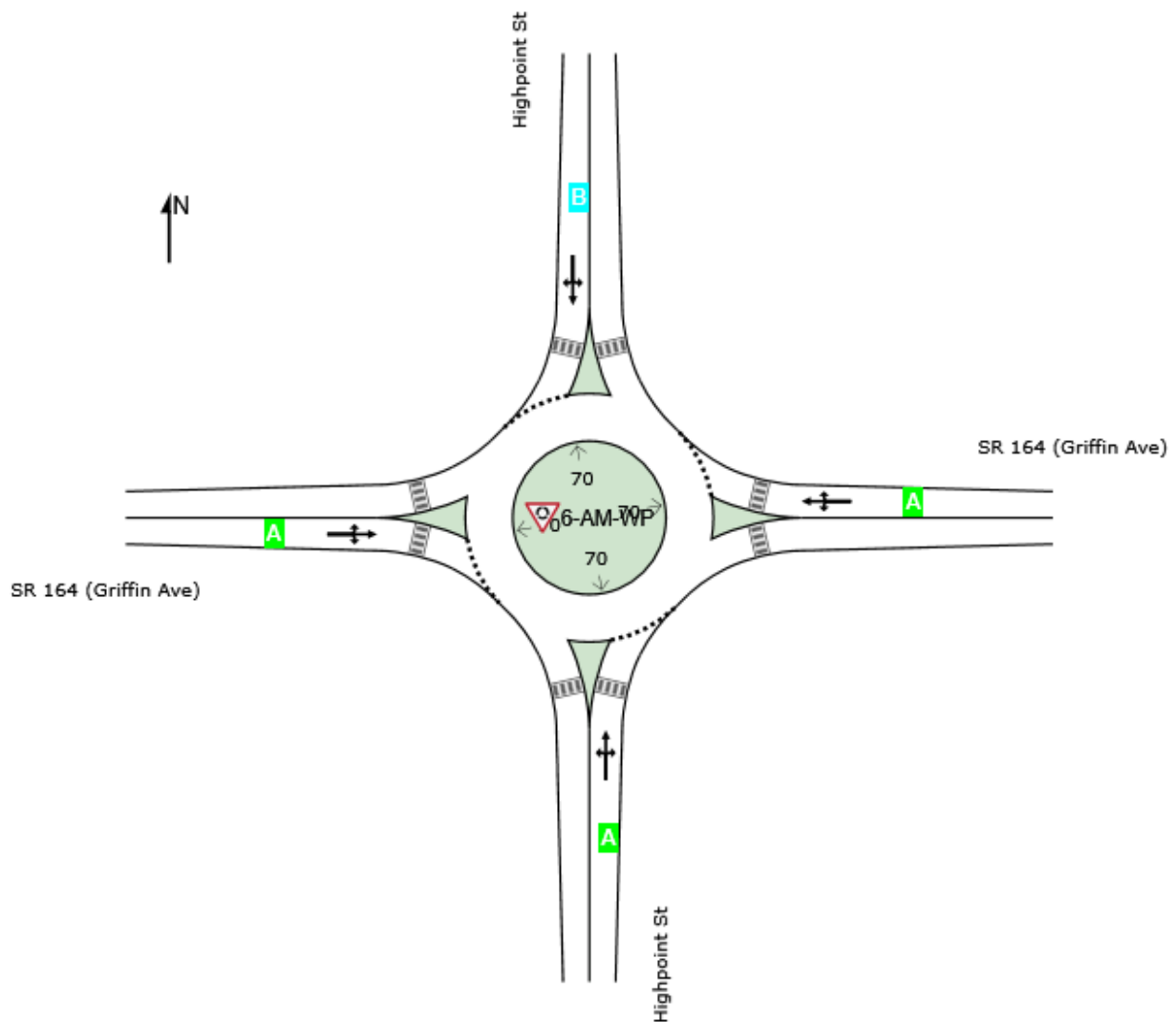
Highpoint St / SR 164 (Griffin Ave)

Site Category: 2030 With Project - AM Peak Hour

Roundabout

Site Scenario: 1 | Local Volumes

	Approaches				Intersection
	South	East	North	West	
LOS	A	A	B	A	A



Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

MOVEMENT SUMMARY

 Site: [6-AM-WP] Highpoint St / SR 164 (Griffin Ave) - AM Peak Hour (2030 With Project)

Output produced by SIDRA INTERSECTION Version: 10.0.3.210

Highpoint St / SR 164 (Griffin Ave)
 Site Category: 2030 With Project - AM Peak Hour
 Roundabout
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop of Cycles	Number of Cycles	Aver. Speed
			[Total HV]	[Total HV]	[Total HV]	[Total HV]	v/c	sec		[Veh.]	[Dist]		Rate to Depart		mph
			veh/h	%	veh/h	%				veh	ft				
South: Highpoint St															
3	L2	All MCs	11	0.0	11	0.0	0.053	11.9	LOS B	0.3	6.4	0.55	0.66	0.55	32.4
8	T1	All MCs	1	0.0	1	0.0	0.053	7.1	LOS A	0.3	6.4	0.55	0.66	0.55	33.0
18	R2	All MCs	32	0.0	32	0.0	0.053	6.9	LOS A	0.3	6.4	0.55	0.66	0.55	32.7
Approach			44	0.0	44	0.0	0.053	8.2	LOS A	0.3	6.4	0.55	0.66	0.55	32.7
East: SR 164 (Griffin Ave)															
1	L2	All MCs	11	5.0	11	5.0	0.414	9.4	LOS A	2.9	75.7	0.13	0.42	0.13	34.8
6	T1	All MCs	472	5.0	472	5.0	0.414	4.6	LOS A	2.9	75.7	0.13	0.42	0.13	35.5
16	R2	All MCs	17	5.0	17	5.0	0.414	4.4	LOS A	2.9	75.7	0.13	0.42	0.13	35.2
Approach			500	5.0	500	5.0	0.414	4.7	LOS A	2.9	75.7	0.13	0.42	0.13	35.5
North: Highpoint St															
7	L2	All MCs	33	9.0	33	9.0	0.053	12.3	LOS B	0.2	6.3	0.53	0.71	0.53	30.7
4	T1	All MCs	1	9.0	1	9.0	0.053	7.4	LOS A	0.2	6.3	0.53	0.71	0.53	31.3
14	R2	All MCs	6	9.0	6	9.0	0.053	7.3	LOS A	0.2	6.3	0.53	0.71	0.53	31.0
Approach			40	9.0	40	9.0	0.053	11.5	LOS B	0.2	6.3	0.53	0.71	0.53	30.7
West: SR 164 (Griffin Ave)															
5	L2	All MCs	3	7.0	3	7.0	0.419	9.7	LOS A	2.9	75.8	0.25	0.42	0.25	34.4
2	T1	All MCs	474	7.0	474	7.0	0.419	4.9	LOS A	2.9	75.8	0.25	0.42	0.25	35.1
12	R2	All MCs	3	7.0	3	7.0	0.419	4.7	LOS A	2.9	75.8	0.25	0.42	0.25	34.8
Approach			481	7.0	481	7.0	0.419	4.9	LOS A	2.9	75.8	0.25	0.42	0.25	35.1
All Vehicles			1066	5.8	1066	5.8	0.419	5.2	LOS A	2.9	75.8	0.22	0.44	0.22	35.0

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

Intersection and Approach LOS values are based on average delay for all movements (v/c not used).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

LANE LEVEL OF SERVICE

Lane Level of Service

 Site: [6-PM-WP] Highpoint St / SR 164 (Griffin Ave) - PM Peak Hour (2030 With Project)

Output produced by SIDRA INTERSECTION Version: 10.0.3.210

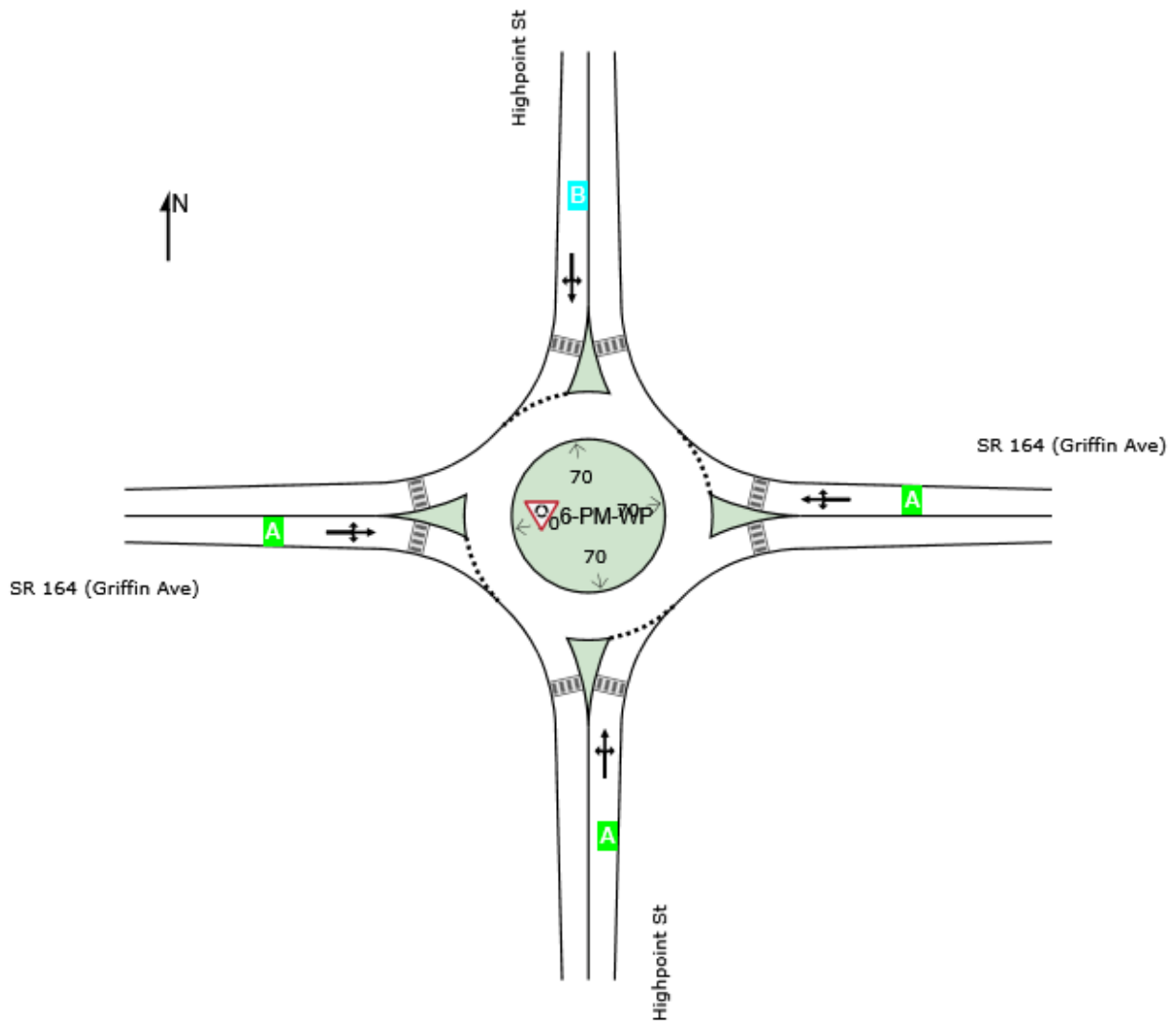
Highpoint St / SR 164 (Griffin Ave)

Site Category: 2030 With Project - PM Peak Hour

Roundabout

Site Scenario: 1 | Local Volumes

	Approaches				Intersection
	South	East	North	West	
LOS	A	A	B	A	A



Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

MOVEMENT SUMMARY

Site: [6-PM-WP] Highpoint St / SR 164 (Griffin Ave) - PM Peak Hour (2030 With Project)

Output produced by SIDRA INTERSECTION Version: 10.0.3.210

Highpoint St / SR 164 (Griffin Ave)
 Site Category: 2030 With Project - PM Peak Hour
 Roundabout
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop of Cycles	Number of Cycles to Depart	Aver. Speed
			[Total HV]	[Total HV]	[Total HV]	[Total HV]	v/c	sec		[Veh.]	[Dist]		Rate		mph
			veh/h	%	veh/h	%				veh	ft				
South: Highpoint St															
3	L2	All MCs	6	0.0	6	0.0	0.041	13.3	LOS B	0.2	5.3	0.66	0.70	0.66	31.9
8	T1	All MCs	1	0.0	1	0.0	0.041	8.4	LOS A	0.2	5.3	0.66	0.70	0.66	32.4
18	R2	All MCs	20	0.0	20	0.0	0.041	8.3	LOS A	0.2	5.3	0.66	0.70	0.66	32.2
Approach			28	0.0	28	0.0	0.041	9.4	LOS A	0.2	5.3	0.66	0.70	0.66	32.1
East: SR 164 (Griffin Ave)															
1	L2	All MCs	34	2.0	34	2.0	0.523	9.4	LOS A	4.2	105.8	0.16	0.42	0.16	34.7
6	T1	All MCs	569	2.0	569	2.0	0.523	4.6	LOS A	4.2	105.8	0.16	0.42	0.16	35.4
16	R2	All MCs	42	2.0	42	2.0	0.523	4.4	LOS A	4.2	105.8	0.16	0.42	0.16	35.1
Approach			645	2.0	645	2.0	0.523	4.8	LOS A	4.2	105.8	0.16	0.42	0.16	35.4
North: Highpoint St															
7	L2	All MCs	30	5.0	30	5.0	0.062	12.9	LOS B	0.3	7.5	0.58	0.72	0.58	30.9
4	T1	All MCs	1	5.0	1	5.0	0.062	8.0	LOS A	0.3	7.5	0.58	0.72	0.58	31.5
14	R2	All MCs	14	5.0	14	5.0	0.062	7.8	LOS A	0.3	7.5	0.58	0.72	0.58	31.2
Approach			45	5.0	45	5.0	0.062	11.2	LOS B	0.3	7.5	0.58	0.72	0.58	31.0
West: SR 164 (Griffin Ave)															
5	L2	All MCs	11	1.0	11	1.0	0.599	10.0	LOS A	5.2	130.9	0.37	0.43	0.37	34.3
2	T1	All MCs	690	1.0	690	1.0	0.599	5.1	LOS A	5.2	130.9	0.37	0.43	0.37	35.0
12	R2	All MCs	10	1.0	10	1.0	0.599	4.9	LOS A	5.2	130.9	0.37	0.43	0.37	34.7
Approach			711	1.0	711	1.0	0.599	5.2	LOS A	5.2	130.9	0.37	0.43	0.37	34.9
All Vehicles			1429	1.6	1429	1.6	0.599	5.3	LOS A	5.2	130.9	0.29	0.44	0.29	34.9

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

Intersection and Approach LOS values are based on average delay for all movements (v/c not used).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Appendix G

Safety Analysis Worksheets

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections						
General Information			Location Information			
Analyst	TENW	2030 With Project	Intersection	Highpoint St / SR 164 (Griffin Ave)		
Agency or Company	TENW	Enumclaw/King County	Jurisdiction	2030		
Date Performed	07/01/25		Analysis Year	2030		
Input Data		Base Conditions		Site Conditions		
Intersection type (3ST, 3SG, 4ST, 4SG)		--		4ST		
AADT _{major} (veh/day)	AADT _{MAX} = 46,800 (veh/day)	--		11,708		
AADT _{minor} (veh/day)	AADT _{MAX} = 5,900 (veh/day)	--		800		
Intersection lighting (present/not present)		Not Present		Present		
Calibration factor, C _i		1.00		1.00		
Data for unsignalized intersections only:						
Number of major-road approaches with left-turn lanes (0,1,2)		0		0		
Number of major-road approaches with right-turn lanes (0,1,2)		0		0		
Data for signalized intersections only:						
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0		0		
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0		0		
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--		0		
Type of left-turn signal phasing for Leg #1		Permissive		Not Applicable		
Type of left-turn signal phasing for Leg #2		--		Not Applicable		
Type of left-turn signal phasing for Leg #3		--		Not Applicable		
Type of left-turn signal phasing for Leg #4 (if applicable)		--		Not Applicable		
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0		0		
Intersection red light cameras (present/not present)		Not Present		Not Present		
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only				0		
Maximum number of lanes crossed by a pedestrian (N _{lanes})		--		0		
Number of bus stops within 300 m (1,000 ft) of the intersection		0		0		
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present		Not Present		
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0		0		

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF _{1i}	CMF _{2i}	CMF _{3i}	CMF _{4i}	CMF _{5i}	CMF _{6i}	CMF _{COMB}
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
1.00	1.00	1.00	1.00	0.91	1.00	0.91

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections										
(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N _{bimv}	Proportion of Total Crashes	Adjusted N _{bimv}	Combined CMFs	Calibration Factor, C _i	Predicted N _{bimv}
	from Table 12-10									
	a	b	c							
Total	-8.90	0.82	0.25	0.40	1.573	1.000	1.573	0.91	1.00	1.436
Fatal and Injury (FI)	-11.13	0.93	0.28	0.48	0.579	(4) _{FI} /((4) _{FI} +(4) _{PDO})	0.573	0.91	1.00	0.523
Property Damage Only (PDO)	-8.74	0.77	0.23	0.40	1.011	(5) _{TOTAL} -(5) _{FI}	0.636	1.000	0.91	0.913

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections					
(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted N _{bimv (FI)} (crashes/year)	Proportion of Collision Type _(PDO)	Predicted N _{bimv (PDO)} (crashes/year)	Predicted N _{bimv (TOTAL)} (crashes/year)
	from Table 12-11	(9) _{FI} from Worksheet 2C	from Table 12-11	(9) _{PDO} from Worksheet 2C	(9) _{PDO} from Worksheet 2C
Total	1.000	0.523	1.000	0.913	1.436
Rear-end collision	0.338	0.177	0.374	0.341	0.518
Head-on collision	0.041	0.021	0.030	0.027	0.049
Angle collision	0.440	0.230	0.335	0.306	0.536
Sideswipe	0.121	0.063	0.044	0.040	0.103
Other multiple-vehicle collision	0.060	0.031	0.217	0.198	0.229

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections										
(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N _{bisv}	Proportion of Total Crashes	Adjusted N _{bisv}	Combined CMFs	Calibration Factor, C _i	Predicted N _{bisv}
	from Table 12-12									
	a	b	c							
Total	-5.33	0.33	0.12	0.65	0.238	1.000	0.238	0.91	1.00	0.217
Fatal and Injury (FI)	--	--	--	--	0.067	(4) _{FI} /((4) _{FI} +(4) _{PDO})	0.078	0.91	1.00	0.071
Property Damage Only (PDO)	-7.04	0.36	0.25	0.54	0.136	(5) _{TOTAL} -(5) _{FI}	0.671	0.91	1.00	0.146

Worksheet 3A -- Predicted Crashes by Severity and Site Type and Observed Crashes Using the Site-Specific EB Method for Urban and Suburban Arterials							
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Collision type / Site type	Predicted average crash frequency (crashes/year)			Observed crashes, $N_{observed}$ (crashes/year)	Overdispersion Parameter, k	Weighted adjustment, w Equation A-5 from Part C Appendix	Expected average crash frequency, Equation A-4 from Part C Appendix
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)				
INTERSECTIONS							
Multiple-vehicle							
Highpoint SR164 Exist	1.261	0.452	0.809	0.400	0.400	0.665	0.973
Highpoint SR164 No Action	1.364	0.494	0.871	0.400	0.400	0.647	1.024
Highpoint SR164 With Project	1.436	0.523	0.913	0.400	0.400	0.635	1.058

Appendix H

FHWA Field Guide for Selecting Countermeasures at Uncontrolled Pedestrian Crossing Locations (Table 1)

Table 1: Application of Pedestrian Crash Countermeasures by Roadway Feature

Table 1 identifies suggested countermeasures for uncontrolled crossing locations according to roadway and traffic features. Review the corresponding worksheets for countermeasures considered for the site. The worksheets describe additional design and installation considerations for the countermeasures.

Table 1. Application of pedestrian crash countermeasures by roadway feature.

Roadway Configuration	Posted Speed Limit and AADT								
	Vehicle AADT <9,000			Vehicle AADT 9,000–15,000			Vehicle AADT >15,000		
	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph
2 lanes (1 lane in each direction)	① 2 4 5 6	① 5 6 7 9	① 5 6 ⑦ ⑨	① 4 5 6	① 5 6 7 9	① 5 6 ⑦ ⑨	① 4 5 6	① 5 6 7 9	① 5 6 ⑨
3 lanes with raised median (1 lane in each direction)	① 2 3 4 5	① ③ 5 7 9	① ③ 5 ⑦ ⑨	① 3 4 5 7 9	① ③ 5 ⑦ ⑨	① ③ 5 ⑦ ⑨	① ③ 4 5 7 9	① ③ 5 ⑦ ⑨	① ③ 5 ⑨
3 lanes w/o raised median (1 lane in each direction with a two-way left-turn lane)	① 2 3 4 5 6 7 9	① ③ 5 6 7 9	① ③ 5 6 ⑨	① 3 4 5 6 7 9	① ③ 5 6 ⑦ ⑨	① ③ 5 6 ⑨	① ③ 4 5 6 7 9	① ③ 5 6 ⑨	① ③ 5 6 ⑨
4+ lanes with raised median (2 or more lanes in each direction)	① ③ 5 7 8 9	① ③ 5 7 8 9	① ③ 5 8 ⑨	① ③ 5 7 8 9	① ③ 5 ⑦ 8 ⑨	① ③ 5 8 ⑨	① ③ 5 ⑦ 8 ⑨	① ③ 5 8 ⑨	① ③ 5 8 ⑨
4+ lanes w/o raised median (2 or more lanes in each direction)	① ③ 5 6 7 8 9	① ③ 5 ⑥ 7 8 9	① ③ 5 ⑥ 8 ⑨	① ③ 5 ⑥ 7 8 9	① ③ 5 ⑥ ⑦ 8 ⑨	① ③ 5 ⑥ 8 ⑨	① ③ 5 ⑥ ⑦ 8 ⑨	① ③ 5 ⑥ 8 ⑨	① ③ 5 ⑥ 8 ⑨
<p>Given the set of conditions in a cell,</p> <ul style="list-style-type: none"> # Signifies that the countermeasure is a candidate treatment at a marked uncontrolled crossing location. ● Signifies that the countermeasure should always be considered, but not mandated or required, based upon engineering judgment at a marked uncontrolled crossing location. ○ Signifies that crosswalk visibility enhancements should always occur in conjunction with other identified countermeasures.* <p>The absence of a number signifies that the countermeasure is generally not an appropriate treatment, but exceptions may be considered following engineering judgment.</p>					<ol style="list-style-type: none"> 1 High-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs 2 Raised crosswalk 3 Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line 4 In-Street Pedestrian Crossing sign 5 Curb extension 6 Pedestrian refuge island 7 Rectangular Rapid-Flashing Beacon (RRFB)** 8 Road Diet 9 Pedestrian Hybrid Beacon (PHB)** 				

*Refer to Chapter 4, 'Using Table 1 and Table 2 to Select Countermeasures,' for more information about using multiple countermeasures.

**It should be noted that the PHB and RRFB are not both installed at the same crossing location.

This table was developed using information from: Zegeer, C.V., J.R. Stewart, H.H. Huang, P.A. Lagerwey, J. Feaganes, and B.J. Campbell. (2005). Safety effects of marked versus unmarked crosswalks at uncontrolled locations: Final report and recommended guidelines. FHWA, No. FHWA-HRT-04-100, Washington, D.C.; FHWA. Manual on Uniform Traffic Control Devices, 2009 Edition. (revised 2012). Chapter 4F, Pedestrian Hybrid Beacons. FHWA, Washington, D.C.; FHWA. Crash Modification Factors (CMF) Clearinghouse. <http://www.cmfclearinghouse.org/>; FHWA. Pedestrian Safety Guide and Countermeasure Selection System (PEDSAFE). <http://www.pedbikesafe.org/PEDSAFE/>; Zegeer, C., R. Srinivasan, B. Lan, D. Carter, S. Smith, C. Sundstrom, N.J. Thirsk, J. Zegeer, C. Lyon, E. Ferguson, and R. Van Houten. (2017). NCHRP Report 841: Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments. Transportation Research Board, Washington, D.C.; Thomas, Thirsk, and Zegeer. (2016). NCHRP Synthesis 498: Application of Pedestrian Crossing Treatments for Streets and Highways. Transportation Research Board, Washington, D.C.; and personal interviews with selected pedestrian safety practitioners.