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FROM: Alex Atchison, PE, PTOE
SUBJECT: Year 2044 Travel Demand Modeling -
Alternatives Analysis
CC:
PROJECT NUMBER: 554-2237-139
PROJECT NAME: Transportation Functional Plan

The City of Poulsbo has identified four growth alternatives that will be evaluated for the Environmental Impact Statement (EIS) being prepared in support of the City's Comprehensive Plan Update. This technical memorandum summarizes the traffic forecasting and traffic analysis conducted in support of the EIS alternatives.

Description of Alternatives

The alternatives analyzed for the City of Poulsbo's Comprehensive Plan EIS represent different growth strategies for population and employment that could occur by the year 2044. The four alternatives include:

- **Alternative 1 - No Action, Current Adopted Plan:** This alternative assumes no changes to the future land use designations shown on the City's Land Use Map. There are no policy, zoning or regulation changes associated with this alternative. Under this alternative the additional growth in population by 2044 is forecasted to be 6,022 new people and the additional growth in employment by 2044 is forecasted to be 4,165 new jobs.
- **Alternative 2 - Current Adopted Plan + Missing Middle Emphasis:** This alternative focuses on adding policies and development regulation amendments that would promote missing middle housing within residential zoning districts. Missing Middle Housing that would be considered in zoning regulations could include reduced R minimum lot sizes; attached units (duplex, triplex, etc.) allowed in Residential Low zoning districts; infill; multiplex buildings; town or rowhouses; accessory dwelling units; and cottage/courtyard developments. Under this alternative the additional growth in population by 2044 is forecasted to be 6,201 new people and the additional growth in employment by 2044 is forecasted to be 4,165 new jobs.
- **Alternative 3 - Growth focused within SR 305 Corridor Center:** This alternative would evaluate the C-3 commercial zones near the SR 305 corridor for opportunities to increase residential development along the existing SR 305 transit corridor while also maintaining a vital employment area. Future code amendments in support of the Alternative may include increased building height, reduced parking requirements, flexible use of commercial to residential on the first floor and development incentives. Under this alternative the additional growth in population by 2044 is forecasted to be 7,270 new people and the additional growth in employment by 2044 is forecasted to be 4,100 new jobs.



- **Alternative 4 – Growth focused within SR 305 Corridor Center and increase to density in medium and high-density residential districts:** This alternative would include increased growth along the SR 305 corridor and add increased densities to the City’s Residential Medium (RM) and Residential High (RH) zoning districts. Residential Low zoning districts could remain the same as currently adopted. Under this alternative the additional growth in population by 2044 is forecasted to be 7,961 new people and the additional growth in employment by 2044 is forecasted to be 4,100 new jobs.

Alternative 1 and Alternative 4 represent the “bookends” of growth evaluated in the Comprehensive Plan EIS. Both alternatives were modeled to understand the potential impacts on the City’s transportation system. It is assumed that any potential impacts for Alternative 2 and Alternative 3 would be captured within the two bookends of Alternative 1 and Alternative 4.

Travel Demand Model

Travel Demand Model Framework

The City of Poulsbo’s travel demand model was developed using Kitsap County’s travel demand model as its foundation. Forecasts for areas outside Poulsbo’s immediate study area were directly integrated from the Kitsap County model, ensuring consistency with regional growth projections.

To assess the transportation impacts of future growth, Poulsbo’s model translates land use patterns into expected walking, biking, transit, and auto trips. The model organizes the City and surrounding areas into Traffic Analysis Zones (TAZs)—spatial units that range in size from a few blocks to entire neighborhoods. Using these zones, the model estimates trip generation based on the number of housing units and employees in each TAZ. Trips are then assigned to the roadway network, enabling the City to predict traffic volumes on specific streets during peak commute times and plan accordingly.

Both Kitsap County and Poulsbo’s travel demand models use the VISUM software package, which forecasts weekday PM peak-hour traffic volumes based on 2044 land use data. The City’s TAZs align with those in Kitsap County’s updated model, integrating land use and travel forecasts to provide a cohesive regional perspective. This integration ensures that Poulsbo’s travel forecasts and subsequent operations and safety analyses account for regional growth consistent with Kitsap County’s projections.

Growth Allocation

To evaluate the potential impacts of different EIS growth alternatives, the City divided Poulsbo into six subareas, (**Figure 1**). City staff allocated projected population and employment growth to these subareas based on land capacity and density assumptions and provided the resulting data to Parametrix.

Parametrix further refined the growth distribution within each subarea by assigning it to specific Traffic Analysis Zones (TAZs). This assignment was based on parcels identified as buildable lands (**Figure 2**) and areas targeted for focused growth, such as those along SR 305 and Viking Way.

Using the growth allocations illustrated in Figure 2, the increase in travel demand was modeled for both Alternative 1 and Alternative 4. This process involved assigning future travel demand to the roadway network to assess future conditions and capacity needs. The traffic assignment accounted for the existing road system, as well as currently committed and funded improvements, including new developer-funded roadways identified in the previous Comprehensive Plan update (**Figure 3**).

**2044 TRANSPORTATION:
POP/JOBS Distribution Map
City of Poulsbo**

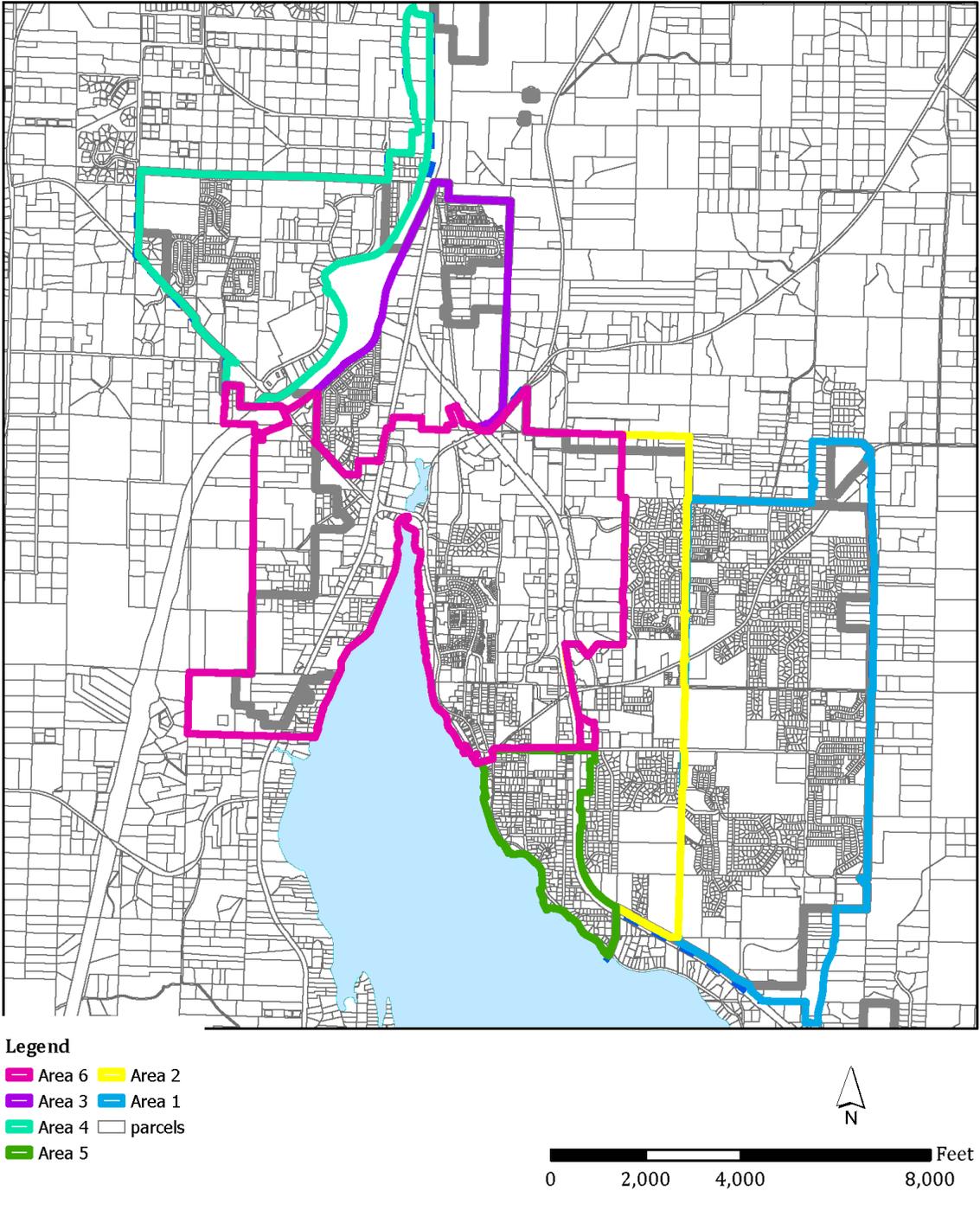


Figure 1. Transportation Study Areas

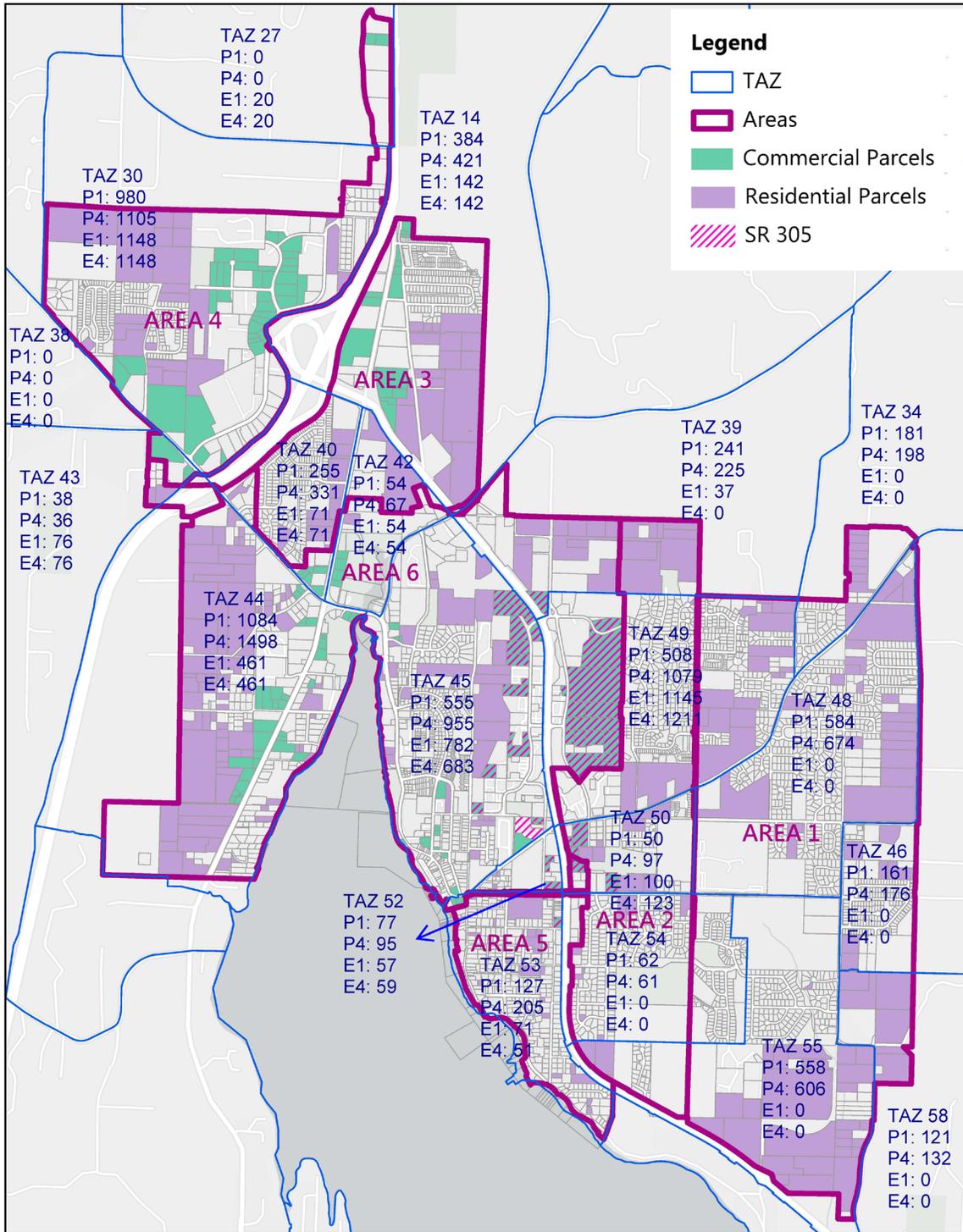
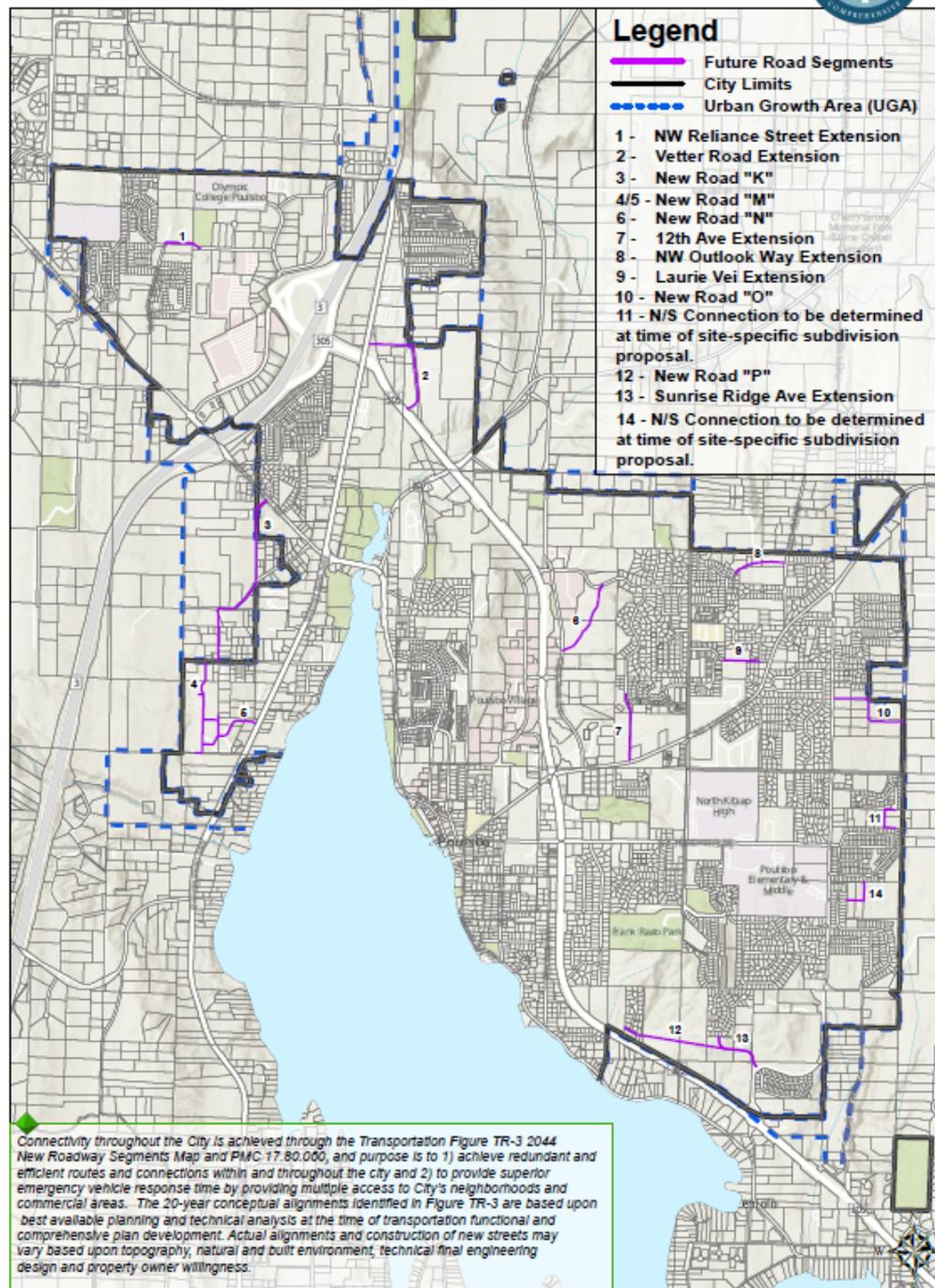


Figure 2. 2044 Growth Assignment by TAZ

**Comprehensive Plan Map:
Figure TR-3: 2044 New Roadway Segments Map**
City of Poulsbo Planning Department



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Figure 3. New Roadways Assumed in Travel Demand Model

Intersection Operations Analysis

Methodology

Traffic operations were evaluated based upon the latest LOS methodologies contained in the Highway Capacity Manual (HCM), Transportation Research Board, using Synchro 11 software. The HCM is a nationally recognized and locally accepted method of measuring traffic flow and congestion. Criteria range from LOS A, indicating free-flow conditions with minimal vehicle delays, to LOS F, indicating extreme congestion with significant vehicle delays, shown in **Table 1**. At signalized intersections, LOS is defined in terms of average delay per vehicle. At unsignalized intersections, LOS is measured in terms of the average delay per vehicle and is typically reported for the worst traffic movement instead of for the whole intersection.

Table 1. Vehicle Level of Service Description

Vehicle Level of Service	
LOS	General Description
A	Highly stable, free-flow conditions
B	Stable, free flow with little congestion
C	Free flow with moderate congestion
D	Approaching unstable flow with increasing congestion
E	Unstable, congested conditions
F	Highly congested

To understand the level of congestion experienced during the evening commute under Alternative 1 and Alternative 4, 42 intersections were evaluated based on their ability to accommodate PM peak hour demand in their existing configuration (number of lanes, traffic control, etc.). Signal timing was optimized for the year 2044 condition.

2044 Intersection Level of Service

The City of Poulsbo has established two levels of service (LOS) standards for transportation facilities within its city limits. The desired standard is LOS D, while the minimum acceptable standard is LOS E. However, several intersections in the city are projected to operate below these standards. At these locations, adding capacity is considered infeasible due to potential adverse impacts on community resources. For the intersections listed below, the city has adopted LOS F as the standard.

- 7th Avenue NE/NE Liberty Road
- 10th Avenue NE/Forest Rock Lane NE
- 8th Avenue NE/NE Lincoln Road
- Front Street NE/NE Torval Canyon Road
- Front Street NE/Jensen Way NE
- Front Street NE/Fjord Drive NW/NE Hostmark Street
- NW Lindvig Way/NW Finn Hill Road /Viking Avenue NW

Table 2 below illustrates the forecasted 2044 PM peak hour intersection level of service for both the Alternative 1 and Alternative 4 growth scenarios.

Table 2 – 2044 PM Peak Hour Level of Service

Intersection	Control Type ¹	LOS Standard	2044 Alternative 1			2044 Alternative 4			Difference in Delay (Alt 4 vs Alt 1)
			LOS	Delay (s) ²	Within LOS Standard?	LOS	Delay (s)	Within LOS Standard?	
WSDOT Intersections									
SR 305 & Olhava Way NW/SR 3 SB off-ramp	Signal	D	C	27.9	Yes	C	29.8	Yes	1.9
SR 3 NB on-ramp & SR 305	Signal	D	D	52.2	Yes	E	54.4	No	2.2
SR 305 & Viking Way NW	Signal	D	C	32.0	Yes	C	34.1	Yes	2.1
SR 305 & Bond Road NE/SR 307	Signal	D	F	95.4	No	F	99.9	No	4.5
SR 305 & Forest Rock Lane NE	Signal	D	F	115.7	No	F	130.6	No	14.9
SR 305 & NE Liberty Road	Signal	D	E	74.5	No	E	76.0	No	1.5
SR 305 & NE Lincoln Road	Signal	D	D	49.8	Yes	D	49.9	Yes	0.1
SR 305 & NE Hostmark Street	Signal	D	D	49.9	Yes	D	50.7	Yes	0.8
SR 307 & Big Valley Road	OWSC	D	F	>300	No	F	>300	No	0.0
SR 3 NB Off-Ramp & NW Finn Hill Road	Signal	D	B	18.0	Yes	C	26.9	Yes	8.9
SR 3 SB On-Ramp & NW Finn Hill Road	Free	D	A	-	Yes	A	-	Yes	0.0
City Intersections									
Viking Way NW & Vetter Road NW	OWSC	E	B	10.5	Yes	B	10.5	Yes	0.0
NW Finn Hill Road & Olhava Way NW	Signal	E	B	16.0	Yes	B	17.6	Yes	1.6
Viking Avenue NW & NW Finn Hill Road	Signal	F	E	58.5	Yes	E	60.0	Yes	1.5
Bond Road NE & NW Lindvig Way	Signal	E	C	31.0	Yes	C	31.8	Yes	0.8
Viking Avenue NW & NW Edvard Street	Signal	E	A	8.3	Yes	A	8.4	Yes	0.1
Little Valley Road NE/10th Ave NE & Forest Rock Lane NE	TWSC ²	F	F	>300	Yes	F	>300	Yes	0.0
7th Avenue NE & NE Liberty Road	AWSC	F	F	104.0	Yes	F	126.3	Yes	22.3
10th Avenue NE & NE Liberty Road	AWSC	E	B	14.4	Yes	C	18.6	Yes	4.2
7th Avenue NE & 8th Avenue NE	AWSC	E	B	13.1	Yes	B	13.9	Yes	0.8
Front Street NE & NE Sunset Street	AWSC	E	C	19.1	Yes	C	19.9	Yes	0.8
3rd Avenue NE & NE Iverson Street	AWSC	E	B	12.2	Yes	B	12.5	Yes	0.3
3rd Avenue NE/Fjord Drive NE & NE Hostmark Street	AWSC	F	B	12.2	Yes	B	12.5	Yes	0.3
NE Lincoln Road & NE Hostmark Street	OWSC	E	B	11.3	Yes	A	11.4	Yes	0.1
6th Avenue NE & NE Hostmark Street	OWSC	E	C	17.3	Yes	C	20.0	Yes	2.7
6th Avenue NE & Fjord Drive NE	AWSC	E	A	8.2	Yes	A	8.1	Yes	-0.1
Caldart Avenue NE & NE Lincoln Road	Signal	E	C	20.9	Yes	C	20.9	Yes	0.0
Maranatha Lane NE & NE Lincoln Road	OWSC	E	C	16.4	Yes	C	17.5	Yes	1.1
Langaunet Ln NE & Noll Road NE/NE Mesford Street	AWSC	E	A	7.9	Yes	A	8.8	Yes	0.9
Noll Road NE & NE Hostmark Street/NE Redford Street	AWSC	E	A	8.5	Yes	A	9.6	Yes	1.1
Caldart Avenue NE & NE Hostmark Street	AWSC	E	B	11.4	Yes	B	11.4	Yes	0.0
Noll Road NE & SR 305	OWSC	E	F	56.4	Yes	F	55.7	Yes	-0.7
Caldart Avenue and Mesford Road	AWSC	E	A	9.8	Yes	A	9.9	Yes	0.1
NW Finn Hill and Rhododendron Ln	TWSC	E	B	11.9	Yes	B	12.0	Yes	0.1
NW Finn Hill and Urdahl Rd NW	TWSC	E	C	15.2	Yes	C	15.4	Yes	0.2
Viking Way NW and NW Stendahl Court Extension	TWSC	E	B	12.0	Yes	B	12.0	Yes	0.0
Front Street and Torval Canyon Road	TWSC	F	C	18.6	Yes	C	18.8	Yes	0.2
Front Street and Jensen Way	TWSC	F	F	79.9	Yes	F	84.8	Yes	4.9
Viking Avenue and Sherman Hill Road	TWSC	E	F	113.9	Yes	F	119.5	Yes	5.6
NW Finn Hill and NW Rude Rd	TWSC	E	B	11.3	Yes	B	11.3	Yes	0.0
NW Finn Hill and Rasmussen Court	TWSC	E	C	15.6	Yes	C	19.4	Yes	3.8
Lincoln Rd and Pugh Rd NE	TWSC	E	B	11.9	Yes	C	19.2	Yes	7.3
Viking Avenue & New Road M	TWSC	E	E	36.4	Yes	E	41.9	Yes	5.5

As illustrated in Table 2, results of the alternatives analysis show that LOS in the 2044 PM peak hour at city intersections are forecasted to be similar between the two modeled growth alternatives. Therefore, to be conservative, the traffic forecasts developed for Alternative 4 were used to develop the framework for the recommended transportation network for the Transportation Functional Plan.

While delays are forecasted to increase at some intersections over existing conditions, all City owned intersections are forecasted to perform at or better than the adopted LOS standard in the year 2044. Therefore, no intersection or roadway capacity projects are required for the short or long-term project list for the Transportation Functional Plan Update.

The City of Poulsbo is served by SR 305 and SR 307. SR 305 and SR 307 are both classified as HSS. Per the WSDOT Highway System Plan, the LOS standards for HSS facilities are set forth by State law. State law sets LOS D for HSS facilities in urban areas. Since SR 305 and SR 307 are located within the Poulsbo urban area, the LOS D standard applies.

The forecasted 2044 LOS along SR 305 in Poulsbo does not meet WSDOT's current LOS standard of D at several locations, however some of the intersections do meet the City's concurrency standards of LOS E for Major Arterials. As shown in Table 2, the following WSDOT owned intersections currently operate below LOS standards:

- SR 3 northbound on-ramp/SR 305 – LOS E
- SR 305/Bond Road NE/SR 307 – LOS F.
- SR 305/Forest Rock Lane NE – LOS F.
- SR 305/NE Liberty Road – LOS E.
- SR 307/Big Valley Road – LOS F.

The City notes that WSDOT considers exceeding LOS D to be an operational deficiency and will work with WSDOT as it addresses LOS conditions along SR 305.

Conclusion

In conclusion, this memorandum provides a comprehensive overview of the traffic forecasting and analysis conducted to support the Environmental Impact Statement (EIS) alternatives for Poulsbo's Comprehensive Plan Update. The analysis evaluates the transportation impacts of four growth alternatives, ranging from maintaining current land use designations (Alternative 1) to focusing growth within the SR 305 corridor and increasing residential densities (Alternative 4).

The City's travel demand model was updated to integrate local and regional growth projections were to forecast traffic volumes and assess intersection operations under future conditions. While some intersections and state highways are projected to operate below adopted standards, all City-owned intersections are expected to meet or exceed Poulsbo's concurrency requirements by 2044, with no additional capacity projects needed. Additionally, the results of the alternatives analysis show that LOS in the 2044 PM peak hour at city intersections are forecasted to be similar between the two modeled growth alternatives. Therefore, to be conservative, the traffic forecasts developed for Alternative 4 were used to develop the framework for the recommended transportation network for the Transportation Functional Plan.