SR 162
Sumner to Orting Congestion Study Report

SR 162 MP 0.00 to MP 8.11

June 2017

Olympic Region Planning
P. O. Box 47440
Olympia, WA 98504-7440

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WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
OLYMPIC REGION
TUMWATER, WASHINGTON

SR 162 CORRIDOR CONGESTION STUDY

Project Limits:

SR 162 / SR 410 Interchange to Orting City Limits
MP 0.00 to 8.11

JUNE 2017

JOHN WYNANDS, P.E.
REGIONAL ADMINISTRATOR

DENNIS ENGEL, P.E.
OLYMPIC REGION PLANNING MANAGER

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WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
OLYMPIC REGION

SR 162 CORRIDOR CONGESTION STUDY

**Study Limits: SR 162 / SR 410 Interchange to Williams Blvd.
Milepost 0.00 to Orting City Limits, Milepost 8.11**

Approved by:

John Wynands
WSDOT Olympic Region Administrator

7/5/17
Date

Concurrence:

Kerri Woehler
Director, Multimodal Planning

6-27-2017
Date

Concurrence:

Scott Zeller
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6-28-17
Date

Concurrence:

Jay Alexander
Director, Capital Program Development & Management

7.5.17
Date

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APPENDICES

Participation Agencies and Individuals

The following individuals participated in the creation of the SR 162 Corridor Congestion Study as Study Stakeholder Committee members (Stakeholder representative of their jurisdictions) and study staff.

Pierce County Planning & Land Services
Rory Grindley, County Traffic Engineer
Jessie Hamashima, Transportation Planning Manager
Gary Hendricks, Senior Planner

City of Bonney Lake
Jason Sullivan, Planning & Building Supervisor

City of Sumner
Eric Mendenhall, Senior Planner

City of Orting
Mark Bethune, City Manager

Muckleshoot Indian Tribe
Dezerae Hayes, Director of Transportation

Nisqually Indian Tribe
Heidi Thomas, Transportation Planner

Puyallup Tribe of Indians
Andrew Strobel, Transportation Planner

Squaxin Island Tribe
Teresa Wright, Public Works/Facilities Engineer

Confederated Tribes and Bands of the Yakama Nation
Alvin Pinkham, Engineering Planner

Pierce Transit
Jason Kennedy, Planner Analyst

Sound Transit
Eric Chipps, Office of Planning & Development

Puget Sound Regional Council
Sean Ardussi, Senior Planner

Tehaleh/Newland Development
Scott Jones, Senior Vice President
Tom Uren, Senior Project Manager

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TDGMO Transportation Data & GIS Modeling Office
Natarajan (Jana) Janthanan, Traffic & Tolling Manager
Ming-Bang Shyu, Modeling & Analysis Planner

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Scott Zeller, Assistant State Design Engineer
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Olympic Region, Traffic Operations
Joseph Perez, Traffic Design Engineer

Olympic Region, Transportation Planning
Dennis Engel, P.E. Planning Manager
Nazmul Alam, Principal Senior Planner
T.J. Nedrow, Study Lead

Support Staff
Forest Sutmiller, Senior Planner
Yvette Liufau, Senior Planner
Debbie Clemen, Senior Planner

EXECUTIVE SUMMARY

Background and Context

Located in the heart of the Orting-Sumner Valley, the area offers a unique character and experience with scenic views of Mt. Rainier and surrounding farmlands. The long standing community vision of the area focuses on continuing efforts to preserve the essence and character of the Orting-Sumner Valley.

However, with recent growth in the area and future planned development, travelers along the State Route (SR) 162 corridor (Figure 1) experience congestion and delay during morning and evening peak periods. This corridor is one of the top priority corridors for area community members and leaders.

The Corridor:

- A Highway of Statewide Significance
- A substantial commuter route
- Categorized as a T-2 Freight & Goods classification with 8.3% (2015) daily truck volumes
- Annual Average Daily Traffic volumes are 21,000 (2014)

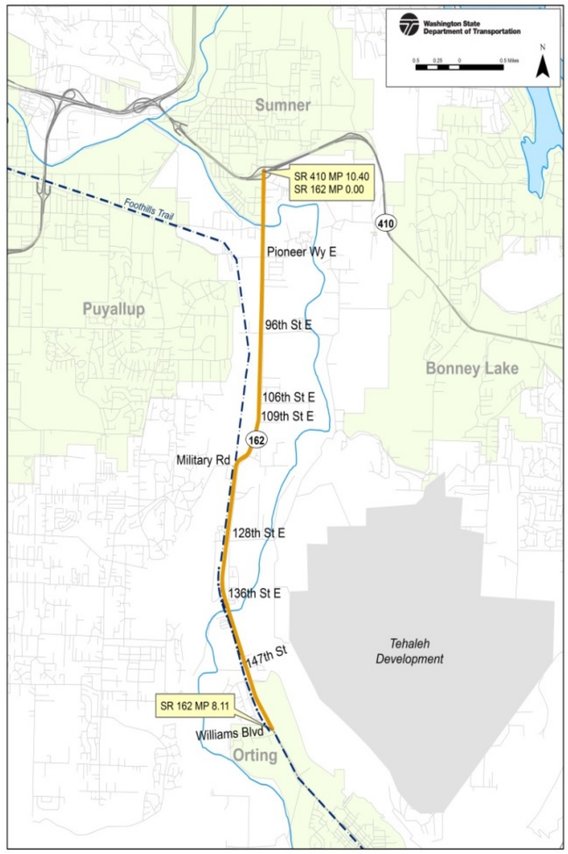


Figure 1: SR 162 Study Corridor

In 2015, the Washington State Department of Transportation (WSDOT) undertook this study as a result of the Connecting Washington Transportation funding. (L2000107 Study congestion on SR 162 and make recommendations for improvements) No design or construction funds are identified beyond this study phase.

Study Purpose & Need

The purpose of the Study is to identify ranked strategies that increase mobility by reducing delay for all users of the corridor, while maintaining or improving the safe operation of the highway.

The need exists to address current and future congestion in the corridor and at signalized intersections, most pronounced during the peak commute periods, imposing delays and inconvenience for motorized travelers that creates challenges and may have a significant impact on reliability and mobility at certain times of the day.

How was this study conducted?

The SR 162 corridor study effort developed strategies that take into account WSDOT's new Practical Solutions approach.

Study Constraints/Assumptions

These Study constraints and assumptions were agreed upon at the July 2016 Stakeholders meeting.

- The Study effort shall focus on the SR 162 corridor
- The Study will rely on a Practical Solutions approach to arrive at strategies
- The strategies shall be ranked
- The Pierce County Model will be used for the modeling effort

Community Engagement and Public Outreach

WSDOT worked with a Study stakeholder group (Figure 2) comprised of area agencies, elected officials, local planning and transportation staff and other stakeholders to ensure ranked strategies are identified to address performance gaps in the corridor.

In collaboration with stakeholders, the Study Goal and Corridor Vision were developed:

Study Goal

The Study will identify ranked strategies that address corridor improvements which result in improved travel time, predictability, and the safe operation of the SR 162 corridor from Sumner to Orting.

SR 162 Corridor Vision

Actively preserve the essence and character of the Orting-Sumner Valley while managing corridor performance that supports the local communities and the traveling public.

An online public survey was conducted to gather input on corridor performance, expectations and ideas to ease congestion and improve highway operations. A total of 2,214 respondents participated in the survey providing valuable public input.

Transportation and service agencies such as school districts, law enforcement and fire/rescue agencies were contacted to ascertain their concerns with the highway corridor.

Five stakeholder committee meetings were held in the Orting-Sumner Valley spanning from June 30, 2016 to November 9, 2016.

Study Stakeholders

- Pierce County
- City of Bonney Lake
- City of Summer
- City of Orting
- Muckleshoot Indian Tribe
- Nisqually Indian Tribe
- Puyallup Tribe of Indians
- Squaxin Island Tribe
- Confederated Tribes and Bands of the Yakama Nation
- Pierce Transit
- Sound Transit
- Puget Sound Regional Council
- Tehaleh/Newland Development
- WSDOT

Figure 2

Two public open houses were conducted; one in Sumner on November 15, 2016 and the second in Orting on November 16, 2016.

Data collection, modeling and analysis

The study team collected traffic data in spring 2016 and used the data to calibrate a base year travel demand model and to perform existing traffic conditions analysis. They performed future travel demand forecasts and future conditions analyses along with evaluating alternative strategy scenarios. The study team performed a review of right of way needs to ascertain impacts and to estimate planning level costs.

Strategy development

Study stakeholders, survey respondents and others identified 46 original ideas for improvements to SR 162 operations. Following a workshop presentation, nine ideas were eliminated as they:

- Failed to meet the study purpose, need, vision and goal
- Were not viable with existing technology or practice (utilize District School Bus associated with fixed commuter travel)
- Were not practical or applicable (Utilize park and ride lot for commercial event parking, changes to state policy on transit benefit districts)

The remaining 37 ideas were presented to the stakeholders. Similar ideas were combined, such as park and ride, park and pool, vanpool and others listed under Transportation Demand Management (TDM). The combined ideas were then advanced to the Stakeholder screening process. The remaining landed in the following seven categories:

1) Transportation Demand Management
2) Public Transportation
3) Channelization
4) Highway Access Management
5) Intersection Improvements
6) Signals
7) Capacity Improvements

Further development of ideas into strategies narrowed the categories to five:

1) Transportation Demand Management
2) Operations (Improvements)/Intelligent Transportation Systems/Incident Management
3) Public Transportation Services
4) Park and Ride, Bicycle & pedestrian Facilities Improvements, Minor Access Management Measures
5) Intersection Control/Corridor Improvements

Strategies were divided into Short-Term (2020), Mid-Term (2025), and Long-Term (2035). Stakeholders stressed that the following be considered in evaluating the strategies:

- A community-based approach that relies on collaboration, commuter information and incentives to influence travel patterns and commuter choices

- Employing effective tools and techniques of TDM
- The aspects of sustainable and economical values
- Realistic capital investments

The WSDOT Practical Solutions approach was used in this performance-based and data-driven study process for transportation decision-making. The study team, with concurrence from study stakeholders, used the latest tools and appropriate performance measures to support and identify low-cost strategies to address performance issues in the highway corridor. This was accomplished recognizing the value of TDM, transit and rail to reduce travel demand and to reduce or delay the need for building costly new infrastructure expansion.

The Practical Solutions approach encourages system performance management through cost-effective operational improvements first, second is demand management opportunities, and the third, after exhausting other options is capacity expansion. Community input, policy change and local network improvements were also considered before capacity investments strategies.

Study Outcomes

Below are some study findings:

- The area is extremely diverse with single-family residential parcels, commercial, large agricultural tracts with seasonal event offerings and recreation opportunities prevalent in the valley and adjacent bluffs.
- Significant large-scale residential developments are a concern for the residents as raised in the online survey and open houses.
- Public transportation options are essentially nonexistent with no service offerings on the corridor by Pierce Transit or Sound Transit.
- The Pierce County Foothill Trail carries the bulk of the area bicycle traffic. However, bicyclists continue to rely on SR 162 for their travels as well.
- The existing highway corridor width is insufficient for capacity expansions without property acquisitions. Intersection improvements are likely to require additional property acquisition as well.
- Consideration of Compact, single lane, and modified single lane roundabouts along the existing two lane facility would reduce or eliminate property acquisitions, improve mobility efficiency, provide secondary safety benefits and delay the need for a multi-lane facility.

- Highway Capacity Improvements:
  - Capital investments alone will not eliminate future anticipated congestion.
  - Significant highway widening improvements shall require additional right of way. Some homes, farmland, businesses, utilities and highway access would be impacted.
  - No one transportation-related strategy will solve the congestion on the corridor.

- An aggressive multi-faceted, multi-partner strategy approach will be required to achieve improvements in travel predictability, and capacity demands along the highway corridor.

At the fifth and final stakeholder meeting held on November 9, 2016, stakeholders agreed on the five strategies below:

1. **Transportation Demand Management (measures)**
   TDM: TDM strategies are aimed at travel behavior rather than expanding the transportation network to meet travel demand. Such strategies may include;
   - The promotion of work hour changes
   - Rideshare options (carpool, vanpool, etc.)
   - Worksite parking policies
   - Telecommuting

2. **Operations (Improvements)/Intelligent Transportation Systems/Incident Management (elements)**
   Ops: Operations include such elements as:
   - Active Traffic Management
   - Traffic signal timing/optimization
   - Signal interconnect actions

   ITS: Intelligent Transportation Systems improve transportation safety and mobility through the use of advanced wireline and wireless communications technologies. ITS strategies proposed include:
   - Electronic traveler information
   - Highway Advisory Radio (HAR)
   - Road & weather information systems

   The SR 162 corridor is not presently included in WSDOT's ITS Plan.

   Incident Management: WSDOT Incident Response resources clear traffic incidents safely and quickly, minimizing congestion and the risk of secondary incidents. Strategies include:
   - Multiple shoulder pullout areas
   - Incident response resources during peak travel times

3. **Public Transportation Services:** Strategies include multiple elements of transit and rail service.

4. **Park and Ride lots (PnR), Bicycle & Pedestrian Facility Improvements, Minor Access Management measures:**
   - **Public park and ride facilities** are envisioned to be in the form of small-to-medium-sized lots both publicly and privately-owned, which may or may not be served by transit.
   - **Bicycle & pedestrian Improvements:** Strategies include:

    - Shoulder widening
    - Improved accessibility and mobility
- **Minor Access Management:** Includes improved delineation of highway access to SR 162.

5. **Intersection Control/Corridor Improvements:**
    - **Intersection Channelization:** A strategy employed that increases mobility and capacity at highway intersections with;
        - Turn lanes
        - Striping
    - **Roundabouts:** Modern roundabouts create continuous, one-way traffic flow, reduce crashes and cost less to maintain than traditional signalized intersections. Converting signalized intersections in a suburban environment into single lane roundabouts may reduce fatal and all injury crashes.
    - **Corridor Segment Widening:** Capital investments that significantly widen the existing roadway.

Short description of the 5 strategies and their definitions are provided in Table 1 below:

	SHORT DESCRIPTION OF STRATEGY	DEFINITIONS / STRATEGIES
STRATEGIES	TDM (Assume 3% volume reduction similar to Mid-Term 2025 Mobility Results)	TDM: (Transportation Demand Management) TDM Strategies are aimed at changing travel behavior rather than expanding the transportation network to meet travel demand. Such strategies may include the promotion of work hour changes, rideshare options, parking policies, and telecommuting.
	Ops / ITS / Incident Management	Ops: Operations include such elements as traffic signal timing/optimization and interconnect actions. ITS: Intelligent Transportation Systems improve transportation safety and mobility through the use of advanced wireline and wireless communications technologies. ITS strategies proposed include electronic traveler information, Highway Advisory Radio, and road & weather information systems. Incident Management: WSDOT Incident Response resources clear traffic incidents safely and quickly, minimizing congestion and risk of secondary incidents. Strategies include multiple shoulder pullout areas and incident response resources during peak travel times.
	Public Transportation Services (2020 Pilot*)	Public Transportation Services: Strategies included multiple elements of transit service and rail service.
	PnR Facilities, Bike & Ped Improvements, Minor Access Management measures	PnR Facilities: Public park and ride facilities are envisioned to be in the form of small to medium size lots, both public and privately owned which may or may not be served by transit. Bicycle & Pedestrian Improvements: Strategies include shoulder widening and improved accessibility. Minor Access Management: Includes improved delineation of highway access to SR 162.
	Intersection Control / Corridor Improvements	Intersection Channelization: A strategy employed that increases mobility and capacity at highway intersections with turn lanes and striping. Roundabouts: Modern Roundabouts create continuous, one-way traffic flow, reduce collisions by 37%, and cost less to maintain than traditional intersections. Corridor Segment Widening: Capital improvements that create significant widening of the existing roadway.

Table 1: Strategy Definitions

The final ranked strategies are summarized in the Table 2 below by Short-, Mid-and Long-Term:

SR 162 Corridor Congestion Study Ranked Strategy Summary

Ranked Strategies in desending order

	SHORT DESCRIPTION OF STRATEGY	Strategy	SHORT-TERM 2020	MID-TERM 2025	LONG-TERM 2035
			RANK	RANK	RANK
STRATEGIES	Transportation Demand Management (Assume 3% volume reduction similar to Mid-Term 2025 Mobility Results)	A	1	1	1
	Operations/Intelligent Transportation Systems/Incident Management Measures	B	4	2	3
	Public Transportation Services (*2020 Pilot)	C	3*	5	4
	Park & Ride Facilities, Bike & Pedestrian Improvements. Minor Access Management measures	D	5	4	2
	Intersection Control/ Corridor Improvements	E	2	3	5

Table 2: Ranked Strategies

Note: Under Strategy E; Intersection Control/Corridor Improvements were identified in the Short-term as an opportunity to be considered in conjunction with the actions of Strategies A – D.

Table 3 below shows scores by criteria and by phasing (Short-, Mid-, and Long-Term).

11/9/2016

SHORT-TERM (2020)

	SHORT DESCRIPTION OF STRATEGY	Strategy	Phasing	Cost Range ①	Mobility Improvements	Partnerships ②	TOTAL
	WEIGHT		1.00	1.00	1.50	0.50	Avg.
STRATEGIES	TDM (Assume 3% volume reduction similar to Mid-Term 2025 Mobility Results)	A	25	25	20	13	83
	Ops/ITS/Incident Management	B	25	24	10	2	62
	Public Transportation Services (2020 Pilot)	C	25	24	5	13	66
	PnR Facilities, Bike & Ped Improvements. Minor Access Management measures	D	25	25	3	8	61
	Intersection Control/ Corridor Improvements	E	25	18	23	5	71

MID-TERM (2025)

	SHORT DESCRIPTION OF STRATEGY	Strategy	Phasing	Cost Range ①	Mobility Improvements	Partnerships ②	TOTAL
	WEIGHT		1.00	1.00	1.50	0.50	Avg.
STRATEGIES	TDM (Assume 3% volume reduction similar to Mid-Term 2025 Mobility Results)	A	15	25	20	13	73
	Ops/ITS/Incident Management	B	15	23	15	4	57
	Public Transportation Services (2020 Pilot)	C	15	13	5	8	40
	PnR Facilities, Bike & Ped Improvements. Minor Access Management measures	D	15	21	4	4	44
	Intersection Control/ Corridor Improvements	E	15	13	22	1	50

LONG-TERM (2035)

	SHORT DESCRIPTION OF STRATEGY	Strategy	Phasing	Cost Range ①	Mobility Improvements	Partnerships ②	TOTAL
	WEIGHT		1.00	1.00	1.50	0.50	Avg.
STRATEGIES	TDM (Assume 3% volume reduction similar to Mid-Term 2025 Mobility Results)	A	1	25	23	13	61
	Ops/ITS/Incident Management	B	1	25	14	1	40
	Public Transportation Services (2020 Pilot)	C	1	8	12	8	29
	PnR Facilities, Bike & Ped Improvements. Minor Access Management measures	D	1	25	8	8	41
	Intersection Control/ Corridor Improvements	E	1	5	21	1	28

Table 3: Strategy Scoring

Next Steps?

With the completion of this planning study, the strategies identified will assist WSDOT and others to make decisions on improving highway efficiencies and reducing congestion on SR 162.

WSDOT will work with stakeholders and partners to implement low-cost strategies such as Transportation Demand Management which includes vanpools and carpools in the Short-Term. WSDOT will continue to work with interested partners on the strategies considered pertinent and viable over the Short-, Mid- and Long-Term operation of the highway corridor.

The strategies for Short-, Mid- and Long-Term will be incorporated in the Corridor Sketch Phase II for the SR 162 corridor. These strategies then will be prioritized on a statewide basis for future implementation. Due to limited state funding, the recommendations in this study will need to compete for funding with other proposed improvements around the state based on performance outcome.

Funding will also need to be identified to advance potential solutions into the design, right of way, and construction phases. Other funding sources could be developer contributions, or create a local improvement district.

Chapter 1

Background and Content

What is the SR 162 Corridor Study?

The State Route (SR) 162 Corridor Study is a planning level effort from Sumner to Orting (Figure 3) that assesses current and future conditions along the corridor and then develops improvement strategies to address those conditions. Conditions studied include mobility, growth, maintenance, operations, safety and the environment. The study process included developing a corridor vision, gathering input from local officials and the public regarding traffic conditions they see affecting the corridor, reviewing existing regional and local comprehensive plans for planned population, and employment growth and funded transportation improvements.

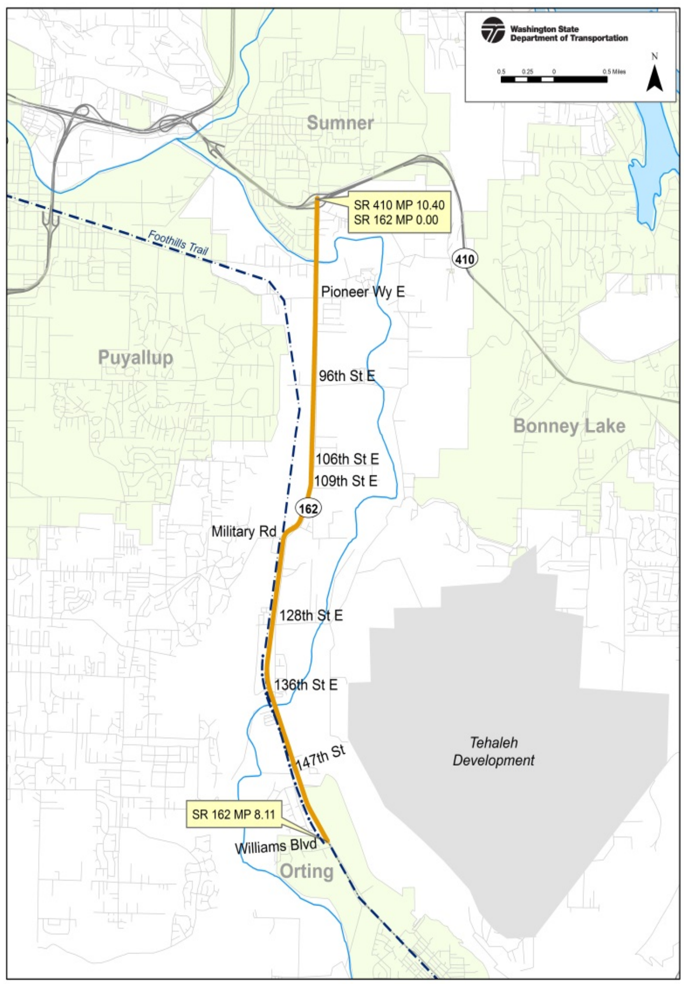


Figure 3: SR 162 Study Corridor

Washington State Department of Transportation (WSDOT) performed the study as a result of 2015 legislation by way of the Connecting Washington Transportation funding package (2ESSB 5988 PL). A State appropriation in the amount of $450,000 of the motor vehicle account was assigned solely for SR 162 Congestion Study (L2000107) to make recommendation for improvements. No design or construction funds were identified at the time of the study.

The study strategies recommended are intended to address highway congestion which result in improved travel predictability and operations of the SR 162 Corridor from Sumner to Orting. (Mile Post ((MP)) 0.00 to MP 8.11, ARM 0.00 to 5.73)

What are the Issues?

The SR 162 corridor, over the years, has become a corridor full of transportation challenges and what some have noted as unmet needs. Growth and future planned development in the area has travelers along the State Route (SR) 162 corridor experiencing congestion and delay during morning and evening peak periods. The congestion of this corridor does have a significant impact on reliability and mobility at certain times of the day. This corridor segment is one of the top priority corridors for area community members and leaders. There are three segments from SR 410 to the City of Orting where speeds operate below 70% of the posted speed limit in during the PM peak period in a southbound direction, in 2015.

- South of the SR 410 Eastbound Ramps and Rivergrove Dr. E.
- South of Pioneer Way E. and 87th St. Ct. E.
- North of 115th St. E. and Military Rd. E.

The study purpose and need statements crafted and approved by the Stakeholder Committee succinctly brought issues to the forefront:

- The purpose of the study is to identify ranked strategies that increase mobility by reducing delay for all users of the corridor, while maintaining or improving the safe operation of the highway.
- The need exists to address current and future congestion in the corridor and at signalized intersections, most pronounced during the peak commute periods, imposing delays and inconvenience for motorized travelers that creates challenges, and may have a significant impact on reliability and mobility at certain times of day.

The corridor currently does not have an active TDM (Transportation Demand Management) element in place. Local – Regional transit service is not available on the SR 162 corridor. Official park and ride lots are not available along the corridor.

Mt. Rainier sits at the head of the Orting Valley, placing the valley at greater risk should a volcanic event result in a lahar flow down the valley floor. The current infrastructure and highway capacity is deemed deficient for a regionally impacting catastrophic event.

Chapter 2

How was the Study Conducted?

The SR 162 corridor study effort developed strategies that take into account WSDOT's new Practical Solutions approach.

The study began in June of 2016 with the first of five stakeholder meetings concluding November 2016. The study sought to identify strategies that would address corridor needs for the next 20 years. This document summarizes the planning phase of the process and describes how this recommendation was developed.

The study effort employed a Practical Solutions approach. Practical Solutions is a performance-based approach to transportation decision-making. This data-driven approach uses the latest tools and performance measures to seek lower cost efficiencies in operating highways, ferries, transit and rail, reduce travel demand to save money and reduce the need for building costly new infrastructure expansion.

Study Stakeholders

- Pierce County
- City of Bonney Lake
- City of Summer
- City of Orting
- Muckleshoot Indian Tribe
- Nisqually Indian Tribe
- Puyallup Tribe of Indians
- Squaxin Island Tribe
- Confederated Tribes and Bands of the Yakama Nation
- Pierce Transit
- Sound Transit
- Puget Sound Regional Council
- Tehaleh/Newland Development
- WSDOT

Figure 4

Planning Phase

In the planning phase, the study team met with stakeholders (Figure 4) to identify current issues and concerns with the intersection and corridor. Additional interviews were conducted with special interest groups, i.e., non-motorized/bicycle pedestrian groups, public safety agencies and school districts.

WSDOT participation included staff representing WSDOT Olympic Region Planning and Traffic offices, WSDOT Transportation Data & GIS and Modeling Office (TDGMO), Traffic, Design, and HQ Multimodal Planning. Work was performed by WSDOT Olympic Region Planning staff, with significant assistance from the TDGMO staff. The Study team also collected traffic data and five years of history on crashes in the corridor, and studied day-to-day road use. The team developed options to improve traffic flow and analyzed those options by using computer models to simulate traffic conditions during various times of the day. Through these techniques, staff identified and developed the options that were then translated into strategies.

Decision Making Process

The Study decision making process relied on the Department's Practical Solutions approach to recommending strategies in a cost-effective manner.

The Practical Solutions framework identifies that WSDOT consider and implement transportation demand management, operational improvements before capital improvements. Such strategies consider timelines for implementation, community context, nature of the current conditions and system performance.

The WSDOT Practical Solutions framework is shown below in Figure 5 depicts where the SR 162 Study lies in the overall progression leading to an eventual implemented solution(s). In the planning phases, studies succinctly identify agreed-upon needs and strategies that assist WSDOT and others to make decisions on improving highway efficiencies and reducing congestion on SR 162.

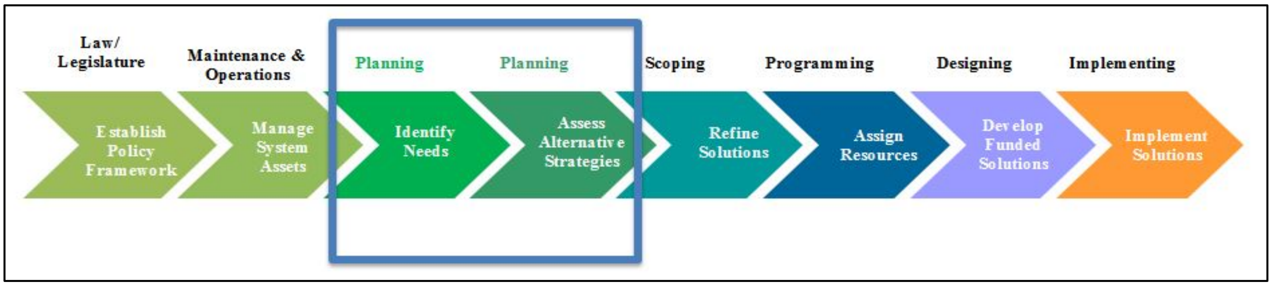


Figure 5: WSDOT Practical Solutions Framework

Guiding Documents

With the assistance of the Stakeholder Committee the Study effort was guided by critical documents approved at the initial Stakeholder meeting. The full context of SR 162 Study Purpose & Need, Goal, and Corridor Vision are found in Appendix A (Study Management Plan/Charter/Communications Plan).

Community Engagement

Public Outreach

The study effort was aided with a formal communications plan (Appendix A), spelling out initial actions for internal stakeholders and the public at-large.

A public outreach process was conducted that informed, identified and responded to jurisdiction and community concerns along the corridor. The outreach process involved three distinct efforts: stakeholder meetings, online survey and public informational open houses.

Stakeholder Meetings

Over the course of the Study, five stakeholder meetings were held between June 30 and November 9, 2016. See Appendix E for summaries of the stakeholder meetings. In addition to these meetings, briefings were made to the Cities of Sumner, Orting and Bonney Lake City Councils, along with an elected official's briefing. Stakeholders invited/participated included: representatives from Pierce County, Cities of Sumner, Orting and Bonney Lake, Pierce Transit, Sound Transit, Muckleshoot, Puyallup, Nisqually, Squaxin Island and Yakama Tribes, Puget Sound Regional Council, and the Tehaleh/Newland development group and WSDOT.

Stakeholders assisted in the development of goals and objectives, a Needs Statement, an online survey, brainstorming of ideas for reducing congestion, modeling of the results and screening and ranking of final strategies. The stakeholders were kept informed on the progress of all of the study work such as the public outreach and elected briefings.

At the last stakeholder meeting, the final strategies were determined using a ranking methodology approved by the committee.

Online Survey

It was decided that for this Study an online survey would be employed to gather feedback from the community. With the assistance of the WSDOT Olympic Region Communications team, a 24-question survey was developed in both English and Spanish, see Appendix D (Study Information Gathering/Online Survey).

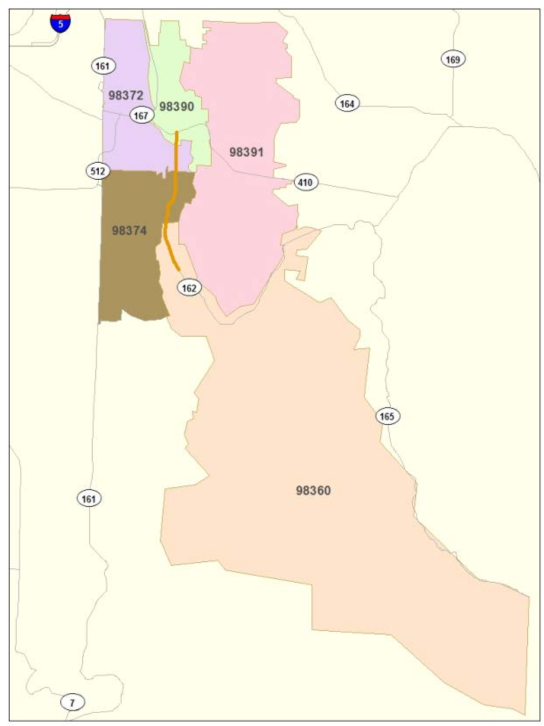


Figure 6: Survey Area

Questions were asked about how often, when, and what mode people use to travel on the corridor, and about their travel times. The survey also asked what changes they would like to see over the next 10 years.

Initially the online survey announcement was sent to two established e-mail lists; one developed for a recent SR 162 Puyallup River Bridge replacement project (MP 6.81) and the other from stakeholders and interested people and groups concerning the study, i.e., Tacoma Washington Bicycle Club, and Foothills Rails-to-Trails Coalition. Many stakeholders also included links to the online survey on their websites. Over 11,000 post cards were sent to target area zip code mailboxes. See Survey Area Figure 6.
Links to the survey were placed on social media outlets Facebook and Twitter.

After a little over two weeks of the survey period, 2,214 responses were received, including two completed in Spanish.

Appendix D provides a detailed account of the 24 questions and responses. Survey questions 7, 8, 12, 19 and 23 solicited written responses which are not contained in this report.

Some of the results from the survey showed approximately 75% of the respondents drive alone and around 10% carpool.

Since there is currently no bus service in this area, there was a question that asked if there was service from Sumner to Orting would they use it; 40% responded yes.

Another question asked what highway changes would travelers like to see on SR 162?

- 60% of the responses expressed interest in widening the roadway by adding a turn lane or making it 4 lanes
- 9% of all the comments were concerned with traffic signals along the corridor; 52% of those wanted better timing or synchronizing
- 15% said less signals, with 18% saying more signals
- 5% of all comments suggested alternate routes
- 4% commented on speed; most saying drivers drive too slow
- 3% of the suggestions want transit or rail along the corridor

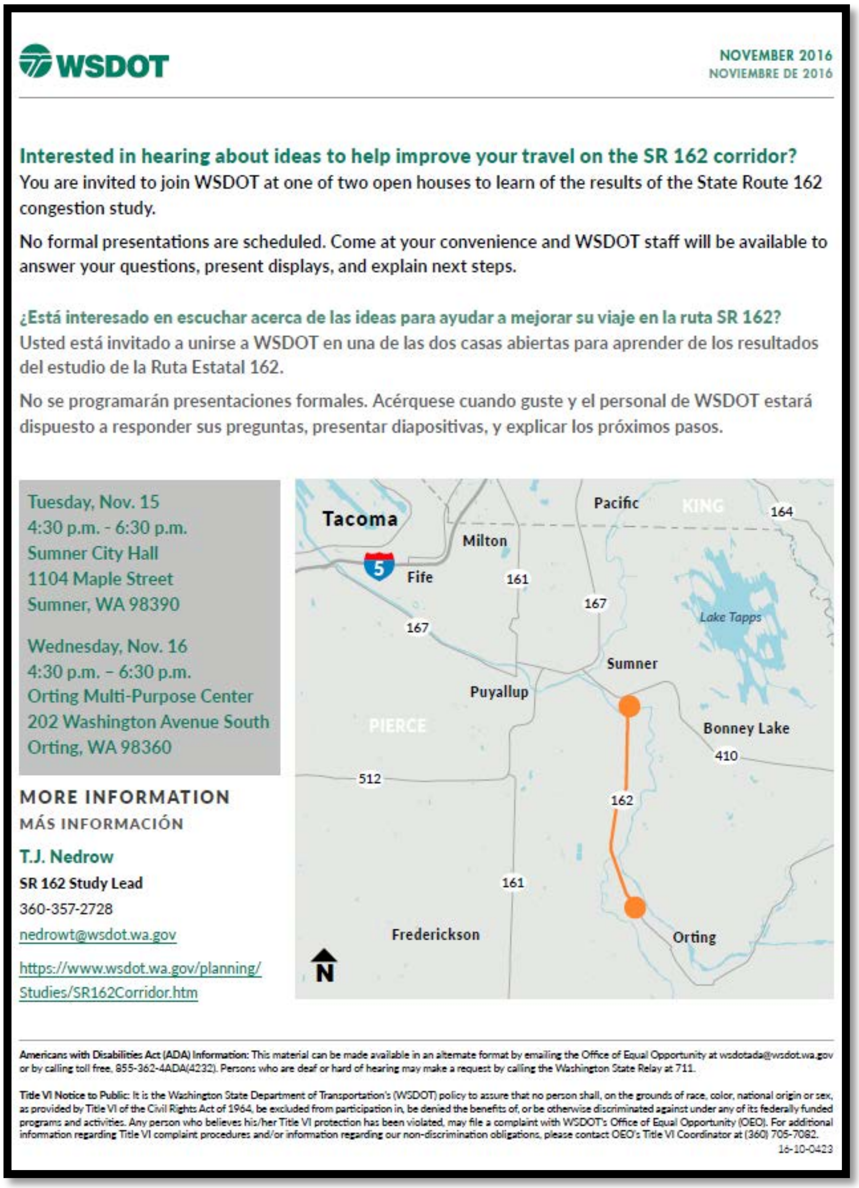
There were other areas of suggestions; however, they had smaller percentages.

- Passing lanes needed
- Add bike lanes, increase access to the Foothills Trail
- Identify a completely new SR 162 alignment
- Construct alternative roads
- School bus turnouts

Survey results were reviewed with the Stakeholder committee. Comments with the higher percentages were included along with the brainstormed ideas from the stakeholders and then moved forward to the screening and ranking process.

Open Houses

On November 15, 2016 the first of two open houses was held in Sumner. On November 16th, the second one was held in Orting. A total of 17 people attended the open house in Sumner and 20 in Orting.



WSDOT

NOVEMBER 2016
NOVIEMBRE DE 2016

Interested in hearing about ideas to help improve your travel on the SR 162 corridor?
You are invited to join WSDOT at one of two open houses to learn of the results of the State Route 162 congestion study.

No formal presentations are scheduled. Come at your convenience and WSDOT staff will be available to answer your questions, present displays, and explain next steps.

¿Está interesado en escuchar acerca de las ideas para ayudar a mejorar su viaje en la ruta SR 162?
Usted está invitado a unirse a WSDOT en una de las dos casas abiertas para aprender de los resultados del estudio de la Ruta Estatal 162.

No se programarán presentaciones formales. Acérquese cuando guste y el personal de WSDOT estará dispuesto a responder sus preguntas, presentar diapositivas, y explicar los próximos pasos.

Tuesday, Nov. 15
4:30 p.m. - 6:30 p.m.
Sumner City Hall
1104 Maple Street
Sumner, WA 98390

Wednesday, Nov. 16
4:30 p.m. – 6:30 p.m.
Orting Multi-Purpose Center
202 Washington Avenue South
Orting, WA 98360

MORE INFORMATION
MÁS INFORMACIÓN

T.J. Nedrow
SR 162 Study Lead
360-357-2728
nedrowt@wsdot.wa.gov
https://www.wsdot.wa.gov/planning/Studies/SR162Corridor.htm

Americans with Disabilities Act (ADA) Information: This material can be made available in an alternate format by emailing the Office of Equal Opportunity at wsdotada@wsdot.wa.gov or by calling toll free, 855-362-4ADA(4232). Persons who are deaf or hard of hearing may make a request by calling the Washington State Relay at 711.

Title VI Notice to Public: It is the Washington State Department of Transportation's (WSDOT) policy to assure that no person shall, on the grounds of race, color, national origin or sex, as provided by Title VI of the Civil Rights Act of 1964, be excluded from participation in, be denied the benefits of, or be otherwise discriminated against under any of its federally funded programs and activities. Any person who believes his/her Title VI protection has been violated, may file a complaint with WSDOT's Office of Equal Opportunity (OEO). For additional information regarding Title VI complaint procedures and/or information regarding our non-discrimination obligations, please contact OEO's Title VI Coordinator at (360) 705-7082.

16-10-0423

Informational boards were set up around the room showing the results of the online survey, traffic data and the strategies that were finalized. See Appendix G. (Idea Screening, Strategies, Definitions and Scoring Process)

WSDOT study staff was available to answer questions and explain any of the information that was being shared.

There were a small number of written comments received from the open houses.

Most of those comments were already captured in the survey responses.

In addition to sharing the online survey results at the two open houses, the same information was posted on the WSDOT SR 162 Sumner to Orting Study webpage. http://www.wsdot.wa.gov/planning/Studies/SR162Corridor.htm. Once posted, the Region Communications Office advised the public on social media, using both Facebook and Twitter.

Chapter 3

Route Characteristics

Existing Operating Conditions
SR 162 is a major collector arterial in the central Pierce County regional network of roads. The corridor is vital for connectivity of Orting to SR 410 and other major state routes such as SR 512, SR 167, SR 18 and I-5. The corridor is also a direct route to the Sumner Sound Transit rail station. The City of Sumner is struggling with street capacity with commuter travel to and from the Sound Transit rail station. In addition to the network of state highways, there are city and county roads in the region. Other local roadway connections and improvements to the existing local arterials are vital to provide travels choices in Pierce County, and offset the high demand for increased capacity on SR 162.

There are two general segments in the SR 162 Study Corridor

- City of Sumner MP 0.00 to 0.53
- Pierce County MP 0.53 to 8.11

State Functional Class
In the State Functional Class system, within the study corridor SR 162 is classified as an Urban Minor Arterial. SR 162 is typically a two-lane facility in level terrain with speeds ranging from a low of 35 to as high as 50 mph from its beginning to MP 6.83. From MP 6.83 to the end of SR 162, the route is classified as a Rural-Collector.

National Highway System Status
SR 162 is not included in the National Highway System.

Freight and Goods Transportation System Status
SR 162 (MP 0.00 to MP 9.54) is identified as a "T2" route in the Statewide Freight and Goods Transportation System (FGTS) records (2015), carrying 6.46 million in annual tonnage with 1,500 annual average daily truck volumes (8.3%).

Roads on the FGTS have designated classifications ranging from "T1" to "T5". Routes with a "T1" designation carry the most annual freight tonnage (over 10,000,000 tons) and "T5" routes carry the least annual tonnage (equivalent to up to 100,000 tons per year). While the FGTS is in essence a current inventory, the system is dynamic and periodic reviews and revisions will be needed. The forces of economic growth and change can bring about a need to add or delete routes or to change route tonnage classifications.

Scenic and Recreational Highway System Status
Presently SR 162 is not designated by WSDOT as one of Washington's Scenic and Recreational Highways.

Roadside Classification
SR 162 roadside classification in the study corridor (MP 0.00 to MP 8.11) is designated RURAL.

This class system refers to the roadside of the State route. The roadside encompasses the area between the roadway pavement edge and right-of-way boundaries. Roadside character is a description of the roadside landscape from the roadway user's perspective. It describes what one sees along the road as you travel it.

Intelligent Transportation System Highway Corridor
SR 162 is not currently a WSDOT ITS priority corridor and has no direct funding source.

ITS technologies lay the groundwork for Transportations Systems Management and Operations (TSM&O). TSM&O encompasses the day-to-day actions and WSDOT responses to the region's transportation system. TSM&O strategies provide money-saving, multimodal solutions that relieve congestion, optimize infrastructure investments, promote travel options and reduce greenhouse gas emissions.

Access Management Plan Classifications
The study corridor has the following access management classifications:

- MP 0.00 to MP 0.10 Full Control
- MP 0.10 to 3.21 – Class 3
- MP 3.21 to 7.17 – Class 2 (approved March 2003)
- MP 7-17 to MP 8.11 – Class 3

Access management is a technique for protecting the carrying capacity of highways and improving highway safety. It accomplishes these goals by minimizing disruptions to through-traffic by eliminating unnecessary driveways and spacing them apart, managing the roadway median, spacing traffic signals and managing turning traffic, as well as other measures.

The Washington State Legislature passed a law called "Highway Access Management", R.C.W. Chapter 47.50 in 1991. This law requires WSDOT to develop two sets of rules to be included in the Washington Administrative Code (WACs). The first set of rules created an orderly application process for gaining access from private property to state highways and established access permit fees. The second set of rules established a set of five classifications for non-limited access highways.

Access is controlled in one of two ways: by limiting it through the purchase of access rights or by managing it. A freeway is an example of a fully limited-access highway. Some highways are partially limited with access rights having been purchased for parts of the roadway, restricting access, but not limiting it to ramps as with freeways. Managing access is a way of limiting access in a more flexible way that is also less costly to taxpayers.

Five access management classifications that have been assigned to state highways reflect different highway environments. Factors that were considered in developing the classifications are: traffic volume, speed limit, adjacent land use, functional classification, existing access density and safety.

SR 162 has the three classifications sections:

Full Limited Access Control

- A highway or street especially designed or designated for through-traffic, and over, from or to which owners or occupants of the abutting land or other persons have right of easement or only limited right or easement of access, light, view or air by reason of the fact that their property abuts upon such limited access facility, or for other reasons to accomplish the purpose of a limited access facility.

Typical criteria for a Class 2 section is

- Mobility favored over access
- Minimum access spacing at 660 feet.
- Access limitations;
    - 1 access only to contiguous parcels under same ownership unless frontage > 1,320 feet
    - Private access not allowed unless no other reasonable access exists

Typical criteria for a Class 3 section is

- Balance between mobility and access with less than maximum buildout
- Minimum access spacing at 330 feet.
- Access limitations;
    - 1 access only to contiguous parcels under the same ownership
    - Joint access for subdivisions preferred but private direct access is allowed with reason

Access Management Plan for SR 162

The WSDOT 1997 Route Development Plan undertook a substantial review of the Access Management Plan (AMP) classifications, its associated typical restrictions and the importance of practical access management for SR 162. The Route Development Plan (RDP) Steering Committee recommended changes to some of the present access management classifications. These changes are due to highway character such as speed limit, existing private road approaches and land uses. This consideration holds true in 2017.

Highway Corridor Right of Way

Typically, SR 162 has 30 feet of right of way on each side of the highway centerline with some variations. This provided a 60-foot-wide corridor, which is not adequate width for constructing additional lanes.

The 5.73-mile highway corridor was determined to have 84 separated abutting parcels in 2016.

Previous Study Efforts

In 2015 WSDOT Olympic Region Planning office completed phase 1 of a highway Corridor Sketch information gathering effort of the SR 162 corridor. The Corridor Sketch Initiative is a new way that WSDOT is working jointly with partners to capture and document consistent baseline information about each transportation corridor around the state. WSDOT implemented the Corridor Sketch Initiative in phases. Phase I focused on working with partners on documenting current conditions, functions and performance expectations for the corridor. Information identified what is working well and what needs to change for the corridor was also collected in collaboration with local jurisdictions. Phase II looks at corridors identified as having mobility performance gaps. Working with various WSDOT offices, cities, counties, transit, MPO/RTPOs and tribes, Olympic Region staff will identify strategies to reduce these gaps. This phase will also include community engagement to assist with identifying strategies. The second phase of the SR 162 sketch effort is scheduled for completion in fall of 2017.

Pierce County undertook the Rhodes Lake Road Corridor Study which resulted in a Final Programmatic EIS, dated 2008. They studied the identification of a new county road in the Vicinity of Rhodes Lake Road E. from SR 162 to 198th Ave. E. to ease traffic congestion and provide for an adequate, efficient and safe roadway for public use. The study has not in highway improvements at the intersection of 198th Ave. E.

A SR 162, SR 410 to Junction SR 165 PDP (MP 0.00 to MP 19.78) was released January 1997. This prior study from SR 410 to Whitsell St. (MP 9.34) in Orting offered recommendations with;

- Access Management
- Highway Mobility/Capacity expansion
- Highway Safety
- Park and Ride Lots
- Non-motorized Accommodations

The 1997 RDP also called for increased emphasis and infrastructure improvement in the areas of Transportation Demand Management (TDM) i.e., carpool/vanpools, walking and bicycling, and public transportation (Express Bus service).

The 2007-2026 Highway System Plan, dated December 2007 identifies a Tier III Solution for SR 162 that includes adding a southbound lane from SR 410 eastbound on/off ramp to 96th St. E. This solution is Key 216 on page J-82 in the Highway System Plan Appendix (Appendix J: 2007-2026 HSP Implementation Strategies: Tier III Solutions).

A subsequent Regional Transportation Investment District (RTID) of King, Pierce and Snohomish Counties included a funding package, but the ballot measure was defeated by public vote in November 2007.

The study corridor runs through the boundaries of Pierce County's Alderton-McMillin Community area (Figure 7). The Alderton-McMillin Community Plan adopted in 2008 provides residents, property owners and business people with a detailed sense of how the community wants the area to develop in the future and includes regulations and standards to create and maintain the look and feel envisioned.

One objective of the plan: to maintain and promote rural residential land uses that have a low density rural land use pattern, preserve the rural character, encourage agricultural activities, and protect environmentally sensitive features within the plan area.

A major principle that the Study acknowledged the efforts to balance transportation mobility while maintaining the rural community and character into its future. The rural character of Alderton-McMillin is defined and shall be maintained as working farms, forests, open space and low density residential homes on large lots.

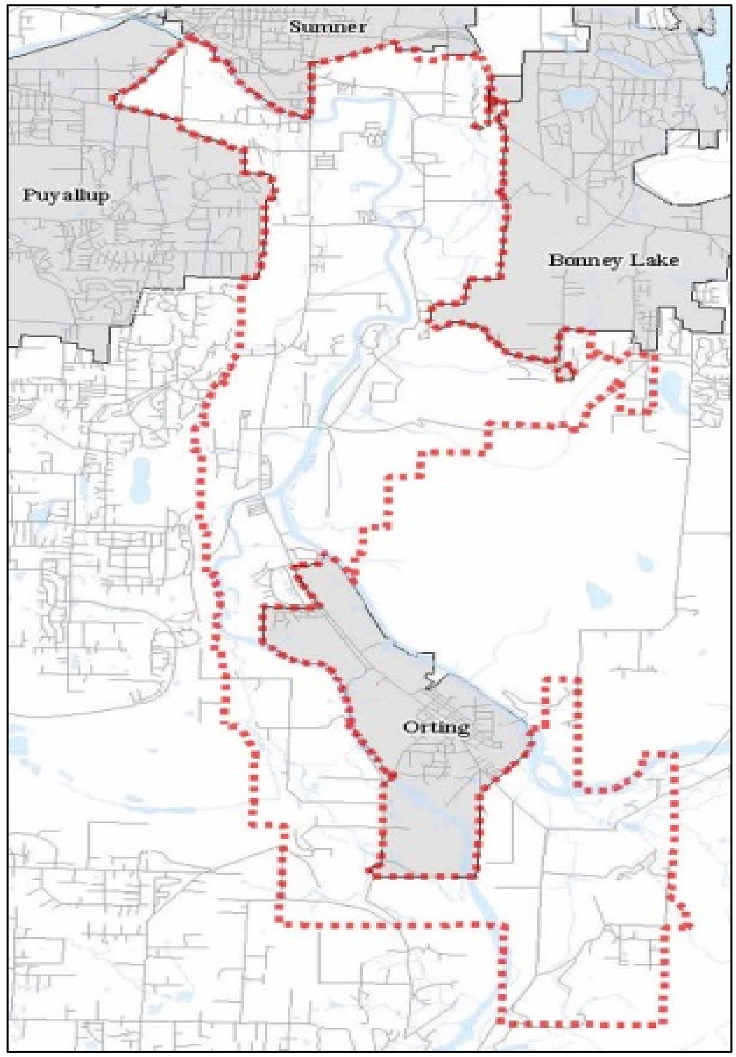


Figure 7: Alderton-McMillin Community Area

The Community Plan denotes two rural neighborhoods centers at the intersection of;

1. SR 162 and 96th St. E.
2. SR 162 and 128th St. E.

Puget Sound Regional Council's (PSRC) Transportation 2040 Adopted Plan as amended in 2015, includes a widening to 4 lanes with restricted median strategy on SR 162 from SR 410 to 96th St. E. ((PSRC 2040 Appendix N: Regional Capacity Project) Project ID 497 Candidate).

Environmental Features

Key environmental features within the corridor (Figure 8) which are briefly summarized below;

- Climate Risk Assessment: The corridor has a low vulnerability for climate change and extreme weather risks, according to WSDOT's statewide climate impacts vulnerability assessment (WSDOT 2011). Future conditions may include an increase in localized flooding.
- The culverts within the study corridor have been assessed for their capacity to pass fish. Two culverts are passable. Two other culverts are barriers to fish passage. These are on the list of fish barrier correction projects, but are not prioritized for correction within the current funding cycle. (Ref. 2015 WSDOT Fish Passage 6-Year Plan).
- Wildlife Habitat and Connectivity. Deer and elk are present in the study corridor. Crashes, carcass removal and citizen salvage reports (2015-2016) indicate that the portion of the corridor from MP 3.5 to MP 8.11 should be considered a medium priority for investing in improvements to reduce crashes with deer and elk.

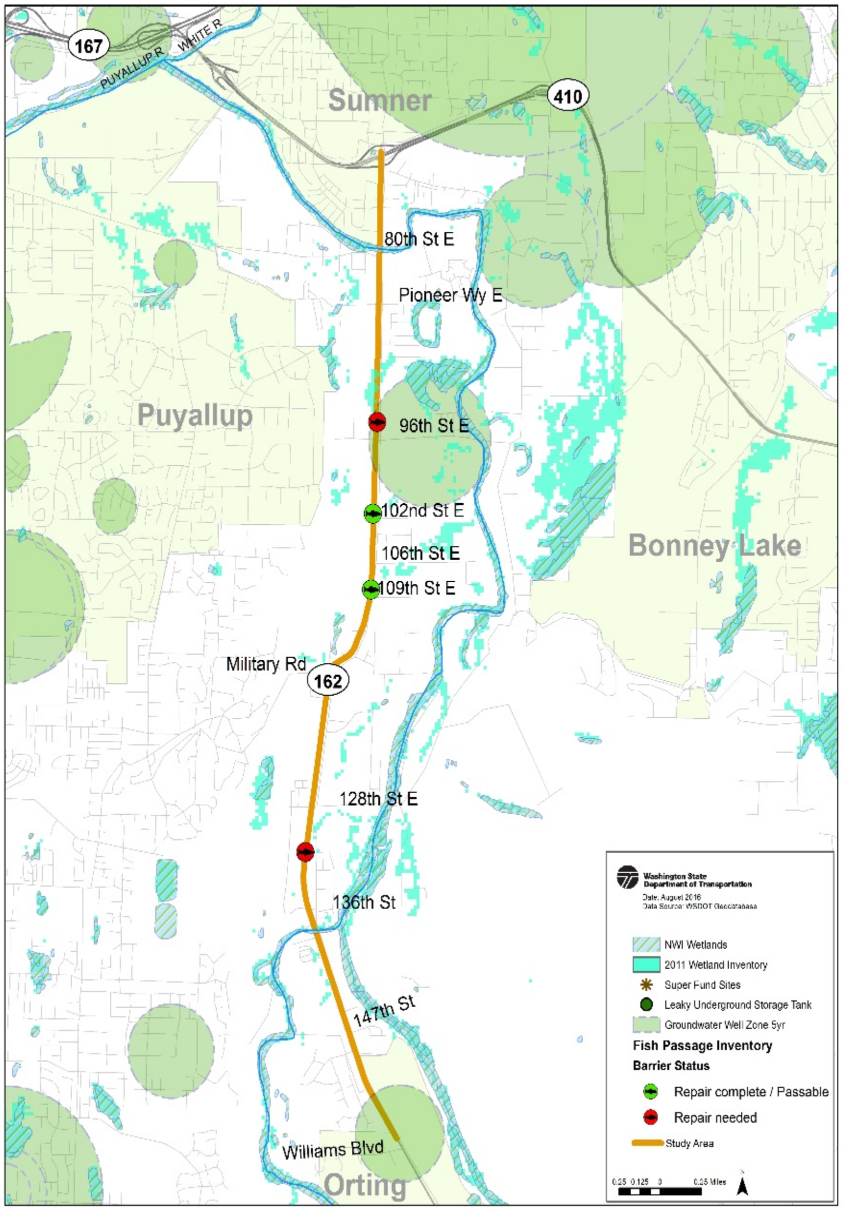


Figure 8: Environmental Features

- Two ground water well zones are located near 96th St. E. and Williams Blvd.

- The 2011 wetland inventory notes minimal wetlands along the study corridor. Some of the wetlands adjacent to the highway are classified as “potentially disturbed.”
- A new bridge over the Puyallup River was built in 2015 to replace the 1935 McMillin Bridge. The original bridge remains adjacent to the highway and is on the National Register of Historic Places.
- The study corridor Department of Archaeology and Historic Preservation Cultural Survey and Archaeological Points are: Alderton School, MP 3.94, National Historic Site, National Register of Historic Places. Historic barns are located on a parcels adjacent to the highway at 96th St. E and 128th St. E.

Land Use/Population

The need for land use planning and regulation increases as the demand for housing, streets, commercial facilities and public facilities grow. Limitations are placed on the use of land to minimize negative impacts to neighboring properties. Zoning regulates the locations of land uses. It is a means of ensuring that land uses are compatible to with another. It allows for control of densities in each zoning category, with the purpose of providing adequate facilities for such categories.

Zoning ordinances are established to prescribe setbacks and minimum lot sizes, and to provide techniques to preserve and protect environmentally sensitive areas. The land use plan is a basic part of the comprehensive plan which is an official statement of the county or city policy establishing the direction it will follow as it develops and changes.

The proposed land use zonings for adjacent areas along SR 162 are shown on the following land use maps. These maps have been taken from the respective city or county comprehensive plan and are believed to be the most current to date.

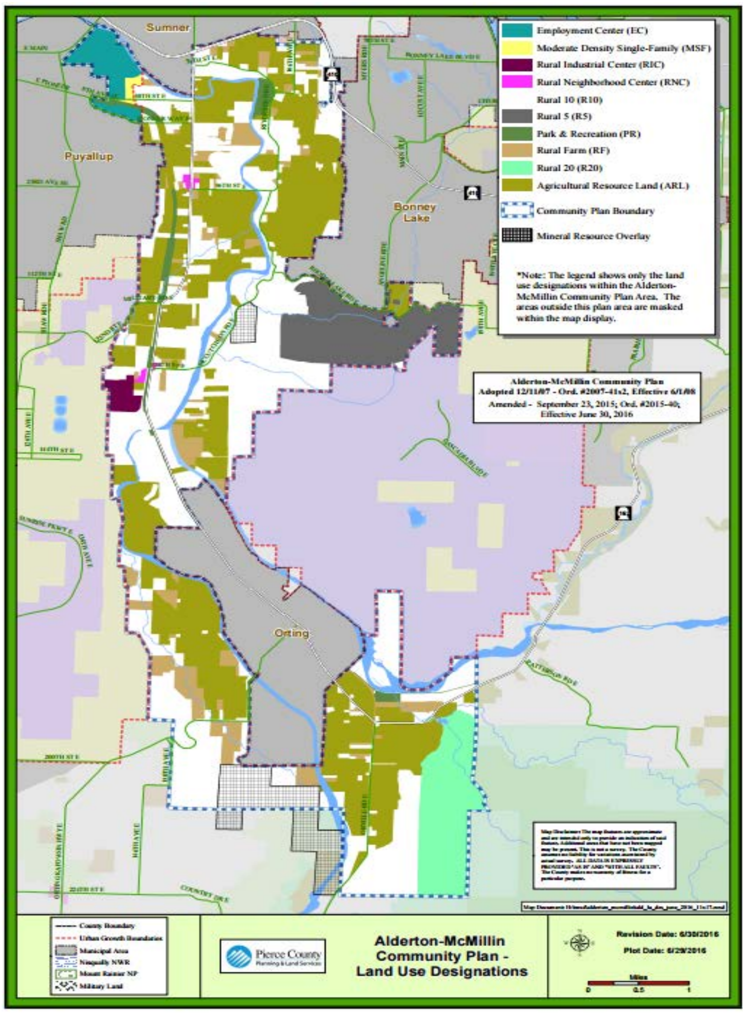


Figure 9: Pierce County Land Use

Knowing adjacent land use zonings along SR 162, traffic generated by expected developments can be predicted.

Land use zonings are taken into consideration when performing traffic modeling. The growth rates resulting from the EMME2 Traffic Model performed by Pierce County Public Works and Utilities reflect the proposed land use.

The Pierce County Land Use Designations Map (Figure 9) is a general illustration of the County's future land use pattern. The map identifies the specific areas land use designations and how the Comprehensive Plan and will apply.

The lines on the Comprehensive Plan Land Use Designations Map are an interpretation of specific property boundaries and physical features (roads, railroads, power lines, etc.) based upon parcel-specific maps.

The map also provides guidance for the development of future zoning maps and implementation of the Pierce County Comprehensive Plan.

Many participants involved in the Study have a strong sense of a great population increase in the incorporated cities of Bonney Lake and Orting. Figure 10 notes the recorded growth in the incorporated area of the Study Corridor.

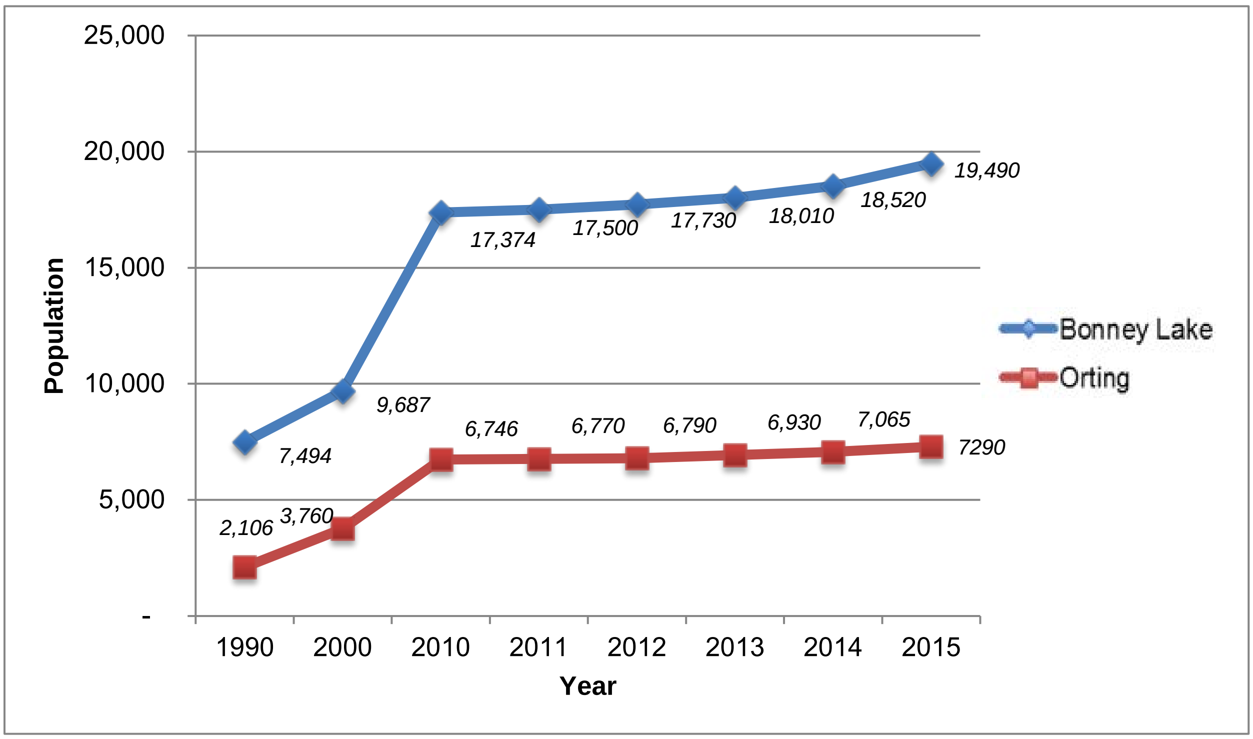


Figure 10: Near Incorporated Area Population Growth

Corridor Service Elements

The Study area corridor is dynamic with a great number of varied businesses, and services:

Commercial Business; The Orting-Sumner Valley is home to a myriad of commercial business and manufactural jobs that rely on adequate highway corridor capacity for accessibility, predictability and transport of goods and service. The listing below is a small sample of businesses along the study corridor:

- Services
    - Veterinary clinic
    - Daycare
    - Gas station
    - Mini mart/convenience store
- Agriculture
    - Christmas tree farm
    - Flower farms
    - Berry farms
    - Nursery & landscaping
- Manufacturing
    - Steel material distribution
    - Steel fabrication

Emergency Services; The corridor is served by multiple emergency service agencies in their jurisdictional area:

Law Enforcement

- Washington State Patrol
- Pierce County Sheriff's Office
- Orting Police Department
- Sumner Police Department

Fire & Rescue Services

- City of Orting Fire & Rescue
- East Pierce Fire and Rescue (Serving Sumner and the unincorporated area of the study corridor)

Regional Emergency Plans

Relevant to the Orting-Sumner Valley is the level of disaster recognition, planning and preparedness. At the center of the effort is the Pierce County Comprehensive Emergency Management Plan (CEMP) developed and managed by Pierce County Department of Emergency Management. The 2010 CEMP establishes a thorough, all-hazards approach to manage emergencies and disasters. Its purpose is to save lives, protect public health, safety, property, the economy, and the environment and then return the community to normal as soon as possible.

Utilities

The highway corridor has 10 different utilities within State right of way. Types range from communications, water, gas and various levels of electrical networks. Utilities are located on the corridor by easement, franchise or permit. Puget Sound Energy (PS&E) primary distribution lines abut the eastern highway corridor from SR 410 south to Military Rd. E. on their own easement. PS&E estimates the cost of relocation of abutting power distribution lines at $1 to $3 million per mile. WSDOT would be required to purchase and deed R/W to PS&E for relocated service.

Ten existing utility systems are operating within the corridor:

- Comcast Telecommunications
- AT&T Telecommunications
- CenturyLink Telecommunications
- City of Sumner Communications
- City of Tacoma Water lines
- PS&E Power lines and Natural Gas lines
- Valley Water District Water lines
- Wave Broadband Telecommunications
- Zayo Group Telecommunications

Transportation Demand Management

Transportation demand management (TDM) contains a broad range of strategies intended to reduce and reshape the demand of the corridor and transportation system. Such strategies are often relatively low in cost. Their success depends both upon the active cooperation of the private sector, and upon effective decision-making by the individuals who use the transportation system. System expansion for single occupancy vehicles is a last resort strategy. TDM measures can include:

- Carpool or vanpool formation assistance
- Encouraging people to walk or ride a bike
- Transit subsidies
- Worker-driver programs for buses and vanpools
- Passenger-only ferry systems
- Designated carpool or vanpool parking
- Parking restrictions - increased parking prices
- Work hour flexibility
- Telecommuting

The Stakeholder committee did not discuss this issue to the extent necessary to prescribe specific recommendations. There are many possibilities for effective TDM strategies along most state highways, SR 162 included. Many, however, are not controlled by WSDOT, but are in the hands of the local and regional agencies and the private sector. WSDOT does encourage these agencies to move forward with plans to implement these “State Interest” strategies. Local and Regional Comprehensive and Transportation Plans were reviewed during the preparation of this report. It was found that all of the Plans discuss strategies related to TDM.

Public Transportation

The SR 162 corridor has been without public bus service since October 2011. Fixed route bus service from Sumner to Orting was discontinued in 2000. Pierce Transit ceased providing its on-demand, dial-a-ride Orting Loop service as a result of the economic downturn that took place during the Great Recession. The economic conditions led to a reduction of Pierce Transit's service area, which included the SR 162 corridor and the City of Orting. There are currently five Pierce Transit sponsored vanpools operating in the Orting area.

Park and Ride Lots

The corridor is currently void of any official park and ride lots along the corridor. Study staff and stakeholder observations noted some informal park and ride use along the corridor.

Park and ride lots are becoming increasingly necessary in Pierce County and the South Puget Sound Region. These facilities promote ride sharing and increased use of public transportation, which in turn reduces the demand for increased automobile capacity. Motorists today and in the future will search for alternate modes of transportation, and if "inviting", these drivers may consider ride sharing, vanpooling and public transit. To be reasonably prepared for this and to plan for future growth, supporting infrastructure such as park and ride lots is vital.

Park and ride lots should be located in the future near large community developments, allowing travelers the opportunity for ride sharing and transit connections.

Presently, there are no plans by local agencies for park and ride lot facilities along SR 162.

Bicycle & Pedestrian Element

SR 162 does not prohibit bicycle or pedestrian travel. However, with diminished shoulder sections for much of the area, the user groups were found to travel on the Pierce County Foothills Trail when possible.

The highway section in the vicinity of the City of Sumner, north of Rivergrove Dr. E. does have an increased number of pedestrians. The high residential densities are a contributing factor.

The Foothills Trail is a regionally significant separated shared-use trail system, providing 25 mile 12-foot-wide shared-use commuter and recreational route between the City of Puyallup (Sumner) and City of Buckley. The trail roughly parallels SR 162 from Military Rd. E. south to Orting to Buckley. The Foothills Trail is recognized as a destination for many users and events on weekends when there is a significant rise in use.

Manual roadway bicycle & pedestrian counts confirmed the importance that the trail affords users to travel on the state highway corridor as shown in Table 6 Bicycle & Pedestrian Counts.

Only in the City of Sumner section of SR 162 north of Rivergrove Dr. E. did the pedestrian counts reflect the higher residential densities.

There are two trailhead facilities in the vicinity of the highway corridor; the East Puyallup trailhead located 1 mile east of the highway on 80th St. E. and the McMillin Trailhead lot adjacent to the highway at the Puyallup River bridge MP 6.91 Rt.

RECORDED BICYCLE & PEDESTRIAN ACTIVITY May 3 -5, 2016
Recorded passage of mode user includes all legs of the intersection

LOCATION	Timeframe	Bicycle	Pedestrian
SR 162 at WB Onramp to SR 410 I/S	6 AM - 8 AM	5	8
	3 PM - 6 PM	4	18
SR 162 & Rivergrove Dr. E.	6 AM - 8 AM	2	3
	3 PM - 6 PM	9	3
SR 162 & Pioneer Way E./Bowman-Hilton Rd.	6 AM - 8 AM	1	1
	3 PM - 6 PM	2	1
SR 162 & 80th St. E.	6 AM - 8 AM	1	0
	3 PM - 6 PM	7	2
SR 162 & 96th St. E.	6 AM - 8 AM	1	0
	3 PM - 6 PM	3	2
SR 162 & Military Rd. E.	6 AM - 8 AM	9	0
	3 PM - 6 PM	45*	2
SR 162 & 128th St. E	6 AM - 8 AM		
	3 PM - 6 PM	1	3
SR 162 & 136th St. E.	6 AM - 8 AM	8	3
	3 PM - 6 PM	18*	9
SR 162 & Williams Blvd. NW	6 AM - 8 AM	15	5
	3 PM - 6 PM	18*	12

*Activity directly attributed to the Foothills Trail crossing at intersection

Table 4: Bicycle & Pedestrian Counts

Trail connections to the highway are limited to public access points. (Figure 11)

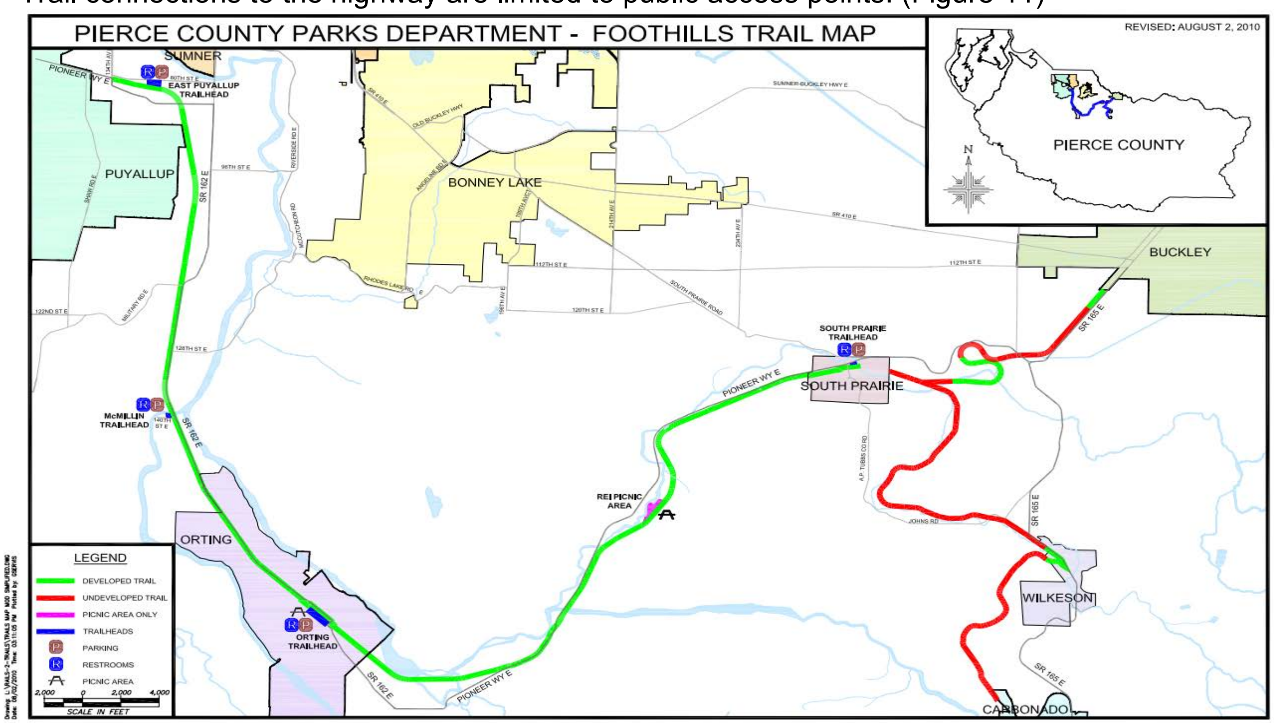


Figure 11: Pierce County Foothills Trail

School Transportation
The Bethel, Sumner and Orting School Districts use the SR 162 highway for student transportation with planned stops on and off the highway.

Freight Rail Presence
The corridor area is served by a Class III short line known as the Meeker Southern Rail and is owned and operated by the Ballard Terminal Railroad Company. The 4.5-mile spur operation runs from East Puyallup to vicinity of the McMillin area (136th St. E. vicinity) with limited service.

Operating Conditions
This and the following section present existing conditions, future-year no-action conditions and future-year conditions with proposed strategies. A key step in identifying traffic performance on the SR 162 corridor was the development of a methodology and a suite of traffic forecasting and operational analysis models.

Appendix B, Data Collection Plan outlines the collection efforts of the TDMGO staff. For detailed analysis results and methods, and assumptions used, see Appendix C: Travel Demand Modeling and Traffic Analysis.

Table 5 (Historic traffic volumes) below highlights the SR 162 Annual Average Daily Traffic volumes (AADT) recorded from 1996 to 2014. The recorded counts over a 3-year period (2011-2014) suggests recovery from the economic downturn of 2008 has not seen the return of 2000 motor vehicle trips to the SR 162 corridor.

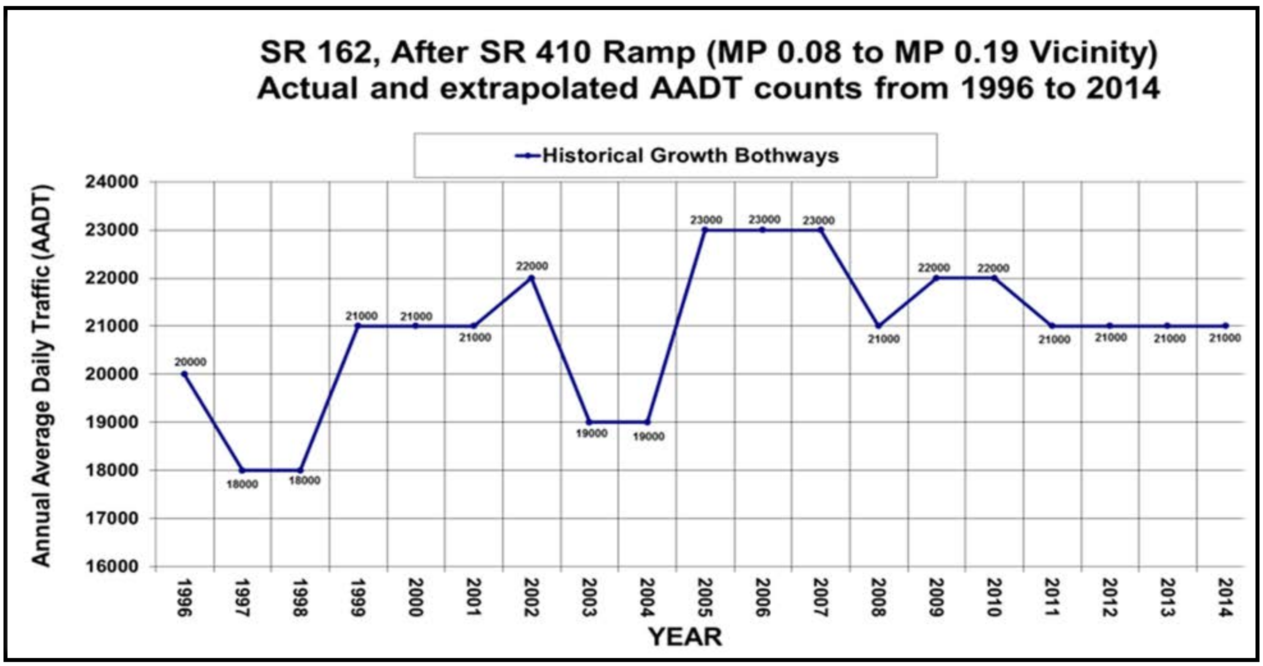


Table 5: Historic Traffic Volumes

The existing condition counts are based on the most recent counts conducted in April and May, 2016. Selected intersection turning movement counts were also collected during the same time period. The AM and PM peak hour turning movement counts are in Appendix C.

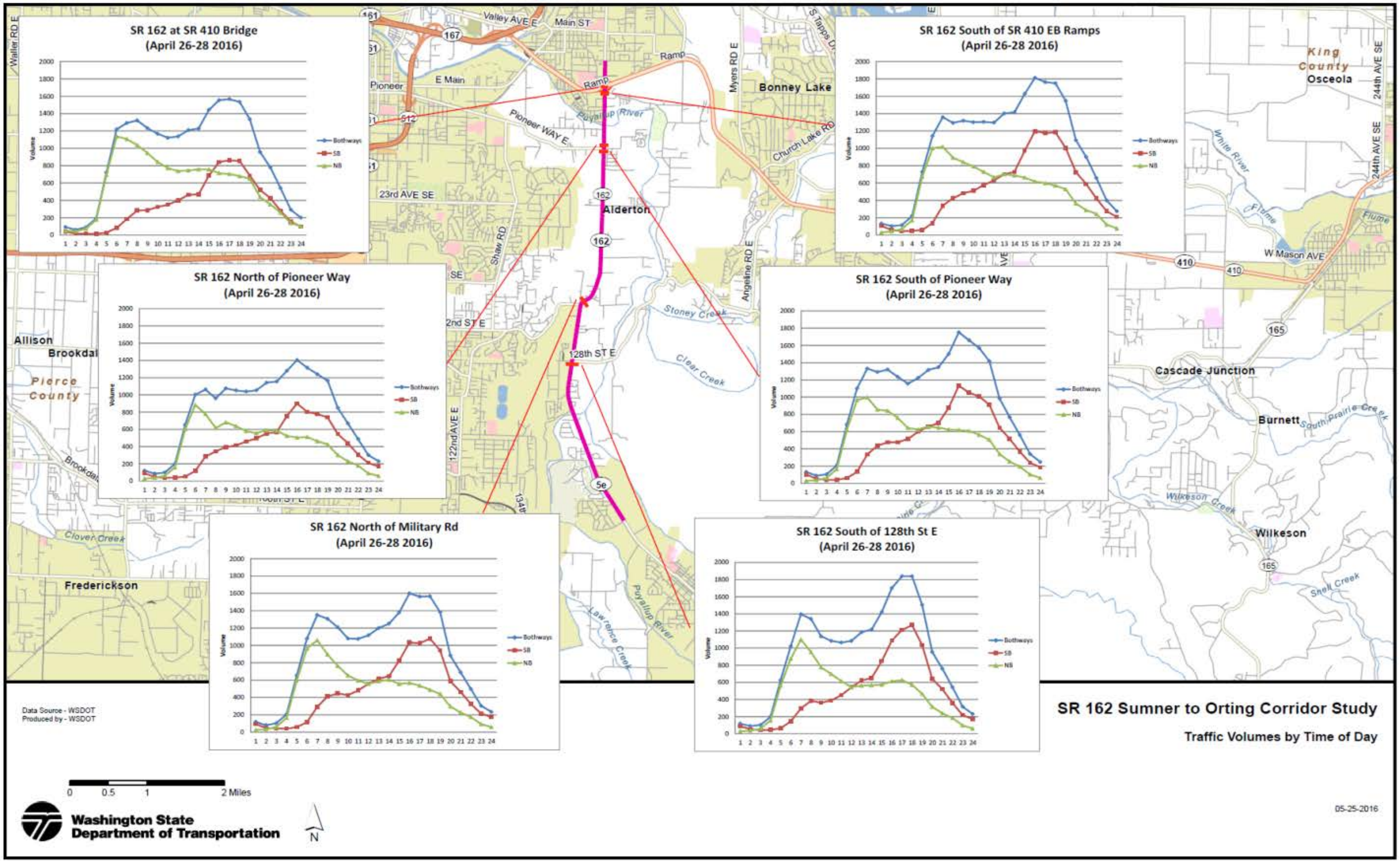
Evaluation focused on mainline and intersection delay that are failing (LOS F) in 2015.

Figure 12 shows 24-hour volumes at six locations on SR 162:

- SR 410 bridge
- South of SR 410 Eastbound Ramps
- North of Pioneer Way E.
- South of Pioneer Way E.
- North of Military Rd. E.
- South of 128th St. E.

The 24-hour traffic volumes (Figure 7) were found to be higher in AM peak period in the Northbound direction and the Southbound direction to be higher in the PM peak period. The AM peak is defined as from 6 AM to 7 AM and the PM peak is from 4 PM to 6 PM.

Figure 12: 24-Hour Traffic Volumes at Six Locations on SR 162



The model volume to capacity (V/C) ratios was determined greater than or equal to 1.0 (LOS F) at three locations in the Southbound direction during the PM peak period. The stop-and-go over capacity locations on SR 162 are:

- South of SR 410 Eastbound Ramps
- South of Pioneer Way E.
- North of Military Rd. E.

The SB is the peak direction in PM and experienced congestion in existing condition. Please see the detailed Demand Modeling & Traffic Analysis Report in Appendix C.

Identified below are the three intersections generating stop-and-go mainline queuing in the Southbound direction during the PM peak period:

- Rivergrove Drive E.
- 96th St. E.
- Military Rd. E.

The "stop-and-go" is based on the travel time survey conducted during the study. The detail travel time plots for the study is shown in Figure 14 in Appendix C, Demand Modeling & Traffic Analysis Report. That is how the three intersections were identified generating stop-and-go mainline queuing in the Southbound direction during the PM peak period.

Base Year Intersection Average Delay and LOS levels indicates the following intersections exceed LOS F (>80 seconds of average delay) on SR 162:

- SR 410 Eastbound Ramps (AM and PM)
- Pioneer Way E. (PM)
- Military Rd. E. (PM)

The intersection data at 128th St. E. (PM) showed the ratio of 2015 Volumes to Capacities (V/C) for AM and PM peak periods. During the AM peak period, the peak direction is northbound. The congested segments are south of Military Rd. E. south of Pioneer Way E. and South of SR 410 eastbound ramps. The V/C ratios at these three segments range from 0.8 to 1.0. During the PM peak periods, the peak direction is southbound. The congested segments are north of Military Rd. E., south of Pioneer Way E., and south of SR 410 eastbound ramps and V/C ratios at these segments are over 1, which indicates these segments are over the capacity.

From March to May 2016 the study team also conducted the travel time survey. The travel time route was from to Lane Blvd. NW.

The variations of the travel speed along the study corridor for AM and PM recorded travel speed greater than 45 mph and below 15 mph. During AM peak periods, the congestion or the travel speed below 15 mph occurred northbound when approaching 128th E. and approaching the SR 410 interchange. During PM peak periods, congestion occurred on southbound mostly from the main intersections queuing upstream.

Base Year Intersection Average Delay and Level of Service (LOS) (Table 6) were based on HCM 2010 methodology in Synchro for AM and PM peak hours. Based on the most recent counts collected in April and May 2016, during the AM peak hour there is one intersection, SR 162 & SR 410 EB Ramps, showing LOS F with an 89.6 second average delay. In PM peak hour there are four intersections operating at LOS F. They are SR 162 & SR 410 EB Ramps, SR 162 & Pioneer Way E., SR 162 & Military Rd. E., SR 162 & 128th St. E. The intersection analysis results are consistent with the V/C ratios from the travel demand model and travel time survey results.

Table 6: Base Year Intersection Average Delay and LOS

Synchro ID	Intersection Name	AM		PM	
		Delay	LOS	Delay	LOS
1	Valley Ave. & Meade McCumber Rd. E.	72.8	E	64.4	E
3	SR 162/Valley Ave. & SR 410 WB Ramps	47.8	D	31.5	C
4	SR 162 & SR 410 EB Ramps	89.6	F	86.8	F
5	SR 162 & Rivergrove Dr. E.	11.3	B	22.6	C
6	SR 162 & 80th St. E.	34.6	D	46.0	E
7	SR 162 & Pioneer Way E./Bowman-Hilton Rd. E.	20.4	C	111.5	F
10	SR 162 & 96th St. E.	56.0	E	45.2	D
14	SR 162 & Military Rd. E.	21.0	C	111.6	F
15	SR 162 & 128th St E.	44.3	D	101.1	F
16	SR 162 & 136th St. E.	9.4	A	38.9	D

Additional intersections generating significant mainline or intersection delay with No-Build conditions in Year 2020 are:

- Valley Ave. E. & Meade McCumber Rd. E. (Intersection delay > 80 seconds in AM and PM peak)
- All stop controlled intersections between SR 410 and 128th St. E. (e.g. 80th St. E.) with minor street delay >50 seconds.

Additional intersections generating significant mainline or intersection delay with No-Build conditions in Year 2025 are:

- No additional locations, but Southbound directional queuing and intersection delays increasing in PM peak with Northbound queuing and intersection delays increasing in AM peak.

Additional intersections generating significant mainline or intersection delay with No-Build conditions in Year 2035 are:

- Valley Ave. E. & SR 410 Westbound Ramps (Intersection delay > 80 seconds in AM and PM peak)
-

Figure 13 below notes the recorded level of service in 2015 along the study corridor.

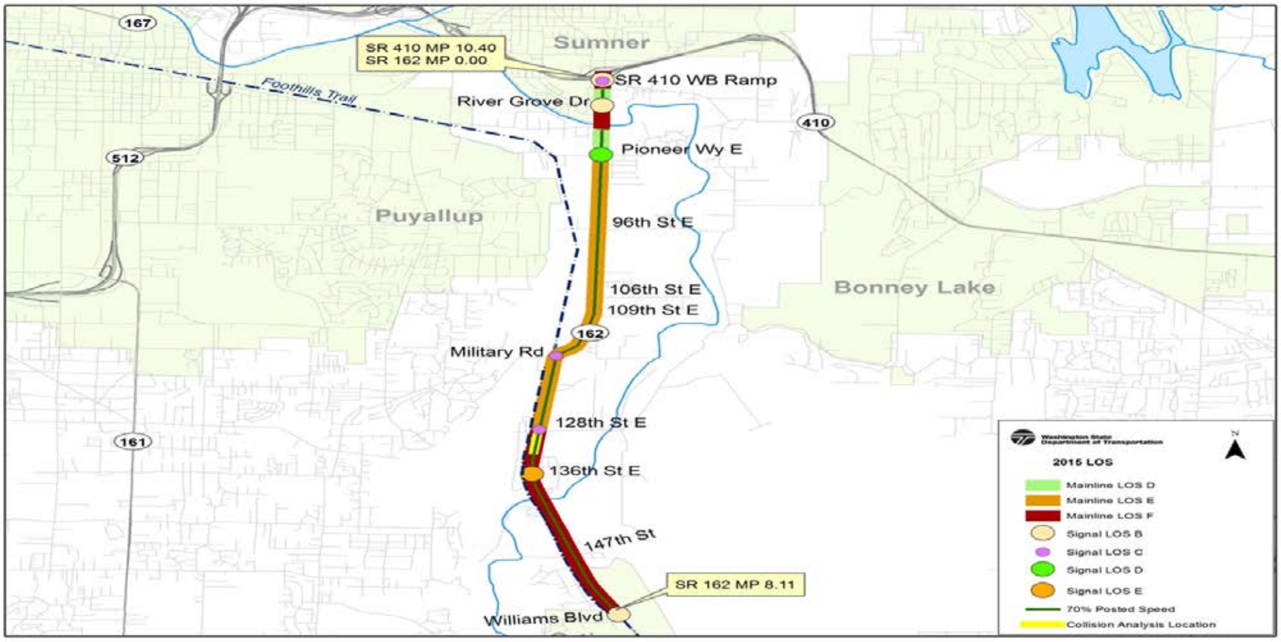


Figure 13: SR 2015 162 LOS Segments

The Travel Time & Speed recorded in the AM (5 – 8AM) and PM (3 - 7 PM) through the 6.3-mile study area (Travel Time Measured Between Meade McCumber Rd. E. & Lane Blvd. NW.) averaged over five separate runs) are noted below:

- Southbound AM: Average Travel Time = 10.1 minutes. Average Speed = 37.4 MPH
- Northbound AM: Average Travel Time = 11.9 minutes. Average Speed = 31.8 MPH

- Southbound PM: Average Travel Time = 17.1 minutes. Average Speed = 22.1 MPH
- Northbound PM: Average Travel Time = 11.5 minutes. Average Speed = 32.9 MPH

In summary, the following signalized intersections are experiencing Level of Service (LOS) F with intersection delay or stop-and-go mainline queuing in 2015:

- SR 410 Eastbound Ramps (>80 seconds in AM and PM peak)
- Rivergrove Dr. E. (Southbound PM queuing V/C > 1.0)
- Pioneer Way E. (>80 seconds in PM peak)
- 96th St. E. (Southbound PM queuing V/C > 1.0)
- Military Rd. E. (Southbound PM queuing V/C > 1.0 and >80 seconds in PM peak)
- 128th St. E. (>80 seconds in PM peak)

Additional traffic related information can be found in Chapter 4, Alternative Analysis & Evaluation and Appendix C.

Crash History

The SR 162 corridor recorded a total of 409 crashes in the 5-year history between 2011 and 2015. Figure 14 noted the crash severity for the 409 crashes. There were no fatal crashes and 4 with serious injury reported. Some common themes were:

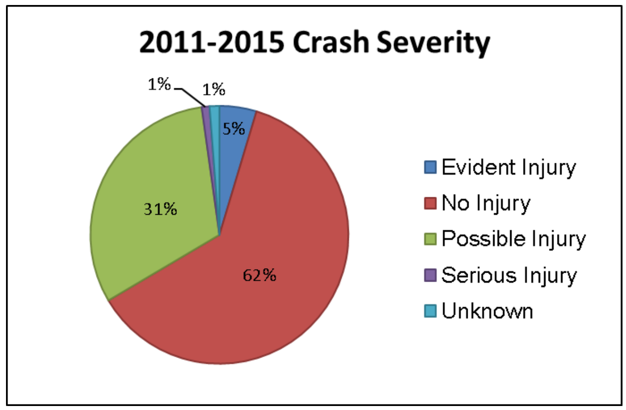


Figure 14: Crash Severity

- 282 crashes or 73% of the total number were rear-end type crashes (Ref. WSP Crash report)
- Most common contributing factors of crashes were inattention, speeding and following too closely
- In 2015, there were 5 crashes involving deer (see Environmental Section)
- Most intersection related crashes occurred at Pioneer Way E. with vehicles traveling northbound.

The 282 "Strike Rear End" crashes report far exceed the next type by 260 crashed per Figure 15.

Disclaimer: "Under 23 U.S. Code, Section 409, this data cannot be used in discovery or as evidence at trial in any action for damages against State, Tribal or Local Government that involves the locations mentioned in this data."

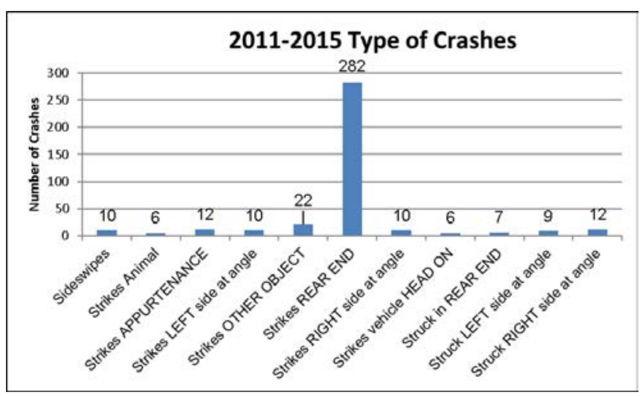


Figure 15: Type of Crashes

Figure 16 notes driver inattention as the leading contributing factor. Washington Traffic Safety Commission's Target Zero data confirms driver inattention to be a leading causes of motor vehicle crashes.

Disclaimer: "Under 23 U.S. Code, Section 409, this data cannot be used in discovery or as evidence at trial in any action for damages against State, Tribal or Local Government that involves the locations mentioned in this data."

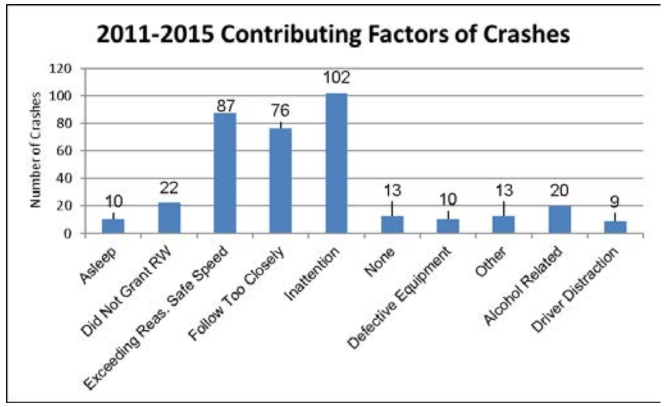


Figure 16: Contributing Factors

Traffic Analysis

The study performed traffic analysis at key intersections and bottlenecks along the corridor (MP 0.00 to 8.11) (ARM 0.00 to 5.73). And identified and ranked a range of counter measures that had the potential to reduce congestion along the corridor. Counter measures could include intersection control such as roundabouts, signals and access management strategies. The study would go on to identify transportation demand management measures to include public transportation services, intelligent transportation system improvements, park and ride lots, bicycle & pedestrian improvements, and incident management measures.

WSDOT produced a list of strategies addressing the corridor needs for the 20-year vision. Stakeholder recommendations were in ranked order.

Traffic Forecasting

The modeling results noted herein and not shown are found within Appendix C, Traffic Analysis.

Evaluation of Future-Year No Action Performance

The future baseline No Build condition was analyzed based on the Pierce County travel demand model. Based on the forecast, the data shows significant growth to Year 2035.

The AM Peak period demand to capacity ratio showed that by 2035 in the Northbound direction between 128th St. and the SR 410 interchange, the V/C (volume to capacity) ratio was determined to be greater than 1.0. In the PM Peak period, the demand to capacity ratio showed that between 2020 and 2025 in the southbound direction the V/C ratio was typically greater than 0.8 and 1.0 from 128th St. north to the SR 410 interchange. In 2035 the V/C ratio would be greater than 1 on the same segment. The performance measure for AM and PM peak hour travel time forecasts was completed for Years 2020, 2025 and 2035. This effort entailed analysis of each direction between Meade McCumber Rd. E. and Lane Blvd. NW.

With a No Build condition, Southbound traffic on the study corridor in both the AM and PM peak hours would experience significantly long delays and travel time. The Northbound travel time would double in both AM and PM peak hours by 2035.

Another performance measure, travel time reliability, was also analyzed. Based on the results for AM and PM peak hours. The results consistently showed that the southbound traffic in both AM and PM peak hours would be significantly unreliable. Southbound is the peak direction in PM peak hour. Southbound traffic times would become unreliable as the Travel Time Index (TTI) is greater than 1.5 after Year 2015. It would become worse in future years as the TTI would be 2.16, 2.39 and 158.2 in 2020, 2025 and 2035, respectively.

The peak direction Northbound in the AM would become unreliable by 2025 as the TTI will be 1.89. It will worsen to 2.53 by the year 2035. The significant growth at SR 162 and 128th St. E. is the main reason for delay. High Southbound left-turn volumes in the AM and PM peak hours, with the current limited turn pocket, causes the queue to spill back upstream, blocking main line. While extremely high TTI may not realistically occur, it indicates the current capacity for left turn and signal timing would not be able to serve the forecast demand in 2035.

Chapter 4

Alternative Analysis & Evaluation

A broad range of strategies were considered to address the performance gaps identified in the SR 162 corridor alternative analysis and evaluation these strategies are summarized below with additional detail provided in the Appendices. The Study outcomes, i.e., strategies, require analysis and evaluations that address performance gaps related to corridor operations. Contained in Chapter 4 are outlines the resulting work.

Public Transportation
Pierce Transit does not at this time have long range service plans to re-introduce service to serve SR 162. Pierce Transit and other transit agencies do offer vanpool service in the area.

The Study area is within the Sound Transit (ST) benefit area; however, there are no existing services on the SR 162 corridor at this time. The 2035 ST Long Range Plans identify the termini of a new rail line route from McMillan to the Puyallup Sounder station. The proposed McMillan-Puyallup system would carry passengers on a single Diesel Multiple Unit vehicle that operates between the termini every 30 minutes during the peak period. The forecasted ridership is estimated as "<1000". A park and ride lot with a capacity of 125 spaces at the McMillan station is also identified. This number is more likely based on the size of an available parcel rather than a measurement of ridership. The 2015 capital cost estimate for ST 16 (project) Sounder Rail Extension is $207 - $222 Million. Sound Transit may within the next 10 years follow up with a feasibility study of the ST 16 project.

Park and Ride Lots
The corridor is void of any official park and ride lots along the corridor. The study stakeholder committee emphasized park and ride lots as a TDM strategy. The effort did not identify standalone locations. However, contained in Sound Transit's long-range plan is the identification of a 125 stall facility in conjunction with a Sounder Rail Station at the SR 162 and 136th St. E. intersection. At present there is no funding obligated to further study the feasibility of the lot or subsequent construction of a lot.

Bicycle & Pedestrians
Review of bicycle & pedestrian movement at specific intersections was conducted in May 2016 by WSDOT staff. It was concluded that the volumes were fairly low on the highway corridor. with exception of the vicinity of the SR 162/SR 410 I/C. Significant use of the Pierce County Foothills trail was the single largest contributor to the low volumes.

The Orting-Sumner Valley being relatively flat presents itself as a very good area for bicycling. The Foothills Trails and its destinations of Orting and beyond draw a significant number of users on weekends regardless of the season.

The following roadway improvement strategies were analyzed and evaluated:

- Short-Term Strategies (Year 2020):
    - Signal Optimization
    - Roundabout at 128th St. E. and Military Rd. E.
- Mid-Term Strategies (Year 2025)
    - Channelization
    - Replacing signal systems with roundabouts
- Long-Term Strategies (Year 2035)
    - Reversible lanes were modeled; however, they were dropped from consideration due to lack of effectiveness given the corridor intersection spacing and lack of required access management elements.
    - Multi-lane widening was modeled and found to not sufficiently improve the corridor operation to an acceptable level (LOS D) or meet expectations in the 2013 horizon year.

      Create a four-lane facility by constructing one additional general purpose lane each direction. As a result of this improvement SR 162 would be reclassified as a Class 2 facility in the *WSDOT Access Management Plan*. Presently a Class 3 designation applies to sections MP 0.10 to 3.21 and MP 7.17 to MP 8.11. When a Class 2 facility becomes multi-laned, median barrier is typically used to separate opposing directions of travel. There would be breaks in the median approximately every one half mile to provide left turn access and U-turn access.

      The mobility improvement described here would likely require additional right-of-way along SR 162. A problem foreseen with this is the large PS&E transmission lines presently paralleling the highway along the left side. Widening, therefore, may not occur symmetrically about the centerline.

    - 1997 Route Development Plan improvements
        - Highway Mobility Recommendations
        - SR 410 to Pioneer Way E. widening to a five-lane roadway
        - Pioneer Way E. to 144th St. E. widening to a four-lane roadway
        - 144th St. E. Whitsell St. would include widening to a five-lane roadway

- Also combinations of strategies were developed and analyzed for Year 2035:
    - TDM + Roadway improvement
    - Public transportation improvement + Roadway improvement
    - Public transportation improvement + TDM + Roadway improvement

Ranking Results

Collected from a series of stakeholder meetings was a list of concerns and observations. Below is the listing of what the study team and stakeholder committee learned, determined and concluded throughout the study process:

- Preserve the character of the area
- Concerns about highway performance due to growth
- Unreliable travel times
- Effects of traffic on SR 162 which impacts local roads
- Transportation Demand Management (TDM) strategies are important
- Improved bicycle & pedestrian accommodations are needed
- Park and ride lots and public transportation services are needed
- The Foothills Trail and agriculture in the community are important to locals
- Short- and Mid-Term strategies are more achievable than Long-Term high cost strategies. Road widening alone can't solve the problem
- The Study's public online survey received 2,214 comments and gathered a significant amount of information. The public meetings on November 15 and 16, 2016 generated additional comments about the corridor and the Study outcomes

The stakeholder committee agreed that a combination of strategies can and will aid in closing the performance on deficiencies along the corridor. Three distinct groups of strategies emerged from the process;

1. TDM/Operations/ITS which could create incentives programs for ride sharing, signal efficiencies and information sharing opportunities for travelers
2. Park and ride lots, public transportation services, and bicycle & pedestrian accommodations
3. Access management and intersection and corridor improvements

The above strategies from a Practical Solutions approach to making improvements over the Short-, Mid-, and Long-Term periods (Years 2020, 2025, 2035).

Discussion on Ranked Strategies

The stakeholder committee agreed to ranked list of strategies for the corridor using WSDOT's Practical Solutions approach with the order of:

1. Cost effective measures including operational type improvements first
2. Demand management opportunities, after exhausting other options
3. Capacity improvements

The study team and stakeholder committee ranked the proposed strategies that considered the following;

- Ranking criteria and associated performance measures
- Planning level cost estimates of strategies and associated elements
- Performance measurements to allow scoring
- A scoring scale from 1-25 range
- Compiling the ranking matrix
- Scoring strategies based on data and scoring ranges. Strategies were ranked based on total average score by Short-, Mid-, and Long-Term

The agreed upon definitions for the ranking criteria and the performance measures included:

- **Phasing** – The potential phases of strategy implementation.

  The performance measure used a:

  - Short-Term qualifier that was worth 25 points and based on a low cost/high return investment potential.
  - Mid-Term, worth 15 points used moderate to higher cost potential.
  - Long-Term, worth 1 point considered higher cost and maximum type fix.

- **Cost** – A range of planning level cost estimates for strategy implementation and the performance measure was used based on year 2015 costs and estimated costs greater than $10 million, equaled 1 point for less than $250,000 received the full 25 points.
- **Mobility** – Mobility improvements in terms of percentage of performance gap reduction by means of delay reduction and travel time savings or improvements. The performance measures were delay and travel time reduction. The traffic analysis data about percentage reduction was interpolated into a score of between 1 and 25 points.
- **Partnerships** – Partnership contributions. The performance measure was the number of partners participating with no partnership likely scoring 1 point, one partnership scoring 15 points and two or more partnerships likely assigned 25 points.

Several considerations suggested at stakeholder meetings are worthy of noting:

- Roundabouts at ramp terminals may prolong the need to widen the existing bridge and rebuild the SR 410/SR 162 interchange.
- TDM strategies scored well. Mobility grant funding could be an option to pursue locally.
- The committee suggested a pilot project identified to place the “Public Transportation Services” strategy into near or Short-Term strategies.

Stakeholder consensus action resulted in the ranking document with a unanimous vote of the stakeholders. Public transportation was deemed to be significant to warrant a standalone strategy. The four prioritized Strategies are:

1. Transportation Demand Management
2. Operations/Intelligent Transportation Systems/Incident Management Measures
3. Public Transportation Services
4. Intersection Control/Corridor Improvements

A more complete level of information presented to the stakeholders for the strategy decision-making process is located in Appendix G.

Evaluation of the Strategies

The operating condition in each strategy was analyzed based on the demand forecast using Pierce County model. The strategies in each future year were compared with No Build scenario in the same year. To evaluate the strategies in future years, intersection average delay and LOS and travel time were mainly used as performance measures. The detailed results for the average intersection delay and LOS and the travel time can be found in Appendix C.

In order to pinpoint the operation efficiency and location needs, the study team segmented the entire study corridor into seven segments for travel time analysis. Since the segment length varies, the segment travel time was normalized to seconds per 1/10 mile within the segments noted in Table 7.

Table 7: Corridor Segmentation Travel Time Analysis

Segment	Cross Street
A	SR 410 WB Ramps - Rivergrove Dr. E.
B	Rivergrove Dr. E. - Pioneer Way E.
C	Pioneer Way E. - 96th St. E.
D	96th St. - Military Rd. E.
E	Military Rd. E. - 128th St. E.
F	128th St. E. - 136th St. E.
G	136th St. E. - Williams Blvd.

In Year 2020 the selected intersection LOS was analyzed and with a signal optimization strategy. Compared to No Build in the AM peak hour, the average intersection delay per vehicle could be reduced by 21% for 11 intersections combined.

The travel time in Year 2020 with signal optimization would not be reduced. The signal optimization considers the intersection efficiency for all approaches. Therefore, the optimization may not favor the Northbound and Southbound mainline directions if demand on the minor street(s) is high. In the travel time analysis, Synchro modeling of signal optimization and roundabout (see Appendix C for SIDRA analysis) strategies suggest an increase in total travel time for the entire study corridor.

In Year 2025, with the TDM strategy, comparing it to the No Build scenario in AM peak hour, the average intersection delay per vehicle could be reduced by 28% for 11 intersections combined with one intersection, which is at 128th St. E., and still would operate at a LOS F. In the PM, it would be reduced by 22%, although there are still five intersections showing LOS F.

Looking at travel time with the TDM strategy, in the AM peak hour, the travel time would be reduced by almost 19% in the Northbound direction for all segments combined. However, in the PM peak hour, the TDM would increase the travel time. The reason is the travel pattern and the trip distribution would change due to the overall 3% trip reduction per the Pierce County travel demand model.

The traffic operation analysis for 2035 resulted in four strategies being analyzed and evaluated for Year 2035. In the AM peak hour except for reversible lane strategy, TDM, 1997 plan and Public transportation strategies would reduce the average intersection delay by approximately 35%, 75% and 36% respectively. Similarly, in the PM peak hour the average intersection delay would be reduced by 32% to 69%. The Year 2035 forecast volumes and the intersection configuration with 1997 Route Development Plan are in Appendix C.

The analysis resulted in the reversible lane strategy being dropped due to poor performance. The 1997 plan would reduce the travel time the most with the proposed intersection lane configurations as in the strategy list under idea AG (Appendix G).

After evaluating and analyzing the strategies individually, each strategy does not improve the corridor to an acceptable level over the long term (LOS D or better). Several intersections would still operate at LOS F and much longer travel time compared to existing conditions.

It was stressed that per WSDOT's Practical Solutions approach, the introduction of incremental Short- and Mid-Term strategies must be further refined and considered over time to manage corridor performance. The study team developed the following three combinations of strategies:

- TDM + Roadway improvement
- Public transportation improvement + Roadway improvement
- Public transportation improvement + TDM + Roadway improvement

In summary, the results of the analysis are:

- Given the high travel demand on SR 162 in the future, all strategies evaluated thus far and others yet to be conceived will be needed in order to improve long term corridor performance to the desired level.
- The strategies analyzed and evaluated are not enough to make the corridor operate at an acceptable level (LOS D) or meet expectations (as noted in the study goal). The strategies will need to be continuously implemented and enhanced. For example, additional TDM techniques, reintroduction of public transportation services and increased services to meet demands, etc. More strategies could be considered as they emerge in the future and be introduced to influence the travel patterns and improve performance along the corridor. Emerging transportation trends and technologies should be monitored to understand the influence on travel behavior and the transportation system.

Strategy Development

Throughout the Study, a significant number of strategies were raised with an ongoing process of screening and evaluation. Alternatives within the Study footprint that were expected to offer high value and best return on investment were considered. A wide range of additional transportation improvement strategies were recorded over the course of the Study. A number of the alternatives raised by stakeholders were determined to be unrealistic, or outside the scope of the Study. There were others with merit that could be pursued in the future with condition changes and new technologies.

The following elements were identified in the strategy development process and did not move forward into the analysis process:

- o **Adding Transit Queue Jump Bypass and Bus Lane.** This option was not pursued.
  - There is no defined timeframe for establishing corridor service route.
  - Queue bypass would result in an extra phase cycle of a signal determined to degrade the signal operation.
  - Adding Bus Lanes/auxiliary lanes would require additional right of way and stormwater treatment.
- **Mainline bike lanes**. Improvements to the corridor segments would be considered on a case-by-case basis with conditions presented at the time of solution scoping. Bicycle counts noted minimalized mode use as a result of close proximity to the adjacent Foothills Trail. Adding bike lanes may likely result in right-of-way purchases.
- **Additional access points to Pierce County Foothills Trail.** Additional improvements are at this time are discouraged at locations other than public intersection access to SR 162. A detailed analysis of impacts with at-grade crossing other than at existing intersections would be required.
- **Closed circuit camera monitoring of intersection.** Adding closed circuit cameras would offer real-time highway operation monitoring. However, the demand was not demonstrated.

The WSDOT Study team considered Short-Term, Mid-Term, and Long-Term options. Short-Term strategies are typically low cost with measureable benefits. Long-Term include high cost and corridor wide benefits.

A No-Build scenario was also addressed in the Study process with the conclusion that a No Build option would fail to meet the Study's purpose.

Strategy estimates are based on little or no design-level work resulting in unknown factors that may lead to changes in the future.

Planning cost estimates could be 40% above or below the estimated improvement cost that was used in the decision-making process.

Analysis Methodology

Various tools were used to determine how well the transportation systems operate today and how well it will operate in the future. Appropriate tools were used to evaluate the effectiveness of the transportation improvement alternatives the Study considered. The traffic models were calibrated and validated as described in the Technical Memorandum (Appendix C).

Traffic Analysis

Transportation Demand Management (TDM) elements were employed by applying a 2% and 10% mode shift rate for volume rates for the corridor. With commuters employing TDM measures motorists, transit operation and other reductions to the single occupancy vehicle rate may be realized. It was determined as a standalone measure, TDM would not make significant improvements to the overall corridor performance.

Corridor travel times were collected for the general purpose and bus vehicle type for the AM and PM peak periods. In general, the corridor travel times follow the same pattern as the intersection delay and queue length, with each of the alternatives offering improved travel times over the no build scenario. Appendix C shows travel times for the PM peak.

Traffic alternative analysis results are provided in Tables 5 through 8 in the SR 162 Traffic Analysis Technical Memorandum (Appendix C).

Chapter 5

Next Steps

With the completion of this planning Study the strategies identified will assist WSDOT and others to make decisions on improving highway efficiencies and reducing congestion on SR 162.

WSDOT will work with stakeholders and partners to implement low cost-strategies such as Transportation Demand Management, which includes vanpools and carpools in the Short-term. WSDOT will continue to work with interested partners on the strategies considered pertinent and viable over the Short-, Mid-, and Long-Term operation of the highway corridor.

The strategies for Short-, Mid-, and Long-Term will be incorporated in the Corridor Sketch Phase II for the SR 162 corridor. These strategies then will be prioritized on a statewide basis for future implementation. Due to limited state funding, the recommendations in this study will need to compete for funding with other proposed improvements around the state based on performance outcome. Other funding sources could be developer contributions, or create a local improvement district.

Another follow-up step is to incorporate the study outcome strategies into state, regional and local plans to position the proposed improvements for future funding and implementation (i.e., the Highway System Plan). The Washington State Highway System Plan (HSP) is the state highway component of the Washington State Multimodal Transportation Plan (SMTP). The SMTP is the state's overall transportation plan that will include an analysis of facilities the state owns and those in which the state has an interest. The HSP is updated every two years and serves as the basis for the six-year highway program and the two-year biennial budget request to the State Legislature.

The HSP is also aligned to the Washington Transportation Plan (WTP), which outlines the policies adopted by the Washington State Transportation Commission.

Highway corridor improvements could be pursued by local jurisdictions. Design efforts and improvement funding would need to be approved locally and contained in the Statewide Transportation Improvement Program.

Cooperative Relationships with Partners

The Study found key strategies in some areas and partnerships outside of highway infrastructure improvements. The strategies listed below should be explored, encouraged and where appropriate, acted upon.

Intelligent Transportation System improvements (ITS)

Seek out low-cost ITS enhancements. ITS improvements could improve the experience and reliability to intersection operations. Improvements could prove to have an immediate value to the corridor. Provide highway travel time travel notifications, i.e., kiosks noting transit arrivals and parking lot utilization rates, variable message signs corridor wide, i.e. travel lane condition notification detection and notification of conditions.

Signal inter-connect systems was also suggested. Distance to signals exceeded the ½ mile spacing required for effective operational results, however, should be re-evaluated with technology improvements. The SR 162 corridor is not presently included in WSDOT's ITS Plan.

TDM Strategies and Concepts

Further implementing CTR strategies: Recognized worksite commute trip reduction (CTR) programs should be further encouraged by stakeholders. CTR and Active Transportation resources offered at the County and State level should be employed where appropriate.
Recognized worksite commute trip reduction programs should be further encouraged by stakeholders. CTR and Active Transportation resources offered at the County and State level should be employed where appropriate (carpool-vanpool mode shifts, alternative work schedules and telecommuting) in area and the greater Tacoma & Seattle area that may result in the 2% mode shift used in the traffic modeling exercise.

WSDOT will continue to engage stakeholders in exploration and encourage opportunities that could bring forms of public transportation and commuter rail service to the SR 162 corridor.

Park and Ride lots

PnR lots: Sound Transit's Long Range plan seeks to locate a park and ride lot with 125 spaces and a rail station in the vicinity of 136th St. E. Pursuing property acquisition and construction prior to commuter rail was recognized by stakeholders as an excellent opportunity for a phased approach to the full-service facility. Further evaluation of park and ride facilities exceeding 150 stalls capacity should be considered in the next five-years. Small local park and pool lot (without transit service) should be explored. The study determined that with interest and funding opportunities establishing park and ride lots is a possibility at various locations on the corridor. Seeking grant funding could be a funding strategy to investigate.

The WSDOT Regional Mobility Grant program offers funding opportunities on mobility projects that are cost-effective, reduce travel delay for people and goods, improve connectivity between counties and regional population centers, and are consistent with local and regional transportation and land use plans.

Capital-construction, equipment-acquisition and operating projects could be funded by this program. WSDOT will continue to engage area stakeholders in identifying grant opportunities that would deliver on transportation improvements for the area.

Transit/Rail Development

Transit: while the SR 162 corridor remains without transit service for the foreseeable future, efforts and investments by transit and/or others could yield positive mode shift results. Specific grant funding opportunities should be explored and could be initiated by Sound Transit, Pierce Transit or local jurisdictions. Transit Queue Jump Bypass and Bus Lane may need to be re-evaluated with the introduction of transit service.

Rail Development: Stakeholders should continue to dialogue resulting in construction of the Sound Transit rail line, station and park and ride lot at 136th St. E.

Bicycles and Pedestrians

For bicycle & pedestrian modes: emerging policies, active transportation measures, best practices, and specific accommodations for all ages and abilities will need to be address at the time of scoping solutions. Mainline bike lanes at selected intersection; possible improvements to the intersections will need to address the accommodation at the time of scoping solutions.

Driver Education / Outreach – This strategy proposes education and public outreach to better inform and educate the traveling public. This strategy is largely looked to be facilitated by others, i.e., Washington Traffic Safety Commission and American Automobile Association of Washington.

Access Management – Discovered in the Study was use of the highway shoulders for local agricultural related event parking. Such motor vehicle parking on narrow shoulder decreases the safety of motorists and pedestrians. WSDOT and law enforcement should work with property owners on eliminating highway shoulder parking use before enforce efforts are required for compliance.

Environmental

WSDOT shall continue to assess the conditions and correction schedule of the fish passage culverts in the study area. The Department shall further identify strategies that result in reductions of crashes with deer and elk.

SR 162 Sumner to Orting Congestion Study Report

APPENDICIES

TABLE OF CONTENTS

APPENDIX A

Study Management Plan/Charter/Communications Plan

SR 162 Sumner to Orting Corridor Study

Study Management Plan

Prepared by

WSDOT
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Phone: 360-357-2600

June 30, 2016

Photos courtesy of WSDOT, and Biking Puget Sound - Bill Thorness

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SR 162 Sumner to Orting Corridor Study

Study Management Plan

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Appendices

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OVERVIEW

The *Study Management Plan* for the State Route (SR) 162 Sumner to Orting Corridor Study offers a description of the key outcomes, tasks, and resources necessary to carry out the study. The SR 162 corridor study will use strategies that take into account WSDOT's new Practical Solutions approach.

The *Study Management Plan* was prepared as both a management tool to guide the study development process, and as an informational overview for communicating the objectives of the study. The study's overall management strategy is summarized, as are the responsibilities, procedures and schedule. In addition, the *Study Management Plan* provides the framework for the study, and establishes the standards by which study performance is measured.

The *Study Management Plan* is founded on a team approach. The plan relies on coordination with stakeholders in order to accurately reflect existing and projected conditions within the study area.

The *Study Management Plan* is intended to:

- Provide a framework for advancing, developing and implementing the *Study Management Plan* in accordance with federal, state, and regional plans, policies and procedures. Specifically, the study will address each of the transportation policy goals established in RCW 47.04.280 to integrate transportation performance at the local, regional and state government levels.
- Specify the management procedures and organizational structure that will be used by WSDOT and its partners to complete the study.
- Establish guidelines for interaction and coordination between the stakeholders who are participating in, and interested in the study.
- Outline study outcomes and the work effort that will be completed over the course of the study.
- Establish a preliminary schedule for completion of the study.
- Document the work effort, and key decisions over the course of the study. This will set the stage for future development of transportation solutions or projects, and subsequent project-level decisions for federal funding.

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STUDY AREA

The study area encompasses 8.11 miles of SR 162 in Pierce County. The study area commencing at the SR 162/SR 410 interchange (MP 0.00) in Sumner; and continuing south to the city limits of Orting (MP 8.11). For your reference, this area is depicted in the map graphic below. This section of highway features a mostly two lane highway classified as an urban minor arterial. The following major county roads intersect SR 162 in this area: Rivergrove Drive, Pioneer Way, 96th Street, Military Road and 128th Street. Interestingly, SR 162 crosses the Puyallup River twice within the study area.

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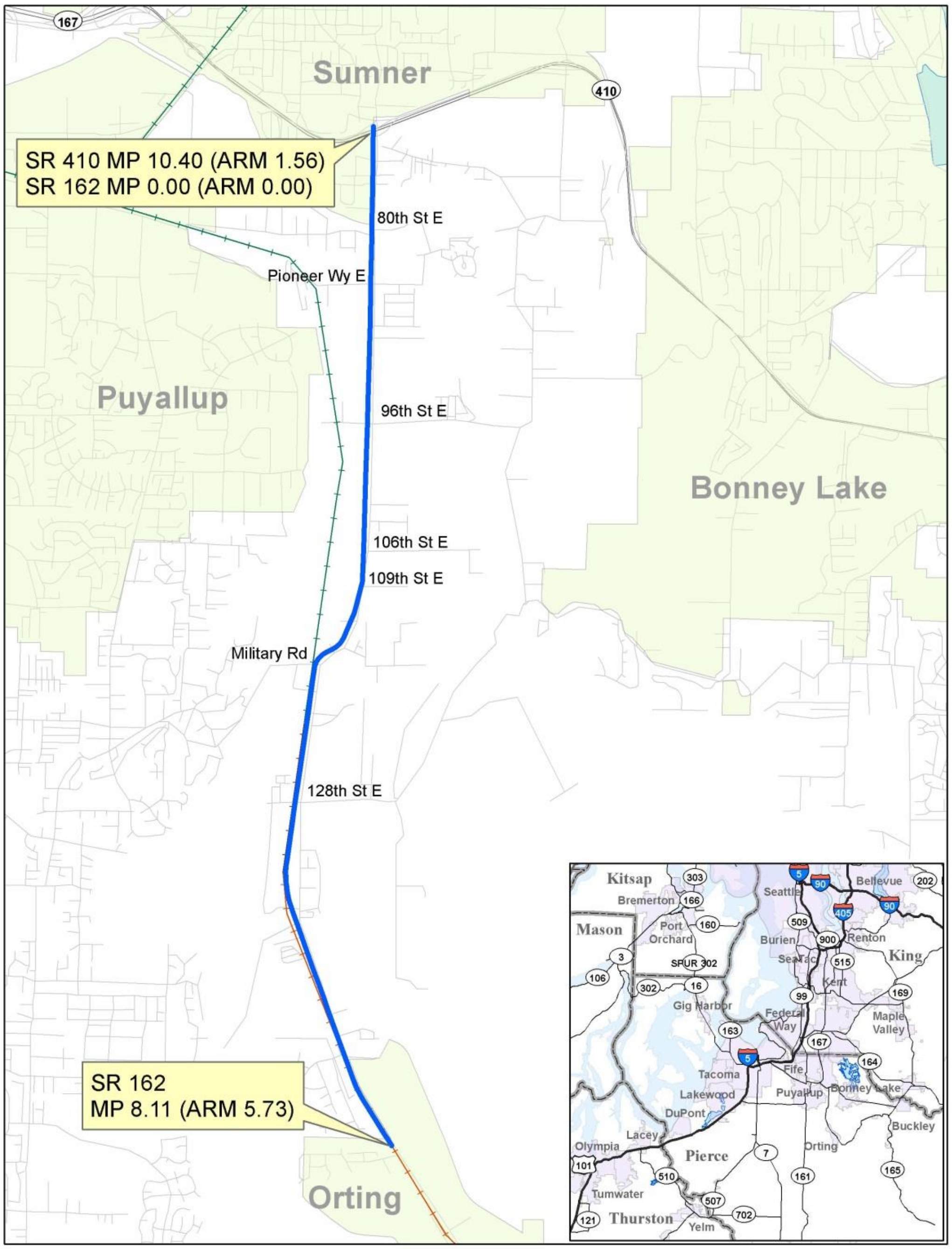

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PURPOSE AND NEED

The purpose of the study is to identify ranked strategies that increase mobility by reducing delay for travelers using the highway corridor, while maintaining or improving the safe operation of the highway.

The need exists to address congestion in the corridor especially at the signalized intersections. The congestion is most pronounced during the peak commute periods. It imposes delays and inconvenience for travelers. This inconvenience creates challenges for travelers, and may have a significant impact on the reliability and mobility at certain times of day.

DRAFT SR 162 CORRIDOR VISION

Together with the community, a corridor vision will be developed. A draft SR 162 Corridor Vision is provided below for your consideration.

> *Actively preserve the essence and character of the Orting Valley while managing corridor performance that supports the local communities and the traveling public.*

STUDY GOALS AND OBJECTIVES

STUDY GOAL

The study will identify ranked strategies that increase mobility by reducing delay for travelers using the SR 162 Sumner to Orting corridor, while maintaining or improving the safe operation of the highway.

STUDY OBJECTIVES

The study will engage partners, transportation service providers, and the community to develop a plan that will:

- Provide a safe and efficient transportation corridor that enhances the mobility and connectivity within the corridor;
- Provide an appropriate balance between the different users (through mobility and local access) along the corridor;
- Identify ranked near-term, mid-term and long-term improvement strategies for the corridor that include operational improvements and demand management strategies;
- Ensure that the strategies provide safe alternative modes of transportation;
- Ensure that the strategies are compatible with existing land use and transportation plans.

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SCOPE OF WORK

The *Study Management Plan* identifies the level of work effort needed by WSDOT to evaluate the state owned transportation system. The plan also contains elements that are necessary to evaluate the regional transportation network. This may assist in the identification of comprehensive transportation strategies within the study area.

1.0 Study Administration and Management

1.1 Study Administration

WSDOT, Olympic Region Planning Office will lead the study. The study lead is responsible for: managing the *WSDOT Multidiscipline, Multimodal Study Team*; maintaining the study schedule; budget; reporting; and monitoring the study's progress.

WSDOT is responsible for maintaining communications with the study stakeholders; organizing the necessary materials and documentation to support the study. Note: documentation materials may include, but is not limited to:

- Status Reports, summary briefings
- Documentation Logs; Risk Management Records
- Quality Control/Quality Assurance
- Close Out

1.2 Study Coordination

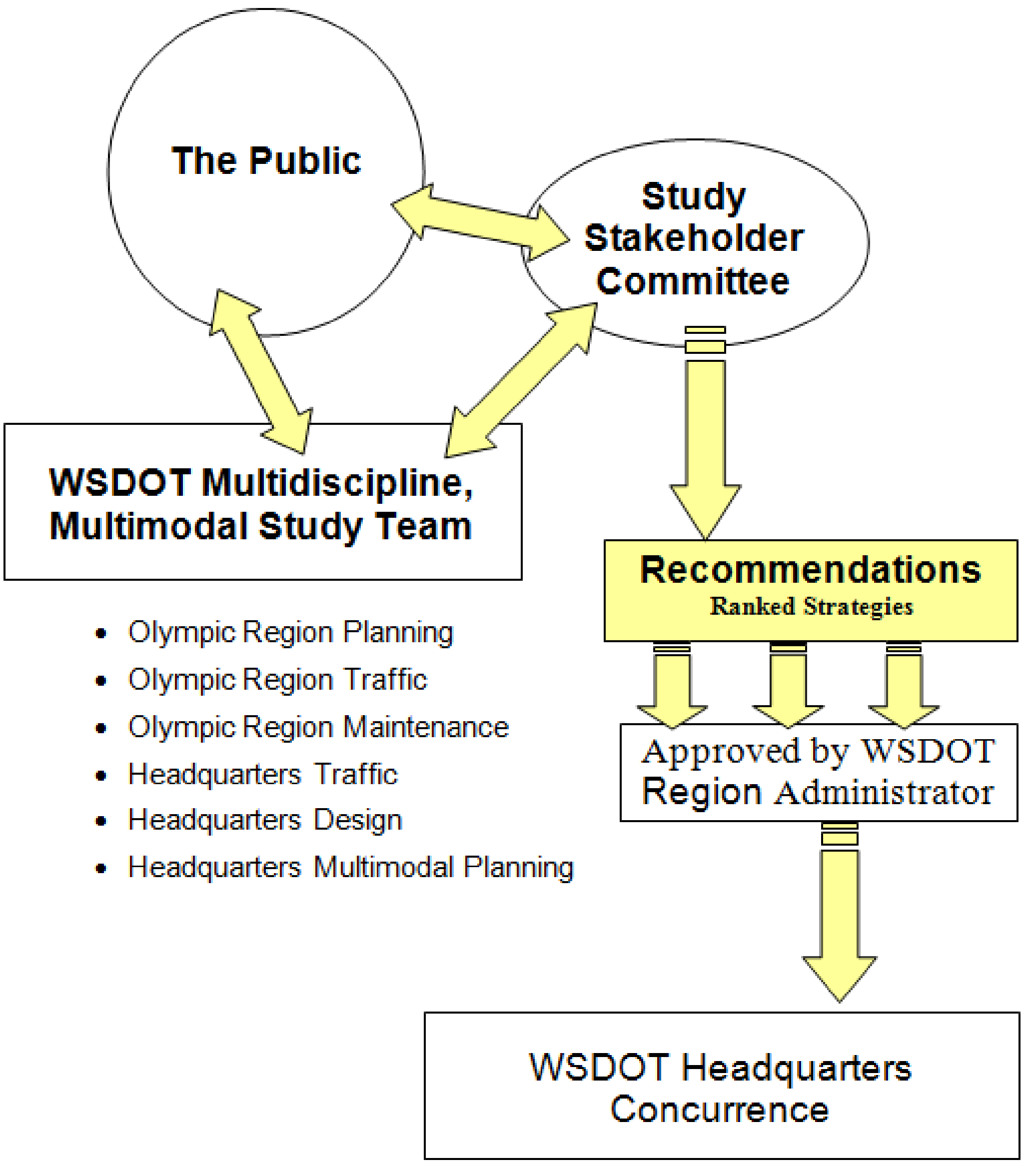
The study will include coordination between WSDOT, Pierce County, Puget Sound Regional Council (PSRC), and the cities of Sumner, Orting, and Bonnie Lake; Pierce Transit and Sound Transit agencies; Muckelshoot Indian Tribe; Nisqually Indian Tribe; Puyallup Tribe of Indians; Squaxin Island Tribe; and the Confederated Tribes and Bands of the Yakama Nation; and the Tehaleh/Newland communities. The above named entities are members of the *Study Stakeholder Committee*. Please reference Figure 1 on Page 8 depicting the *Decision Making Process* for their role in the study.

1.2-1 WSDOT Multidiscipline, Multimodal Study Team –The *WSDOT Multidiscipline, Multimodal Study Team* meetings will be held bi-monthly, or as deemed necessary throughout the study cycle. The Study Team will be primarily responsible for reviewing the study information. At the discretion of the study lead, Study Team meetings may include the entire team; or just the individuals directly responsible for specific tasks identified on the agenda. These meetings will be informal in nature, and may be via in-person, telephone conference call, or by other means available. Reference Appendix A: Study Roles and Expectation Matrix, and Appendix C: Study Stakeholder List.

1.2-2 Study Stakeholder Committee – This advisory committee will be responsible for providing comments on key deliverables in the process; and the identification of alternative transportation strategies.

The study's Decision Making Process is depicted in Figure 1 below.

Figure 1: Decision Making Process



- Olympic Region Planning
- Olympic Region Traffic
- Olympic Region Maintenance
- Headquarters Traffic
- Headquarters Design
- Headquarters Multimodal Planning

1.2-4 Identify Study Area Boundary

The specific boundaries of the study area will be reviewed by the *Study Stakeholder Committee.*

1.2-5 Identify Corridor Vision and Goals

WSDOT will work with the *Study Stakeholder Committee* to develop a vision for the corridor with supporting study goals.

1.3. Change Management Revisions/Amendments

Revisions to the work elements and schedule may be necessary from time to time in order to ensure that the study continues to meet its objectives and expectations. Change Management Requests may be initiated by the study lead in writing through the Change Management request application.

1.3-1 Proposed changes to the study will be evaluated by the study lead to determine:

- If the proposed amendment would be consistent with the study purpose, objectives, schedule, and budget;
- If there is a significant change to the study schedule or budget.

1.3-2 The study lead will be responsible for processing the amendment request, and maintaining the change management record and log.

2.0. Study Charter

The success of this study will be dictated in part by the identification of the underlying assumptions, methodology, and study requirements necessary to evaluate the transportation system (Appendix E).

2.0-1 Develop a Charter Agreement

The Study Charter shall include ground rules, roles and responsibilities, and communication. The charter shall also include processes for reaching an agreement, resolving disputes and for making a final decision process.

The study lead will consult with WSDOT Headquarters to establish a *WSDOT Multidiscipline, Multimodal Study Team.* Members include subject matter experts.

Key Deliverable

- Study Charter Agreement

3.0 Communication Plan

Developing a well thought out communication strategy can be critical to the success of a study. This strategy proactively anticipates community participation needs at the beginning of the study and throughout the process. This strategy provides for the sharing of information; and builds support. The communication plan will identify study stakeholders; determine stakeholders' expectations; and provide the best types of communication methods for early, continuous and meaningful opportunities to maintain open communication and input (Appendix F)

3.1 Developing a Communication Plan

WSDOT will prepare a Communications Plan for the study. The plan will be prepared in accordance with WSDOT procedures. The plan will identify communication and public outreach objectives; key audiences; and outline the communication strategies and processes that will be employed throughout the study. The plan will also delineate communication and outreach responsibilities.

3.2 Communication Plan - Review

The Communication Plan will be reviewed by the *Study Stakeholder Committee*.

Key Deliverables

- Study Stakeholder List (Appendix C)
- Communication Plan (Appendix F)
- List of workshops, meetings and other events

4.0 Data Collection

Study team members will conduct necessary research; compile data and information characterizing the SR 162 corridor. The data used will be supplied by WSDOT, local agencies and other applicable related sources. This research effort will focus on the collection of data related to, but not limited to, the following: geometric configurations of the corridor right of way information; safety (crash data, crash history, etc.); land use; environmental data; pavement and bridge conditions; traffic patterns, volumes and operating conditions for peak (AM and PM Periods); and multimodal applications (sidewalks and bicycles).

The data collection effort will include all available WSDOT and local improvement projects along SR 162 and connecting arterials. Recent study materials from this area will also be utilized. Data will be collected during different points in the schedule as needed.

4.1 Collection of Data, Plans, Studies, and GIS information

Building on the Corridor Sketch Initiative Phase 1 information, GIS and existing data resources, and collect additional data where needed to develop an inventory.

The inventory should identify the following:

- Transportation network
- Traffic volumes on major segments and turning movements counts at intersections on the study corridor
- Intersection controls at intersections on the study corridor
- Transit system, including major transit stations, and park & ride lots as applicable
- Freight/Rail
- Local and Regional Land Use

The table below identifies information needs and primary responsibilities for providing information to support the study.

Result	Information Source	Responsibility
Prepare Base Maps	Aerial Orthophoto	WSDOT
Prepare Base Maps	Topography	WSDOT
Prepare Base Maps	Existing Right of Way	WSDOT
Infrastructure Evaluation	Design Files, As-builts, Orthophoto, Topographic maps, evaluation reports, design standards	WSDOT
Traffic Analysis (baseline)	Traffic Counts	WSDOT and local agencies
Crash Analysis	Crash Data	WSDOT & local agencies
Geometric Analysis	Transportation Infrastructure Geometrics	All agencies
TDM evaluation	Transit System and Park and Ride Lots as applicable	WSDOT
Base Map & TDM evaluation	Bike and Pedestrian facilities, routes & usage	WSDOT & all agencies

The table below identifies information needs and primary responsibilities for providing information to support the study.

Result	Information Source	Responsibility
Modeling & Traffic Analysis	Funded Transportation Projects	All agencies
Traffic Forecast	Study Area Demographics & Forecast Data (Population/Employment/Land Use)	WSDOT and local agencies
Environmental Screening	Floodplains, rivers and streams (FEMA Flood and other existing maps and data sources)	WSDOT, & local agencies
Environmental Screening	Wetlands (National Wetland Inventory and other local supplemental data)	WSDOT, & local agencies
Environmental Screening	Fish and Wildlife Habitat (existing data sources)	WSDOT, & local agencies
Environmental Screening	Geologic Hazards (including seismic hazards and steep slopes)	WSDOT, & local agencies
Environmental Screening	Cultural Resources	WSDOT, Tribes & local agencies
Climate Change & Extreme Weather Strategies	Critical Infrastructure vulnerability Assessment	WSDOT
Traffic Baseline & Forecast	Pierce County Comprehensive Plan	Pierce County

4.2 Prepare Transportation System Base Map(s)

Develop base maps with appropriate data base layers for the study. Maps may include using aerial photographic maps; right of way maps; transportation facilities; environmental documentation; modal elements; federal roads classification; and other information available to represent the study needs. The scale of the maps will be developed in accordance with best practices, and as needed to accurately represent the study.

4.3 Existing Geometric Assessment

Evaluate SR 162 transportation facility geometrics to identify existing needs, and potential constraints in the development of alternatives. Evaluate the following components separately: stopping sight distance; merge and diverge lengths; lane widths; turning lane storage capacity; shoulder and median widths; clearances; infrastructure age and condition ratings; vertical and horizontal roadway curvature; and the spacing between signals at intersections. Using aerial base maps *(scale)* show the following:

- Identify existing geometric conditions that may affect traffic operating conditions or are needed to conduct traffic analysis.
- Identify potential needs and constraints in the development of alternatives.
- Prepare drawings, graphics and other data for SR 162, SR 410 interchanges and ramps as warranted.
- Prepare a summary of Geometric findings.

Key Deliverables

- Data, Resource and Requirements Inventory list of plans, studies and other data collected for the study.
- Base map of study area with data base layers representing the transportation facilities, environmental and other sources.
- Summary Report of Geometrics for SR 162, SR 410 interchange, ramps and structures.

5.0 EXISTING CONDITIONS

WSDOT will conduct a planning level environmental review as part of the existing conditions assessment. The review will be conducted with the aid of geographic information systems (GIS). This review is not intended to replace a more thorough environmental assessment that may be needed in the future. Instead, the purpose of this review is to provide an indication of where sensitive environmental resources may exist within the study area. This information can be used to identify issues or concerns in the development of improvement strategy recommendations for the study corridor. Should any of the recommendations move forward to implementation, this review will be the first step in understanding any environmental challenges that may exist within the study corridor. The environmental challenge will need to be addressed prior to implementation.

SCOPE OF WORK

5.1 Environmental Review

A brief description of environmental factors in the study area will be prepared using GIS and other data for the baseline assessment.

Environmental resources include:

- Floodplains, rivers or stream
- Wetlands
- Climate Change and Extreme Weather
- Wildlife Habitat
- Geotechnical and Soil conditions
- Geologic Hazards include steep slopes
- Traffic Noise
- Water Quality (Stormwater treatment)
- Cultural Resources
- Fish passage

5.2 Consultation with Resource Agencies/Consultation with Tribes

Identify and consult with resource agencies responsible for land-use management, natural resources, environmental protection, conservation and historic preservation.

5.2-1 The Communication Plan identifies stakeholders and processes for participation in Section 2.2 (Appendix F).

5.2-2 Work with resource agencies to identify environmental resources of concern, and potential environmental mitigation activities.

5.2-3 During the alternatives phase of the study, work with resource agencies. Identify those alternatives that may need more specific environmental GIS mapping to address environmental constraints and or mitigation measures.

5.3 Review of Land Use, Regional and Local Comprehensive Plans and Zoning

Each type of land use generates different types of trips that have the potential to impact certain systems if not closely evaluated. General land use inventory should include single family, multifamily, commercial, industrial, agriculture, opens space and recreation.

5.3-1 Provides a brief summary description of existing regional plans, local comprehensive plans, and development regulations within the study area. The summaries may include maps and graphics as appropriate to reflect major land use types as well as agriculture, rural and urban growth areas.

5.3-2 The Pierce County's travel demand model will be used for the study's modeling effort. The most recent land use data will be incorporated into the travel demand model.

5.3 Review of Land Use, Regional and Local Comprehensive Plans and Zoning

5.3-1 Provides a brief summary description of existing regional plans, local comprehensive plans, and development regulations within the study area. The summaries may include maps and graphics as appropriate to reflect major land use types as well as agriculture, rural and urban growth areas.

5.3-2 The Pierce County's travel demand model will be used for the study's modeling effort. The most recent land use data will be incorporated into the travel demand model.

5.4 Social Economic and Demographics

Identify and document the social, economic, and demographic information within the study area, including the presence of minority and/or low-income populations. Population, employment data, and forecast information will be provided by Pierce County and PSRC. This information will also be supported in the Travel Demand Model. Prepare text summary with maps and graphics to document conditions in the study area.

Key Deliverables

- Consultation resource contact list and summary of concerns and potential mitigation activities.
- Prepare a text summary of the environmental areas, land use and demographic factors with charts, maps, and graphics to document the conditions in the study area with appropriate citations.

6.0 Crash Analysis

WSDOT staff will conduct a crash analysis for the SR 162 corridor; the SR 410 interchange; and appropriate ramps. Crash data and analysis will be analyzed per the Highway Safety Manual's guidelines and procedures. WSDOT will employ agency safety guidance for corridor planning studies.

6.1 Crash Analysis Methodology

Identify crash analysis methodology for highways and regional network. Collect and Analyze Crash Data. The data analysis per the Highways Safety Manual's guidance will be summarized in tabular and graphical format.

6.2 Crash Technical Report

Summarize the crashes in the corridor by type, location, frequency, severity and time of day. Crash data will be summarized by segment on the highway, including the SR 410 ramp segments, and at the ramp terminal intersections. Similar crash summaries will be completed for the local regional road system within the study area. The crash analysis will use the most recent 5-year data available from WSDOT.

- Present Data Analysis to the WSDOT Study Team

Key Deliverables

- Crash Analysis Technical Report

7.0 Existing Traffic Operations

This task element relies on the integration of resources, data and analysis from WSDOT and Pierce County. The integration of resources is needed to conduct a baseline assessment of all modal elements of the study area's transportation network. The primary purpose of the analysis will be to identify modal travel patterns.

7.1 Existing Traffic Data Collection

The following data will be collected for the base year traffic analysis:

- AM and PM peak periods traffic volumes on selected locations in the study area
- AM and PM peak periods turning movement counts at intersections in the study corridor
- Travel time observation on the study corridor area
- Signal timing plans at each signalized intersection on the study area

7.2 Existing Traffic Operations Analysis

The analysis will evaluate and analyze the traffic operations, corridor segments, and intersections within the study corridor. Additional tools may also be used to analyze other modes such as transit activity, to validate the results of the model and/or as needed to accurately reflect operating conditions.

7.2-1 The Synchro 8 and SimTraffic 8 macro-simulation software will be used to conduct AM and PM peak hour (HCM 2010) operational analysis. Below are examples of some performance measures that may be used in the model.

- Segment and Intersection delay and level of service
- Travel time
- Average speeds
- Intersection Queue length

7.2-2 Using the results from WSDOT's traffic analysis, identify where there are existing operational performance issues associated with the following:

- Arterial Operations (local arterial intersections LOS and congestion)
- Travel time reliability

7.3 Model Development/Calibration/Validation

The Pierce County travel demand model will be used for this study. The base year will be Year 2015. The primary objective of the model calibration/validation is to obtain the model estimates within the predefined calibration/validation targets comparing with the observed performance measures. The calibration/validation will be conducted for AM and PM peak periods for the following performance measures:

- traffic volumes at selected screen lines
- traffic volumes on the study corridor
- travel time on the study corridor; and visual audits for queue length at major intersections
- travel time on the study corridor; and visual audits for queue length at major intersections

7.4 Review and Approve Base Year 2015 Model

WSDOT will send the model volume outputs with the validation results to the WSDOT Multidiscipline, Multimodal Study Team for review.

8.0 Future Year Travel Demand Forecasts

This element will prepare a travel demand forecast analysis in the study area and include motorized transportation modes. The analysis will use 2035 population and employment forecasts and travel demand model developed by Pierce County for their 2015 GMA update. The transportation forecast will use baseline transportation network analysis identified in 8.0 for 2035.

8.1 Update Future-year baseline Travel Demand Forecasts (5-year forecast 2020, 10-year forecast 2025 and 20-year 2035 forecast)

WSDOT will conduct future year 5-year 2020, 10-year 2025 and 20-year 2035 travel demand forecasts. This analysis will evaluate the regionally significant transportation network and demand on the study area. Demand volumes to capacity ratio will be analyzed for the selected major corridors and particularly the study corridor.

8.2 Review and approve Network Volume for (5-year 2020, 10-year 2025 forecast and 20-year 2035 forecast) conditions

WSDOT will send model volume outputs to select WSDOT Multidiscipline, Multimodal Study Team for review.

8.3 Trip Generation on the Anticipated Development

WSDOT will follow ITE Trip Generation Manual.

8.4 Evaluation of future no action transportation network Performance for 5-year 2020, 10-year 2025 and 20-year 2035 conditions.

The analysis will evaluate and analyze the traffic operations, corridor segments, and intersections within the study corridor in conditions with the demand added from anticipated development. It is to determine the types of improvements the corridor will need to meet future demand. Other models may also be used to analyze other modes such as transit activity (as applicable), to validate the results of the model and/or as needed to accurately reflect operating conditions.

8.4-1 Using the results from WSDOT's traffic analysis, identify where there are existing operational performance issues associated with the following:

- Arterial Operations (local arterial intersections LOS and congestion)
- Travel time reliability

8.4-2 Compare the forecast demand volumes with the travel demand capacity of the transportation network.

8.4-3 Summarize the information in a graphic/table to represent the future AM and PM peak periods segment volumes to evaluate the demand on the corridor.

8.4-4 Compare the future Transportation Forecast analysis to the baseline traffic analysis to determine changes and reasons for changes in system performance.

8.4-5 The Synchro 8 and SimTraffic 8 macro-simulation software will be used to conduct AM and PM peak hour (HCM 2010) operational analysis. Below are examples of some performance measures that may be used in the model.

- Segment and Intersection delay and level of service
- Travel time
- Average speeds
- Intersection Queue length

8.5 Evaluation of improvements of future transportation network Performance for 5-year 2020, 10-year 2025 and 20-year 2035 conditions.

When the types of improvements are determined for the corridor to meet future demand, the analysis will evaluate and analyze the traffic operations, corridor segments, and intersections within the study corridor with the recommended improvements.

8.5-1 Review the travel pattern with the improvements. If the travel pattern would change significantly due to the improvements, the travel demand model would be rerun with the improvements coded in the model.

8.5-2 The Synchro 8 and SimTraffic 8 macro-simulation software will be used to conduct AM and PM peak hour operational analysis with the improvements. The performance with improvements will be compared with the future baseline and no action conditions. Below are examples of some performance measures that may be used in the model.

- Segment and Intersection delay and level of service
- Travel time
- Average speeds Intersection Queue length

9.0 Corridor Strategies Development

The *WSDOT Multidiscipline, Multimodal Study Team* will review and organize the *Strategy Development* tasks in a staged approach.

A *Needs Assessment* of the existing transportation network will be conducted. Stakeholders will identify a reasonable range of strategies for the transportation system to address future employment and population needs.

Next the identified strategies will be evaluated using a double screening method. Each screening method will have its own specific set of criteria that addresses the statewide and regional policy goals. Each screening will be conducted using a high level qualitative approach to address outcomes and proposed strategies.

9.1 Prepare a *Needs Assessment*

The baseline traffic conditions will be used to identify the transportation network performance and needs as identified in 8.3 and 8.4. The WSDOT Multidiscipline, Multimodal Study Team will review and agree on performance results and needs.

WSDOT will calibrate the traffic model in conjunction with estimates of future socioeconomic conditions that will be used to identify future transportation network conditions and potential deficiencies. In addition, system-wide measures of effectiveness (MOE's), such as total vehicle delay, can be used to gain a relative estimation as to the rate at which levels of congestion will be increasing over time throughout the study area.

9.1-1 Distribute the Needs Assessment to the *WSDOT Multidiscipline, Multimodal Study Team*, and *Study Stakeholder Committee* for comments.

9.1-2 Re-evaluate the Needs Assessment as needed to address concerns and comments.

9.2 Prepare Transportation 2020, 2025 and 2035 Forecast Analysis Technical Report

WSDOT will prepare a Baseline Condition Assessment and Transportation 2020, 2025 and 2035 Forecast Analysis Technical Report. The report will present the traffic tools and approach, peak periods/hours analysis, traffic and modal element data, travel demand forecasts, and other elements as needed to convey the results of the analysis in text and graphically to represent the results.

- Provide a summary briefing of the report to the *WSDOT Multidiscipline, Multimodal Study Team*, *Study Stakeholder Committee,* and other stakeholders upon request.

Using the information from the study the WSDOT Multidiscipline, Multimodal Study Team will identify the methodology and criteria that should be used to evaluate and assess each alternative. Screening criteria will be developed that weigh the benefits and impact of each strategy to determine which strategies show the most promise for solving deficiencies

9.3 Identify Methodology and Criteria to Evaluate Strategies 9.3-1 Prepare screening criteria and provide definitions for each criterion. Evaluation criteria should include economic benefits, environmental concerns, community issues, traffic and safety concerns, cost estimates, and other criteria as needed to address state and regional issues.

9.3-2 Submit the draft methodology and approach to the *WSDOT Multidiscipline, Multimodal Study Team* for comment and adjust as necessary to meet the goals and objectives of the study

9.3-3 Prepare final screening criteria and definitions and submit to the *WSDOT Multidiscipline, Multimodal Study Team*, and the *Study Stakeholder Committee* for review.

9.4 Identify Strategies

Alternatives should consider a wide range of strategies for achieving the operational and safety objectives of the highway, intersections, interchange and local-regional corridors within the study area.

9.4-1 To assist in identifying a range of transportation strategies, stakeholders and community engagement will be initiated, including an online survey.

- Prepare online survey.

9.4-2 Summarize the results of the *Study Stakeholder Committee* meetings and Community Engagement including sketch level location of strategies. Group the results into the following categories:

- Operational Improvements
- Local Regional Network Improvements
- Transportation Demand Management and Land Use
- Strategically Increase Capacity

9.5 High Level Strategy Identification

WSDOT will consider a wide range of strategies for achieving the operational objectives of the highway, major arterial intersections and local-regional corridors in the study area.

9.5-1 Evaluate and rank the alternatives using the methodology and criteria identified in 9.3. A no action alternative will also be analyzed in the Alternatives Analysis.

9.5-2 The Study Lead will provide a brief summary of the results, sketch level location, ranked strategies, and findings. They will then present those findings to the *WSDOT Multidiscipline, Multimodal Study Team* for comments.

The *Study Team* will provide recommendations on the Screening Alternatives Evaluation, and identify and confirm ranked strategies recommendations.

9.5-3 Recommendations will then be forwarded to the *Study Stakeholder Committee* for consideration.

10.0 Plan Documentation

Prepare reports and supporting documentation.

10.1 WSDOT will prepare a draft report. The report will summarize the study findings, including existing conditions, options considered, and improvement ranked strategy recommendations. A clear vision for the future of SR 162 corridor will be presented. The report will include, but is not limited to a description of transportation facilities, traffic volumes and operations, geometrics, safety, high level scan of environmental factors, land use, and provide a baseline assessment and 2035 Future Transportation Forecast, and ranked improvement strategy recommendations, for the near-term, mid-term, and the long-term.

Key Deliverables

- Final SR 162 Sumner to Orting Corridor Study.

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GLOSSARY

AM Peak Hour

Traffic counts, forecasts and analysis in this study are based on average traffic conditions during a two hour AM Peak period that runs from 6 am to 8 am.

Baseline

The existing transportation system's characteristics and performance in both AM and PM peak hour conditions for the base year.

Base year

The year from which transportation, land use, population and employment data is gathered in order to establish existing transportation system performance.

Communication Plan

The Communication Plan is a document that identifies the study objectives and communication strategy that will be used during the study.

Federal and State

Investment strategies on federal or state transportation facilities are forwarded to WSDOT Capital Development Program and Management Office for evaluation. Investments will be evaluated against other regional and statewide priorities to determine inclusion in the WSDOT Highway System Plan.

Future no-action

Refers to the transportation system's performance in PM peak hour conditions, reflecting the future year traffic forecast applied to the existing transportation system that has been modified to include currently known and funded, improvements.

Future year

The year (or years) chosen as the basis for evaluating future transportation system performance, system needs and alternatives to address system needs.

Highway Capacity Manual (HCM)

Guides the application of traffic engineering principles for evaluating transportation system performance and strategies.

Investment Strategy

A document that identifies future statewide and regional investment strategies to implement projects identified in a corridor planning effort. Projects and strategies identified in the Investment Plan may include funded and non-funded projects; and responsible agencies and partnerships. The purpose of the Implementation Strategy will be to provide decision makers with information to support informed decisions for future state, regional and local projects and partnerships.

Local Jurisdictions and Agencies

Proposed investment strategies on the local regional transportation network will be forwarded to the appropriate agency and/or jurisdictions for formal board review and approval to determine inclusion in their capital facilities plan.

PM Peak Hour

Traffic counts, forecasts and analysis in this study are based on average traffic conditions during a two hour PM Peak period that runs from 4 pm to 6 pm.

GLOSSARY

Practical Solutions

The overarching umbrella that encompasses both Least Cost Planning and Practical Design.

Practical Design

An approach to making project decisions that focuses on the need for the project and looks for the lowest cost solutions. It engages local stakeholders at the earliest stages of defining scope to ensure their input is included at the right stage of project design.

Least Cost Planning

An approach to making highway planning decisions that considers a variety of conceptual solutions to achieve the desired system performance targets for the least cost. Central to least cost planning is a process that engages the public, applies methods to evaluate, practical solutions, planning options, and how to select options.

Study Lead

The study lead is responsible for accomplishing the study objectives and manages the planning, execution and closing of the study. Multiple managers are assigned to this study to address different needs in the study under their respective authority. See the Study Responsibility Matrix in Appendix A.

Study Management Plan

The *Study Management Plan* refers to the study purpose statement, study objectives and assumptions, work elements (scope of work), schedule, budget, coordination and communication plan, requirements, work delivery plan, risk management plan and quality control. These elements will assist in the study administration and development of the study in accordance with WSDOT organization policies and procedures.

WSDOT Multidiscipline, Multimodal Study Team

The WSDOT Multidiscipline, Multimodal Study Team is made up of all the individuals that have assigned roles and responsibilities for completing the study including collecting, analyzing, reviewing data and information, and providing recommendations The WSDOT Multidiscipline, Multimodal Study Team may include subject matter experts and decision makers from federal, state, regional, and local agencies.

Study Stakeholder Committee

This advisory committee is responsible for providing support and guidance to policy and technical documents related to the study.

Stakeholders

References those entities within or near the study area that may be impacted by the study, have the authority to act, and or have an interest in the study.

Traffic Analysis Zones (TAZ)

The unit of geography used in a travel demand model which generates and attracts trips on a modeled transportation network based upon the land use, population and the employment characteristics of all of the TAZ's established in the travel demand model.

Traffic Forecast

The forecast of volume, by mode in AM/PM peak hour conditions that travels or impacts travel on the transportation network in the study area.

GLOSSARY

Transportation Demand Management

Strategies aimed at changing travel behavior rather than expanding the transportation network to meet travel demand. Such strategies can include the promotion of work hour changes, ride sharing options, parking policies and telecommuting.

Transportation Policy Goals

Six transportation policy goals were established in RCW 47.04.280 by the legislature for the planning, operation, performance, and investment in the state's transportation system. The intent of the legislation was to ensure that the transportation system performance at the local, regional, and state agencies were consistent and achieved detailed and measurable objectives to support public investments in the transportation system. The six transportation policies include economic vitality, preservation, Safety, mobility, environment and stewardship.

WSDOT

Refers to the Washington State Department of Transportation

WSDOT Design Manual

This manual sets forth engineering standards and guidelines for the design of state highway infrastructure.

Washington State Highway System Plan (HSP)

The HSP is the state highway component of the Washington Transportation Plan.

Washington Transportation Plan (WTP)

The WTP also referred to as the Washington State Multimodal Transportation Plan, and provides the statewide policy that guides transportation funding and investment strategy at the local, regional and state level.

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Roles and Responsibilities Matrix

Study Role	Description (how the role is to be used for this study)
WSDOT Planner Study Lead	Provide study oversight, review, monitor, and control study progress. Develop and manage scope, schedule, and other study administration and management tools. Lead communications between *WSDOT Multidiscipline, Multimodal Study Team*, *Study Stakeholder Committee*, and the *Study Lead*. Recommend and manage strategies that may be needed to keep the study within scope and schedule. Manage study risks and change management process. Coordinate activities among multiple parties and maintain open communication with federal, state, and local jurisdiction staff. Hold meetings as necessary to explain concept, approach, roles, and timeline.
Technical Study Lead	Provide study oversight, review, and facilitate traffic data collection and analysis including the baseline transportation technical analysis; future forecast analysis; crash analysis; and geometrics; and alternatives development with technical staff. Evaluate and coordinate on traffic models and coordinate prioritization of improvement options with traffic and others. Contribute to analysis of risks, needs and opportunities. Lead development of planning-level cost estimates, and benefit/cost analysis as needed.
Traffic Engineer	Provide information, documentation, analysis and recommended strategies and actions to develop the baseline traffic analysis, future no build forecast analysis, crash analysis, needs assessment and development of alternatives. Develop planning level cost-estimates and benefit/cost analysis as needed.
Design	Develop, analyze and provide recommendations on design components of the study including geometrics, environmental, crash, alternatives development and other components as needed in the study area. Contribute to analysis of risks, needs and opportunities. Contribute to development of improvement options. Contribute to planning-level cost estimates. Contribute to evaluation of improvement options. Contribute to and create text and graphics for final report.
Environmental	Communicate with federal, state, local and tribal agencies to obtain timely environmental information, documentation, and other measures as necessary to meet applicable WSDOT policies, and state and federal environmental regulations. Provide study environmental oversight and guidance to the *WSDOT Multidiscipline, Multimodal Study Team*. Identify existing and potential environmental constraints during alternatives development and evaluation.
Communications	Communicate with the public and media on the study as appropriate and when needed to provide public outreach, workshops and meetings. Maintain webpage, media information and facilitate study information to media and the public throughout the life of the study. Assist in developing and reviewing study documents, draft and final reports and study messaging. Contribute to the text and graphics of the final report.
Study Sponsor	Sustain executive and organizational commitment and support for the study. Communicate business direction changes to the study lead. Approve any change request to the study scope, schedule, or budget.

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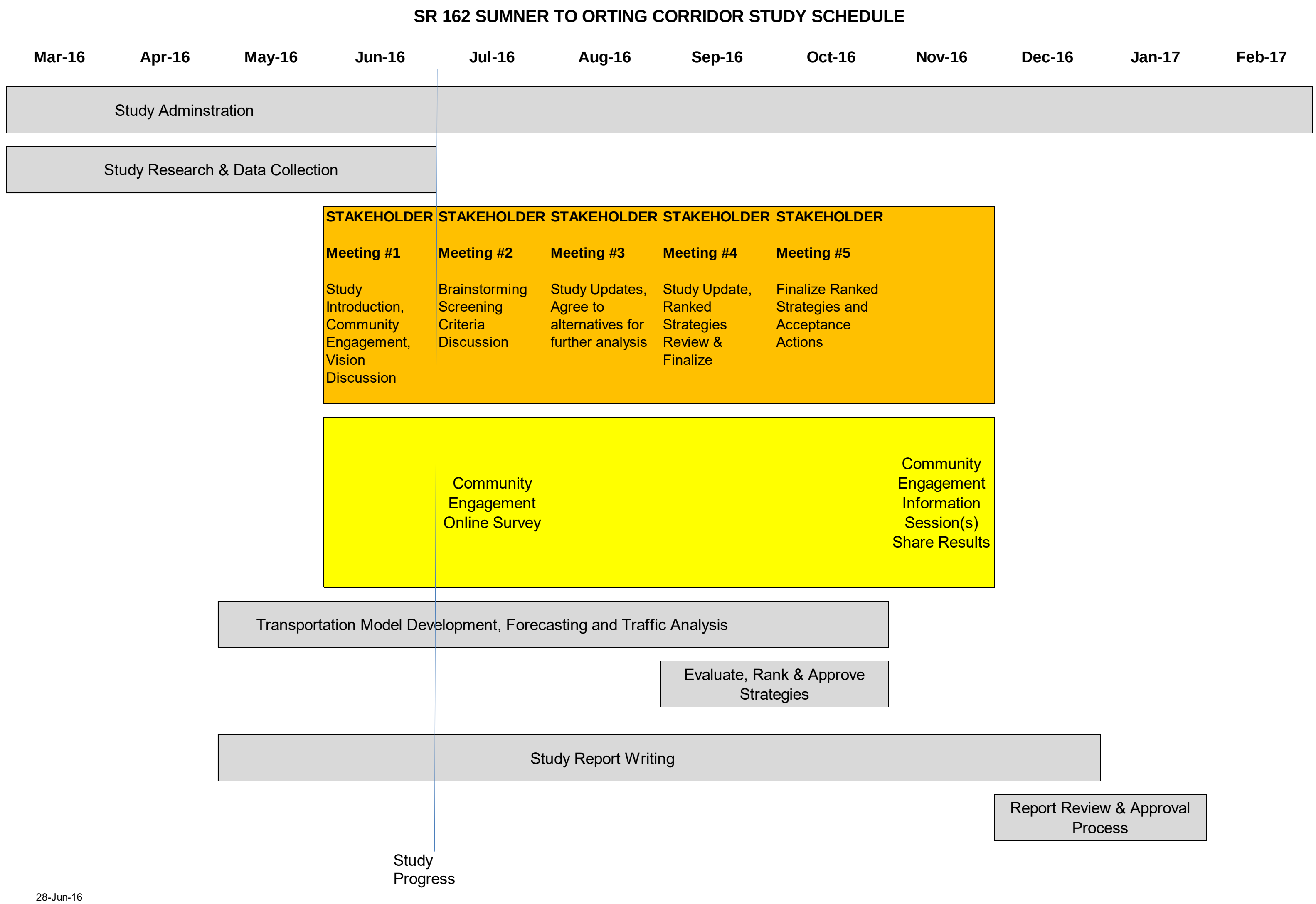
Appendix B

Schedule



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Appendix C

SR 162 Sumner to Orting Corridor Study
Study Stakeholder Committee List

Stakeholder	Contact Person	E-mail address	Phone
Pierce County	Jesse Hamashima	jhamash@co.pierce.wa.us	253.798.2760
City of Bonney Lake	Jason Sullivan	sullivanj@ci.bonney-lake.wa.us	253.447.4355
City of Orting	Mark Bethune	mbethune@cityoforting.org	360.893.2219 x115
City of Sumner	Eric Mendenhall	ericm@ci.sumner.wa.us	253.299.5524
Puget Sound Regional Council	Sean Ardussi	sardussi@psrc.org	206-464-7080
Tehaleh/Newland Communities	Tom Uren	turen@newlandco.com	253.275.3361
Muckleshoot Indian Tribe	Dezerae Hayes	Dezerae.Hayes@muckleshoot.nsn.us	253.876.3321
Nisqually Indian Tribe	Heidi Thomas	Thomas.Heidi@nisqually-nsn.gov	360.456.5221.
The Puyallup Tribe of Indians	Andrew Strobel	Andrew.Strobel@PuyallupTribe.com	253.573.7879
Squaxin Island Tribe	Teresa Wright.	twright@squaxin.us	360-432-3901
Confederated Tribes and Bands of the Yakama Nation	Alvin Pinkham	apinkham@yakama.com	509.865.5121 x6735
Pierce Transit	Jason Kennedy	jkennedy@piercetransit.org	253-581-8135
Sound Transit	Eric Chipps	eric.chipps@soundtransit.org	206.398-5020
WSDOT Headquarters	Scott Zeller	ZellerS@wsdot.wa.gov	360.705.7253
WSDOT Region Planning	Dennis Engel	EngelD@wsdot.wa.gov	360.357.2651

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Appendix D

Risk Management Matrix

RISK MANAGEMENT MATRIX
STUDY DATE: June 22, 2016
STUDY NAME: SR 162 Sumner to Orting Corridor Study
SPONSOR: WSDOT
STUDY CONTACT:T.J. Nedrow (360) 357-2728 nedrowt@wsdot.wa.gov
STUDY DESCRIPTION: The Study will identify and prioritize a range of countermeasures that have the potential to reduce congestion along the corridor.

DATE: June 22, 2016

RISKS WILL BE MANAGED, DOCUMENTED AND REPORTED

ID	Risk Description	Organization	Probability	Impact	Risk Response *(Threats /Opportunities)*	Description of Risk Response
	What Risks may be associated with this study?					How will you respond to this risk and what actions will you take to match that response?
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17	OPPORTUNITIES					
18						
19						
20						

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SR 162 Sumner to Orting Corridor Study

Study Charter

June 30, 2016

Olympic Region Planning
P. O. Box 47440
Olympia, WA 98504-7440
Phone 360-357-2600

Photos courtesy of WSDOT, *Biking Puget Sound - Bill Thorness*

Title VI Notice to Public

It is the Washington State Department of Transportation's (WSDOT) policy to assure that no person shall, on the grounds of race, color, national origin or sex, as provided by Title VI of the Civil Rights Act of 1964, be excluded from participation in, be denied the benefits of, or be otherwise discriminated against under any of its federally funded programs and activities. Any person who believes his/her Title VI protection has been violated, may file a complaint with WSDOT's Office of Equal Opportunity (OEO). For additional information regarding Title VI complaint procedures and/or information regarding our non-discrimination obligations, please contact OEO's Title VI Coordinator at (360) 705-7082.

Americans with Disabilities Act (ADA) Information

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855-362-4ADA (4232). Persons who are deaf or hard of hearing may make a request by calling the Washington State Relay at 711.

Notificación de Titulo VI al Público

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de participación o sea negado los beneficios, o sea discriminado bajo cualquiera de sus programas y actividades financiado con fondos federales sobre la base de raza, color, origen nacional o sexo, como proveído por el Título VI de el Acto de Derechos Civiles de 1964. Cualquier persona que cree que sus protecciones de Titulo VI han sido violadas, puede hacer una queja con la Oficina de Igualdad de Oportunidades (OEO). Para información adicional con respecto a procedimientos de quejas de Titulo VI y/o información con respecto a nuestras obligaciones sin discriminación, por favor de comunicarse con el Coordinador de Titulo VI de la Oficina de Igualdad de Oportunidades (OEO) (360) 705-7082.

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INTRODUCTION AND STUDY DESCRIPTION

State Route (SR) 162 is an important north-south link for the Orting community and the surrounding area of southeast Pierce County. This mostly 2-lane highway is classified as an urban minor arterial

The study was funded through the Legislative Evaluation & Accountability Program (LEAP) as part of the Connecting Washington Projects package as developed on June 28, 2015. A total of $450,000 was allocated over the 2015-2017 and 2017-2019 biennium.

The WSDOT 2007-2026 Highway System Plan (HSP) (Appendix L) identifies two sections on the SR 162 corridor needing further study (2007) MP 0.00 to 3.21 (SR 410 I/C to pioneer Way & MP 3.21 to 7.10 Pioneer Way to 144th Street East).

STUDY PURPOSE AND NEED, VISION, AND GOAL AND OBJECTIVES

Purpose and Need

The purpose of the SR 162 Sumner to Orting Corridor Study is to identify ranked strategies that increase mobility by reducing delay for travelers using the highway corridor, while maintaining or improving the safe operation of the highway.

The need exists to address congestion in the corridor especially at the signalized intersections. The congestion is most pronounced during the peak commute periods. It imposes delays and inconvenience for travelers. This inconvenience creates challenges for travelers, and may have a significant impact on the reliability and mobility at certain times of day.

Draft SR 162 Corridor Vision

Together with the community, a corridor vision will be developed. A draft SR 162 Corridor Vision is provided below for your consideration.

> *Actively preserve the essence and character of the Orting Valley while managing corridor performance that supports the local communities and the traveling public.*

Study Goal

STUDY GOAL

The study will identify ranked strategies that increase mobility by reducing delay for travelers using the SR 162 Sumner to Orting corridor, while maintaining or improving the safe operation of the highway.

Study Objectives

STUDY OBJECTIVES

The study will engage partners, transportation service providers, and the community to develop a plan that will:

- Provide a safe and efficient transportation corridor that enhances the mobility and connectivity within the corridor;
- Provide an appropriate balance between the different users (through mobility and local access) along the corridor;
- Identify ranked near-term, mid-term, and long-term improvement strategies for the corridor that include operational improvements and demand management strategies;
- Ensure that the strategies provide safe alternative modes of transportation;
- Ensure that the strategies are compatible with existing land use and transportation plans.

GROUND RULES

Stakeholder Committee members agree to:

- Start and stop on time
- Be constructive and come to meetings prepared
- Seek first to understand, and then to be understood
- Value constructive feedback
- One speaker at a time
- Innovate and stay open to new ideas
- Silence is consent
- Decisions by consent
- Maintain a focus on strategies that benefit the roadway segment.
- Share information openly, honestly, and promptly.
- Be patient when information may not be readily available.
- Articulate concerns as early as possible.
- Respect each other's time and commitment.
- Offer solutions to go with problems.
- Make group decisions openly.
- Respect the decisions made by the group.

ROLES AND RESPONSIBILITIES

The Study Lead agrees to:

- Effectively manage the scope, schedule, and budget.
- Keep partners informed of study progress.
- Complete all necessary documentation to support recommendations.
- Provide technical expertise when requested.
- Manage logistics for meetings.
- Brief local decision-makers and produce briefing materials and reports when requested by stakeholders.

Study Stakeholder Committee members agree to:

- Comment on materials promptly when requested.
- Provide expertise and perspective when requested.
- Provide data and technical information when requested.
- Arrive for meetings on time.
- Confirm attendance or lack thereof.
- Delegate a substitute member when necessary.
- Be prepared for and actively participate in meetings.

WSDOT Multidiscipline, Multimodal Study Team agree to

- Participate in bi-monthly meetings, or as deemed necessary throughout the study cycle.
- Review of all study materials.

• COMMUNICATION

Between meetings:

- E-mail: WSDOT copied on all correspondence; full team (including stakeholders) copied when appropriate.
- WSDOT will maintain and update a project website.
- Meetings are only called when necessary.

- ## COMMUNICATION

At meetings:

- At least one representative from each of the Stakeholder Committee partners should be present.
- Informed alternates are acceptable and encouraged if the designated Stakeholder partner cannot attend.
- Meetings end with clear understanding of expectations and assignments for next steps.
- Decisions are documented at the close of every meeting.

DECISION MAKING

WSDOT will communicate with the *Study Stakeholder Committee* regarding which decisions are within the purview of each group.

At times, WSDOT will reach consensus on a decision and report those to the Stakeholder Committee. In other cases, WSDOT will bring issues to the group for discussion and analysis at the Stakeholder Team meetings.

- Stakeholders will strive to reach agreement by consensus at a level that can be characterized as partners being willing to accept the proposed action.
- Minority opinions will be reflected in the final report on recommendations.
- Stakeholders will avoid spending an inordinate amount of time working toward consensus on any issue at the expense of reaching consensus on other issues.
- Stakeholders agree not to revisit decisions once they have been made.

CONFLICT IDENTIFICATION & RESOLUTION

When an issue arises that cannot be easily resolved, the partners agree to:

- Determine if the issue should be resolved within the group or be taken to higher levels.
- Ensure the appropriate decision makers are at the table to resolve the issue.
- Remember that controversial projects are unlikely to receive funding; the intent of all parties is to resolve issues so projects can be funded.

The WSDOT Project Team and Stakeholders will work to resolve conflicts respectfully and when making group decisions will strive for consensus. If consensus cannot be achieved, the involved parties will meet together, separate from the group to resolve the conflict on their own. If consensus still cannot be reached, WSDOT has the authority to choose the solution most consistent with the project goals, except for specific decisions requiring federal agency concurrence.

Appendix F

SR 162 Sumner to Orting Corridor Study

Communication Plan

June 30, 2016

WSDOT

Olympic Region Planning
P. O. Box 47440
Olympia, WA 98504-7440
Phone 360-357-2600

Photos courtesy of WSDOT, & *Biking Puget Sound - Bill Thorness*

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Introduction:

SR 162 is an important north-south link for the Orting community and the surrounding area of southeast Pierce County. This mostly 2-lane highway is classified as an urban minor arterial

The purpose of the State Route (SR) 162 Sumner to Orting Corridor Study is to identify ranked strategies that increase mobility by reducing delay for travelers using the highway corridor, while maintaining or improving the safe operation of the highway.

The need exists to address congestion in the corridor especially at the signalized intersections. The congestion is most pronounced during the peak commute periods. It imposes delays and inconvenience for travelers. This inconvenience creates challenges for travelers, and may have significant impact on the reliability and mobility at certain times of the day.

The study was funded through the Legislative Evaluation & Accountability Program (LEAP) as part of the Connecting Washington Projects package as developed on June 28, 2015. A total of $450,000 was allocated over the 2015-2017 and 2017-2019 biennium.

The WSDOT 2007-2026 Highway System Plan (HSP) (Appendix L) identifies two sections on the SR 162 corridor needing further study (2007) MP 0.00 to 3.21 (SR 410 I/C to pioneer Way & MP 3.21 to 7.10 Pioneer Way to 144th Street East).

Target Audience:

WSDOT's Olympic Region Planning office is the study lead. The study's structure consists of a stakeholder committee and an internal *WSDOT Multidiscipline, Multimodal Study Team.* The *Study Stakeholders Committee* consists of representatives from the following entities:

Agencies/Tribes/Interest Groups

- WSDOT, Planning
- WSDOT, Headquarters
- Pierce County
- Puget Sound Regional Council
- City of Sumner
- City of Orting
- City of Bonney Lake
- Muckleshoot Indian Tribe
- Pierce Transit
- Puyallup Tribe of Indians
- Squaxin Island Tribe
- Nisqually Indian Tribe
- Confederated Tribes and Bands of the Yakama Nation
- Newland Communities (Tehaleh developer)

Note: The study team will also coordinate with Public Safety, Foothills Trail Coalition and the Tacoma Wheelman Bicycle Group.

How does this study affect your audience?

Land use zoning for the region is mixed and predominately rural with tracts designated for residential development.

A major development is planned in the region. The Tehaleh development is a proposed 4,200-acre employment-based community. This planned community may feature up to 9,200 homes with a 419-acre employment center, fire station, seven public schools and a park and trail system. This development is proposed to have connection to SR 162, and may adversely impact the current and future operation of the highway.

Key Messages

- It is important to understand the local issues, plans and perspective along state highway corridors to adequately plan for the future;
- Engage local and regional partners and the community in fulfilling study objectives and anticipated outcomes;
- WSDOT is looking for input from partners and community members along the corridor, and will actively seek input as the study progresses;
- Coordinated and collaborative approach in enhancing the corridor.

Key Dates

- **Spring 2016**
  Stakeholder Communication; Public Outreach; Data Collection & Analysis
- **Summer 2016**
  Travel Demand Model Development; Refine Options with Stakeholders' Concurrence
- **Fall 2016**
  Finalize alternatives; Identify strategies; Stakeholders Acceptance
- **Winter 2017**
  Community Engagement Information Session; Study Report Complete

Communication Tool Options

- Study Management Plan
- SR 162 Orting to Sumner Corridor Study webpage: www.wsdot.wa.gov/planning/studies/sr162corridor

Communication Objectives

- Clearly communicate the study's process and schedule to stakeholders and interested parties;
- Explain WSDOT's focus on Practical Solutions as its new approach to project development;
- Provide an open and transparent decision-making process through constructive two-way communication between all study members;
- Provide early and ongoing opportunities for stakeholders and the community to raise issues or concerns;
- Build widespread community understanding of findings and decisions;
- Engage local and regional partners and the community in the planning process;
- Seek integrated input from stakeholders and the community in the planning process;
- Identify performance gaps in the corridor;
- Identify strategies to address the performance gaps short-term, mid-term, and long-term.

Public Involvement Approach

The SR 162 study is due to be completed in spring 2017. The WSDOT team has tailored public involvement to align with the study process and outreach will occur primarily at key milestones.

WSDOT's approach will follow these principles:

- **Involve stakeholders** in the study throughout its process, focus on the need for and benefits of the study, and manage expectations.
- **Ensure stakeholders know who to contact** for information, questions, and concerns, and that we respond to them within one business day.
- **No surprises:** WSDOT is the best source of information about the study, and will always strive to provide honest, timely information to the public and the media.
- **Lead with the web** so it is the first and most current place most people go for information about the study.
- **Explain** the study's results in a way that people can understand. This means using graphics in place of text to help explain complex concepts, avoiding jargon, using active voice, and following WSDOT Plain Talk style guidelines.
- **Track interested parties** by maintaining a contact list and provide frequent updates at all key milestones and ahead of public meetings.

Study Contacts

- Dennis Engel, WSDOT Olympic Region Planning Manager, 360-357-2651
- T.J. Nedrow, WSDOT Olympic Region Study Lead, 360-357-2728
- Claudia Bingham Baker, WSDOT Communications Manager, 360-357-2789

APPENDIX B

Data Collection Plan

SR 162 Sumner to Orting Congestion Corridor Study

Traffic Data Collection Plan (April 15, 2016)

In order to develop a quality forecast for the study corridor, it is important to make sure the outcomes in base year travel demand model reflects the current traffic condition. This document is to provide an overview of the traffic data collection plan for the SR 162 Sumner to Orting Corridor Study. The data will be used as a snapshot of traffic condition during the Spring of Year 2016. It is to support the validation of base year travel demand model and Synchro/SimTraffic model. The data collection plan includes the following data sets:

- Screen Line Counts
- Turning Movement Counts (TMCs)
- Travel Time Runs
- Origin Destination (O-D) Data

The following sections describe the reasons and approaches for obtaining the data.

Screen Line Counts

In order to understand better the traffic pattern and the volumes traveling on the study corridor as well as the study area, a set of screen lines for this study has been prepared. It is to capture traffic on all possible major roadways coming in and going out the study area. Figures 1 and 2 shows the screen line locations and the count locations associated to the screen lines, respectively. Table 1 lists the screen line cross streets as count locations.

Additional to the screen lines, traffic at several locations along the study corridor will be counted to understand the traffic pattern and volumes. Table 2 lists the locations of locations along the study corridor.

Figure 1: Screen Line Location

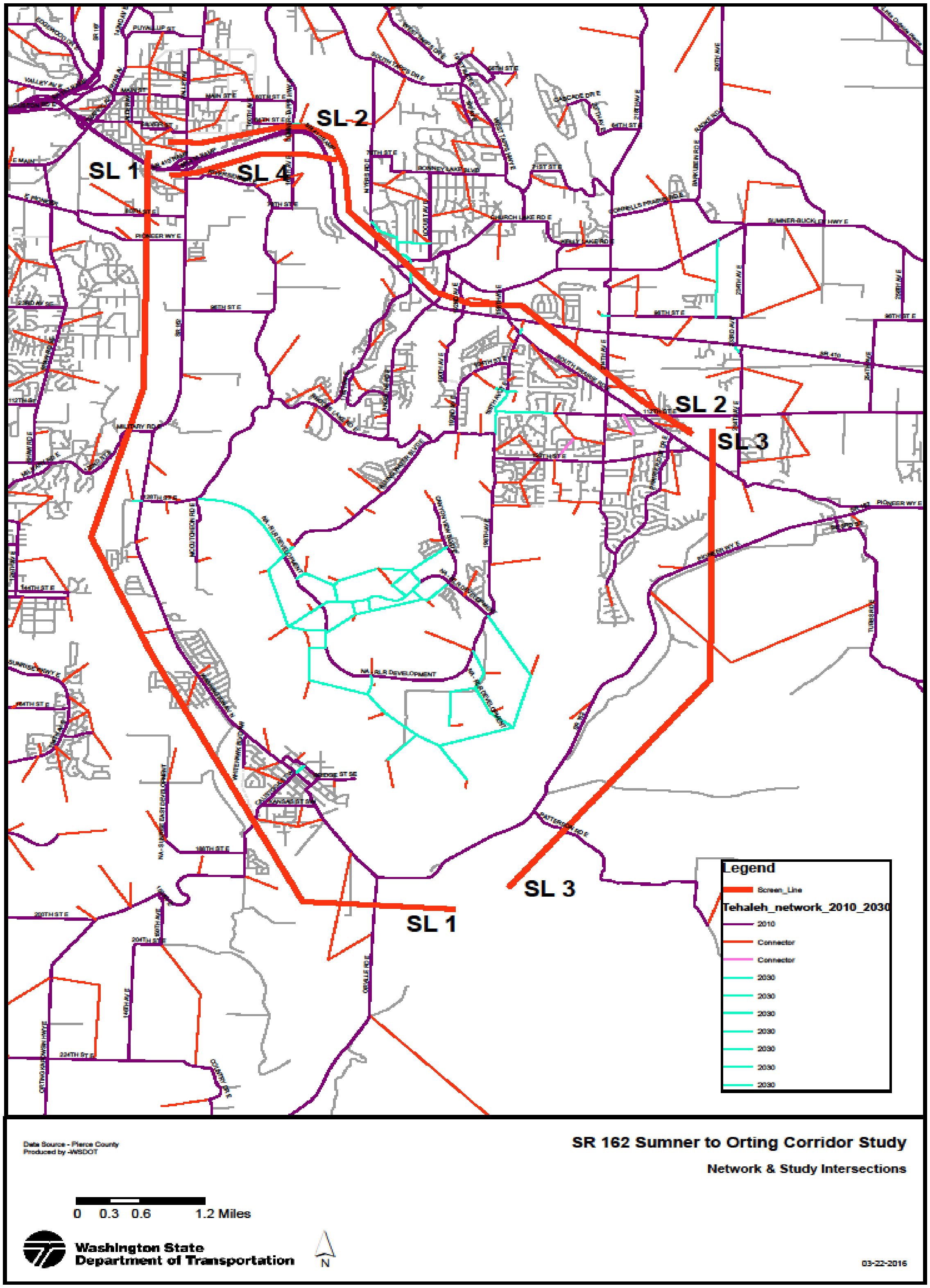


Figure 2: Count Locations for Screen Lines

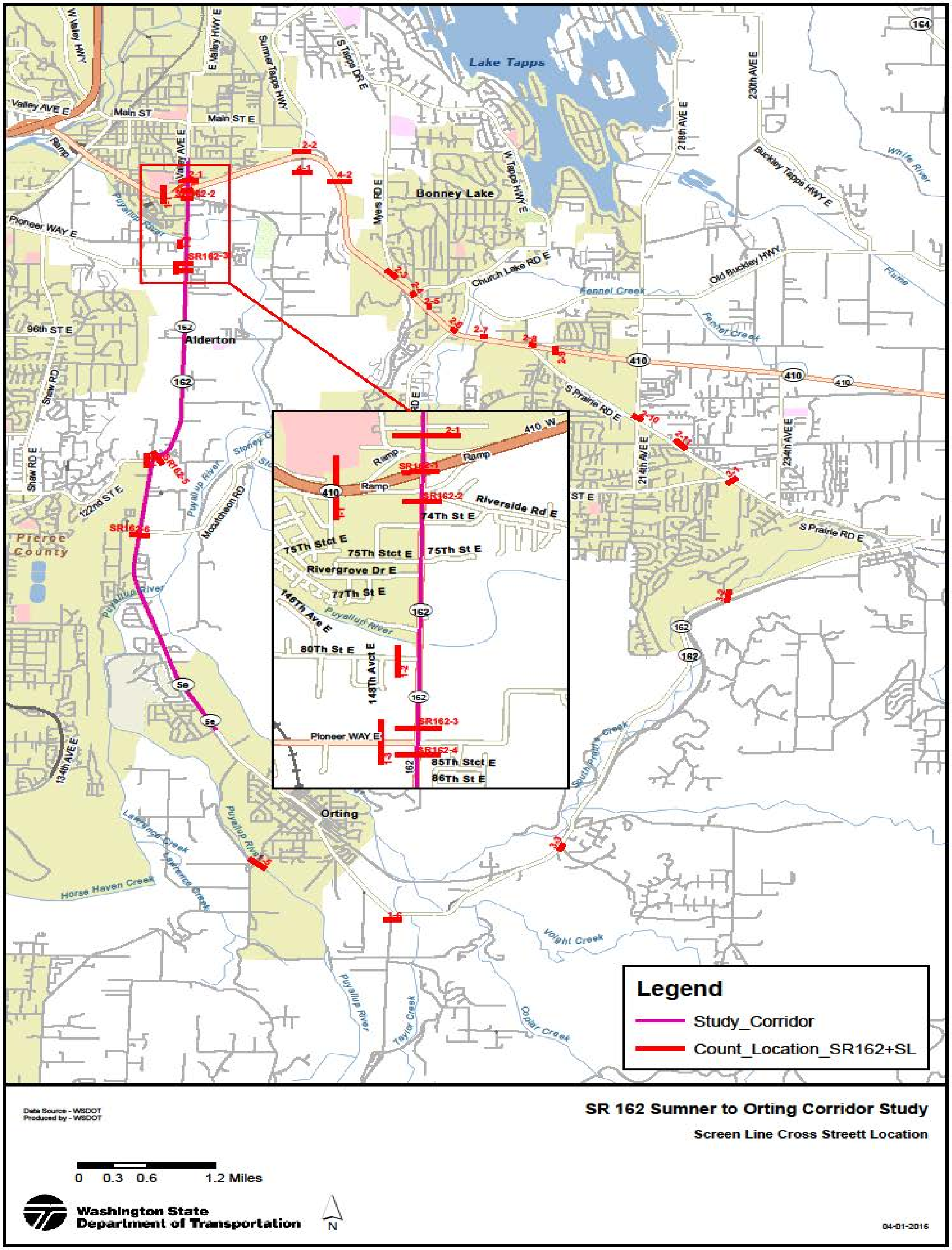

Lake Tapps
Bonney Lake
Alderton
Orting
Pierce County
Legend
Study_Corridor
Count_Location_SR162+SL
SR 162 Sumner to Orting Corridor Study
Screen Line Cross Streett Location
Data Source - WSDOT
Produced by - WSDOT
0 0.3 0.6 1.2 Miles
Washington State Department of Transportation
04-01-2016

Table 1: Screen Line Cross Street

Screen Line No.	Count location	Location ID
1	SR 410 West SR 162 I/C	1-1
	80th St. E. West of SR 162	1-2
	Pioneer Way E. West of SR 162	1-3
	Military Rd E. West of SR 162	1-4
	Calistoga St (Orting Kapowsin Hwy E.) @ Puyallup River	1-5
	Orville Rd. E. South of SR 162	1-6
2	Valley Way North of SR 410 WB Ramps	2-1
	Sumner Tapps Hwy E. North of SR 410 WB Ramps	2-2
	Myers Rd. E. North of SR 410	2-3
	Veterans Memorial Dr. E. East of SR 410	2-4
	Main St. E. East of SR 410	2-5
	Angeline Rd. E. East of SR 410	2-6
	192nd Ave. E. North of SR 410	2-7
	198th Ave. E. North of SR 410	2-8
	SR 410 West of 202nd Ave. E.	2-9
	214th Ave E North of S. Prairie Rd. E.	2-10
	112th St. E. East of S. Prairie Rd. E.	2-11
3	S. Prairie Rd. E. South of 120th St. E.	3-1
	SR 162/Pioneer Way E. East of Spring Site Rd. E.	3-2
	Patterson Rd. E. East of SR 162/Pioneer Way E. East	3-3
4	166th Ave. E. South of WinCo Foods shopping plaza	4-1
	SR 410 East of 166th Ave E. I/C	4-2
	SR 162 South of SR 410 EB Ramps	SR162-2

Table 2: Count Location on SR 162

ID	Location	Location ID
1	SR 162 Bridge at SR 410	SR162-1
2	SR 162 South of SR 410 EB Ramps	SR162-2
3	SR 162 North of Pioneer Way E.	SR162-3
4	SR 162 South of Pioneer Way E.	SR162-4
5	SR 162 North of Military Rd.	SR162-5
6	SR 162 South of 128th St. E.	SR162-6

The data will be used to validate the daily, AM and PM peak periods traffic volumes from the travel demand model. The approach of the screen line data collection is as follows:

- Method: tube counts to cover both directions on each location
- Time periods: three full days (24 hours) plus half days before and after those three days
- Data granularity/time interval : 15 minutes
- Additional mode: it would be nice to obtain the truck percentage

Turning Movement Counts (TMCs)

Turning movements are needed for intersection operational analysis for the study. It will be used in Synchro/SimTraffic model to evaluate the intersection level of service and simulate the traffic condition.

Figures 3 shows the locations of the study intersections and Table 3 lists the names of study intersections.

Figure 3: Locations of Study Intersections

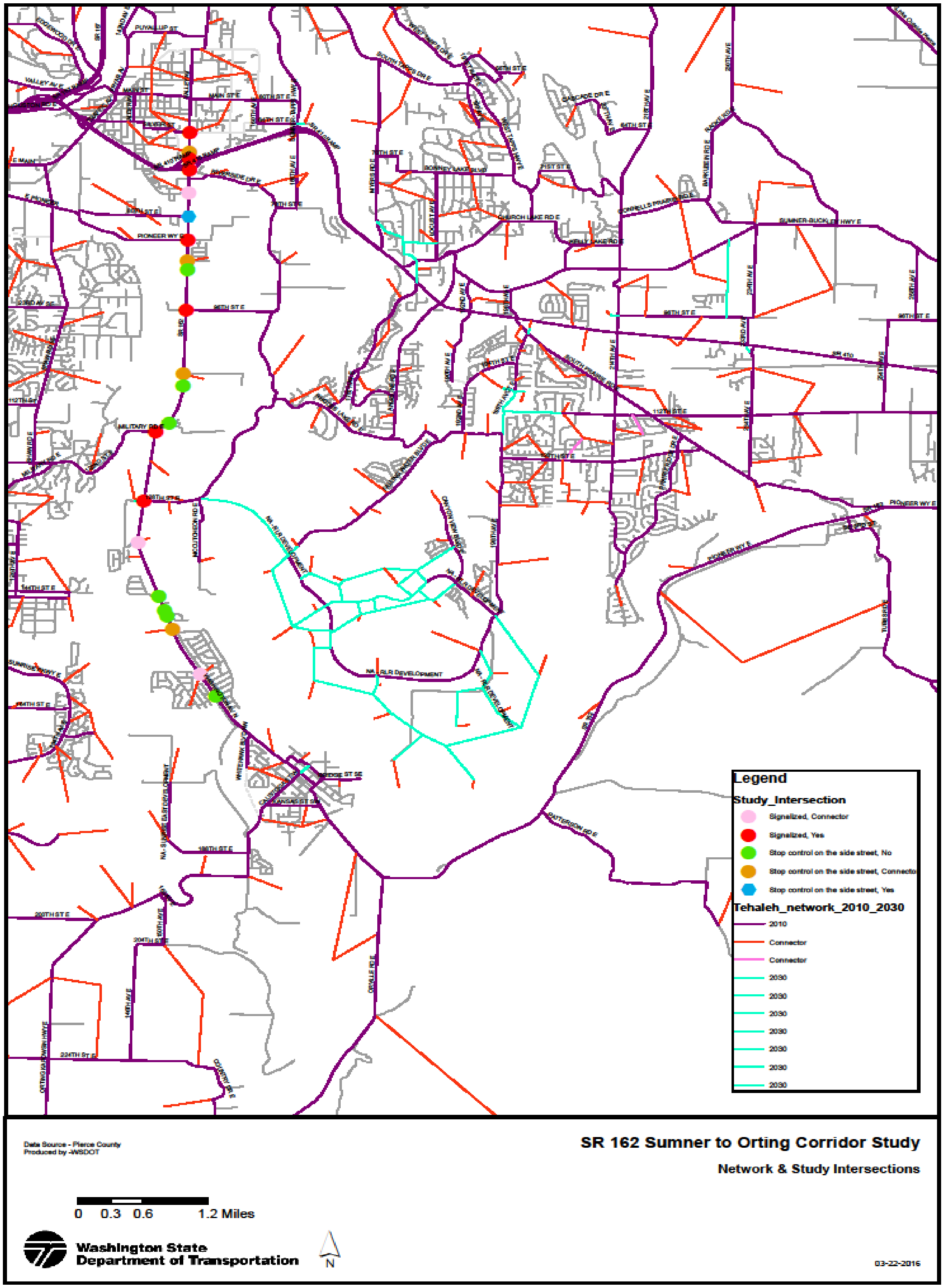


Table 3: names of study intersections

ID	Intersection Name	N-S	E-W	Control
1	Valley Ave. & Meade McCumber Rd. E.	Valley Ave.	Meade McCumber Rd. E.	Signalized
3	SR 162/Valley Ave. & SR 410 WB Ramps	SR 162/Valley Ave.	R 410 WB Ramps	Signalized
4	SR 162 & SR 410 EB Ramps	SR 162	SR 410 EB Ramps	Signalized
5	SR 162 & Rivergrove Dr. E.	SR 162	Rivergrove Dr. E.	Signalized
6	SR 162 & 80^{th} St. E.	SR 162	80^{th} St. E.	Stop control on the side street
7	SR 162 & Pioneer Way E./Bowman-Hilton Rd. E.	SR 162	Pioneer Way E./ Bowman-Hilton Rd. E.	Signalized
10	SR 162 & 96^{th} St. E.	SR 162	96^{th} St. E.	Signalized
14	SR 162 & Military Rd. E.	SR 162	Military Rd. E.	Signalized
15	SR 162 & 128^{th} St. E.	SR 162	128^{th} St. E.	Signalized
16	SR 162 & 136^{th} St. E.	SR 162	136^{th} St. E.	Signalized
21	SR 162 & Williams Blvd. NW/Williams Blvd. NE.	SR 162	Williams Blvd. NW/ Williams Blvd. NE.	Signalized

The approach of the TMCs data collection is as follows:

- Method: manual counts or setting up video cameras to collection traffic volumes on each turning movements at each study intersection
- Time periods: AM period from 6:00 to 8:00 AM and PM period from 3:30 to 5:30 PM on either Tuesday, Wednesday or Thursday
- Data granularity/time interval: 15 minutes; Peak hour factor (PHF) for each approach shall be provided.
- Additional mode: pedestrian and bicycle on the crosswalks will be included. It also would be nice to obtain the truck percentage

Travel Time Runs

Travel time will provide the actual (real-time) traffic condition. With the travel time data the study team can easily evaluate the delay and congestion level and pin point the congestion locations/bottlenecks. It will be used to calibrate the SimTraffic simulation model. Table 4 shows the travel time runs segments.

Table 4: Travel Time Runs Segments

Corridor		From	To
SR 162	NB	Lane Blvd NW./Lane St. NE.	Meade McCumber Rd. E.
	SB	Meade McCumber Rd. E.	Lane Blvd NW./Lane St. NE.

The approach of the travel time data collection is as follows:

- Method: floating car method using GPS device. the GPS device generate location points every one-two seconds
- Time periods: AM period from 6:00 to 8:00 AM and PM period from 3:30 to 5:30 PM
- Number of runs: total three runs for each direction and each peak period

Origin Destination (O-D) Data

The Sound Transit Sounder Sumner Station is just several miles north of the study corridor. In order to evaluate the impact of the traffic of the station on the study corridor, the study team proposed to obtain the O-D data. It will help understand the characteristics of Sounder raiders from and to Sumner Station including but not limited to:

- Where the rider come from;
- Which routes they use;
- What mode they take;
- What time they travel and their experiences traveling on the study corridor.

The approach of the O-D data collection is as follows:

- Method: Online survey questionnaire; send out post cards
- Target: Drivers/riders who go to and come from Sounder Sumner Station
- Period: Spring 2016

APPENDIX C

Travel Demand Modeling and Traffic Analysis

Technical Memorandum
Travel Demand Modeling & Traffic Analysis

Introduction
The purpose of the analysis for SR 162 Corridor Study is to identify the travel patterns and where there are existing transportation system constraints affecting system performance and travel decisions within the study area. It is also to evaluate the future performance with a given demand growth and with proposed strategies. A key step in identifying traffic performance on SR 162 corridor is the development of a methodology and a suite of traffic forecasting and operational analysis models. Concurrent with the development of the methodology the suite of traffic forecasting and operational analysis models is establishing and agreeing upon a certain set of assumptions for this analysis. These assumptions can include, but are not limited to, future forecast year(s); population/economic growth, and land use and network assumptions. This report presents the modeling methodologies, assumptions, geographic focus area of the study, analysis years, the base year model validations, and the final traffic operational analysis results for existing condition, future-year no action conditions, and future-year conditions with proposed strategies.

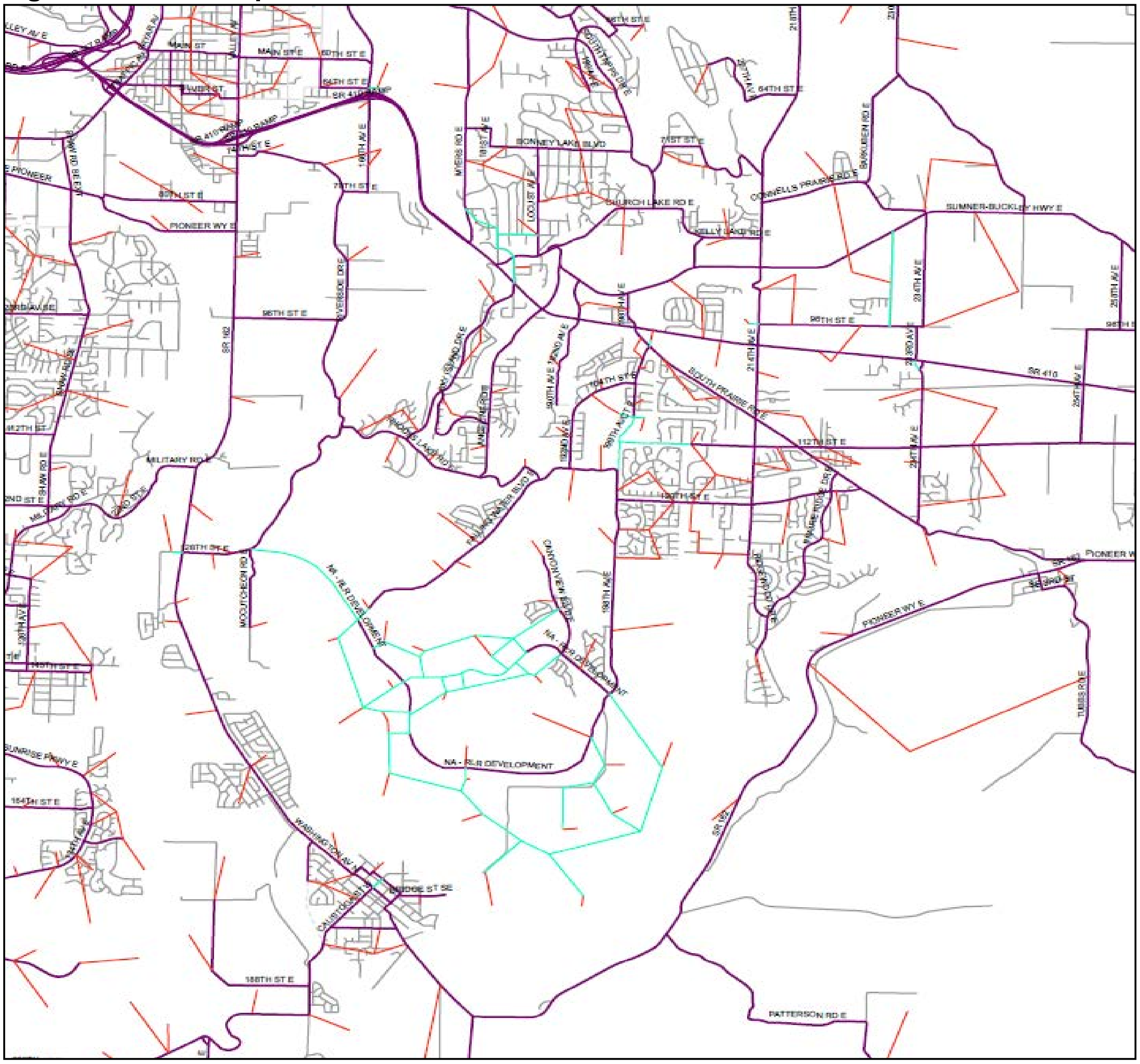
Methodology and Assumptions
In this study there were two different types of modeling platforms developed for traffic forecast and analysis. The four-step travel demand model was used as the macroscopic model to look at the demand forecasts and the traffic distribution. The traffic operational and simulation model was used to evaluate the traffic performance including the intersection and corridor segments performances.

- Macroscopic Model
The macroscopic travel demand model is to help identify how many people want to travel at the same time (travel demand), where people want to travel to/from, and which routes they will likely take, based on socioeconomic data. The travel demand model also helps create traffic forecasts for the number of people and vehicles that will use a transportation facility; to understand a transportation system or particular corridor; and to understand potential impacts/benefits due to changes in a transportation system.

The Pierce County travel demand model was used for this study since it has better land use data and more detailed network for the County, especially for the study vicinity. The County model is the Traffic Impact Fee (TIF) model for 2015 and 2030. WSDOT has worked closely with Pierce County in the travel demand forecasting effort over the course of this study.

- Model Area
    - As mentioned, the Pierce County model was used. It includes not just the County itself, but also part of King and Kitsap Counties. The focused area was identified to make sure the possible alternative routes for the study corridor are covered if potential development with significant growth is in place. It is the area surrounding SR 162 and SR410/So. Prairie Rd. E. The following map shows the focused study area for macroscopic travel demand model.

Figure 1: Macroscopic Travel Demand Model Focused Area



- Analysis years and time periods

  One of the objectives of this study is to provide Short-, Mid-, and Long-Term strategies. WSDOT has defined that the short-term would be five years from the base year; mid-term would be 10 years from the base year; and long-term would be 20 years from the base year. Given the base year model is for Year 2015, it resulted in the following analysis years for this study:

  - Base year – 2015
  - Future forecast years – 2020, 2025 and 2035

  The analyses were focused on AM and PM peak periods:
  - AM Peak Period 6:00 – 9:00
  - PM Peak Period 3:00 – 6:00

- Land use assumptions

Pierce County recently updated its travel demand TIF model for Year 2015 for base year and Year 2030 for future year. The land use data were also updated to the corresponding years. The 2030 model matches the County Comprehensive Plan land use control totals at jurisdiction level. However there are differences at the TAZ level by 2030 due to updating Pirece County land use to 2015, updating development capacities used in the land use allocation model, updating assumptions for master planned developments, and updating pipeline growth. Within the Study vicinity the Tehaleh development, which is just east of the study corridor, the Phase I addmended approval is ~2600 housing units 4 and non-residentual space that could support more than 2000 employment jobs.

The land use data for Year 2020 and 2025 were interpolated based on County's 2015 and 2030 model. The interpolation was applied to all Traffic Analysis Zones (TAZs) including all cities, county unincorporated areas and external zones. For Year 2035 land use, after consultation with the County staff, the study team decided to extrapolate to 2035 for the entire county, except the area for Tehaleh development. Since Tehaleh development is next to the study corridor and will have significant impact on the corridor, and is also in the Environmental Impact Statement (EIS) process of Phase 2 development, the study team assumed the full build of Tehaleh development with Phase 2 Applicants Preferred Alternative 3 assumption being in place. It would have about 9700 housing units. HHs and 10,300 jobs created in the development in 2035. 9800 HHs includes ~100 units within "exception parcels" not within the Tehaleh application.The following figure shows the land use growth for Pierce County and the table shows the annual growth rates for HHs and jobs.

Figure 2: Pierce County Land Use Growth

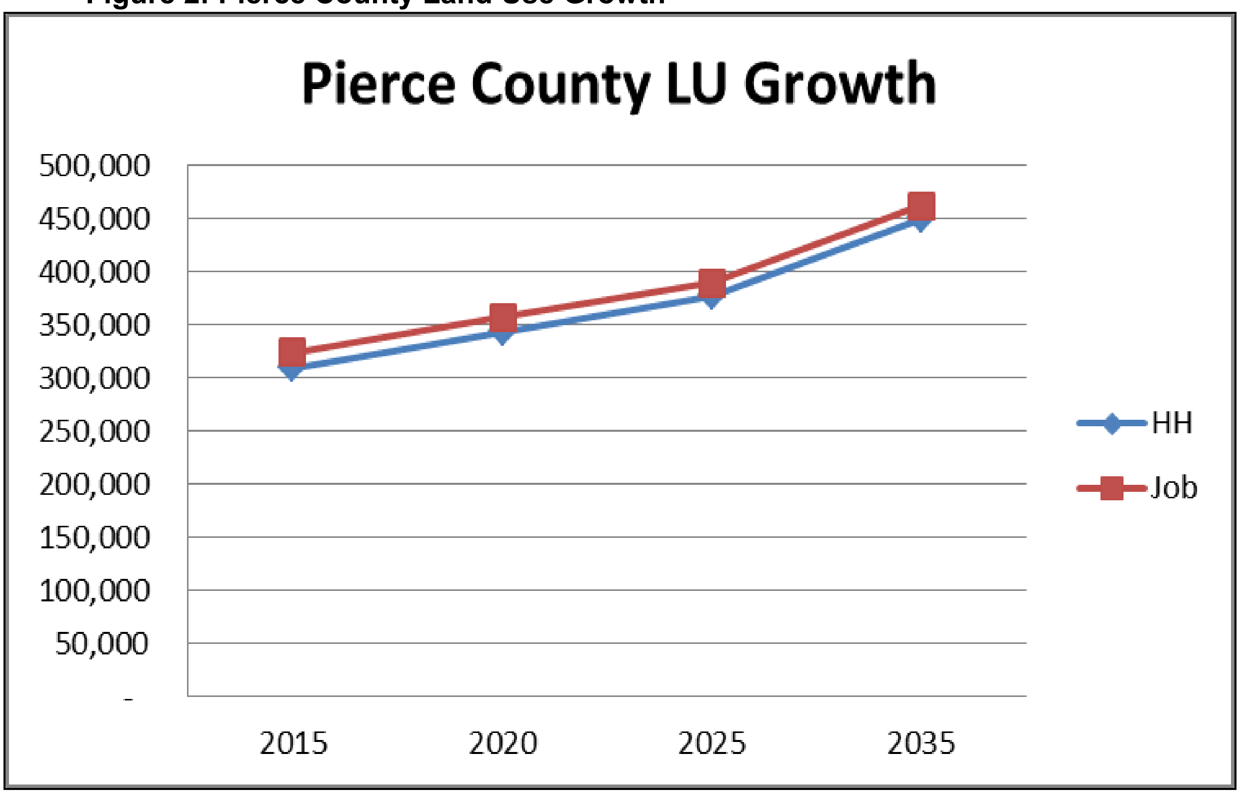


Table 1: Pierce County Land Use Annual Growth Rates

	2015-2020	2020-2025	2025-2035
HH	2.20%	2.20%	2.27%
Job	2.01%	2.01%	2.12%

- Network assumptions
  Pierce County helped spot check the improvements at network links using City and County Transportation Improvement Programs (TIPs) for Interim Year 2020 and 2025 models and provided a list of improvements to WSDOT for network updates. For the network in Year 2035 it remained the same as Year 2030 model.

- Traffic Operational and Simulation Model

The analysis will evaluate and analyze the traffic operations, corridor segments, and intersections within the study corridor. The Synchro 8 and SimTraffic 8 simulation software will be used to conduct the operational analysis.

- Study segments and intersections
  The study corridor starts at the Interchange with SR 410 in Sumner and then goes south to Williams Blvd NE in Orting. It is separated into 7 segments in the following table.

Table 2: Study Segments

Segment	From – To Street Names
A	SR 410 WB Ramps - Rivergrove Dr. E.
B	Rivergrove Dr. - Pioneer Way E>
C	Pioneer Way - 96 th St.
D	96 th St. - Military Rd.
E	Military Rd. - 128 th St.
F	128 th St .- 136 th St.
G	136 th St. - Williams Blvd.

The study also identified key intersections along the study corridor for analysis as shown in the table below.

Table 3: Study Intersections

ID	Intersection Name	Intersection Control
1	Valley Ave & Meade McCumber Rd. E.	Signalized
3	SR 162/Valley Ave. & SR 410 WB Ramps	Signalized
4	SR 162 & SR 410 EB Ramps	Signalized
5	SR 162 & Rivergrove Dr. E.	Signalized
6	SR 162 & 80^{th} St. E.	TWSC
7	SR 162 & Pioneer Way E./Bowman-Hilton Rd. E.	Signalized
10	SR 162 & 96^{th} St. E.	Signalized
14	SR 162 & Military Rd. E.	Signalized
15	SR 162 & 128^{th} St. E.	Signalized
16	SR 162 & 136^{th} St. E.	Signalized
21	SR 162 & Williams Blvd .NW/Williams Blvd. NE.	Signalized

- Analysis years and time periods
  The analysis years for the traffic operational and simulation model were same as travel demand model. But the analysis periods focused on peak hours only. Based on the traffic data the following peak hours were identified:
  AM Peak Hour 6:00 – 7:00
  - PM Peak Hour 4:00 – 5:00

- Analysis inputs
  The key analysis components for the traffic operational and simulation models included the following items:
  - Travel demand forecast volumes
    The existing observed data was used for base year. The future forecast volumes were post-processed based on the travel demand model forecast volumes.
  - Intersection controls
    There are 10 signalized intersections and one two-way stop controlled intersection. All the signal timing plans for AM and PM peak hours were collected and coded in the Synchro model.
  - Detailed intersection geometry and lane configurations
    In order to accurately calculate the intersection delay in the Synchro model, along with the intersection controls, it is necessary to have detailed geometry and lane configurations for intersections and interchanges/ramps

- **Traffic Data Collection**

In order to develop a quality forecast for the study corridor, it was important to make sure the outcomes in a base year travel demand model reflects the current traffic condition. This section shows an overview of the traffic data collection for this study.

The data was used as a snapshot of traffic conditions during the Spring of Year 2016. It supports the validation of base year travel demand model and Synchro/SimTraffic model.

Screen Line Counts

In order to better understand traffic patterns and the volumes traveling on the study corridor as well as the study area, a set of screen lines for this study was been prepared.

It captures traffic on all possible major roadways coming in and going out of the study area.

Figures 3 and 4 shows screen line locations and count locations associated to the screen lines, respectively.

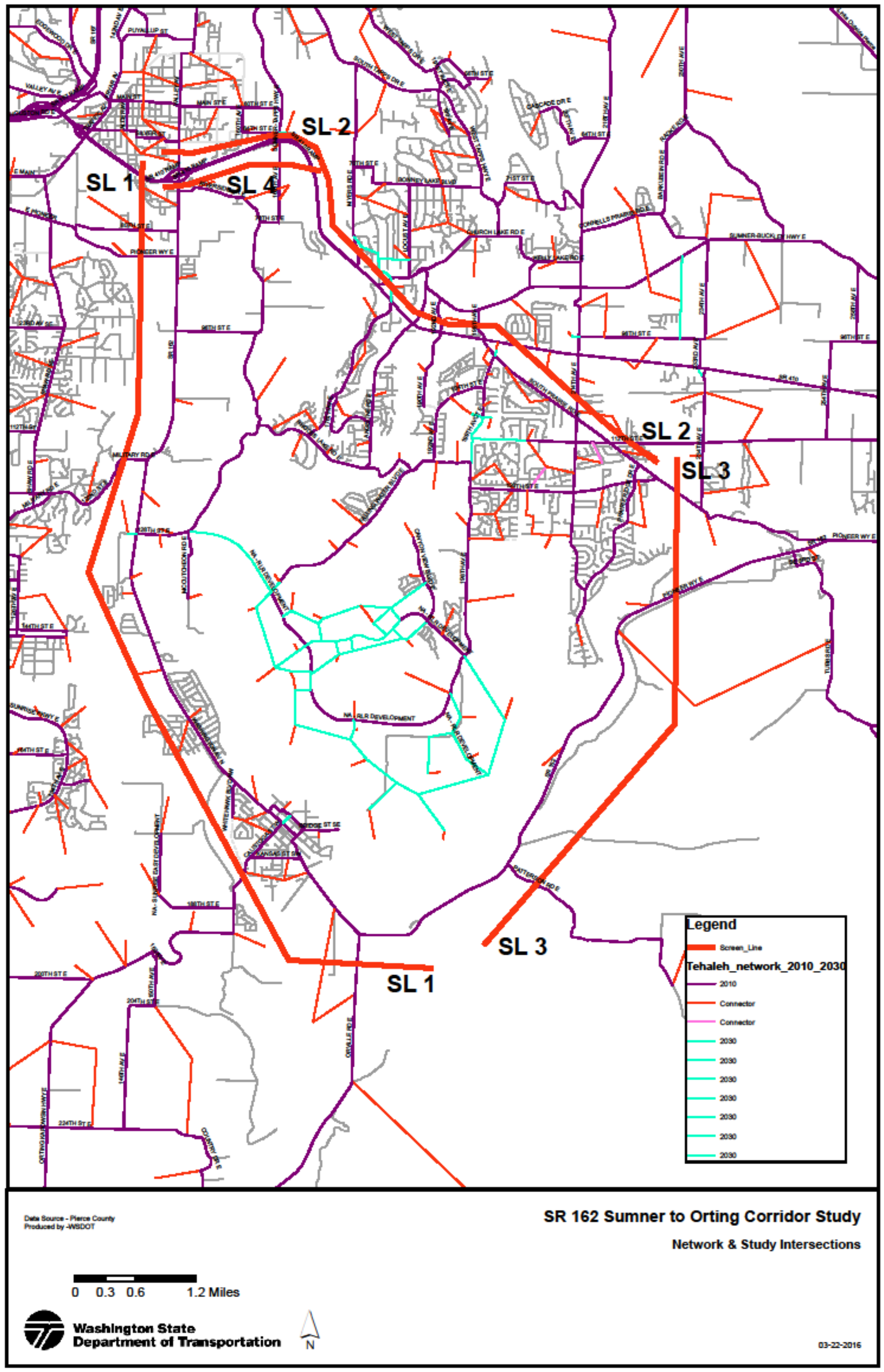


Figure 3: Screen Line Location

Table 4 lists the screen line cross streets as count locations. In addition to the screen lines, traffic at several locations along the study corridor were counted to understand the traffic patterns and volumes. Screen Lines locations counts idenitied below in Figure 4**.**

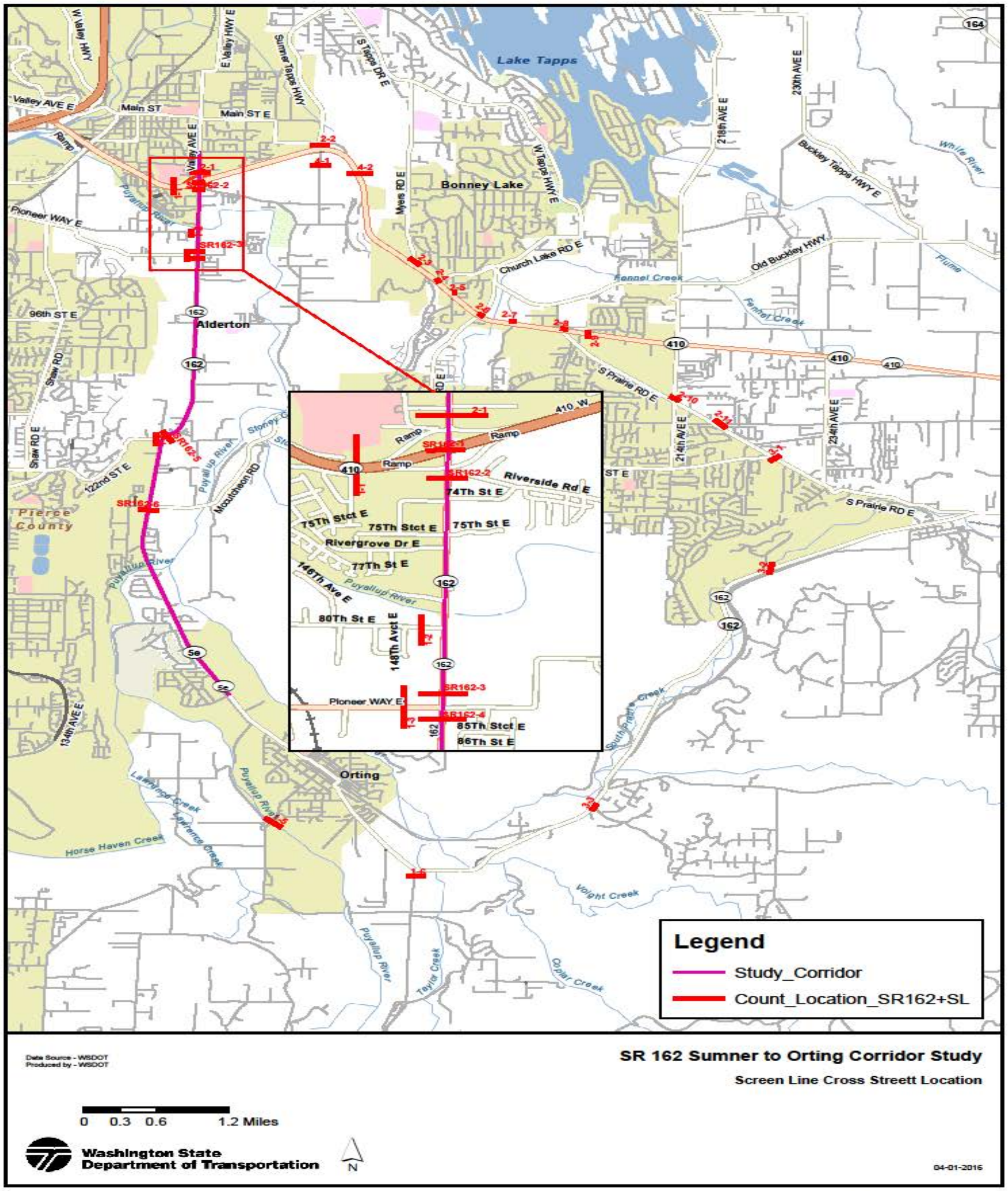


Figure 4: Count Locations for Screen Lines

Table 4: Screen Line Cross Street

Screen Line No.	Count location	Location ID
1	SR 410 West of SR 162 I/C	1-1
	80th St. E. West of SR 162	1-2
	Pioneer Way E. West of SR 162	1-3
	Military Rd E West of SR 162	1-4
	Calistoga St. (Orting Kapowsin Hwy E.) @ Puyallup River	1-5
	Orville Rd. E. South of SR 162	1-6
2	Valley Way North of SR 410 WB Ramps	2-1
	Sumner Tapps Hwy E. North of SR 410 WB Ramps	2-2
	Myers Rd. E. North of SR 410	2-3
	Veterans Memorial Dr. E. East of SR 410	2-4
	Main St. E.East of SR 410	2-5
	Angeline Rd. E. East of SR 410	2-6
	192nd Ave. E. North of SR 410	2-7
	198 th Ave. E. North of SR 410	2-8
	SR 410 West of 202nd Ave. E.	2-9
	214 th Ave. E. North of S. Prairie Rd. E.	2-10
	112 th St E. East. of S. Prairie Rd. E.	2-11
3	S Prairie Rd. E. South of 120th St. E.	3-1
	SR 162/Pioneer Way E. East of Spring Site Rd. E.	3-2
	Patterson Rd. E. East of SR 162/Pioneer Way East	3-3
4	166 th Ave. E South of WinCo Foods shopping plaza	4-1
	SR 410 East of 166th Ave. E. I/C	4-2
	SR 162 South of SR 410 EB Ramps	SR162-2

Table 5: Count Location on SR 162

ID	Location	Location ID
1	SR 162 Bridge at SR 410	SR162-1
2	SR 162 South of SR 410 EB Ramps	SR162-2
3	SR 162 North of Pioneer Way	SR162-3
4	SR 162 South of Pioneer Way	SR162-4
5	SR 162 North of Military Rd.	SR162-5
6	SR 162 South of 128th St. E.	SR162-6

- Turning Movement Counts (TMCs)
  Turning movements are needed for intersection operational analysis for the study. It was used in Synchro/SimTraffic simulation model to evaluate the intersection level of service and simulate traffic conditions. Table 3 above has listed the study intersections.

- Travel Time Runs
  Travel time provides actual (real-time) traffic condition. With travel time data the study team can easily evaluate the delay and congestion level and pinpoint congestion locations/bottlenecks. It was used to validate and calibrate the SimTraffic simulation model. Table 6 shows the travel time runs segments.

Table 6: Travel Time Runs Segments

Corridor		From	To
SR 162	NB	Lane Blvd NW/Lane St. NE.	Meade McCumber Rd. E.
	SB	Meade McCumber Rd. E.	Lane Blvd NW/Lane St. NE.

- **Performance Measures**

Below are performance measures we used for the analysis:

- Corridor/segment volume to capacity (V/C) ratio in travel demand models
- Intersection delay and level of service (LOS) in Synchro model based on 2010 Highway Capacity Manual (HCM) methodology
- Travel time and travel speed in SimTraffic simulation model
- Travel Time Reliability
  It is based on the travel time index (TTI) calculation. The TTI is the ratio of peak hour travel time to free flow travel time. The travel time reliability threshold is set to be 1.5, which means 50% more than free flow travel time.

Base Year Model Validation

The primary objective of model calibration/validation is to obtain the model estimates within the predefined calibration/validation targets comparing with the observed performance measures. The calibration/validation will be conducted for AM and PM peak periods for the following performance measures:

- traffic volumes at selected screen lines
- traffic volumes on the study corridor
- travel time on the study corridor; and visual audits for queue length at major intersections

In order to calibrate the model to get the forecast volumes close to the observed counts, some parameters, such as link capacity and speed in the model were adjusted. Because the model was designed for macroscopic County demand modeling, the pre-coded capacities and speeds are often based on given functional classifications.

When demand modeling for a corridor study is conducted, more local and real conditions should be taken into account, for example, capacity changes due to lane width, shoulder width, the allowance of on-street parking, and so on may reduce capacity.

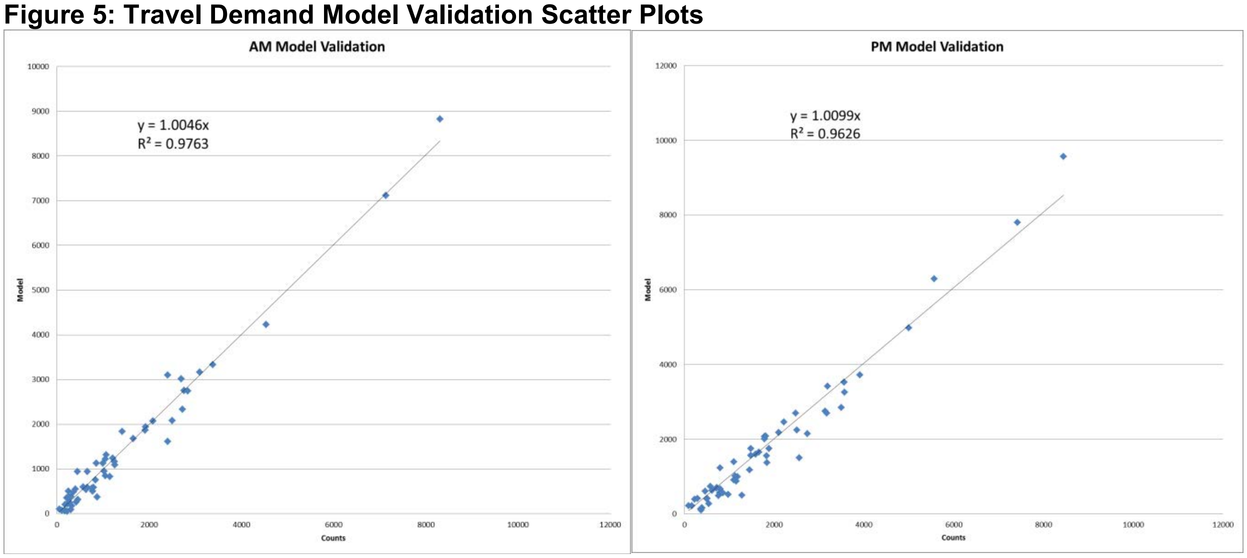
The criteria were based on the Wisconsin Department of Transportation model calibration example in Traffic Analysis Tool Box Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software, FHWA. The criteria and the model validation measures are in the following table.

Table 7: Travel Demand Model Validation Criteria and Measures

Criteria & Measures		Acceptance Targets	AM	PM
Individual Link Volumes		85% of cases	87.9%	87.9%
Volumes< 700 veh/h	< 100 veh/h			
700 veh/h < Volumes < 2700 veh/h	< 15%			
Volumes > 2700 veh/h	< 400 veh/h			
Sum of All Links		< 5%	-0.6%	-3.4%

The plots of model forecast volumes (y axis) versus observed counts (x axis) for AM and PM peak periods were also evaluated. Considering the R-square 1 (45 degree regression line) being the perfect matches between forecast volumes and counts, the actual R-square was 0.976 for AM and 0.963 for PM. They indicate the model is well validated compared to the observed (actual) counts.

Figure 5: Travel Demand Model Validation Scatter Plots



For the traffic operational and simulation modeling using Synchro/SimTraffic, the travel time measure was used for model validation. The average of 10 runs from SimTraffic simulation was used to compare against the observed travel time. The criteria were based on the Wisconsin Department of Transportation model calibration example in Traffic Analysis Tool Box Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software, FHWA. The difference of travel time between model and observed needs to be within 15% (or 1 minute, if higher). The travel time route was from Meade McCumber Rd. E. to Lane Blvd. NW. The validation measures are in the following table.

The travel time differences in AM peak hour were 3.4% in northbound and 3.7% in southbound. In the PM peak hour the differences were 5.3% in northbound and 1.6% in southbound. Both AM and PM peak hours models meet the validation criteria.

Table 8: AM and PM Travel Time Validation Measures

AM	Distance (mile)	Average Travel Time (min)	Average Speed (mph)	SimTraffic Model Average Travel Time (min)	SimTraffic Model Average Travel Speed (mph)	Travel Time % Difference	Travel Speed % Difference
SB	6.3	10.1	37	10.5	36	3.7%	-2.7%
NB	6.3	11.9	32	11.5	33	-3.4%	3.1%
PM	Distance (mile)	Average Travel Time (min)	Average Speed (mph)	SimTraffic Model Average Travel Time (min)	SimTraffic Model Average Travel Speed (mph)	Travel Time % Difference	Travel Speed % Difference
SB	6.3	17.1	22	16.2	23	-5.3%	4.5%
NB	6.3	11.5	33	11.7	33	1.6%	0.0%

Existing Condition

The existing condition is based on the most recent counts conducted in April and May, 2016. In the 24 hour count distributions at six locations along the study corridor, the highest directional counts were 1268 vehicles per hour southbound just south of 128th St E at 5:00 PM.

Puget Sound Regional Council, in consultation with WSDOT, has adopted LOS D for this urban segment of SR 162 which is a Highway of Regional Significance. This is based on service volume thresholds (LOS D) for State signalized arterials by Florida DOT (FDOT 2013 QLOS Handbook), two-lane undivided at areas over 5,000 population and not in urbanized areas Class I (40 mph or higher posted speed limit) – 1460 veh/h, and two-lane undivided at areas over 5,000 population and not in urbanized areas Class II (35 mph or lower posted speed limit) – 1200 veh/h. However, capacity is based on the maximum throughputs of most existing 72-hour counts which are 1200 veh/h for 50 mph posted speed limit and 1100 veh/hr for 35 mph or lower posted speed limit.

To better reflect the real situation on the study corridor, we used the maximum throughputs for capacity. The following figures show the 24-hour traffic volume distributions at six locations along the study corridor.

The intersection turning movement counts were also collected during the same time period. The AM and PM peak hour turning movement counts are in Appendix A.

Figure 6 24-Hour Traffic Volumes on SR 162 at SR 410 Bridge

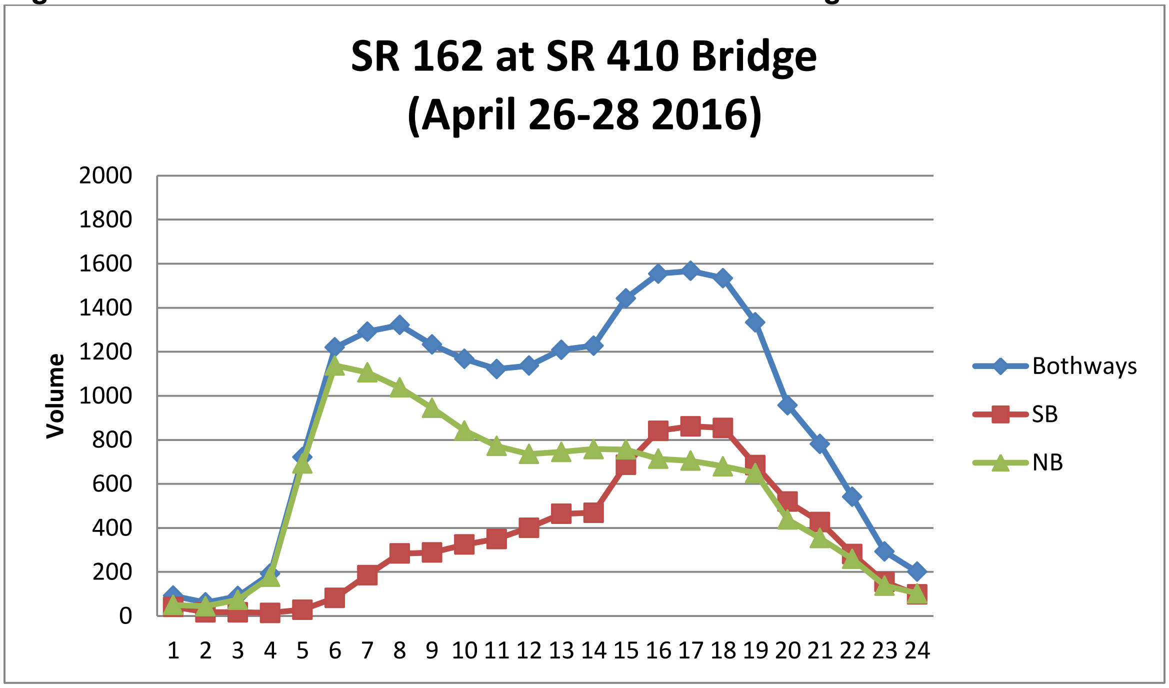


Figure 7 24-Hour Traffic Volumes on SR 162 South of SR 410 Eastbound Ramps

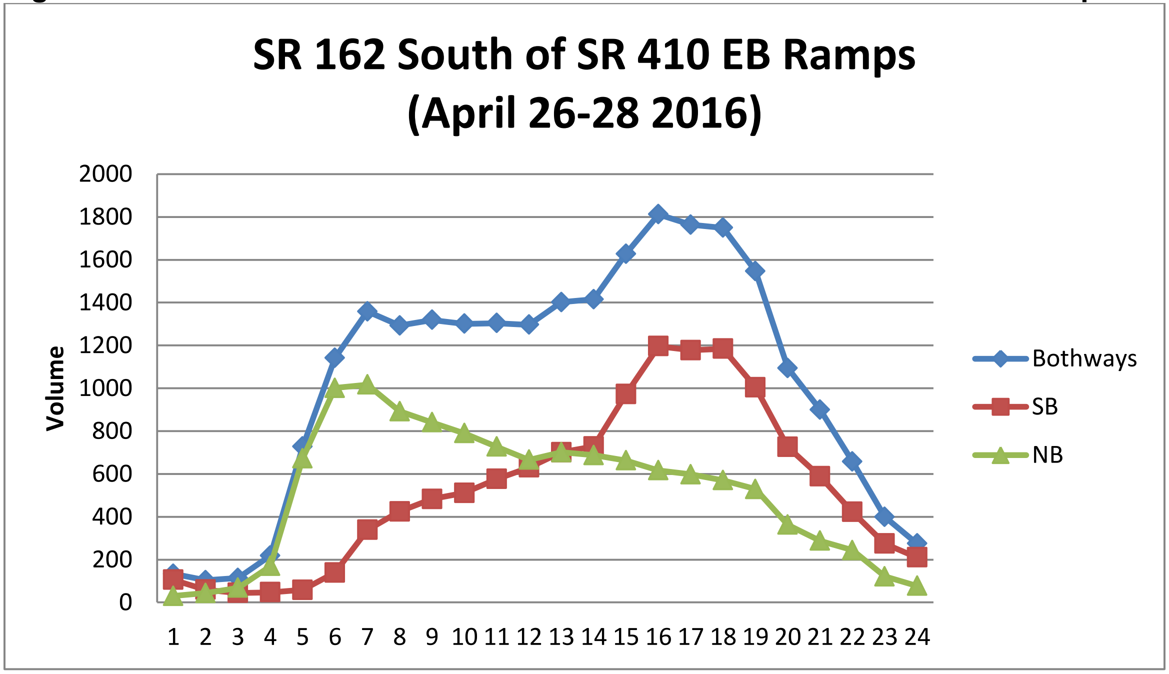


Figure 8 24-Hour Traffic Volumes on SR 162 North of Pioneer Way

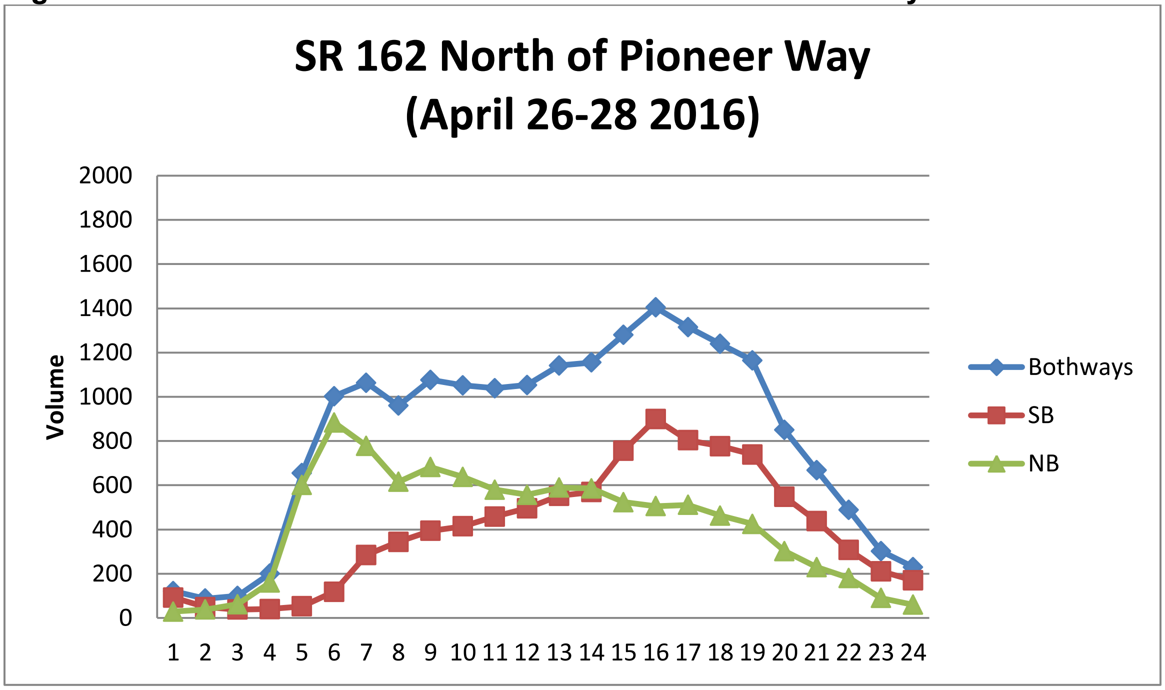


Figure 9 24-Hour Traffic Volumes on SR 162 South of Pioneer Way

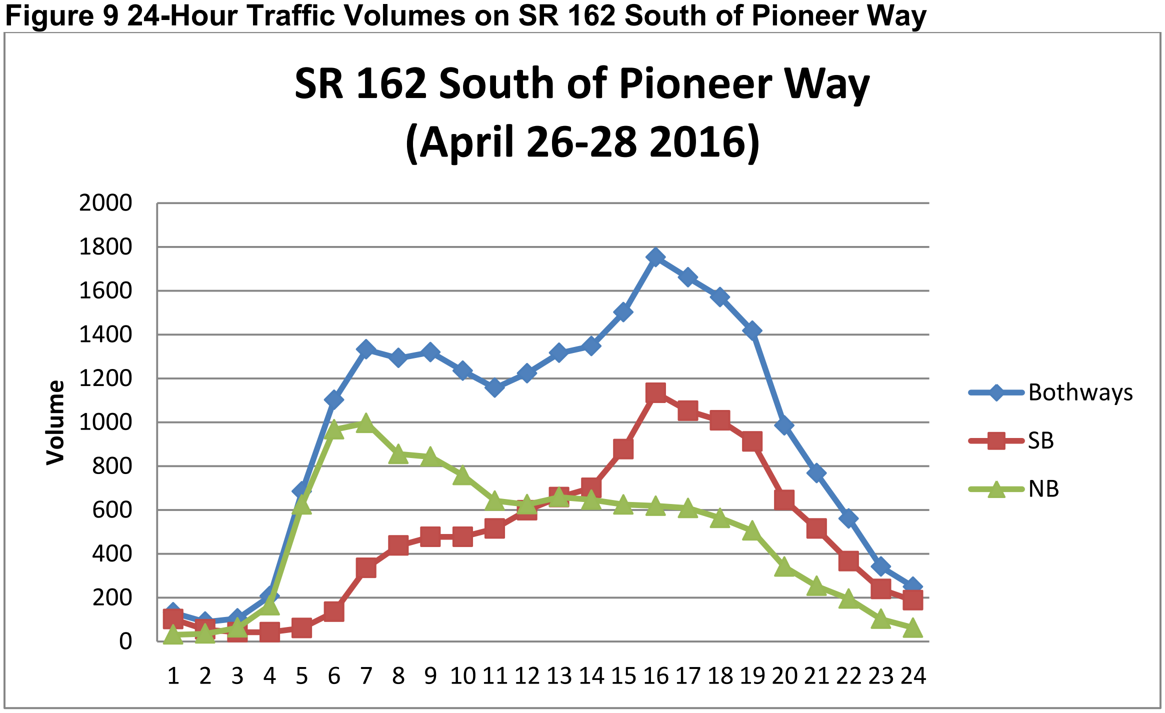


Figure 10 24-Hour Traffic Volumes on SR 162 North of Military Rd

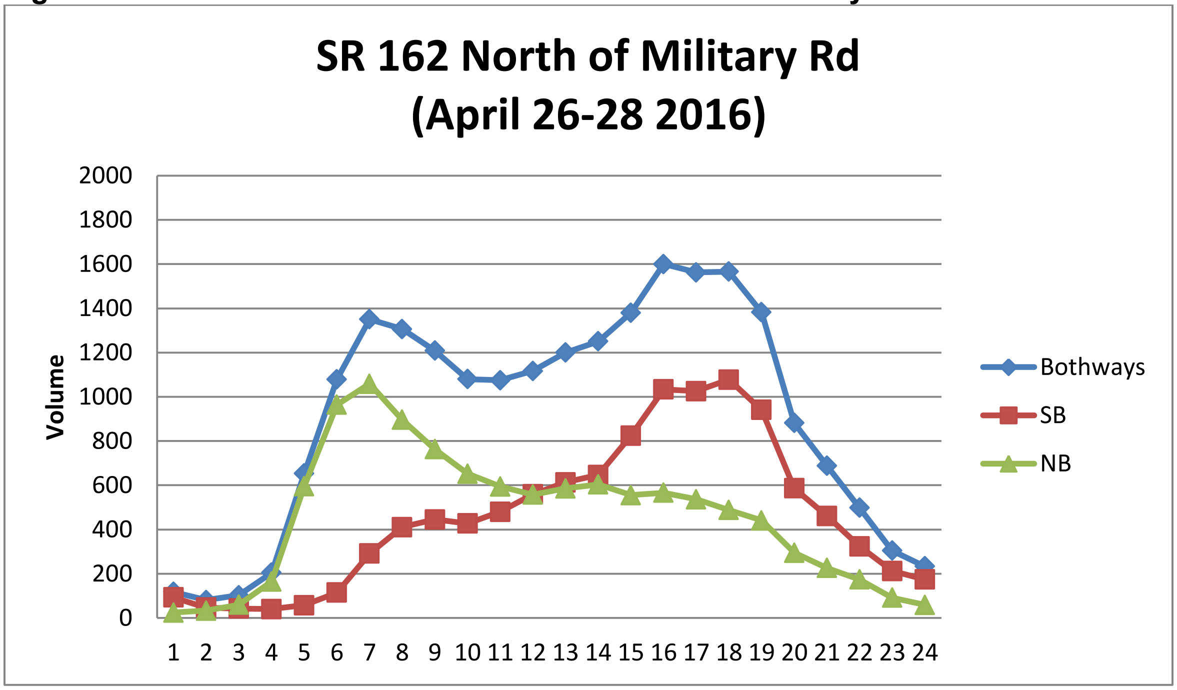
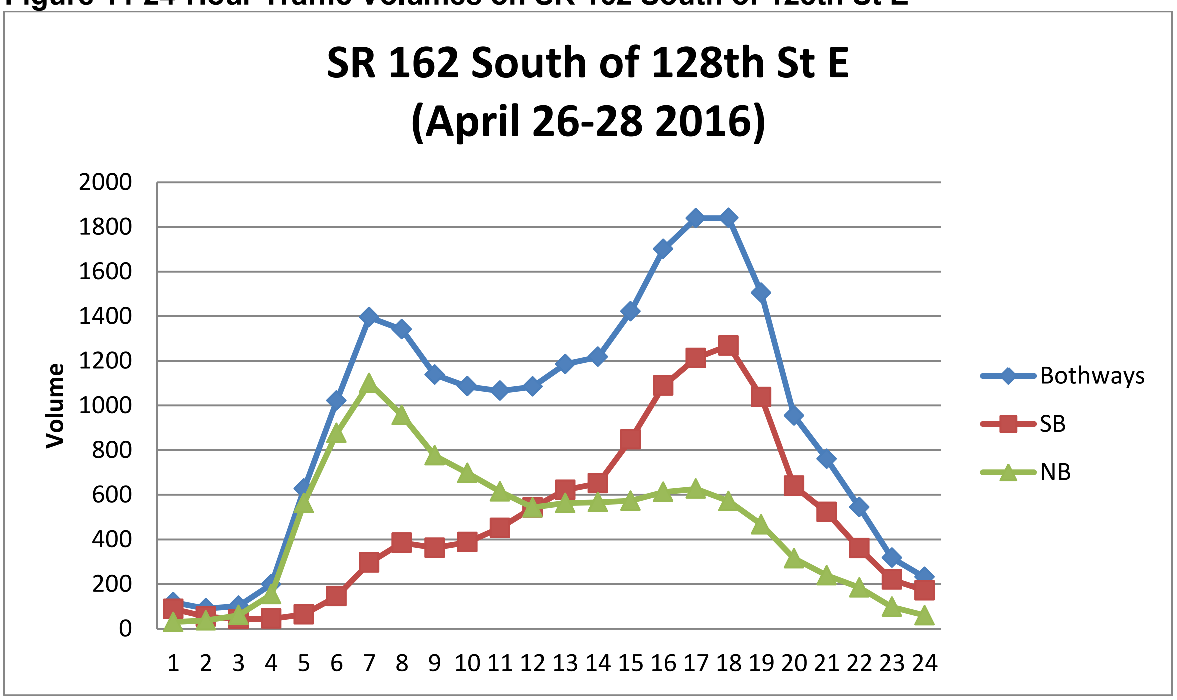
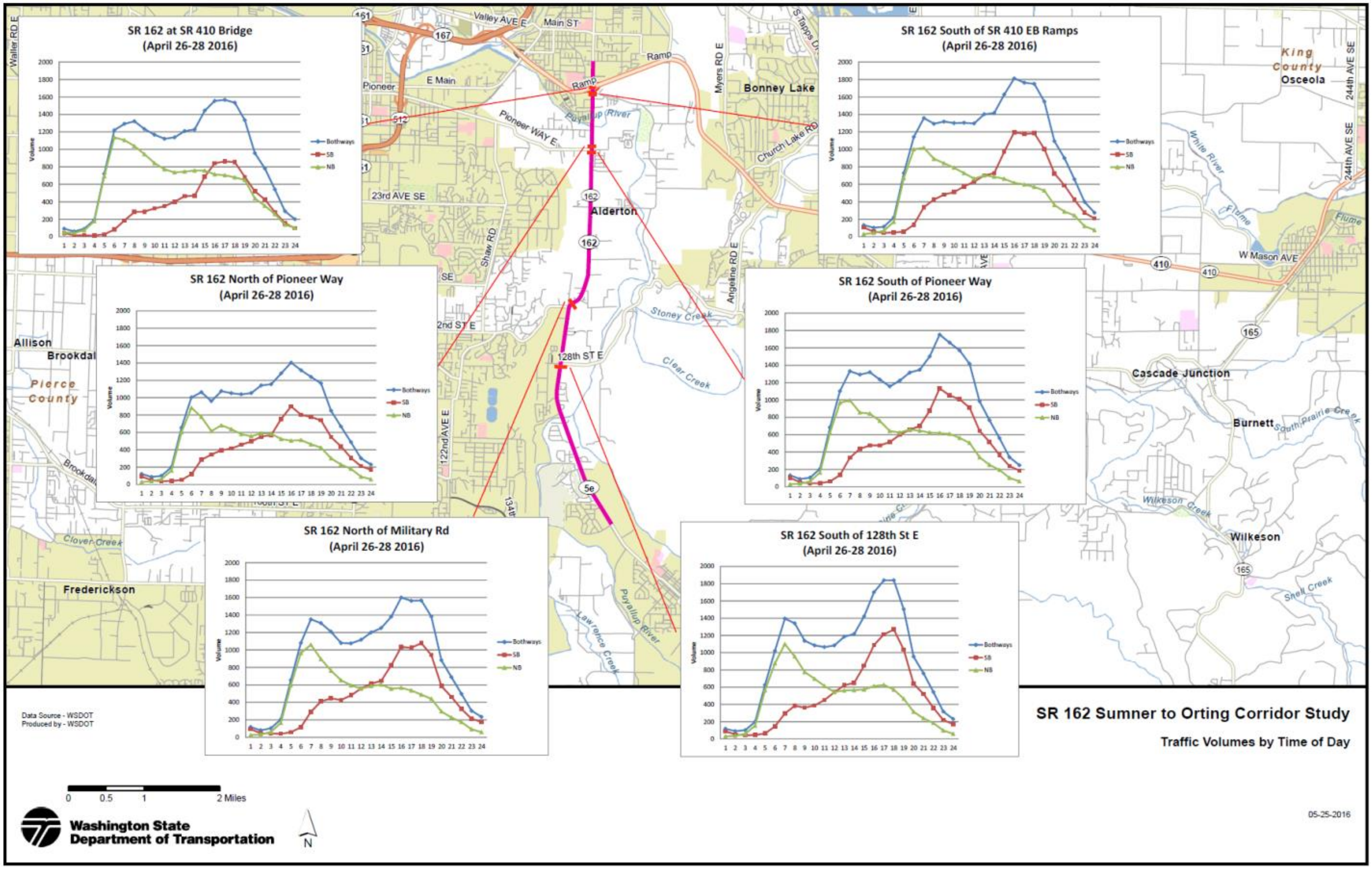


Figure 11 24-Hour Traffic Volumes on SR 162 South of 128th St E



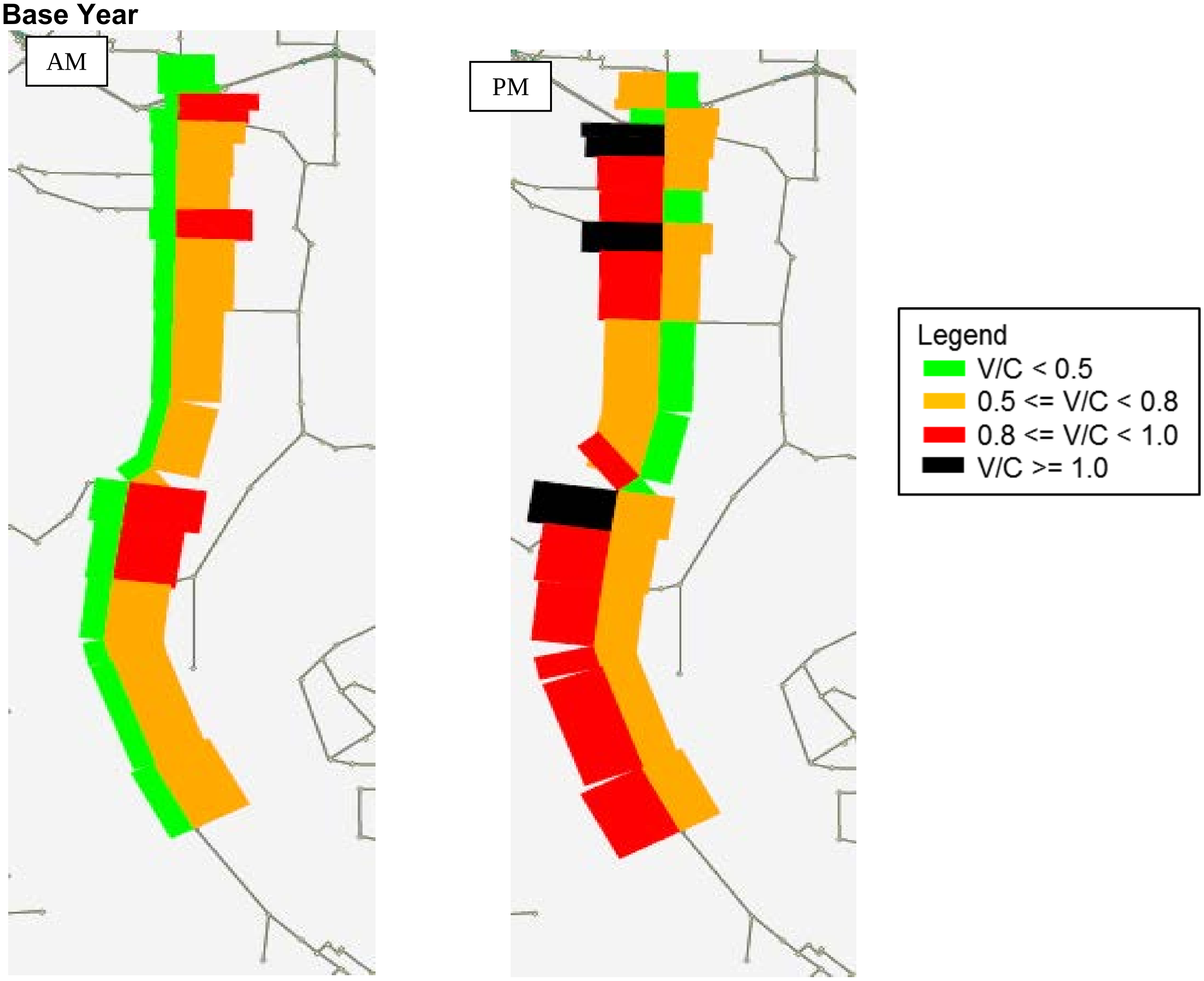
The following figure shows 24-hour volumes at all six locations on SR 162 on the map.

Figure 12 24-Hour Traffic Volumes at Six Locations on SR 162



The following figure shows the ratio of 2015 model volumes to Capacities (V/C) for AM and PM peak periods. As mentioned the capacity is based on the maximum throughputs of most existing 72-hour counts. It is 1200 veh/h for 50 mph posted speed limit and 1100 veh/hr for 35 mph or lower posted speed limit. During the AM peak period, the peak direction is northbound. The congested segments are south of Military Rd. E, South of Pioneer Way E. and South of SR 410 eastbound Ramps. The V/C ratios at these three segments are higher than 0.8 close to 1. During the PM peak periods, the peak direction is southbound. The congested segments of the study corridor were found to be north of Military Rd. E, south of Pioneer Way E, and south of SR 410 eastbound Ramps are over 1, which indicates the volumes are over the capacity.

Figure 13 2015 Model Volume to Capacity (V/C) Ratio for AM and PM Peak Periods in Base Year

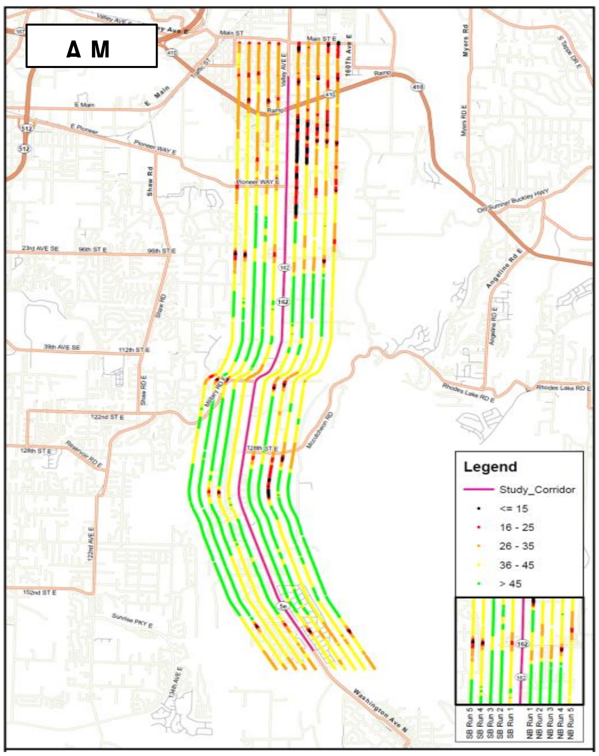


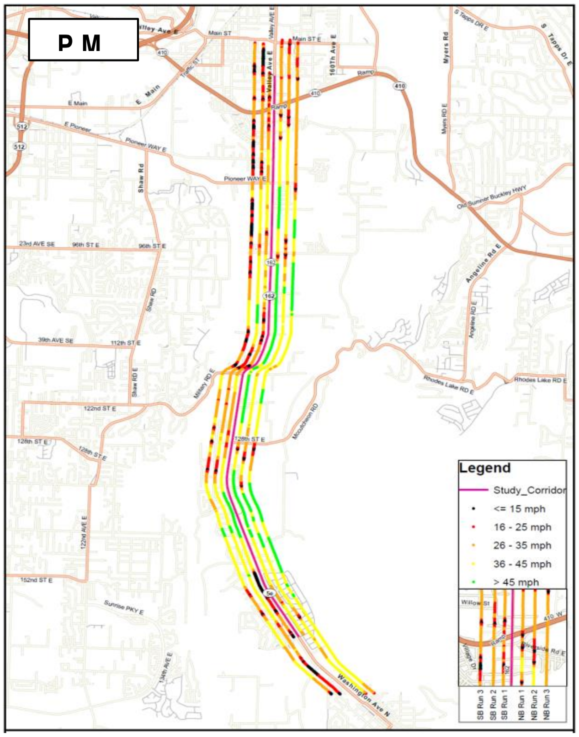
Back in March to May 2016 the study team also conducted the travel time survey. The travel time route was from Meade McCumber Rd. E. to Lane Blvd. NW. A GPS device which generates points every second or two was used. Each generated point included the time stamp and the point speed. Therefore, congested locations could be easily identified by plotting all points on the map.

The figure below shows the variations of the travel speed along the study corridor for AM and PM. The green indicates travel speed is greater than 45 mph and black indicates travel speed is below 15 mph.

As can be seen during AM peak periods the congestion or the travel speed below 15 mph occurred northbound when approaching 128th E. and approaching SR 410 interchange. During PM peak periods congestion occurred on southbound mainly from the main intersections queuing upstream.

Figure 14 Existing Travel Time Survey for AM and PM Peak Periods





The following table shows the base year intersection average delay and level of service (LOS) based on HCM 2010 methodology in Synchro for AM and PM peak hours. Based on the most recent counts collected in April and May in AM peak hour there is one intersection, SR 162 & SR 410 EB Ramps, showing LOS F with 89.6 seconds average delay.

In PM peak hour there are four intersections operating in LOS F. They are SR 162 & SR 410 EB Ramps, SR 162 & Pioneer Way E, SR 162 & Military Rd. E, SR 162 & 128th St. E. The intersection analysis results are consistent with the V/C ratios from the travel demand model and travel time survey results.

Table 9 Base Year Intersection Average Delay and LOS

Table 10 Base Year Intersection Average Delay and LOS

Synchro ID	Intersection Name	AM		PM	
		Delay	LOS	Delay	LOS
1	Valley Ave. & Meade McCumber Rd. E.	72.8	E	64.4	E
3	SR 162/Valley Ave. & SR 410 WB Ramps	47.8	D	31.5	C
4	SR 162 & SR 410 EB Ramps	89.6	F	86.8	F
5	SR 162 & Rivergrove Dr. E.	11.3	B	22.6	C

6	SR 162 & 80th St. E.	34.6	D	46.0	E
7	SR 162 & Pioneer Way E/Bowman-Hilton Rd. E.	20.4	C	111.5	F
10	SR 162 & 96th St. E.	56.0	E	45.2	D
14	SR 162 & Military Rd. E.	21.0	C	111.6	F
15	SR 162 & 128th St. E.	44.3	D	101.1	F
16	SR 162 & 136th St. E.	9.4	A	38.9	D
21	SR 162 & Williams Blvd. NW/Williams Blvd. NE	25.0	C	32.6	C

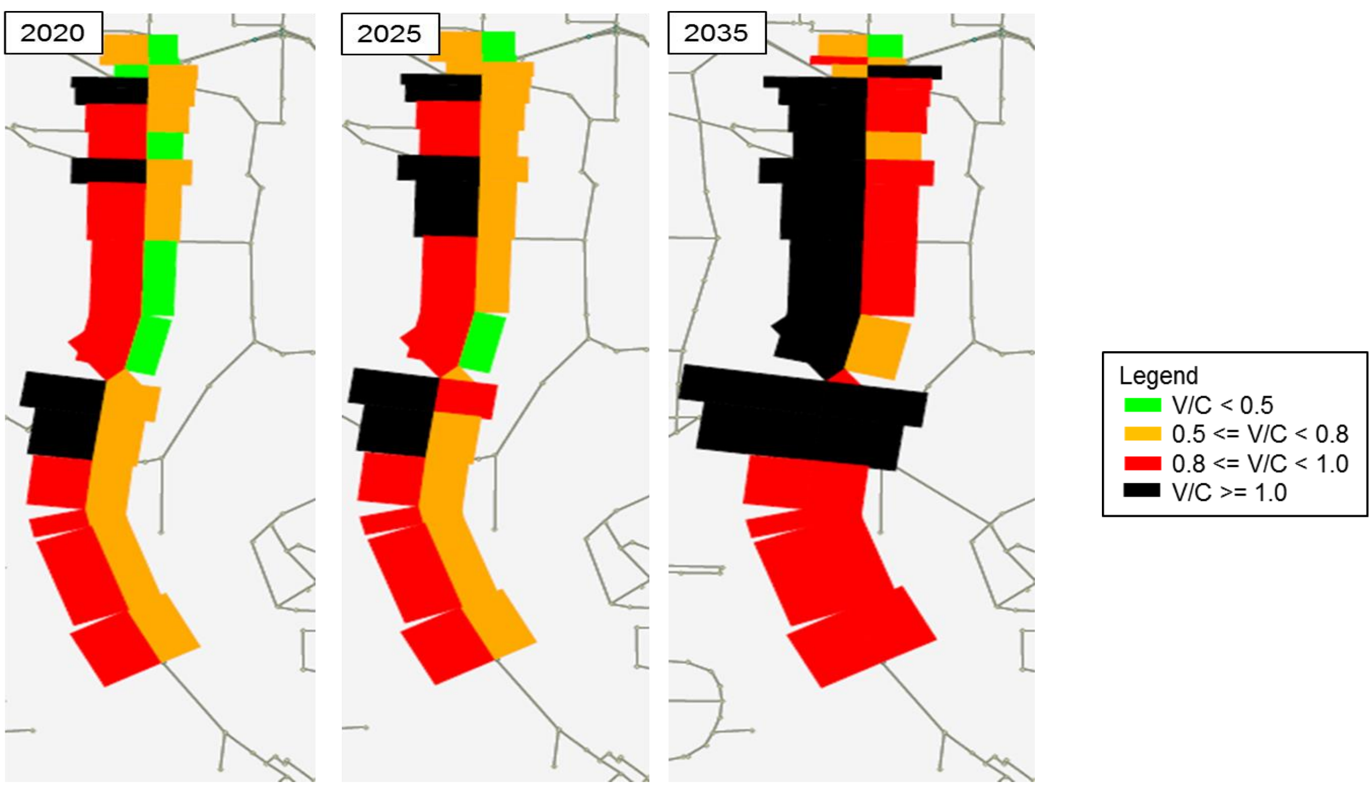
Evaluation of Future-Year No Action Performance

The future baseline no build condition was analyzed based on the Pierce County travel demand model. Based on the forecast the data shows significant growth to Year 2035. The AM Peak period demand to capacity ratio showed that by 2035 in the northbound direction between 128th Street and the SR 410 interchange, the V/C (volume to capacity) ratio is greater than 1.0. In the PM Peak period, the demand to capacity ratio showed that between 2020 and 2025 in the southbound direction the V/C ratio is typically greater than 0.8 and 1.0 from 128th Street north to the SR 410 interchange.

In 2035 the V/C ratio would be greater than 1 on the same segment. The following figures show the V/C ratios on the study corridor for AM and PM peak periods for Years 2020, 2025 and 2035.

Figure 15 Future No Action V/C ratios for AM Peak Periods

Figure 16 Future No Action V/C ratios for PM Peak Periods



As shown earlier in the current year of the AM Peak Hour, there doesn't seem to be much congestion, except at SR 162 and SR 410 eastbound ramps which shows LOS F. In the year 2025 there are four intersections showing LOS F and in 2035 the majority of intersections are at LOS F. In the PM Peak Hour the current year shows four intersections with LOS F and in 2020, 2025 and 2035 the majority of the 11 intersections are at LOS F. The intersection average delay and LOS for future Years on No Action condition are listed in the tables below.

Table 11 Future No Action Intersection Average Delay and LOS for AM Peak Hour

Synchro ID	Intersection Name	2020		2025		2035	
		Delay	LOS	Delay	LOS	Delay	LOS
1	Valley Ave & Meade McCumber Rd E	91.0	F	112.0	F	148.8	F
3	SR 162/Valley Ave & SR 410 WB Ramps	52.3	D	53.4	D	120.9	F
4	SR 162 & SR 410 EB Ramps	95.2	F	105.7	F	>180.0	F
5	SR 162 & Rivergrove Dr E	12.1	B	13.2	B	24.5	C
6	SR 162 & 80th St E	38.1	E	43.0	E	155.1	F
7	SR 162 & Pioneer Way E/Bowman-Hilton Rd E	22.2	C	41.2	D	142.9	F
10	SR 162 & 96th St E	62.0	E	88.8	F	>180.0	F
14	SR 162 & Military Rd E	27.1	C	35.4	D	>180.0	F
15	SR 162 & 128th St E	75.9	E	118.8	F	>180.0	F
16	SR 162 & 136th St E	10.3	B	11.2	B	11.5	B
21	SR 162 & Williams Blvd NW/Williams Blvd NE	26.0	C	30.1	C	32.5	C

Table 12 Future No Action Intersection Average Delay and LOS for PM Peak Hour

Synchro ID	Intersection Name	2020		2025		2035	
		Delay	LOS	Delay	LOS	Delay	LOS
1	Valley Ave. & Meade McCumber Rd. E.	80.5	F	108.9	F	140.2	F
3	SR 162/Valley Ave & SR 410 WB Ramps	33.2	C	34.1	C	92.2	F
4	SR 162 & SR 410 EB Ramps	92.7	F	107.6	F	>180.0	F
5	SR 162 & Rivergrove Dr. E.	24.9	C	35.0	D	84.9	F
6	SR 162 & 80th St. E.	72.9	F	103.9	F	>180.0	F
7	SR 162 & Pioneer Way E/Bowman-Hilton Rd. E.	134.8	F	>180.0	F	>180.0	F
10	SR 162 & 96th St. E.	55.7	E	62.5	E	139.1	F
14	SR 162 & Military Rd .E.	144.8	F	177.1	F	>180.0	F
15	SR 162 & 128th St. E.	122.7	F	144.1	F	>180.0	F
16	SR 162 & 136th St. E.	50.2	D	62.5	E	64.7	E
21	SR 162 & Williams Blvd. NW/Williams Blvd. NE	43.2	D	55.7	E	62.0	E

The table below shows the AM and PM peak hour travel time forecasts for Years 2020, 2025 and 2035 for each direction between Meade McCumber Rd E and Lane Blvd NW. At No action condition, southbound traffic on the study corridor in both AM and PM peak hours would experience significantly long delays and travel time. The northbound travel time would double in both AM and PM peak hours by 2035.

Another performance measure, travel time reliability, was also analyzed based on TTI. Tables 13 and 14 show the results for AM and PM peak hours. The TTI consistently shows that the southbound traffic in both AM and PM peak hours would be significantly unreliable. Southbound is the peak direction in PM peak hour. It would become unreliable as TTI is greater than 1.5 after Year 2015. It will become worse in future years as the TTI would be 2.16, 2.39 and 158.2 in 2020, 2025 and 2035, respectively. The peak direction northbound in AM would become unreliable by 2025 as the TTI will be 1.89. It will worsen to 2.53 in 2035.

The significant growth at SR 162 and 128th St. E. is the main reason for delay. High southbound left-turn volumes in AM and PM peak hours, with the current limited turn pocket, causes the queue to spill back upstream blocking main line. While extremely high TTI may not happen in the real world, it indicates the current capacity for left turn and signal timing would not be able serve the forecast demand in 2035.

Table 13 Future No Action Travel Time for AM and PM Peak Hours

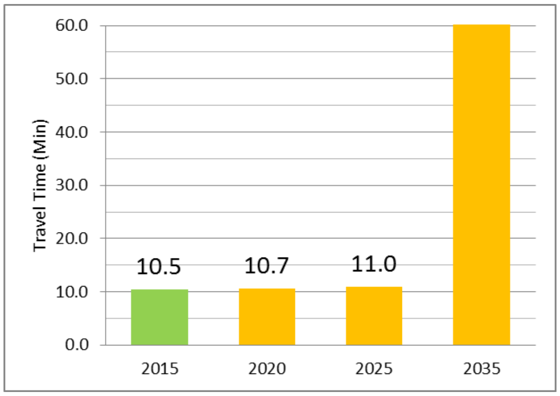
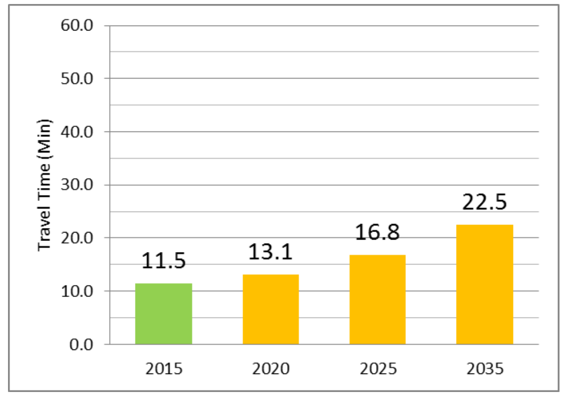
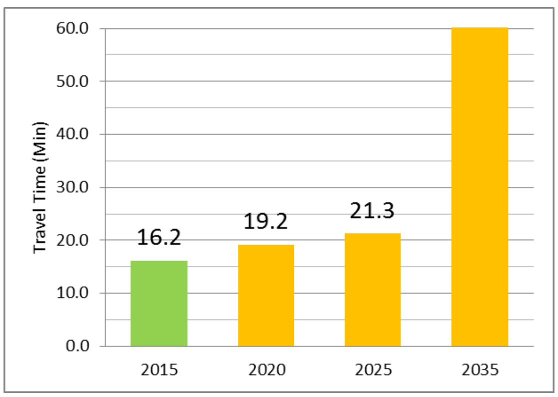
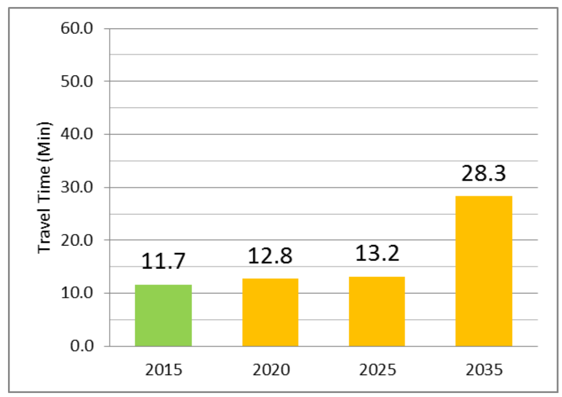
	Southbound	Northbound
AM Peak Hour		
PM Peak Hour		

Table 14 Future No Action Travel Time and Travel Time Index for AM Peak Hour

AM	Free Flow Travel Time (based on Posted Speed Limit)	Average Travel Time (min)				Travel Time Index			
		2015	2020	2025	2035	2015	2020	2025	2035
SB	8.9	10.5	10.7	11.0	569.1	1.18	1.20	1.23	63.95
NB	8.9	11.5	13.1	16.8	22.5	1.29	1.47	1.89	2.53

Note: Green is <1.3, Yellow is 1.3-1.4, Red is 1.4-1.5, Black is >=1.5

Table 15 Future No Action Travel Time and Travel Time Index for PM Peak Hour

PM	Free Flow Travel Time (based on Posted Speed Limit)	Average Travel Time (min)				Travel Time Index			
		2015	2020	2025	2035	2015	2020	2025	2035
SB	8.9	16.2	19.2	21.3	1408.0	1.82	2.16	2.39	158.20
NB	8.9	11.7	12.8	13.2	28.3	1.31	1.44	1.48	3.18

Note: Green is <1.3, Yellow is 1.3-1.4, Red is 1.4-1.5, Black is >=1.5

Evaluation of Future-Year Strategies Performance

This section includes the development of the strategies and the evaluation of the strategies based on results of the performance measures.

- Development of the Strategies

Based on the analysis for the future No Action scenarios, the study team has developed several strategies for short-, mid- and long-terms. The strategies could be categorized into three categories. They are Travel Demand Management (TDM), Public Transportation Improvement, and Roadway Improvement.

Here is the table showing the list of the strategies:

Table 16 Strategies for Future Years

Strategies	2020	2025	2035
TDM		√	√
Public Transportation Improvement			√
Signal timing adjustments/optimizations	√	√	√
Roundabouts	√	√	
Reversible 3rd lane			√
1997 Route Development Plan improvements			√

- Travel Demand Management (TDM)

  The TDM is a community-based approach. It relies on collaboration, commuter information and incentives in the community to reduce the number of trips by encouraging the commuters change their travel patterns and choices. The examples of techniques of TDM are:

  - commute trip reduction
  - telework
  - vanpool programs and ride-matching
  - Flexible work shift

  Based on the experience and trends of effectiveness of the TDM techniques in the past, the reductions of the trips were assumed to be 3% during the peak periods for future years in the travel demand model exercise.

- Public Transportation Improvement

  The public transportation could involve buses, commuter rail, light rail/street car, or any of the combination of the modes mentioned above. During the study Sound Transit has proposed the ST3 package to improve the service in the Puget Sound area. One of the proposed strategies is to serve the SR 162 study corridor. It is to extend the commuter rail from Puyallup to Orting. Some of the project features are:

  - The peak headway is 30 minutes.
  - By 2040 the daily boarding would be around 1,000 passengers.
  - A 125-car surface parking at proposed station location in McMillin/128th to 136th St. vicinity.
  - The rail extension is one possible form of the public transportation strategies. Although it could be other public transportation modes, the study team has used the benefits which Sound Transit has estimated for the strategy analysis and evaluation. Sound Transit has considered the land use nearby and current ridership at nearby stations for the ridership forecast for the proposed station at 128th to 136th St. vicinity. The key modeling forecast assumptions are listed below:
  - The ridership would be constrained by the capacity of the park & ride lot which has been restrained further by the amount of suitable property. Sound Transit forecasted that the riders would be proportioned by the following modes: 120 SOV (60%) riders, 20 carpool/vanpool (10%) riders, and 60 riders who walk, bike or are dropped off. Total is 200 riders at peak hour.

- The proportion of total riders who would have used SR 162 between McMillan and Sumner if they drove is 30%. Thirty percent of 200 vehicles are 60 vehicles which can be reduced on SR 162 at peak hour.
- Given the apportion of the ridership and the park and ride lot utilization, we assumed 50% more trips can be reduced on SR 162. One hundred and fifty percent of 60 vehicles equals 90 vehicles which can be reduced on SR 162 at peak hour generally between 128th St. and Pioneer Way. Two thirds of the vehicles are traveling to/from Pioneer Way and 1/3 is traveling to/from Sumner.
- The reduction would be northbound in AM traffic and southbound in PM traffic.

▪ Roadway Improvement Strategies

The following roadway improvement strategies were analyzed and evaluated:

- Short Term Strategies (Year 2020):
  - Signal Optimization using Synchro
  - Roundabout at 128th Street and Military Road
  - Mid Term Strategies (Year 2025)Channelization
  - Replacing signal systems with roundabouts
- Long Term Strategies (Year 2035)
  - Reversible lanes
    - One additional lane in the peak direction (northbound in AM and southbound in PM)
    - Signal modification would be needed to accommodate the middle reversible lane movements, which would be left-turn and through shared lane. It would become split phases for northbound and southbound approaches. They can no longer run concurrently.
  - 1997 Route Development Plan improvements
    - Highway Mobility Recommendations
    - SR 410 to Pioneer Way would include widening to a five lane roadway
    - Pioneer Way to 144th Street would include widening to a four lane roadway
    - 144th Street to Whitesell Street would include widening to a five lane roadway

▪ Combinations of strategies in Year 2035

Several combinations of strategies were also developed and analyzed for Year 2035:

- TDM + Roadway improvement
- Public transportation improvement + Roadway improvement
- Public transportation improvement + TDM + Roadway improvement

- Evaluations of the Strategies

The operating condition in each strategy was analyzed based on the demand forecast using Pierce County model. The strategies in each future year were compared with no action scenario in the same year. The detailed results for the average intersection delay and LOS and the travel time can be found in Appendix B. To evaluate the strategies in future years, intersection average delay and LOS and travel time were mainly used as performance measures. In order to pinpoint the operation efficiency and location needs, the study team segmented the entire study corridor into seven segments for travel time analysis. The seven segments are listed in the following table. They are also under the AG category for the identified strategies for the scoring calculation. Since the segment length varies, the segment travel time was normalized to seconds per 1/10 mile.

Table 17 Corridor Segmentation Travel Time Analysis

Segment	Cross Street
A	SR 410 WB Ramps - Rivergrove Dr
B	Rivergrove Dr - Pioneer Way
C	Pioneer Way - 96th St
D	96th St - Military Rd
E	Military Rd - 128th St
F	128th St - 136th St
G	136th St - Williams Blvd

In Year 2020 the intersection LOS was analyzed and with a signal optimization strategy, comparing it to no action in the AM peak hour the average intersection delay per vehicle could be reduced by 21% for the 11 intersections combined. In the PM it would be reduced by 16%, although there still are four intersections showing a LOS F. If the intersections at 128th Street and Military Rd. were converted to roundabouts in 2020, the average intersection delay would be reduced about 3 seconds at Military Rd. and about 18 seconds at 128th St. in the AM peak hour. In the PM peak hour the intersection delay would be reduced about 91 seconds and 20 seconds at Military Rd. and 128th Street intersections.

The travel time in Year 2020 with signal optimization would not be reduced. The signal optimization considers the intersection efficiency for all approaches. Therefore, the optimization may not favor the northbound and southbound mainline directions if demand on the minor street(s) is high. In the travel time analysis Synchro modeling of signal optimization and roundabout strategies suggest an increase in total travel time for the entire study corridor. This is mainly due to the signal optimization while analyzing the travel time for northbound and southbound directions. Both northbound and southbound directions are no longer favored approaches. It is to compensate and tradeoff with other approaches during the optimization. With roundabout conversions at two intersections, there would be fewer delays at those two locations and vehicles will go through more quickly. However, without any changes on the rest of the corridor, the traffic would be more congested on the remaining segments along the corridor.

In Year 2025 with the TDM strategy, comparing it to the no action scenario in AM peak hour, the average intersection delay per vehicle could be reduced by 28% for 11 intersections combined with one intersection, which is at 128th St., and still would operate at a LOS F. In the PM it would be reduced by 22%, although there are still five intersections showing LOS F. Looking at travel time with the TDM strategy, in the AM peak hour the travel time would be reduced by almost 19% in the northbound direction for all segments combined. However, in the PM peak hour, the TDM would increase the travel time. The reason is the travel pattern and the trip distribution would change due to the overall 3% trip reduction per the Pierce County model. The volumes along SR 162 are actually very similar to the no action option. Plus, the signal optimization which considers all approaches would not favor the northbound and southbound directions only. The study team noticed the LOS at 128th Street would be bad during the AM peak hour in 2025. It is due to the growth forecasted in the model with no roadway improvements (intersection geometry changes or roadway widening) at the intersection. Therefore, the westbound and northbound approaches showed significant delays, particularly the westbound left turn and right turn movements.

The traffic operation analysis for 2035 resulted in four strategies being analyzed and evaluated for Year 2035. In the AM peak hour except reversible lane strategy, TDM, 1997 plan and Public transportation strategies would reduce the average intersection delay by approximately 35%, 75% and 36%. Similarly, in the PM peak hour the average intersection delay would be reduced by 32% to 69%. The 1997 Route Development Plan strategy shows the highest reduction in intersection delay in both the AM and PM peak hours with fewer intersections operating at LOS F. The Year 2035 forecast volumes and the intersection configuration with 1997 Route Development Plan are in Appendix C.

The Reversible Lane strategy would increase the average intersection delay in both the AM and PM peak hours. Because of the middle reversible lane configuration, it has to become left turn and through shared lane. The signal phases for the northbound and southbound direction can no longer run concurrently.

It has to become split phase setting and intersection performance would not operate as efficiently as regular signal phase setting. Similar to the Year 2025 TDM strategy, the travel time would not be reduced. It is because the travel pattern and the trip distribution would change due to the overall 3% trip reduction county wide. The volumes along SR 162 are actually very similar to the no action option in 2035. Signal optimization was also applied to consider the efficiency for all approaches. The analysis resulted in the reversible lane strategy being dropped, due to the poor performance. The 1997 plan would reduce the travel time the most with the proposed intersection lane configurations as in the strategy list under AG.

After evaluating and analyzing the strategies individually, each strategy does not improve the corridor back to an acceptable level over the long-term (LOS D or better). Several intersections would still operate at LOS F and much longer travel time comparing to existing condition. It was stressed that per WSDOT's Practical Solutions approach the introduction of incremental short and mid-term strategies must be further refined and considered over time to manage corridor performance. The study team developed the following three combinations of strategies:

- TDM + Roadway improvement
- Public transportation improvement + Roadway improvement
- Public transportation improvement + TDM + Roadway improvement

The average intersection delay would be reduced with more strategies combined. However, several intersections would still experience LOS F condition. Travel time also shows additional reduction when strategies were combined, but delays still occur at several key locations.

To wrap all of the information up, the results of the analysis are:

- Given the high travel demand on SR 162 in the future, all strategies evaluated thus far and others yet to be conceived will be needed in order to improve desired corridor performance long term.
- The strategies analyzed and evaluated are not enough to make the corridor operate at an acceptable level (LOS D) or meet expectations (as noted in the study goal). The strategies will need to be continuously implemented and enhanced. For example, additional TDM techniques, reintroduction of public transportation services, and increased services to meet demands, etc. More strategies could be considered as they emerge in the future and be introduced to influence the travel patterns and improve performance along the corridor.

Appendix A Existing Traffic Volumes

AM Peak Hour

Int 1: Valley Ave. & Meade McCumber Rd. E.

Int 3: SR 162/Valley Ave. & SR 410 WB Ramps

Int 4: SR 162 & SR 410 EB Ramps

Int 5: SR 162 & Rivergrove Dr. E.

Int 6: SR 162 & 80th St. E.
E.

Int 7: SR 162 & Pioneer Way E./Bowman-Hilton Rd.

Int 10: SR 162 & 96th St. E.

Int 14: SR 162 & Military Rd. E.

Int 15: SR 162 & 128tth St. E.

Int 16: SR 162 & 136th St. E.

Int 21: SR 162 & Williams Blvd. NW/Williams Blvd. NE

PM Peak Hour

Int 1: Valley Ave. & Meade McCumber Rd. E.

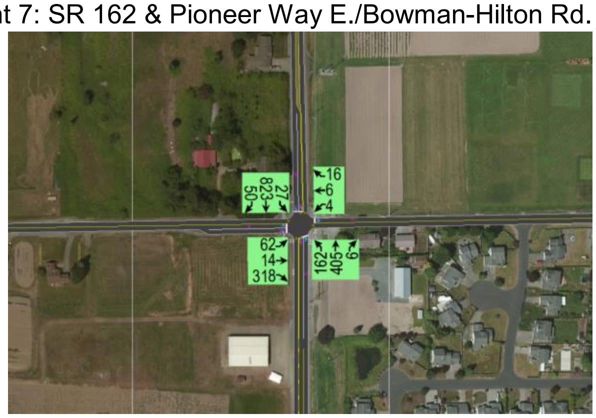
Int 3: SR 162/Valley Ave. & SR 410 WB Ramps

Int 4: SR 162 & SR 410 EB Ramps

Int 5: SR 162 & Rivergrove Dr. E.

Int 6: SR 162 & 80th St. E.

Int 7: SR 162 & Pioneer Way E./Bowman-Hilton Rd. E.



Int 10: SR 162 & 96th St. E.

Int 14: SR 162 & Military Rd. E.

Int 15: SR 162 & 128th St. E.

Int 16: SR 162 & 136th St. E.

Int 21: SR 162 & Williams Blvd. NW/Williams Blvd. NE

Appendix B Analysis results for Future Year strategies Performance

Year 2020

- Intersection Average Delay and LOS

AM Peak Hour		No Action		Signal Optimization		Roundabout	
Synchro ID	Intersection Name	2020		2020		2020	
		Delay	LOS	Delay	LOS	Delay	LOS
1	Valley Ave & Meade McCumber Rd E	91.0	F	41.1	D	41.1	D
3	SR 162/Valley Ave & SR 410 WB Ramps	52.3	D	40.0	D	40.0	D
4	SR 162 & SR 410 EB Ramps	95.2	F	71.6	E	71.6	E
5	SR 162 & Rivergrove Dr E	12.1	B	11.2	B	11.2	B
6	SR 162 & 80th St E	38.1	E	38.1	E	38.1	E
7	SR 162 & Pioneer Way E/Bowman-Hilton Rd E	22.2	C	18.5	B	18.5	B
10	SR 162 & 96th St E	62.0	E	51.8	D	51.8	D
14	SR 162 & Military Rd E	27.1	C	23.0	C	20.5	C
15	SR 162 & 128th St E	75.9	E	74.2	E	56.7	F
16	SR 162 & 136th St E	10.3	B	9.4	A	9.4	A
21	SR 162 & Williams Blvd NW/Williams Blvd NE	26.0	C	23.9	C	23.9	C
		512.2		402.8	-21%	382.8	-25%

PM Peak Hour		No Action		Signal Optimization		Roundabout	
Synchro ID	Intersection Name	2020		2020		2020	
		Delay	LOS	Delay	LOS	Delay	LOS
1	Valley Ave & Meade McCumber Rd E	80.5	F	42.5	D	42.5	D
3	SR 162/Valley Ave & SR 410 WB Ramps	33.2	C	31.2	C	31.2	C
4	SR 162 & SR 410 EB Ramps	92.7	F	78.8	E	78.8	E
5	SR 162 & Rivergrove Dr E	24.9	C	21.9	C	21.9	C
6	SR 162 & 80th St E	72.9	F	72.9	F	72.9	F
7	SR 162 & Pioneer Way E/Bowman-Hilton Rd E	134.8	F	107.8	F	107.8	F
10	SR 162 & 96th St E	55.7	E	44.9	D	44.9	D
14	SR 162 & Military Rd E	144.8	F	139.5	F	48.4	E
15	SR 162 & 128th St E	122.7	F	108.6	F	88.9	F
16	SR 162 & 136th St E	50.2	D	40.4	D	40.4	D
21	SR 162 & Williams Blvd NW/Williams Blvd NE	43.2	D	30.8	C	30.8	C
		855.6		719.3	-16%	608.5	-29%

- Travel Time

AM	2020 NA		2020 Signal Optimization		% Change		2020 Roundabout		% Change	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
Total	517.2	676.9	528.1	630.7	2%	-7%	528.6	1293.1	2%	91%

Segment Travel Time per 1/10 mile (seconds)

AM	2020 NA		2020 Signal Optimization		% Change		2020 Roundabout		% Change	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
AG Segment A - SR 410 WB Ramps - Rivergrove Dr	14.4	22.4	16.8	23.2	17%	4%	16.6	20.6	15%	-8%
AG Segment B - Rivergrove Dr - Pioneer Way	12.6	10.9	12.8	11.1	2%	2%	12.7	10.9	1%	0%
AG Segment C - Pioneer Way - 96th St	8.2	9.6	8.2	9.6	0%	0%	8.3	9.5	1%	-1%
AG Segment D - 96th St - Military Rd	8.6	12.5	8.6	9.7	0%	-22%	7.8	9.4	-9%	-25%
AG Segment E - Military Rd - 128th St	8.1	9.5	8.1	9.5	0%	0%	8.9	14.0	10%	47%
AG Segment F - 128th St - 136th St	8.0	21.0	7.9	18.9	-1%	-10%	9.4	81.7	18%	289%
AG Segment G - 136th St - Williams Blvd	7.8	8.0	7.9	7.9	1%	-1%	7.8	31.6	0%	295%

PM	2020 NA		2020 Signal Optimization		% Change		2020 Roundabout		% Change	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
Total	1062.0	664.3	1102.6	750.1	4%	13%	2421.1	719.3	128%	8%

Segment Travel Time per 1/10 mile (seconds)

PM	2020 NA		2020 Signal Optimization		% Change		2020 Roundabout		% Change	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
AG Segment A - SR 410 WB Ramps - Rivergrove Dr	23.3	39.1	40.7	44.2	75%	13%	36.8	47.5	58%	21%
AG Segment B - Rivergrove Dr - Pioneer Way	19.9	11.4	42.0	11.5	111%	1%	42.6	13.6	114%	19%
AG Segment C - Pioneer Way - 96th St	10.3	10.2	9.9	10.3	-4%	1%	11.9	10.5	16%	3%
AG Segment D - 96th St - Military Rd	34.9	9.3	27.5	9.3	-21%	0%	93.0	9.4	166%	1%
AG Segment E - Military Rd - 128th St	13.6	9.2	10.6	17.2	-22%	87%	63.8	9.7	369%	5%
AG Segment F - 128th St - 136th St	12.7	12.2	11.6	13.6	-9%	11%	11.0	13.4	-13%	10%
AG Segment G - 136th St - Williams Blvd	9.5	8.4	9.4	8.4	-1%	0%	9.0	8.4	-5%	0%

Year 2025

- Intersection Average Delay and LOS

AM Peak Hour		No Action		TDM	
Synchro ID	Intersection Name	2025		2025	
		Delay	LOS	Delay	LOS
1	Valley Ave & Meade McCumber Rd E	112.0	F	46.6	D
3	SR 162/Valley Ave & SR 410 WB Ramps	53.4	D	40.0	D
4	SR 162 & SR 410 EB Ramps	105.7	F	78.2	E
5	SR 162 & Rivergrove Dr E	13.2	B	11.9	B
6	SR 162 & 80th St E	43.0	E	39.6	E
7	SR 162 & Pioneer Way E/Bowman-Hilton Rd E	41.2	D	20.8	C
10	SR 162 & 96th St E	88.8	F	67.9	E
14	SR 162 & Military Rd E	35.4	D	26.7	C
15	SR 162 & 128th St E	118.8	F	100.4	F
16	SR 162 & 136th St E	11.2	B	9.5	A
21	SR 162 & Williams Blvd NW/Williams Blvd NE	30.1	C	25.6	C
		652.8		467.2	-28%

PM Peak Hour		No Action		TDM	
Synchro ID	Intersection Name	2025		2025	
		Delay	LOS	Delay	LOS
1	Valley Ave & Meade McCumber Rd E	108.9	F	47.1	D
3	SR 162/Valley Ave & SR 410 WB Ramps	34.1	C	31.5	C
4	SR 162 & SR 410 EB Ramps	107.6	F	85.0	F
5	SR 162 & Rivergrove Dr E	35.0	D	28.8	C
6	SR 162 & 80th St E	103.9	F	87.6	F
7	SR 162 & Pioneer Way E/Bowman-Hilton Rd E	196.4	F	140.1	F
10	SR 162 & 96th St E	62.5	E	50.9	D
14	SR 162 & Military Rd E	177.1	F	164.2	F
15	SR 162 & 128th St E	144.1	F	127.1	F
16	SR 162 & 136th St E	62.5	E	46.9	D
21	SR 162 & Williams Blvd NW/Williams Blvd NE	55.7	E	36.8	D
		1087.8		846	-22%

- Travel Time

AM	2025 NA		2025 TDM		% Change	
	SB	NB	SB	NB	SB	NB
Total	527.4	877.3	526.9	713.4	-0.1%	-18.7%

Segment Travel Time per 1/10 mile (seconds)

AM	2025 NA		2025 TDM		% Change	
	SB	NB	SB	NB	SB	NB
AG Segment A - SR 410 WB Ramps - Rivergrove Dr	15.2	32.0	14.3	23.2	-6%	-28%
AG Segment B - Rivergrove Dr - Pioneer Way	13.1	12.7	13.4	11.2	2%	-12%
AG Segment C - Pioneer Way - 96th St	8.4	9.8	8.3	9.7	-1%	-1%
AG Segment D - 96th St - Military Rd	8.7	16.8	8.7	10.8	0%	-36%
AG Segment E - Military Rd - 128th St	8.2	9.5	8.3	9.5	1%	0%
AG Segment F - 128th St - 136th St	8.0	37.6	8.1	32.3	1%	-14%
AG Segment G - 136th St - Williams Blvd	7.9	9.3	7.8	8.3	-1%	-11%

PM	2025 NA		2025 TDM		% Change	
	SB	NB	SB	NB	SB	NB
Total	1182.1	678.0	1274.8	920.1	7.8%	35.7%

Segment Travel Time per 1/10 mile (seconds)

PM	2025 NA		2025 TDM		% Change	
	SB	NB	SB	NB	SB	NB
AG Segment A - SR 410 WB Ramps - Rivergrove Dr	27.3	40.7	48.5	54.5	78%	34%
AG Segment B - Rivergrove Dr - Pioneer Way	26.2	11.3	59.9	14.0	129%	24%
AG Segment C - Pioneer Way - 96th St	10.4	10.9	10.0	10.5	-4%	-4%
AG Segment D - 96th St - Military Rd	38.7	9.5	29.5	9.4	-24%	-1%
AG Segment E - Military Rd - 128th St	15.6	9.3	13.0	31.8	-17%	242%
AG Segment F - 128th St - 136th St	12.8	12.2	12.8	14.9	0%	22%
AG Segment G - 136th St - Williams Blvd	9.7	8.4	9.3	8.4	-4%	0%

Year 2035

- Intersection Average Delay and LOS

AM Peak Hour		No Action		TDM		Reversible 3rd Lane		1997 Plan Improvement		Transit - Sounder Rail Extension	
Synchro ID	Intersection Name	2035		2035		2035		2035		2035	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	Valley Ave & Meade McCumber Rd E	148.8	F	63.2	E	112.1	F	114.3	F	63.2	E
3	SR 162/Valley Ave & SR 410 WB Ramps	120.9	F	111.3	F	174.2	F	60.4	E	115.4	F
4	SR 162 & SR 410 EB Ramps	269.6	F	230.5	F	275.0	F	74.5	E	225.9	F
5	SR 162 & Rivergrove Dr E	24.5	C	21.3	C	202.3	F	11.6	B	19.8	B
6	SR 162 & 80th St E	155.1	F	137.9	F	101.0	F	34.0	D	139.0	F
7	SR 162 & Pioneer Way E/Bowman-Hilton Rd E	142.9	F	64.3	E	380.1	F	49.8	D	56.9	E
10	SR 162 & 96th St E	218.3	F	175.8	F	344.1	F	56.1	E	151.1	F
14	SR 162 & Military Rd E	238.2	F	181.9	F	496.6	F	35.2	D	182.6	F
15	SR 162 & 128th St E	1154.9	F	614.9	F	977.4	F	176.4	F	607.5	F
16	SR 162 & 136th St E	11.5	B	10.1	B	10.2	B	7.5	A	11.5	B
21	SR 162 & Williams Blvd NW/Williams Blvd NE	32.5	C	28.8	C	30.2	C	19.3	B	32.5	C
		2517.2		1640	-35%	3103.2	23%	639.1	-75%	1605.4	-36%

PM Peak Hour		No Action		TDM		Reversible 3rd Lane		1997 Plan Improvement		Transit - Sounder Rail Extension	
Synchro ID	Intersection Name	2035		2035		2035		2035		2035	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	Valley Ave & Meade McCumber Rd E	140.2	F	57.7	E	87.4	F	94.9	F	59.0	E
3	SR 162/Valley Ave & SR 410 WB Ramps	92.2	F	74.6	E	344.3	F	98.0	F	74.6	E
4	SR 162 & SR 410 EB Ramps	347.8	F	284.1	F	693.4	F	109.9	F	287.7	F
5	SR 162 & Rivergrove Dr E	84.9	F	86.8	F	349.9	F	7.5	A	84.2	F
6	SR 162 & 80th St E	354.4	F	290.6	F	629.4	F	140.0	F	331.4	F
7	SR 162 & Pioneer Way E/Bowman-Hilton Rd E	319.1	F	242.1	F	528.9	F	164.7	F	227.6	F
10	SR 162 & 96th St E	139.1	F	117.6	F	494.3	F	78.8	E	103.7	F
14	SR 162 & Military Rd E	525.4	F	465.2	F	754.2	F	237.2	F	452.5	F
15	SR 162 & 128th St E	1402.3	F	664.0	F	941.9	F	123.0	F	646.3	F
16	SR 162 & 136th St E	64.7	E	47.8	D	63.4	E	11.9	B	64.7	E
21	SR 162 & Williams Blvd NW/Williams Blvd NE	62.0	E	40.3	D	50.2	D	19.4	B	62.0	E
		3532.1		2370.8	-33%	4937.3	40%	1085.3	-69%	2393.7	-32%

Combinations of Strategies

AM Peak Hour		No Action		TDM + 1997 Plan Improvement		Transit + 1997 Plan Improvement		Transit+TDM + 1997 Plan Improvement	
Synchro ID	Intersection Name	2035		2035		2035		2035	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	Valley Ave & Meade McCumber Rd E	148.8	F	102.2	F	106.3	F	94.4	F
3	SR 162/Valley Ave & SR 410 WB Ramps	120.9	F	57.9	E	60.9	E	58.3	E
4	SR 162 & SR 410 EB Ramps	269.6	F	68.4	E	70.5	E	64.5	E
5	SR 162 & Rivergrove Dr E	24.5	C	11.2	B	11.4	B	11.0	B
6	SR 162 & 80th St E	155.1	F	32.4	D	33.6	D	32.0	D
7	SR 162 & Pioneer Way E/Bowman-Hilton Rd E	142.9	F	25.6	C	24.9	C	23.6	C
10	SR 162 & 96th St E	218.3	F	50.2	D	46.4	D	41.6	D
14	SR 162 & Military Rd E	238.2	F	33.1	C	32.5	C	30.9	C
15	SR 162 & 128th St E	1154.9	F	175.7	F	157.9	F	157.0	F
16	SR 162 & 136th St E	11.5	B	7.4	A	7.5	A	7.4	A
21	SR 162 & Williams Blvd NW/Williams Blvd NE	32.5	C	18.8	B	19.3	B	18.8	B
		2517.2		582.9	-77%	571.2	-77%	539.5	-79%

PM Peak Hour		No Action		TDM + 1997 Plan Improvement		Transit + 1997 Plan Improvement		Transit+TDM + 1997 Plan Improvement	
Synchro ID	Intersection Name	2035		2035		2035		2035	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	Valley Ave & Meade McCumber Rd E	140.2	F	88.8	F	88.9	F	83.1	F
3	SR 162/Valley Ave & SR 410 WB Ramps	92.2	F	92.0	F	92.4	F	86.7	F
4	SR 162 & SR 410 EB Ramps	347.8	F	103.6	F	110.7	F	104.3	F
5	SR 162 & Rivergrove Dr E	84.9	F	5.8	A	6.6	A	5.6	A
6	SR 162 & 80th St E	354.4	F	147.5	F	132.7	F	132.4	F
7	SR 162 & Pioneer Way E/Bowman-Hilton Rd E	319.1	F	150.8	F	151.1	F	137.6	F
10	SR 162 & 96th St E	139.1	F	72.6	E	68.3	E	62.4	E
14	SR 162 & Military Rd E	525.4	F	227.8	F	223.6	F	214.3	F
15	SR 162 & 128th St E	1402.3	F	113.6	F	110.6	F	101.5	F
16	SR 162 & 136th St E	64.7	E	11.6	B	11.9	B	11.6	B
21	SR 162 & Williams Blvd NW/Williams Blvd NE	62.0	E	18.6	B	19.4	B	18.6	B
		3532.1		1032.7	-71%	1016.2	-71%	958.1	-73%

- ## Travel Time

AM	2035 NA		2035 TDM		% Change		2035 Reversible 3rd Lane		% Change		2035 1997 Plan Improvement		% Change		2035 Transit - Sounder Rail Extension		% Change	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
Total	33898.9	1252.6	29745.5	2546.1	-12.3%	103.3%	4885.4	2595.3	-85.6%	107.2%	533.3	943.4	-98.4%	-24.7%	28982.3	2390.1	-14.5%	90.8%

Segment Travel Time per 1/10 mile (seconds)

AM	2035 NA		2035 TDM + 1997 Plan Improvement		% Change		2035 Transit + 1997 Plan Improvement		% Change		2035 Transit + TDM + 1997 Plan Improvement		% Change	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
AG Segment A - SR 410 WB Ramps - Rivergrove Dr	86.5	60.3	13.0	46.9	-85.0%	-22.2%	13.1	49.5	-84.9%	-17.9%	12.7	48.3	-85.3%	-19.9%
AG Segment B - Rivergrove Dr - Pioneer Way	124.0	40.5	13.8	31.9	-88.9%	-21.2%	13.6	44.7	-89.0%	10.4%	13.2	36.7	-89.4%	-9.4%
AG Segment C - Pioneer Way - 96th St	285.6	13.5	8.3	10.6	-97.1%	-21.5%	8.2	11.4	-97.1%	-15.6%	8.3	10.5	-97.1%	-22.2%
AG Segment D - 96th St - Military Rd	2146.3	9.3	9.3	9.0	-99.6%	-3.2%	9.4	9.0	-99.6%	-3.2%	9.3	9.0	-99.6%	-3.2%
AG Segment E - Military Rd - 128th St	48.1	18.0	8.2	14.8	-83.0%	-17.8%	8.2	19.8	-83.0%	10.0%	8.2	17.2	-83.0%	-4.4%
AG Segment F - 128th St - 136th St	7.5	59.8	8.4	18.7	12.0%	-68.7%	8.5	25.3	13.3%	-57.7%	8.5	19.2	13.3%	-67.9%
AG Segment G - 136th St - Williams Blvd	7.8	12.1	7.8	7.7	0.0%	-36.4%	7.9	7.7	1.3%	-36.4%	7.8	7.7	0.0%	-36.4%

PM	2035 NA		2035 TDM + 1997 Plan Improvement		% Change		2035 Transit + 1997 Plan Improvement		% Change		2035 Transit + TDM + 1997 Plan Improvement		% Change	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
Total	83048.0	1597.5	2362.7	983.5	-97.2%	-38.4%	2104.2	1171.8	-97.5%	-26.6%	2074.5	1039.7	-97.5%	-34.9%

Segment Travel Time per 1/10 mile (seconds)

PM	2035 NA		2035 TDM + 1997 Plan Improvement		% Change		2035 Transit + 1997 Plan Improvement		% Change		2035 Transit + TDM + 1997 Plan Improvement		% Change	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
AG Segment A - SR 410 WB Ramps - Rivergrove Dr	396.8	103.6	17.4	57.7	-95.6%	-44.3%	19.6	74.3	-95.1%	-28.3%	17.1	65.5	-95.7%	-36.8%
AG Segment B - Rivergrove Dr - Pioneer Way	1255.3	68.8	57.2	11.9	-95.4%	-82.7%	60.7	16.9	-95.2%	-75.4%	53.6	16.5	-95.7%	-76.0%
AG Segment C - Pioneer Way - 96th St	2522.1	9.8	17.7	15.6	-99.3%	59.2%	12.1	17.9	-99.5%	82.7%	11.4	16.8	-99.5%	71.4%
AG Segment D - 96th St - Military Rd	3896.7	8.9	101.2	9.0	-97.4%	1.1%	85.8	9.1	-97.8%	2.2%	88.0	9.1	-97.7%	2.2%
AG Segment E - Military Rd - 128th St	119.7	33.5	36.1	18.4	-69.8%	-45.1%	32.5	20.9	-72.8%	-37.6%	31.4	19.2	-73.8%	-42.7%
AG Segment F - 128th St - 136th St	8.5	51.5	9.5	42.2	11.8%	-18.1%	9.7	54.6	14.1%	6.0%	9.5	39.8	11.8%	-22.7%
AG Segment G - 136th St - Williams Blvd	8.6	11.8	8.6	8.9	0.0%	-24.6%	8.7	9.4	1.2%	-20.3%	8.6	8.8	0.0%	-25.4%

Combination of Strategies

AM	2035 NA		2035 TDM + 1997 Plan Improvement		% Change		2035 Transit + 1997 Plan Improvement		% Change		2035 Transit + TDM + 1997 Plan Improvement		% Change	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
Total	33898.9	1252.6	532.5	857.0	-98.4%	-31.6%	533.6	1005.0	-98.4%	-19.8%	527.6	905.0	-98.4%	-27.8%

Segment Travel Time per 1/10 mile (seconds)

AM	2035 NA		2035 TDM + 1997 Plan Improvement		% Change		2035 Transit + 1997 Plan Improvement		% Change		2035 Transit + TDM + 1997 Plan Improvement		% Change	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
AG Segment A - SR 410 WB Ramps - Rivergrove Dr	86.5	60.3	13.0	46.9	-85.0%	-22.2%	13.1	49.5	-84.9%	-17.9%	12.7	48.3	-85.3%	-19.9%
AG Segment B - Rivergrove Dr - Pioneer Way	124.0	40.5	13.8	31.9	-88.9%	-21.2%	13.6	44.7	-89.0%	10.4%	13.2	36.7	-89.4%	-9.4%
AG Segment C - Pioneer Way - 96th St	285.6	13.5	8.3	10.6	-97.1%	-21.5%	8.2	11.4	-97.1%	-15.6%	8.3	10.5	-97.1%	-22.2%
AG Segment D - 96th St - Military Rd	2146.3	9.3	9.3	9.0	-99.6%	-3.2%	9.4	9.0	-99.6%	-3.2%	9.3	9.0	-99.6%	-3.2%
AG Segment E - Military Rd - 128th St	48.1	18.0	8.2	14.8	-83.0%	-17.8%	8.2	19.8	-83.0%	10.0%	8.2	17.2	-83.0%	-4.4%
AG Segment F - 128th St - 136th St	7.5	59.8	8.4	18.7	12.0%	-68.7%	8.5	25.3	13.3%	-57.7%	8.5	19.2	13.3%	-67.9%
AG Segment G - 136th St - Williams Blvd	7.8	12.1	7.8	7.7	0.0%	-36.4%	7.9	7.7	1.3%	-36.4%	7.8	7.7	0.0%	-36.4%

PM	2035 NA		2035 TDM + 1997 Plan Improvement		% Change		2035 Transit + 1997 Plan Improvement		% Change		2035 Transit + TDM + 1997 Plan Improvement		% Change	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
Total	83048.0	1597.5	2362.7	983.5	-97.2%	-38.4%	2104.2	1171.8	-97.5%	-26.6%	2074.5	1039.7	-97.5%	-34.9%

Segment Travel Time per 1/10 mile (seconds)

PM	2035 NA		2035 TDM + 1997 Plan Improvement		% Change		2035 Transit + 1997 Plan Improvement		% Change		2035 Transit + TDM + 1997 Plan Improvement		% Change	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
AG Segment A - SR 410 WB Ramps - Rivergrove Dr	396.8	103.6	17.4	57.7	-95.6%	-44.3%	19.6	74.3	-95.1%	-28.3%	17.1	65.5	-95.7%	-36.8%
AG Segment B - Rivergrove Dr - Pioneer Way	1255.3	68.8	57.2	11.9	-95.4%	-82.7%	60.7	16.9	-95.2%	-75.4%	53.6	16.5	-95.7%	-76.0%
AG Segment C - Pioneer Way - 96th St	2522.1	9.8	17.7	15.6	-99.3%	59.2%	12.1	17.9	-99.5%	82.7%	11.4	16.8	-99.5%	71.4%
AG Segment D - 96th St - Military Rd	3896.7	8.9	101.2	9.0	-97.4%	1.1%	85.8	9.1	-97.8%	2.2%	88.0	9.1	-97.7%	2.2%
AG Segment E - Military Rd - 128th St	119.7	33.5	36.1	18.4	-69.8%	-45.1%	32.5	20.9	-72.8%	-37.6%	31.4	19.2	-73.8%	-42.7%
AG Segment F - 128th St - 136th St	8.5	51.5	9.5	42.2	11.8%	-18.1%	9.7	54.6	14.1%	6.0%	9.5	39.8	11.8%	-22.7%
AG Segment G - 136th St - Williams Blvd	8.6	11.8	8.6	8.9	0.0%	-24.6%	8.7	9.4	1.2%	-20.3%	8.6	8.8	0.0%	-25.4%

Appendix C Year 2035 Forecast Volumes and Intersection Configurations for 1997 Route Development Plan strategy

AM Peak Hour

Int 1: Valley Ave. & Meade McCumber Rd. E.

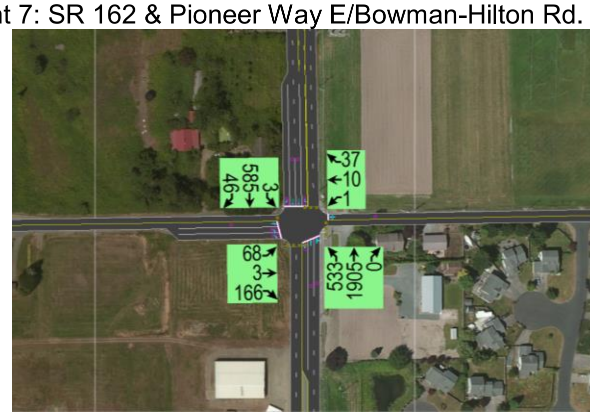
Int 3: SR 162/Valley Ave. & SR 410 WB Ramps

Int 4: SR 162 & SR 410 EB Ramps

Int 5: SR 162 & Rivergrove Dr. E.

Int 6: SR 162 & 80th St. E.

Int 7: SR 162 & Pioneer Way E/Bowman-Hilton Rd. E.



Int 10: SR 162 & 96th St. E.

Int 14: SR 162 & Military Rd. E.

Int 15: SR 162 & 128th St. E.

Int 16: SR 162 & 136th St. E.

Int 21: SR 162 & Williams Blvd. NW/Williams Blvd. NE

PM Peak Hour

Int 1: Valley Ave. & Meade McCumber Rd. E.

Int 3: SR 162/Valley Ave. & SR 410 WB Ramps

Int 4: SR 162 & SR 410 EB Ramps

Int 5: SR 162 & Rivergrove Dr. E.

Int 6: SR 162 & 80th St. E.

Int 7: SR 162 & Pioneer Way E/Bowman-Hilton Rd. E.

Int 10: SR 162 & 96th St E.

Int 14: SR 162 & Military Rd. E.

Int 15: SR 162 & 128th St. E.

Int 16: SR 162 & 136th St. E.

Int 21: SR 162 & Williams Blvd. NW/Williams Blvd. NE

APPENDIX C

Travel Demand Modeling and Traffic Analysis

Technical Memorandum
Travel Demand Modeling & Traffic Analysis

Introduction

The purpose of the analysis for SR 162 Corridor Study is to identify the travel patterns and where there are existing transportation system constraints affecting system performance and travel decisions within the study area. It is also to evaluate the future performance with a given demand growth and with proposed strategies. A key step in identifying traffic performance on SR 162 corridor is the development of a methodology and a suite of traffic forecasting and operational analysis models. Concurrent with the development of the methodology the suite of traffic forecasting and operational analysis models is establishing and agreeing upon a certain set of assumptions for this analysis. These assumptions can include, but are not limited to, future forecast year(s); population/economic growth, and land use and network assumptions. This report presents the modeling methodologies, assumptions, geographic focus area of the study, analysis years, the base year model validations, and the final traffic operational analysis results for existing condition, future-year no action conditions, and future-year conditions with proposed strategies.

Methodology and Assumptions

In this study there were two different types of modeling platforms developed for traffic forecast and analysis. The four-step travel demand model was used as the macroscopic model to look at the demand forecasts and the traffic distribution. The traffic operational and simulation model was used to evaluate the traffic performance including the intersection and corridor segments performances.

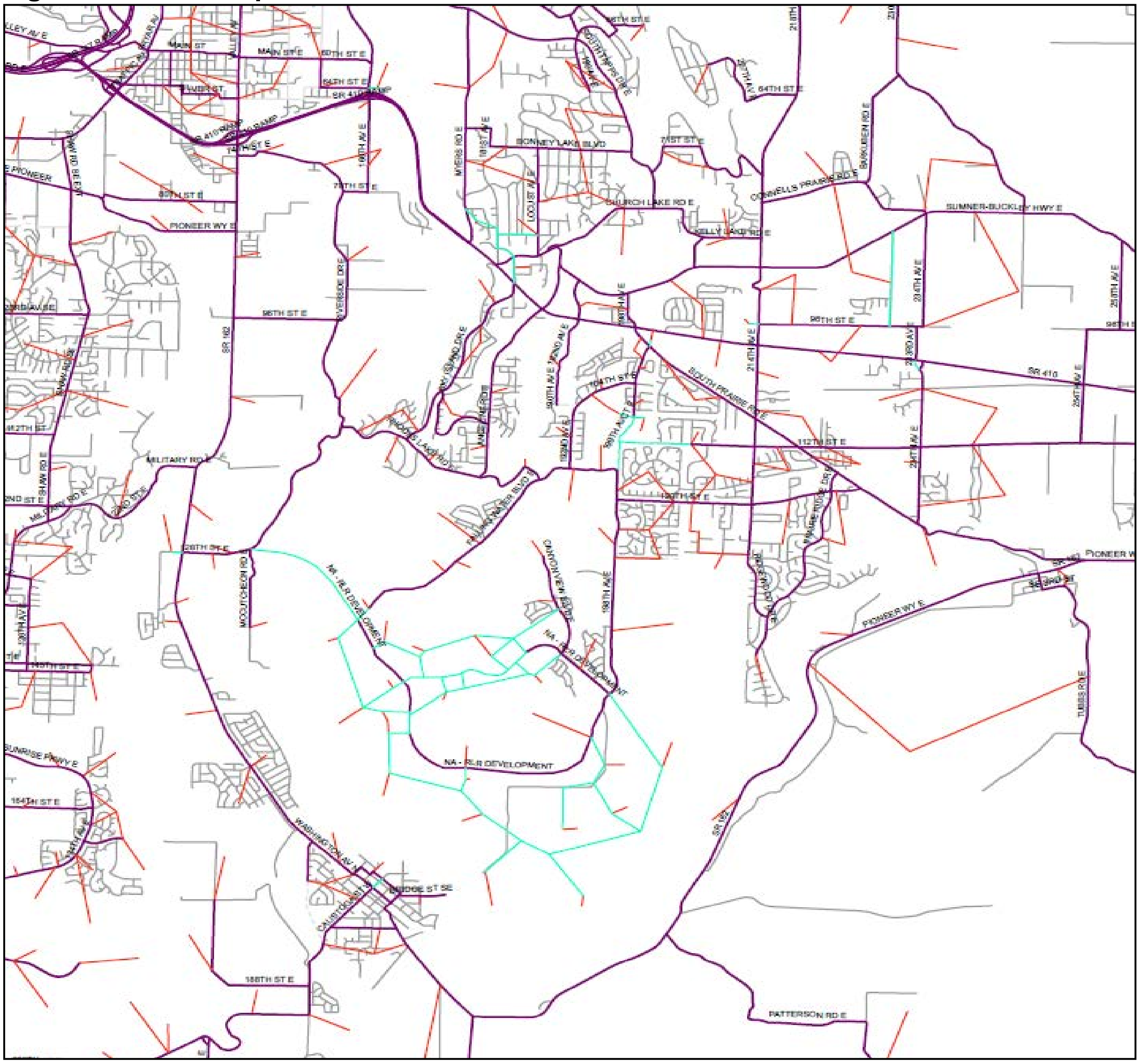
- Macroscopic Model

The macroscopic travel demand model is to help identify how many people want to travel at the same time (travel demand), where people want to travel to/from, and which routes they will likely take, based on socioeconomic data. The travel demand model also helps create traffic forecasts for the number of people and vehicles that will use a transportation facility; to understand a transportation system or particular corridor; and to understand potential impacts/benefits due to changes in a transportation system.

The Pierce County travel demand model was used for this study since it has better land use data and more detailed network for the County, especially for the study vicinity. The County model is the Traffic Impact Fee (TIF) model for 2015 and 2030. WSDOT has worked closely with Pierce County in the travel demand forecasting effort over the course of this study.

- Model Area
    - As mentioned, the Pierce County model was used. It includes not just the County itself, but also part of King and Kitsap Counties. The focused area was identified to make sure the possible alternative routes for the study corridor are covered if potential development with significant growth is in place. It is the area surrounding SR 162 and SR410/So. Prairie Rd. E. The following map shows the focused study area for macroscopic travel demand model.

Figure 1: Macroscopic Travel Demand Model Focused Area



- Analysis years and time periods

  One of the objectives of this study is to provide Short-, Mid-, and Long-Term strategies. WSDOT has defined that the short-term would be five years from the base year; mid-term would be 10 years from the base year; and long-term would be 20 years from the base year. Given the base year model is for Year 2015, it resulted in the following analysis years for this study:

  - Base year – 2015
  - Future forecast years – 2020, 2025 and 2035

  The analyses were focused on AM and PM peak periods:

  - AM Peak Period 6:00 – 9:00
  - PM Peak Period 3:00 – 6:00

- Land use assumptions

Pierce County recently updated its travel demand TIF model for Year 2015 for base year and Year 2030 for future year. The land use data were also updated to the corresponding years. The 2030 model matches the County Comprehensive Plan land use control totals at jurisdiction level. However there are differences at the TAZ level by 2030 due to updating Pirece County land use to 2015, updating development capacities used in the land use allocation model, updating assumptions for master planned developments, and updating pipeline growth. Within the Study vicinity the Tehaleh development, which is just east of the study corridor, the Phase I addmended approval is ~2600 housing units 4 and non-residentual space that could support more than 2000 employment jobs.

The land use data for Year 2020 and 2025 were interpolated based on County's 2015 and 2030 model. The interpolation was applied to all Traffic Analysis Zones (TAZs) including all cities, county unincorporated areas and external zones. For Year 2035 land use, after consultation with the County staff, the study team decided to extrapolate to 2035 for the entire county, except the area for Tehaleh development. Since Tehaleh development is next to the study corridor and will have significant impact on the corridor, and is also in the Environmental Impact Statement (EIS) process of Phase 2 development, the study team assumed the full build of Tehaleh development with Phase 2 Applicants Preferred Alternative 3 assumption being in place. It would have about 9700 housing units. HHs and 10,300 jobs created in the development in 2035. 9800 HHs includes ~100 units within "exception parcels" not within the Tehaleh application.The following figure shows the land use growth for Pierce County and the table shows the annual growth rates for HHs and jobs.

Figure 2: Pierce County Land Use Growth

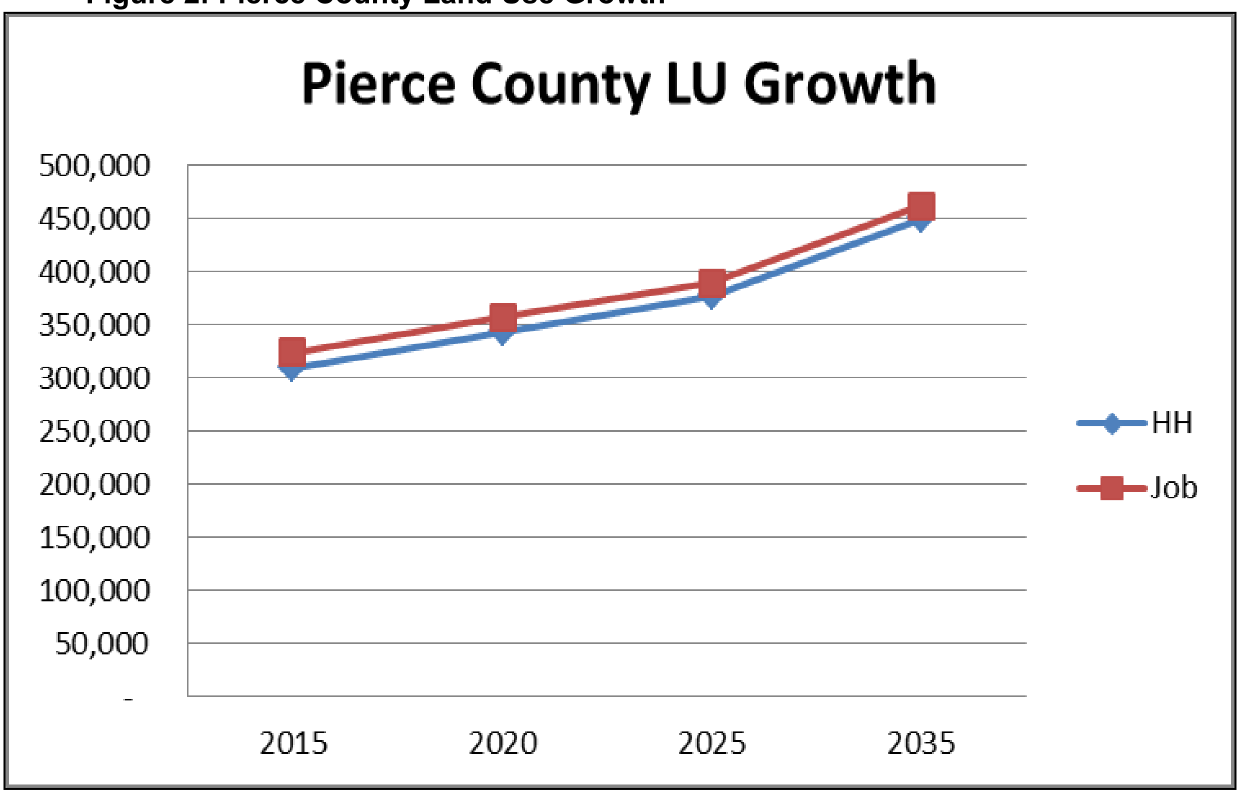


Table 1: Pierce County Land Use Annual Growth Rates

	2015-2020	2020-2025	2025-2035
HH	2.20%	2.20%	2.27%
Job	2.01%	2.01%	2.12%

- Network assumptions
  Pierce County helped spot check the improvements at network links using City and County Transportation Improvement Programs (TIPs) for Interim Year 2020 and 2025 models and provided a list of improvements to WSDOT for network updates. For the network in Year 2035 it remained the same as Year 2030 model.

- Traffic Operational and Simulation Model

The analysis will evaluate and analyze the traffic operations, corridor segments, and intersections within the study corridor. The Synchro 8 and SimTraffic 8 simulation software will be used to conduct the operational analysis.

- Study segments and intersections
  The study corridor starts at the Interchange with SR 410 in Sumner and then goes south to Williams Blvd NE in Orting. It is separated into 7 segments in the following table.

Table 2: Study Segments

Segment	From – To Street Names
A	SR 410 WB Ramps - Rivergrove Dr. E.
B	Rivergrove Dr. - Pioneer Way E>
C	Pioneer Way - 96 th St.
D	96 th St. - Military Rd.
E	Military Rd. - 128 th St.
F	128 th St .- 136 th St.
G	136 th St. - Williams Blvd.

The study also identified key intersections along the study corridor for analysis as shown in the table below.

Table 3: Study Intersections

ID	Intersection Name	Intersection Control
1	Valley Ave & Meade McCumber Rd. E.	Signalized
3	SR 162/Valley Ave. & SR 410 WB Ramps	Signalized
4	SR 162 & SR 410 EB Ramps	Signalized
5	SR 162 & Rivergrove Dr. E.	Signalized
6	SR 162 & 80th St. E.	TWSC
7	SR 162 & Pioneer Way E./Bowman-Hilton Rd. E.	Signalized
10	SR 162 & 96th St. E.	Signalized
14	SR 162 & Military Rd. E.	Signalized
15	SR 162 & 128th St. E.	Signalized
16	SR 162 & 136th St. E.	Signalized
21	SR 162 & Williams Blvd .NW/Williams Blvd. NE.	Signalized

- Analysis years and time periods
  The analysis years for the traffic operational and simulation model were same as travel demand model. But the analysis periods focused on peak hours only. Based on the traffic data the following peak hours were identified:
  AM Peak Hour 6:00 – 7:00
  - PM Peak Hour 4:00 – 5:00

- Analysis inputs
  The key analysis components for the traffic operational and simulation models included the following items:
  - Travel demand forecast volumes
    The existing observed data was used for base year. The future forecast volumes were post-processed based on the travel demand model forecast volumes.
  - Intersection controls
    There are 10 signalized intersections and one two-way stop controlled intersection. All the signal timing plans for AM and PM peak hours were collected and coded in the Synchro model.
  - Detailed intersection geometry and lane configurations
    In order to accurately calculate the intersection delay in the Synchro model, along with the intersection controls, it is necessary to have detailed geometry and lane configurations for intersections and interchanges/ramps

- Traffic Data Collection

In order to develop a quality forecast for the study corridor, it was important to make sure the outcomes in a base year travel demand model reflects the current traffic condition. This section shows an overview of the traffic data collection for this study.

The data was used as a snapshot of traffic conditions during the Spring of Year 2016. It supports the validation of base year travel demand model and Synchro/SimTraffic model.

Screen Line Counts

In order to better understand traffic patterns and the volumes traveling on the study corridor as well as the study area, a set of screen lines for this study was been prepared.

It captures traffic on all possible major roadways coming in and going out of the study area.

Figures 3 and 4 shows screen line locations and count locations associated to the screen lines, respectively.

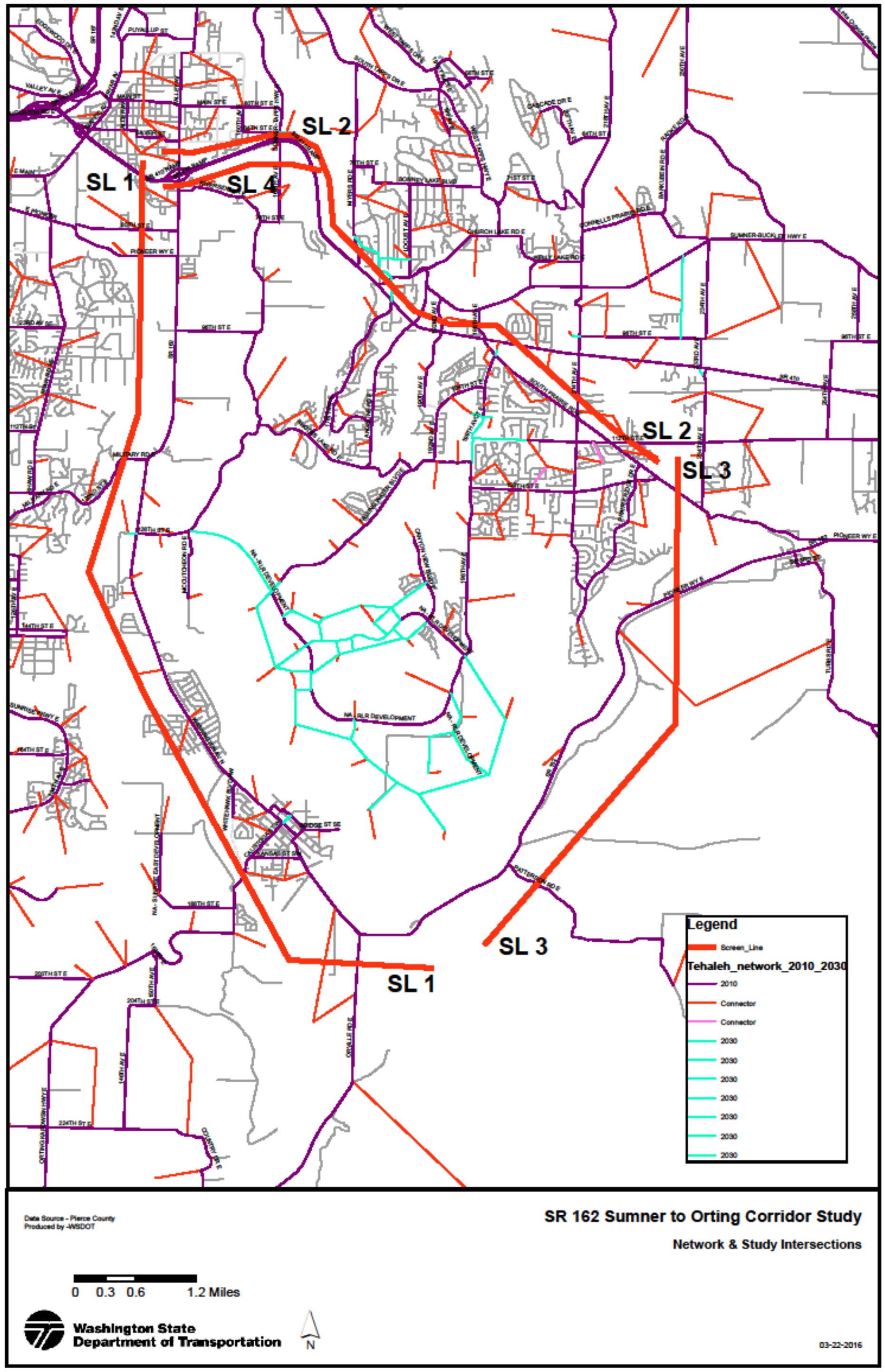


Figure 3: Screen Line Location

Table 4 lists the screen line cross streets as count locations. In addition to the screen lines, traffic at several locations along the study corridor were counted to understand the traffic patterns and volumes. Screen Lines locations counts idenitied below in Figure 4**.**

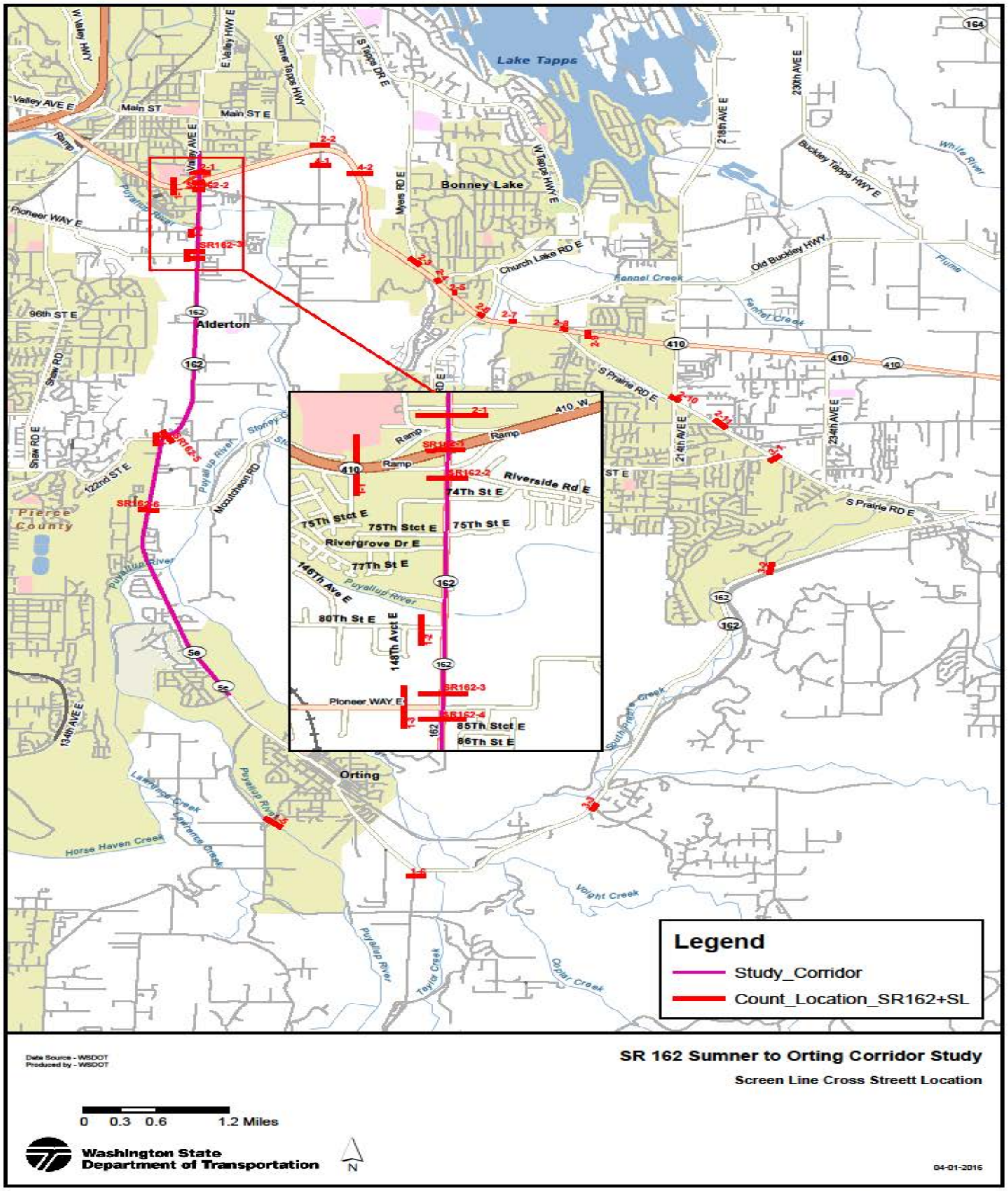


Figure 4: Count Locations for Screen Lines

Table 4: Screen Line Cross Street

Screen Line No.	Count location	Location ID
1	SR 410 West of SR 162 I/C	1-1
	80th St. E. West of SR 162	1-2
	Pioneer Way E. West of SR 162	1-3
	Military Rd E West of SR 162	1-4
	Calistoga St. (Orting Kapowsin Hwy E.) @ Puyallup River	1-5
	Orville Rd. E. South of SR 162	1-6
2	Valley Way North of SR 410 WB Ramps	2-1
	Sumner Tapps Hwy E. North of SR 410 WB Ramps	2-2
	Myers Rd. E. North of SR 410	2-3
	Veterans Memorial Dr. E. East of SR 410	2-4
	Main St. E.East of SR 410	2-5
	Angeline Rd. E. East of SR 410	2-6
	192nd Ave. E. North of SR 410	2-7
	198 th Ave. E. North of SR 410	2-8
	SR 410 West of 202nd Ave. E.	2-9
	214 th Ave. E. North of S. Prairie Rd. E.	2-10
	112 th St E. East. of S. Prairie Rd. E.	2-11
3	S Prairie Rd. E. South of 120th St. E.	3-1
	SR 162/Pioneer Way E. East of Spring Site Rd. E.	3-2
	Patterson Rd. E. East of SR 162/Pioneer Way East	3-3
4	166 th Ave. E South of WinCo Foods shopping plaza	4-1
	SR 410 East of 166th Ave. E. I/C	4-2
	SR 162 South of SR 410 EB Ramps	SR162-2

Table 5: Count Location on SR 162

ID	Location	Location ID
1	SR 162 Bridge at SR 410	SR162-1
2	SR 162 South of SR 410 EB Ramps	SR162-2
3	SR 162 North of Pioneer Way	SR162-3
4	SR 162 South of Pioneer Way	SR162-4
5	SR 162 North of Military Rd.	SR162-5
6	SR 162 South of 128th St. E.	SR162-6

- Turning Movement Counts (TMCs)

  Turning movements are needed for intersection operational analysis for the study. It was used in Synchro/SimTraffic simulation model to evaluate the intersection level of service and simulate traffic conditions. Table 3 above has listed the study intersections.

- Travel Time Runs
  Travel time provides actual (real-time) traffic condition. With travel time data the study team can easily evaluate the delay and congestion level and pinpoint congestion locations/bottlenecks. It was used to validate and calibrate the SimTraffic simulation model. Table 6 shows the travel time runs segments.

Table 6: Travel Time Runs Segments

Corridor		From	To
SR 162	NB	Lane Blvd NW/Lane St. NE.	Meade McCumber Rd. E.
	SB	Meade McCumber Rd. E.	Lane Blvd NW/Lane St. NE.

- **Performance Measures**

Below are performance measures we used for the analysis:

- Corridor/segment volume to capacity (V/C) ratio in travel demand models
- Intersection delay and level of service (LOS) in Synchro model based on 2010 Highway Capacity Manual (HCM) methodology
- Travel time and travel speed in SimTraffic simulation model
- Travel Time Reliability
  It is based on the travel time index (TTI) calculation. The TTI is the ratio of peak hour travel time to free flow travel time. The travel time reliability threshold is set to be 1.5, which means 50% more than free flow travel time.

Base Year Model Validation

The primary objective of model calibration/validation is to obtain the model estimates within the predefined calibration/validation targets comparing with the observed performance measures. The calibration/validation will be conducted for AM and PM peak periods for the following performance measures:

- traffic volumes at selected screen lines
- traffic volumes on the study corridor
- travel time on the study corridor; and visual audits for queue length at major intersections

In order to calibrate the model to get the forecast volumes close to the observed counts, some parameters, such as link capacity and speed in the model were adjusted. Because the model was designed for macroscopic County demand modeling, the pre-coded capacities and speeds are often based on given functional classifications.

When demand modeling for a corridor study is conducted, more local and real conditions should be taken into account, for example, capacity changes due to lane width, shoulder width, the allowance of on-street parking, and so on may reduce capacity.

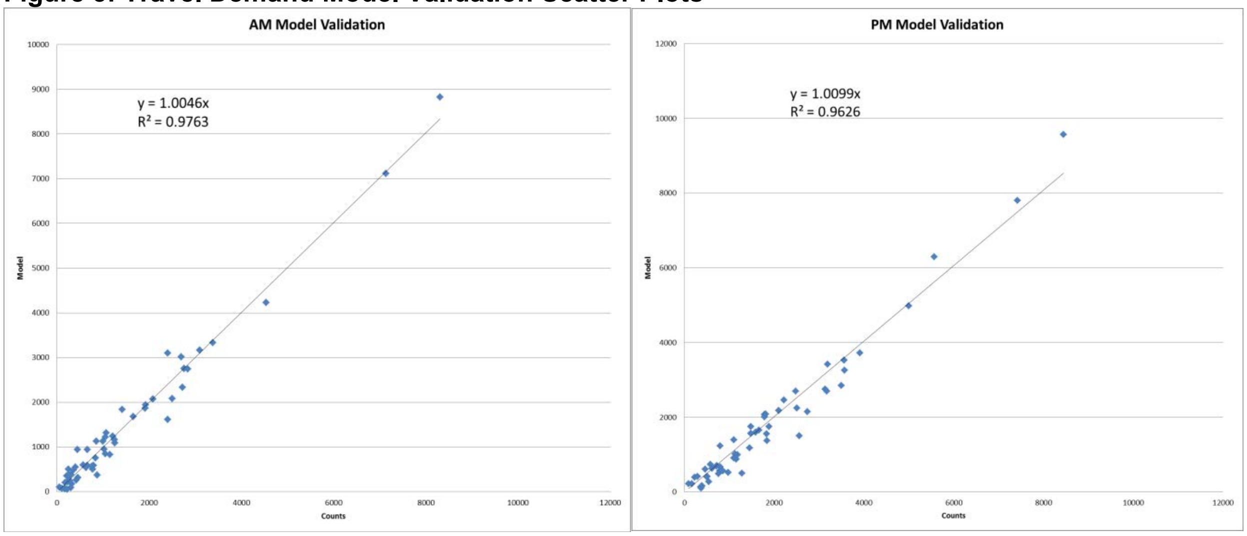
The criteria were based on the Wisconsin Department of Transportation model calibration example in Traffic Analysis Tool Box Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software, FHWA. The criteria and the model validation measures are in the following table.

Table 7: Travel Demand Model Validation Criteria and Measures

Criteria & Measures		Acceptance Targets	AM	PM
Individual Link Volumes		85% of cases	87.9%	87.9%
Volumes< 700 veh/h	< 100 veh/h			
700 veh/h < Volumes < 2700 veh/h	< 15%			
Volumes > 2700 veh/h	< 400 veh/h			
Sum of All Links		< 5%	-0.6%	-3.4%

The plots of model forecast volumes (y axis) versus observed counts (x axis) for AM and PM peak periods were also evaluated. Considering the R-square 1 (45 degree regression line) being the perfect matches between forecast volumes and counts, the actual R-square was 0.976 for AM and 0.963 for PM. They indicate the model is well validated compared to the observed (actual) counts.

Figure 5: Travel Demand Model Validation Scatter Plots



For the traffic operational and simulation modeling using Synchro/SimTraffic, the travel time measure was used for model validation. The average of 10 runs from SimTraffic simulation was used to compare against the observed travel time. The criteria were based on the Wisconsin Department of Transportation model calibration example in Traffic Analysis Tool Box Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software, FHWA. The difference of travel time between model and observed needs to be within 15% (or 1 minute, if higher). The travel time route was from Meade McCumber Rd. E. to Lane Blvd. NW. The validation measures are in the following table.

The travel time differences in AM peak hour were 3.4% in northbound and 3.7% in southbound. In the PM peak hour the differences were 5.3% in northbound and 1.6% in southbound. Both AM and PM peak hours models meet the validation criteria.

Table 8: AM and PM Travel Time Validation Measures

AM	Distance (mile)	Average Travel Time (min)	Average Speed (mph)	SimTraffic Model Average Travel Time (min)	SimTraffic Model Average Travel Speed (mph)	Travel Time % Difference	Travel Speed % Difference
SB	6.3	10.1	37	10.5	36	3.7%	-2.7%
NB	6.3	11.9	32	11.5	33	-3.4%	3.1%
PM	Distance (mile)	Average Travel Time (min)	Average Speed (mph)	SimTraffic Model Average Travel Time (min)	SimTraffic Model Average Travel Speed (mph)	Travel Time % Difference	Travel Speed % Difference
SB	6.3	17.1	22	16.2	23	-5.3%	4.5%
NB	6.3	11.5	33	11.7	33	1.6%	0.0%

Existing Condition

The existing condition is based on the most recent counts conducted in April and May, 2016. In the 24 hour count distributions at six locations along the study corridor, the highest directional counts were 1268 vehicles per hour southbound just south of 128th St E at 5:00 PM.

Puget Sound Regional Council, in consultation with WSDOT, has adopted LOS D for this urban segment of SR 162 which is a Highway of Regional Significance. This is based on service volume thresholds (LOS D) for State signalized arterials by Florida DOT (FDOT 2013 QLOS Handbook), two-lane undivided at areas over 5,000 population and not in urbanized areas Class I (40 mph or higher posted speed limit) – 1460 veh/h, and two-lane undivided at areas over 5,000 population and not in urbanized areas Class II (35 mph or lower posted speed limit) – 1200 veh/h. However, capacity is based on the maximum throughputs of most existing 72-hour counts which are 1200 veh/h for 50 mph posted speed limit and 1100 veh/hr for 35 mph or lower posted speed limit.

To better reflect the real situation on the study corridor, we used the maximum throughputs for capacity. The following figures show the 24-hour traffic volume distributions at six locations along the study corridor.

The intersection turning movement counts were also collected during the same time period. The AM and PM peak hour turning movement counts are in Appendix A.

Figure 6 24-Hour Traffic Volumes on SR 162 at SR 410 Bridge

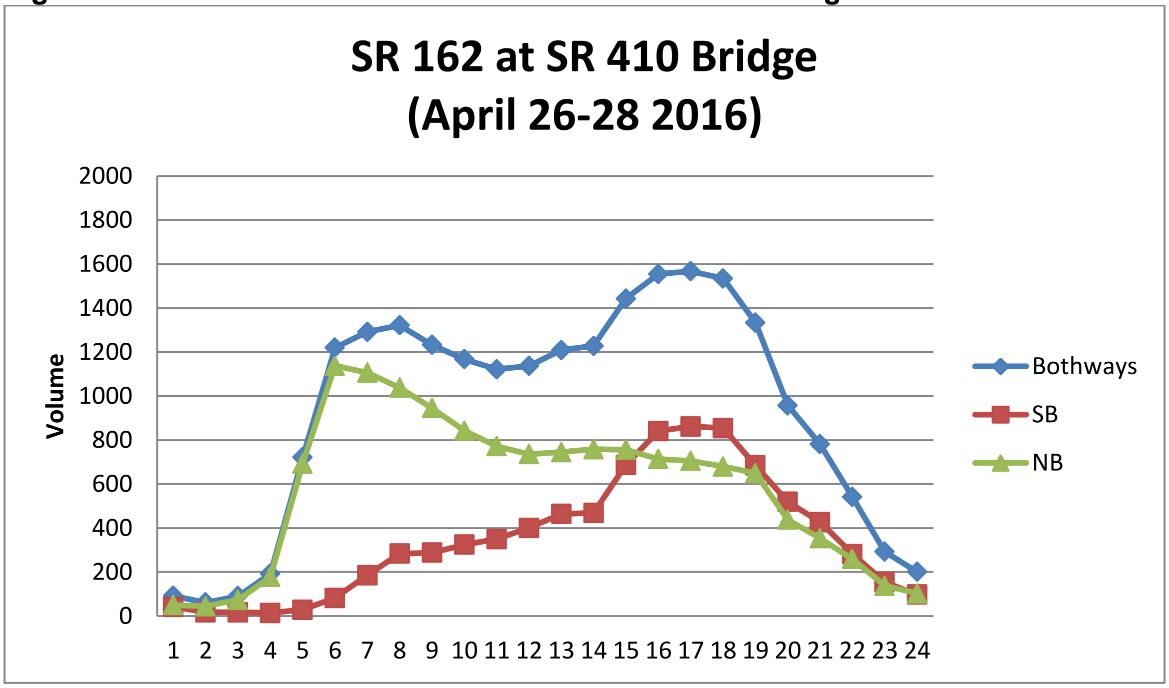


Figure 7 24-Hour Traffic Volumes on SR 162 South of SR 410 Eastbound Ramps

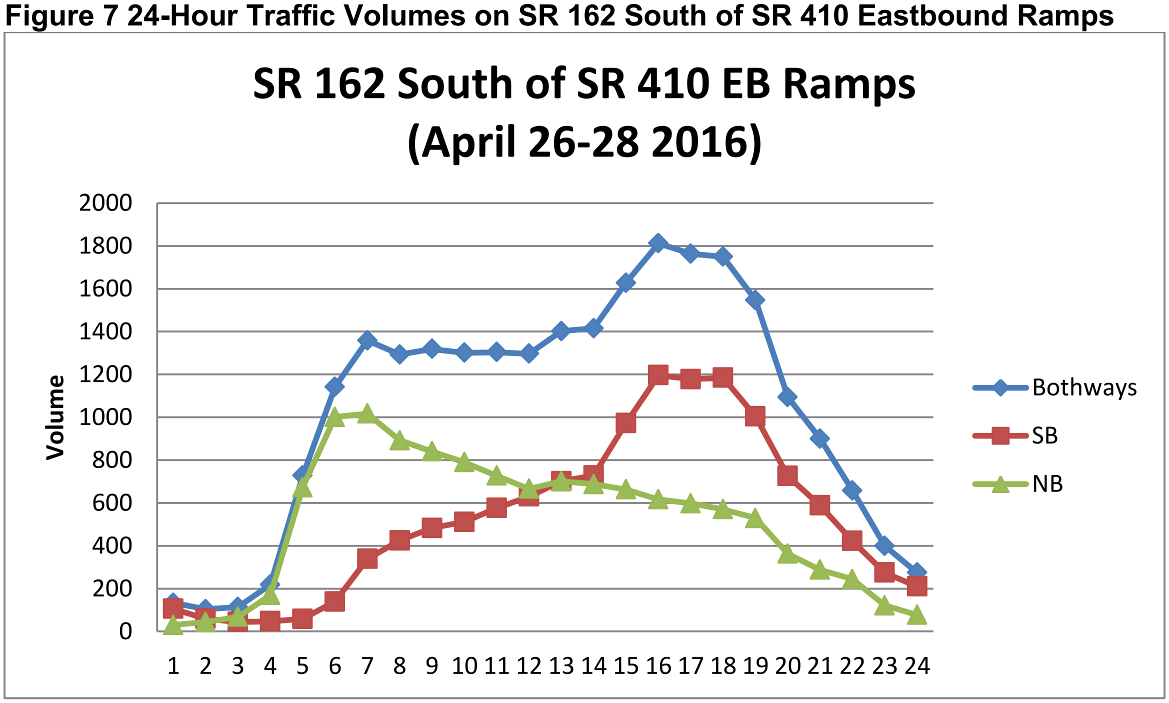


Figure 8 24-Hour Traffic Volumes on SR 162 North of Pioneer Way

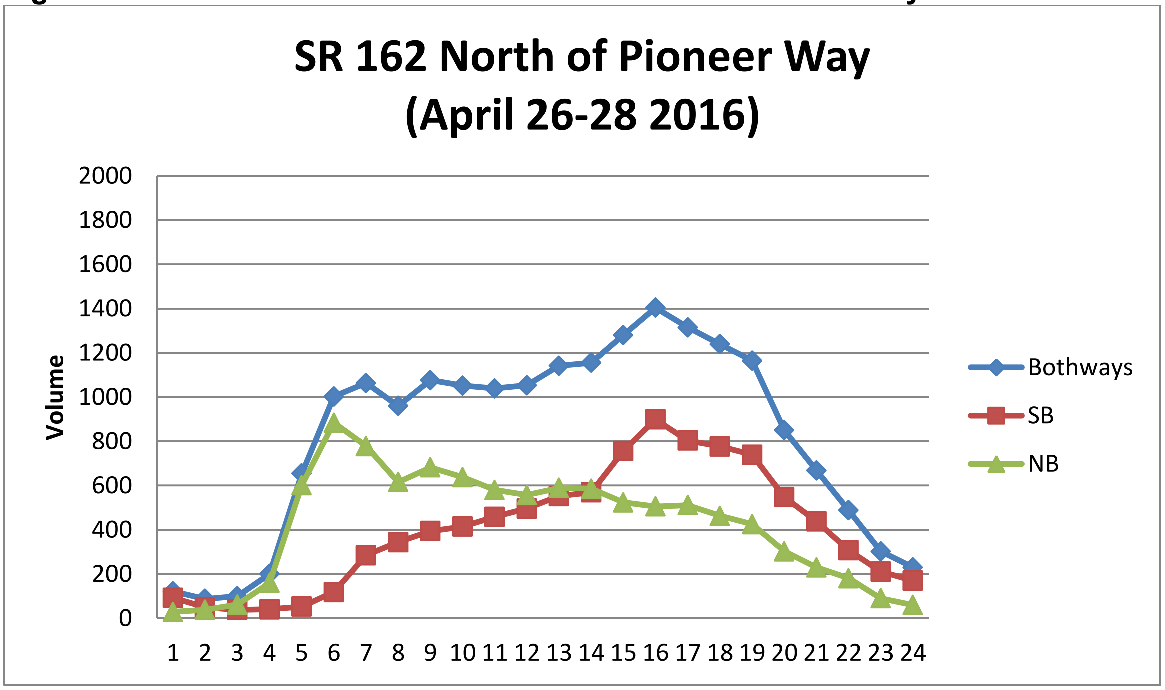


Figure 9 24-Hour Traffic Volumes on SR 162 South of Pioneer Way

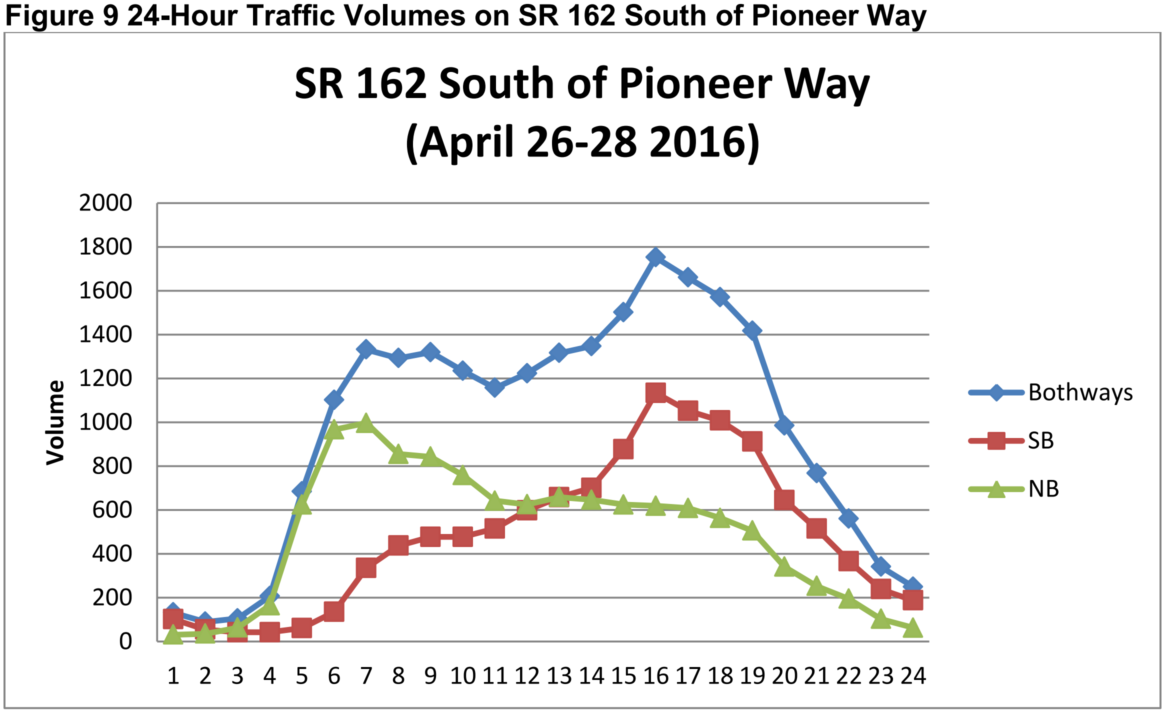


Figure 10 24-Hour Traffic Volumes on SR 162 North of Military Rd

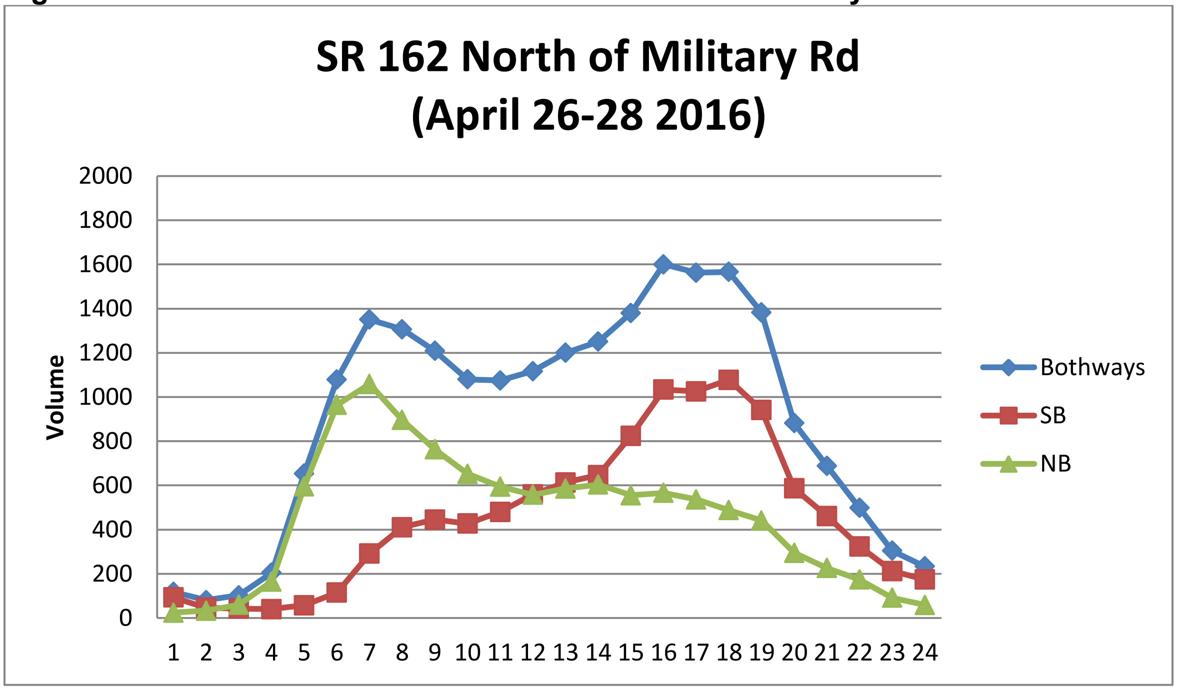
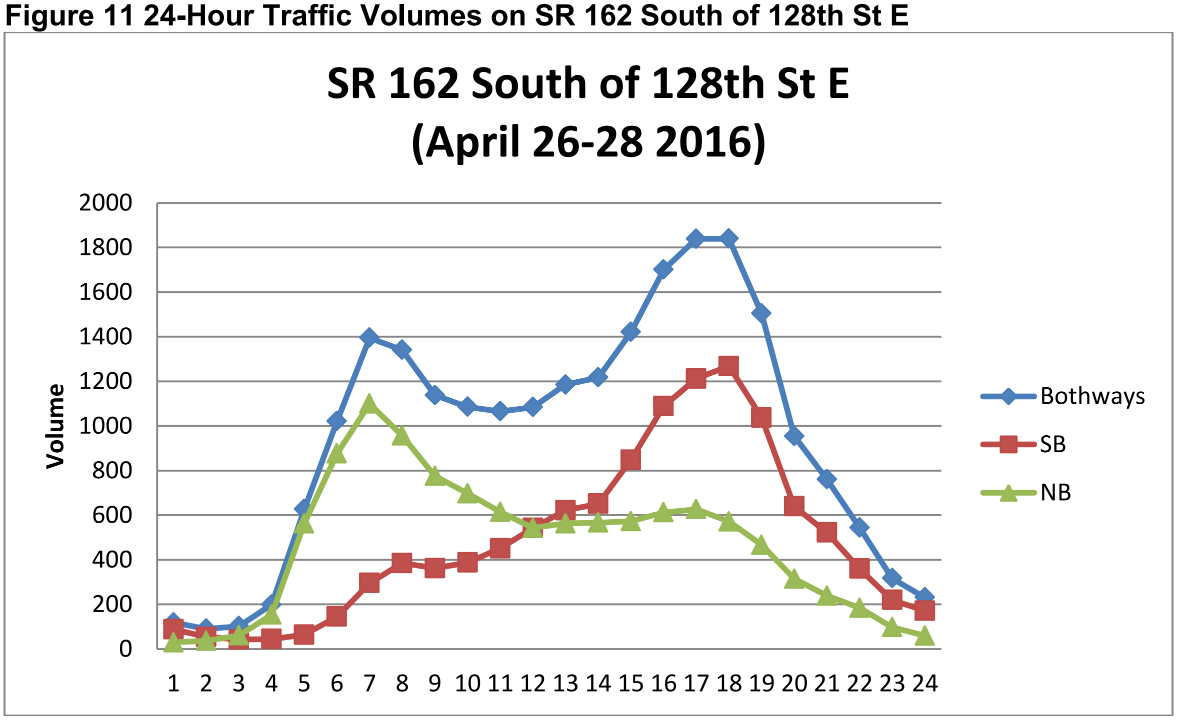
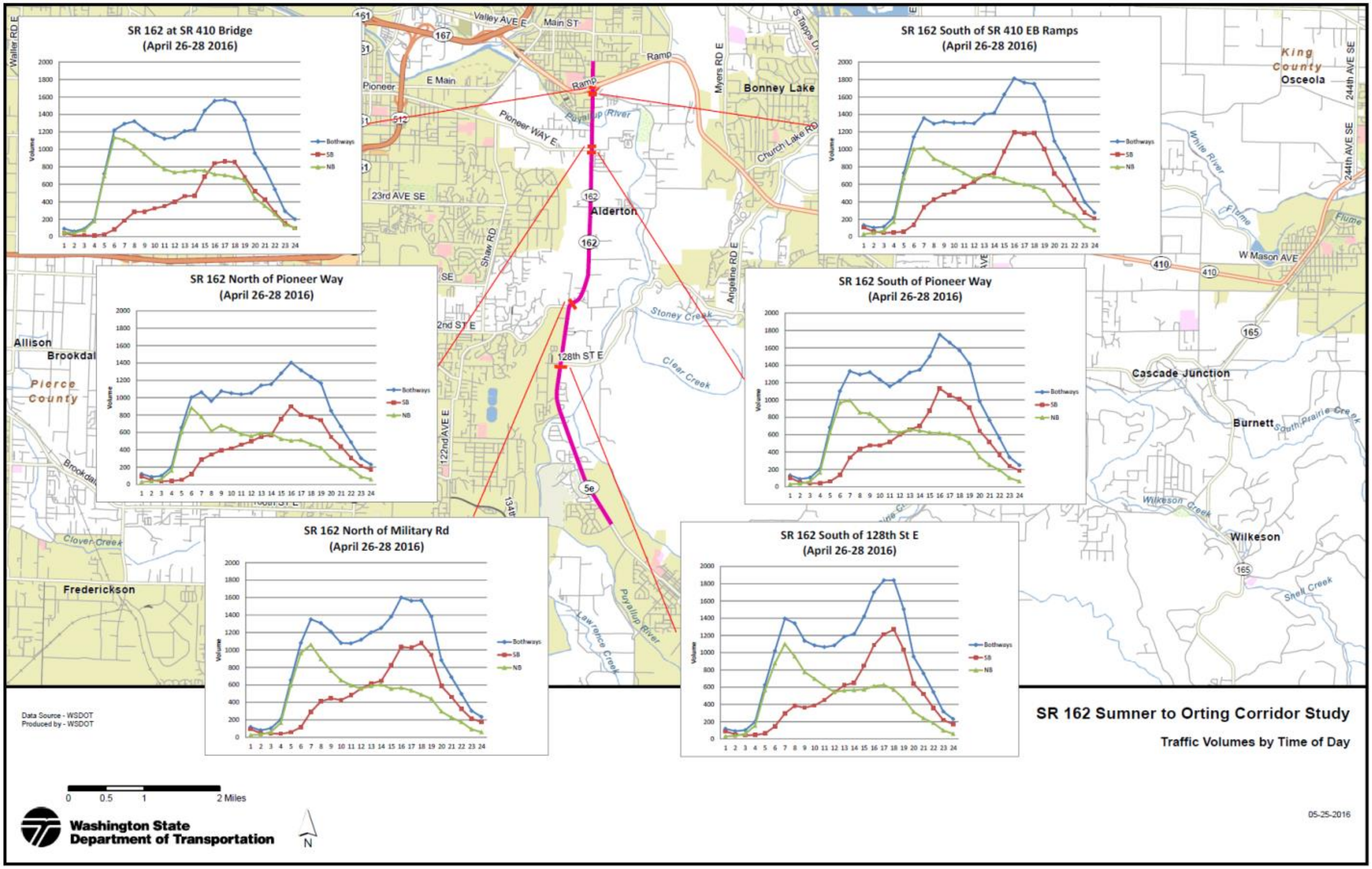


Figure 11 24-Hour Traffic Volumes on SR 162 South of 128th St E



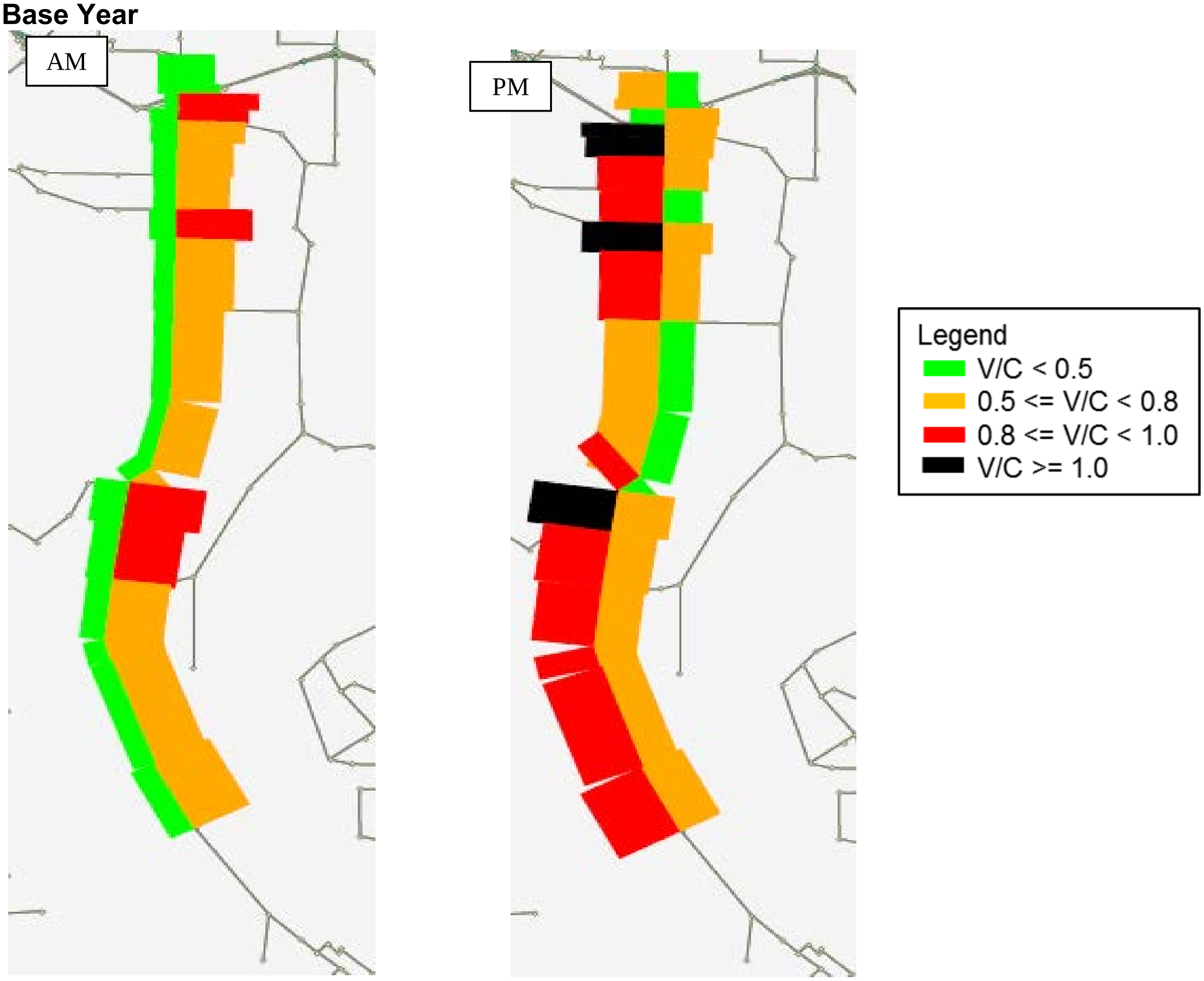
The following figure shows 24-hour volumes at all six locations on SR 162 on the map.

Figure 12 24-Hour Traffic Volumes at Six Locations on SR 162



The following figure shows the ratio of 2015 model volumes to Capacities (V/C) for AM and PM peak periods. As mentioned the capacity is based on the maximum throughputs of most existing 72-hour counts. It is 1200 veh/h for 50 mph posted speed limit and 1100 veh/hr for 35 mph or lower posted speed limit. During the AM peak period, the peak direction is northbound. The congested segments are south of Military Rd. E, South of Pioneer Way E. and South of SR 410 eastbound Ramps. The V/C ratios at these three segments are higher than 0.8 close to 1. During the PM peak periods, the peak direction is southbound. The congested segments of the study corridor were found to be north of Military Rd. E, south of Pioneer Way E, and south of SR 410 eastbound Ramps are over 1, which indicates the volumes are over the capacity.

Figure 13 2015 Model Volume to Capacity (V/C) Ratio for AM and PM Peak Periods in Base Year

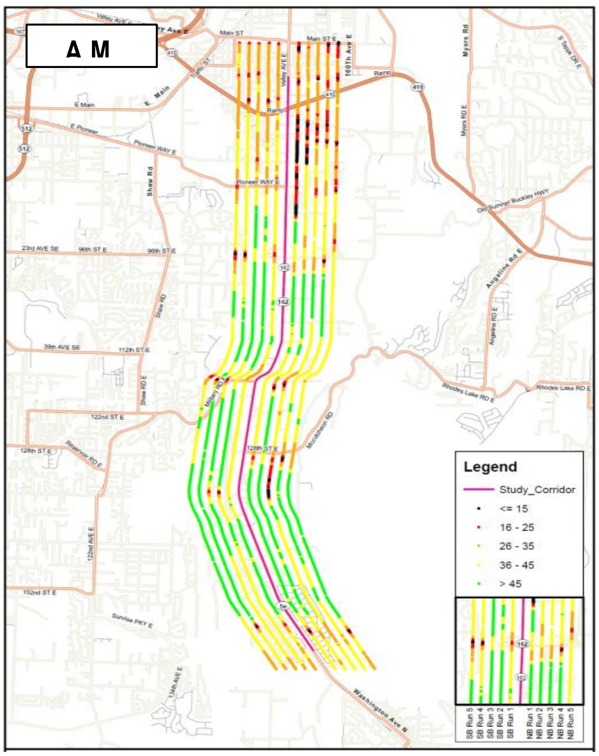


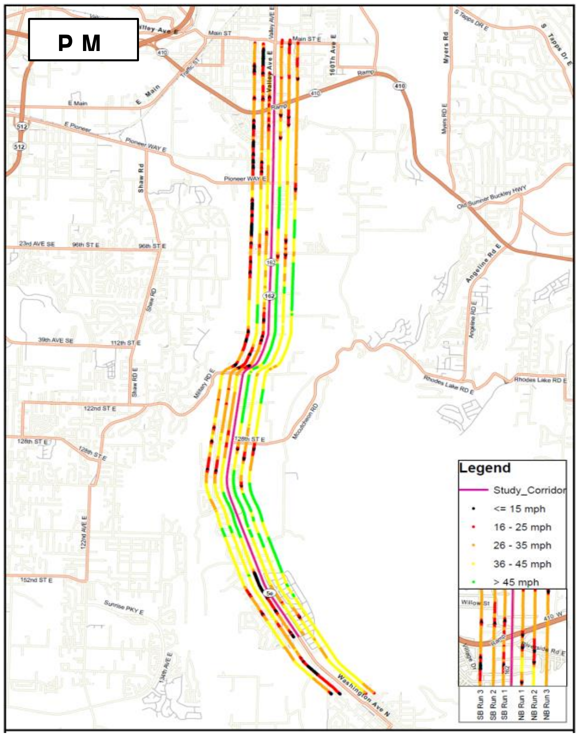
Back in March to May 2016 the study team also conducted the travel time survey. The travel time route was from Meade McCumber Rd. E. to Lane Blvd. NW. A GPS device which generates points every second or two was used. Each generated point included the time stamp and the point speed. Therefore, congested locations could be easily identified by plotting all points on the map.

The figure below shows the variations of the travel speed along the study corridor for AM and PM. The green indicates travel speed is greater than 45 mph and black indicates travel speed is below 15 mph.

As can be seen during AM peak periods the congestion or the travel speed below 15 mph occurred northbound when approaching 128th E. and approaching SR 410 interchange. During PM peak periods congestion occurred on southbound mainly from the main intersections queuing upstream.

Figure 14 Existing Travel Time Survey for AM and PM Peak Periods





The following table shows the base year intersection average delay and level of service (LOS) based on HCM 2010 methodology in Synchro for AM and PM peak hours. Based on the most recent counts collected in April and May in AM peak hour there is one intersection, SR 162 & SR 410 EB Ramps, showing LOS F with 89.6 seconds average delay.

In PM peak hour there are four intersections operating in LOS F. They are SR 162 & SR 410 EB Ramps, SR 162 & Pioneer Way E, SR 162 & Military Rd. E, SR 162 & 128th St. E. The intersection analysis results are consistent with the V/C ratios from the travel demand model and travel time survey results.

Table 9 Base Year Intersection Average Delay and LOS

Table 10 Base Year Intersection Average Delay and LOS

Synchro ID	Intersection Name	AM		PM	
		Delay	LOS	Delay	LOS
1	Valley Ave. & Meade McCumber Rd. E.	72.8	E	64.4	E
3	SR 162/Valley Ave. & SR 410 WB Ramps	47.8	D	31.5	C
4	SR 162 & SR 410 EB Ramps	89.6	F	86.8	F
5	SR 162 & Rivergrove Dr. E.	11.3	B	22.6	C

6	SR 162 & 80th St. E.	34.6	D	46.0	E
7	SR 162 & Pioneer Way E/Bowman-Hilton Rd. E.	20.4	C	111.5	F
10	SR 162 & 96th St. E.	56.0	E	45.2	D
14	SR 162 & Military Rd. E.	21.0	C	111.6	F
15	SR 162 & 128th St. E.	44.3	D	101.1	F
16	SR 162 & 136th St. E.	9.4	A	38.9	D
21	SR 162 & Williams Blvd. NW/Williams Blvd. NE	25.0	C	32.6	C

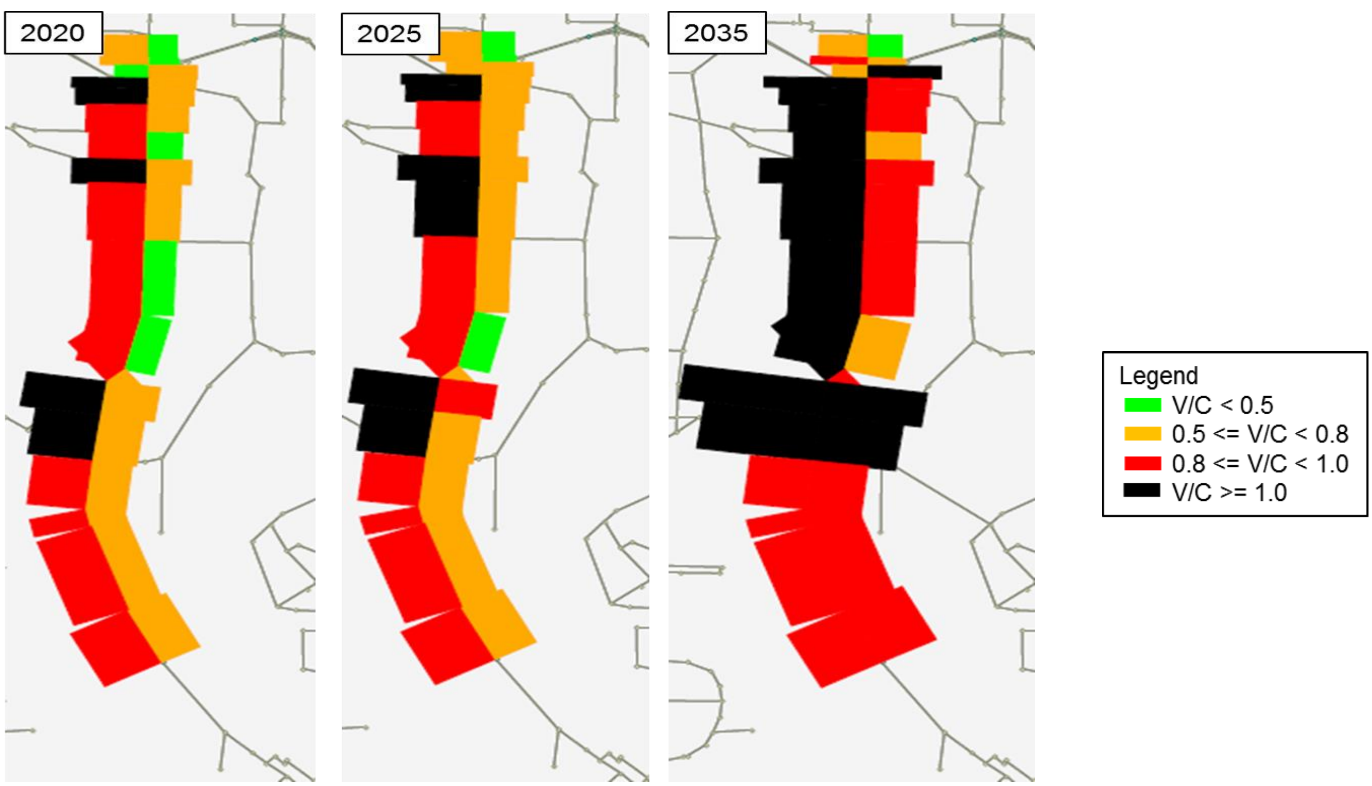
Evaluation of Future-Year No Action Performance

The future baseline no build condition was analyzed based on the Pierce County travel demand model. Based on the forecast the data shows significant growth to Year 2035. The AM Peak period demand to capacity ratio showed that by 2035 in the northbound direction between 128th Street and the SR 410 interchange, the V/C (volume to capacity) ratio is greater than 1.0. In the PM Peak period, the demand to capacity ratio showed that between 2020 and 2025 in the southbound direction the V/C ratio is typically greater than 0.8 and 1.0 from 128th Street north to the SR 410 interchange.

In 2035 the V/C ratio would be greater than 1 on the same segment. The following figures show the V/C ratios on the study corridor for AM and PM peak periods for Years 2020, 2025 and 2035.

Figure 15 Future No Action V/C ratios for AM Peak Periods

Figure 16 Future No Action V/C ratios for PM Peak Periods



As shown earlier in the current year of the AM Peak Hour, there doesn't seem to be much congestion, except at SR 162 and SR 410 eastbound ramps which shows LOS F. In the year 2025 there are four intersections showing LOS F and in 2035 the majority of intersections are at LOS F. In the PM Peak Hour the current year shows four intersections with LOS F and in 2020, 2025 and 2035 the majority of the 11 intersections are at LOS F. The intersection average delay and LOS for future Years on No Action condition are listed in the tables below.

Table 11 Future No Action Intersection Average Delay and LOS for AM Peak Hour

Synchro ID	Intersection Name	2020		2025		2035	
		Delay	LOS	Delay	LOS	Delay	LOS
1	Valley Ave & Meade McCumber Rd E	91.0	F	112.0	F	148.8	F
3	SR 162/Valley Ave & SR 410 WB Ramps	52.3	D	53.4	D	120.9	F
4	SR 162 & SR 410 EB Ramps	95.2	F	105.7	F	>180.0	F
5	SR 162 & Rivergrove Dr E	12.1	B	13.2	B	24.5	C
6	SR 162 & 80th St E	38.1	E	43.0	E	155.1	F
7	SR 162 & Pioneer Way E/Bowman-Hilton Rd E	22.2	C	41.2	D	142.9	F
10	SR 162 & 96th St E	62.0	E	88.8	F	>180.0	F
14	SR 162 & Military Rd E	27.1	C	35.4	D	>180.0	F
15	SR 162 & 128th St E	75.9	E	118.8	F	>180.0	F
16	SR 162 & 136th St E	10.3	B	11.2	B	11.5	B
21	SR 162 & Williams Blvd NW/Williams Blvd NE	26.0	C	30.1	C	32.5	C

Table 12 Future No Action Intersection Average Delay and LOS for PM Peak Hour

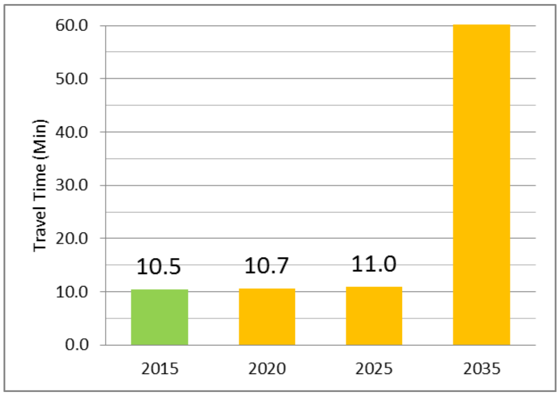
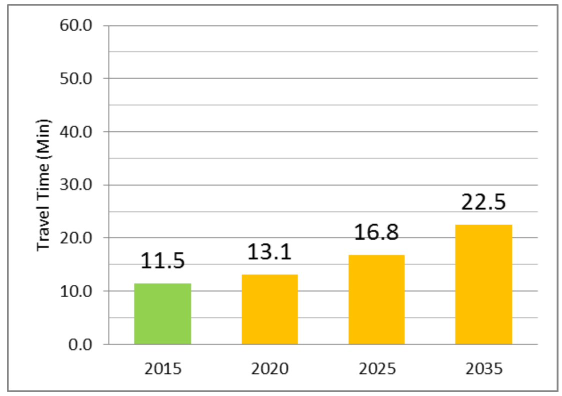
Synchro ID	Intersection Name	2020		2025		2035	
		Delay	LOS	Delay	LOS	Delay	LOS
1	Valley Ave. & Meade McCumber Rd. E.	80.5	F	108.9	F	140.2	F
3	SR 162/Valley Ave & SR 410 WB Ramps	33.2	C	34.1	C	92.2	F
4	SR 162 & SR 410 EB Ramps	92.7	F	107.6	F	>180.0	F
5	SR 162 & Rivergrove Dr. E.	24.9	C	35.0	D	84.9	F
6	SR 162 & 80th St. E.	72.9	F	103.9	F	>180.0	F
7	SR 162 & Pioneer Way E/Bowman-Hilton Rd. E.	134.8	F	>180.0	F	>180.0	F
10	SR 162 & 96th St. E.	55.7	E	62.5	E	139.1	F
14	SR 162 & Military Rd .E.	144.8	F	177.1	F	>180.0	F
15	SR 162 & 128th St. E.	122.7	F	144.1	F	>180.0	F
16	SR 162 & 136th St. E.	50.2	D	62.5	E	64.7	E
21	SR 162 & Williams Blvd. NW/Williams Blvd. NE	43.2	D	55.7	E	62.0	E

The table below shows the AM and PM peak hour travel time forecasts for Years 2020, 2025 and 2035 for each direction between Meade McCumber Rd E and Lane Blvd NW. At No action condition, southbound traffic on the study corridor in both AM and PM peak hours would experience significantly long delays and travel time. The northbound travel time would double in both AM and PM peak hours by 2035.

Another performance measure, travel time reliability, was also analyzed based on TTI. Tables 13 and 14 show the results for AM and PM peak hours. The TTI consistently shows that the southbound traffic in both AM and PM peak hours would be significantly unreliable. Southbound is the peak direction in PM peak hour. It would become unreliable as TTI is greater than 1.5 after Year 2015. It will become worse in future years as the TTI would be 2.16, 2.39 and 158.2 in 2020, 2025 and 2035, respectively. The peak direction northbound in AM would become unreliable by 2025 as the TTI will be 1.89. It will worsen to 2.53 in 2035.

The significant growth at SR 162 and 128th St. E. is the main reason for delay. High southbound left-turn volumes in AM and PM peak hours, with the current limited turn pocket, causes the queue to spill back upstream blocking main line. While extremely high TTI may not happen in the real world, it indicates the current capacity for left turn and signal timing would not be able serve the forecast demand in 2035.

Table 13 Future No Action Travel Time for AM and PM Peak Hours

<table>
<tr><th></th><th>Southbound</th><th>Northbound</th></tr>
<tr><td>AM Peak Hour</td><td>
</td><td>
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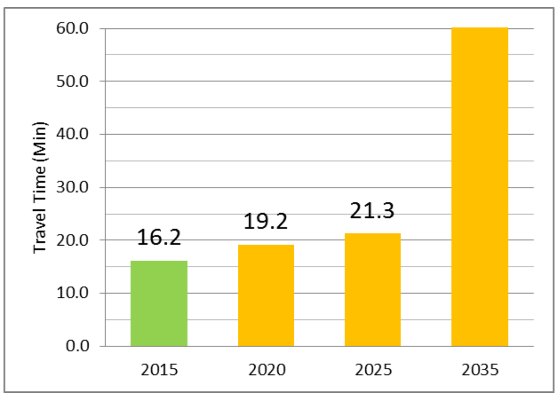
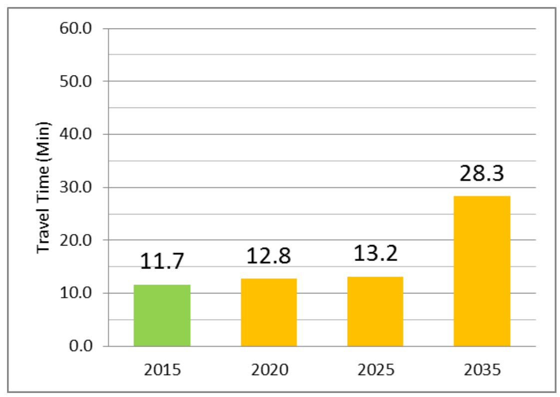
<tr><td>PM Peak Hour</td><td>
</td><td>
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Table 14 Future No Action Travel Time and Travel Time Index for AM Peak Hour

AM	Free Flow Travel Time (based on Posted Speed Limit)	Average Travel Time (min)				Travel Time Index			
		2015	2020	2025	2035	2015	2020	2025	2035
SB	8.9	10.5	10.7	11.0	569.1	1.18	1.20	1.23	63.95
NB	8.9	11.5	13.1	16.8	22.5	1.29	1.47	1.89	2.53

Note: Green is <1.3, Yellow is 1.3-1.4, Red is 1.4-1.5, Black is >=1.5

Table 15 Future No Action Travel Time and Travel Time Index for PM Peak Hour

PM	Free Flow Travel Time (based on Posted Speed Limit)	Average Travel Time (min)				Travel Time Index			
		2015	2020	2025	2035	2015	2020	2025	2035
SB	8.9	16.2	19.2	21.3	1408.0	1.82	2.16	2.39	158.20
NB	8.9	11.7	12.8	13.2	28.3	1.31	1.44	1.48	3.18

Note: Green is <1.3, Yellow is 1.3-1.4, Red is 1.4-1.5, Black is >=1.5

Evaluation of Future-Year Strategies Performance

This section includes the development of the strategies and the evaluation of the strategies based on results of the performance measures.

- Development of the Strategies

Based on the analysis for the future No Action scenarios, the study team has developed several strategies for short-, mid- and long-terms. The strategies could be categorized into three categories. They are Travel Demand Management (TDM), Public Transportation Improvement, and Roadway Improvement.

Here is the table showing the list of the strategies:

Table 16 Strategies for Future Years

Strategies	2020	2025	2035
TDM		√	√
Public Transportation Improvement			√
Signal timing adjustments/optimizations	√	√	√
Roundabouts	√	√	
Reversible 3rd lane			√
1997 Route Development Plan improvements			√

- Travel Demand Management (TDM)

  The TDM is a community-based approach. It relies on collaboration, commuter information and incentives in the community to reduce the number of trips by encouraging the commuters change their travel patterns and choices. The examples of techniques of TDM are:

  - commute trip reduction
  - telework
  - vanpool programs and ride-matching
  - Flexible work shift

  Based on the experience and trends of effectiveness of the TDM techniques in the past, the reductions of the trips were assumed to be 3% during the peak periods for future years in the travel demand model exercise.

- Public Transportation Improvement

  The public transportation could involve buses, commuter rail, light rail/street car, or any of the combination of the modes mentioned above. During the study Sound Transit has proposed the ST3 package to improve the service in the Puget Sound area. One of the proposed strategies is to serve the SR 162 study corridor. It is to extend the commuter rail from Puyallup to Orting. Some of the project features are:

  - The peak headway is 30 minutes.
  - By 2040 the daily boarding would be around 1,000 passengers.
  - A 125-car surface parking at proposed station location in McMillin/128th to 136th St. vicinity.
  - The rail extension is one possible form of the public transportation strategies. Although it could be other public transportation modes, the study team has used the benefits which Sound Transit has estimated for the strategy analysis and evaluation. Sound Transit has considered the land use nearby and current ridership at nearby stations for the ridership forecast for the proposed station at 128th to 136th St. vicinity. The key modeling forecast assumptions are listed below:
  - The ridership would be constrained by the capacity of the park & ride lot which has been restrained further by the amount of suitable property. Sound Transit forecasted that the riders would be proportioned by the following modes: 120 SOV (60%) riders, 20 carpool/vanpool (10%) riders, and 60 riders who walk, bike or are dropped off. Total is 200 riders at peak hour.

- The proportion of total riders who would have used SR 162 between McMillan and Sumner if they drove is 30%. Thirty percent of 200 vehicles are 60 vehicles which can be reduced on SR 162 at peak hour.
- Given the apportion of the ridership and the park and ride lot utilization, we assumed 50% more trips can be reduced on SR 162. One hundred and fifty percent of 60 vehicles equals 90 vehicles which can be reduced on SR 162 at peak hour generally between 128th St. and Pioneer Way. Two thirds of the vehicles are traveling to/from Pioneer Way and 1/3 is traveling to/from Sumner.
- The reduction would be northbound in AM traffic and southbound in PM traffic.

▪ Roadway Improvement Strategies

The following roadway improvement strategies were analyzed and evaluated:

- Short Term Strategies (Year 2020):
  - Signal Optimization using Synchro
  - Roundabout at 128th Street and Military Road
  - Mid Term Strategies (Year 2025)Channelization
  - Replacing signal systems with roundabouts
- Long Term Strategies (Year 2035)
  - Reversible lanes
    - One additional lane in the peak direction (northbound in AM and southbound in PM)
    - Signal modification would be needed to accommodate the middle reversible lane movements, which would be left-turn and through shared lane. It would become split phases for northbound and southbound approaches. They can no longer run concurrently.
  - 1997 Route Development Plan improvements
    - Highway Mobility Recommendations
    - SR 410 to Pioneer Way would include widening to a five lane roadway
    - Pioneer Way to 144th Street would include widening to a four lane roadway
    - 144th Street to Whitesell Street would include widening to a five lane roadway

▪ Combinations of strategies in Year 2035

Several combinations of strategies were also developed and analyzed for Year 2035:

- TDM + Roadway improvement
- Public transportation improvement + Roadway improvement
- Public transportation improvement + TDM + Roadway improvement

- **Evaluations of the Strategies**

The operating condition in each strategy was analyzed based on the demand forecast using Pierce County model. The strategies in each future year were compared with no action scenario in the same year. The detailed results for the average intersection delay and LOS and the travel time can be found in Appendix B. To evaluate the strategies in future years, intersection average delay and LOS and travel time were mainly used as performance measures. In order to pinpoint the operation efficiency and location needs, the study team segmented the entire study corridor into seven segments for travel time analysis. The seven segments are listed in the following table. They are also under the AG category for the identified strategies for the scoring calculation. Since the segment length varies, the segment travel time was normalized to seconds per 1/10 mile.

Table 17 Corridor Segmentation Travel Time Analysis

Segment	Cross Street
A	SR 410 WB Ramps - Rivergrove Dr
B	Rivergrove Dr - Pioneer Way
C	Pioneer Way - 96th St
D	96th St - Military Rd
E	Military Rd - 128th St
F	128th St - 136th St
G	136th St - Williams Blvd

In Year 2020 the intersection LOS was analyzed and with a signal optimization strategy, comparing it to no action in the AM peak hour the average intersection delay per vehicle could be reduced by 21% for the 11 intersections combined. In the PM it would be reduced by 16%, although there still are four intersections showing a LOS F. If the intersections at 128th Street and Military Rd. were converted to roundabouts in 2020, the average intersection delay would be reduced about 3 seconds at Military Rd. and about 18 seconds at 128th St. in the AM peak hour. In the PM peak hour the intersection delay would be reduced about 91 seconds and 20 seconds at Military Rd. and 128th Street intersections.

The travel time in Year 2020 with signal optimization would not be reduced. The signal optimization considers the intersection efficiency for all approaches. Therefore, the optimization may not favor the northbound and southbound mainline directions if demand on the minor street(s) is high. In the travel time analysis Synchro modeling of signal optimization and roundabout strategies suggest an increase in total travel time for the entire study corridor. This is mainly due to the signal optimization while analyzing the travel time for northbound and southbound directions. Both northbound and southbound directions are no longer favored approaches. It is to compensate and tradeoff with other approaches during the optimization. With roundabout conversions at two intersections, there would be fewer delays at those two locations and vehicles will go through more quickly. However, without any changes on the rest of the corridor, the traffic would be more congested on the remaining segments along the corridor.

In Year 2025 with the TDM strategy, comparing it to the no action scenario in AM peak hour, the average intersection delay per vehicle could be reduced by 28% for 11 intersections combined with one intersection, which is at 128th St., and still would operate at a LOS F. In the PM it would be reduced by 22%, although there are still five intersections showing LOS F. Looking at travel time with the TDM strategy, in the AM peak hour the travel time would be reduced by almost 19% in the northbound direction for all segments combined. However, in the PM peak hour, the TDM would increase the travel time. The reason is the travel pattern and the trip distribution would change due to the overall 3% trip reduction per the Pierce County model. The volumes along SR 162 are actually very similar to the no action option. Plus, the signal optimization which considers all approaches would not favor the northbound and southbound directions only. The study team noticed the LOS at 128th Street would be bad during the AM peak hour in 2025. It is due to the growth forecasted in the model with no roadway improvements (intersection geometry changes or roadway widening) at the intersection. Therefore, the westbound and northbound approaches showed significant delays, particularly the westbound left turn and right turn movements.

The traffic operation analysis for 2035 resulted in four strategies being analyzed and evaluated for Year 2035. In the AM peak hour except reversible lane strategy, TDM, 1997 plan and Public transportation strategies would reduce the average intersection delay by approximately 35%, 75% and 36%. Similarly, in the PM peak hour the average intersection delay would be reduced by 32% to 69%. The 1997 Route Development Plan strategy shows the highest reduction in intersection delay in both the AM and PM peak hours with fewer intersections operating at LOS F. The Year 2035 forecast volumes and the intersection configuration with 1997 Route Development Plan are in Appendix C.

The Reversible Lane strategy would increase the average intersection delay in both the AM and PM peak hours. Because of the middle reversible lane configuration, it has to become left turn and through shared lane. The signal phases for the northbound and southbound direction can no longer run concurrently.

It has to become split phase setting and intersection performance would not operate as efficiently as regular signal phase setting. Similar to the Year 2025 TDM strategy, the travel time would not be reduced. It is because the travel pattern and the trip distribution would change due to the overall 3% trip reduction county wide. The volumes along SR 162 are actually very similar to the no action option in 2035. Signal optimization was also applied to consider the efficiency for all approaches. The analysis resulted in the reversible lane strategy being dropped, due to the poor performance. The 1997 plan would reduce the travel time the most with the proposed intersection lane configurations as in the strategy list under AG.

After evaluating and analyzing the strategies individually, each strategy does not improve the corridor back to an acceptable level over the long-term (LOS D or better). Several intersections would still operate at LOS F and much longer travel time comparing to existing condition. It was stressed that per WSDOT's Practical Solutions approach the introduction of incremental short and mid-term strategies must be further refined and considered over time to manage corridor performance. The study team developed the following three combinations of strategies:

- TDM + Roadway improvement
- Public transportation improvement + Roadway improvement
- Public transportation improvement + TDM + Roadway improvement

The average intersection delay would be reduced with more strategies combined. However, several intersections would still experience LOS F condition. Travel time also shows additional reduction when strategies were combined, but delays still occur at several key locations.

To wrap all of the information up, the results of the analysis are:

- Given the high travel demand on SR 162 in the future, all strategies evaluated thus far and others yet to be conceived will be needed in order to improve desired corridor performance long term.
- The strategies analyzed and evaluated are not enough to make the corridor operate at an acceptable level (LOS D) or meet expectations (as noted in the study goal). The strategies will need to be continuously implemented and enhanced. For example, additional TDM techniques, reintroduction of public transportation services, and increased services to meet demands, etc. More strategies could be considered as they emerge in the future and be introduced to influence the travel patterns and improve performance along the corridor.

Appendix A Existing Traffic Volumes

AM Peak Hour

Int 1: Valley Ave. & Meade McCumber Rd. E.

Int 3: SR 162/Valley Ave. & SR 410 WB Ramps

Int 4: SR 162 & SR 410 EB Ramps

Int 5: SR 162 & Rivergrove Dr. E.

Int 6: SR 162 & 80th St. E.
E.

Int 7: SR 162 & Pioneer Way E./Bowman-Hilton Rd.

Int 10: SR 162 & 96th St. E.

Int 14: SR 162 & Military Rd. E.

Int 15: SR 162 & 128tth St. E.

Int 16: SR 162 & 136th St. E.

Int 21: SR 162 & Williams Blvd. NW/Williams Blvd. NE

PM Peak Hour

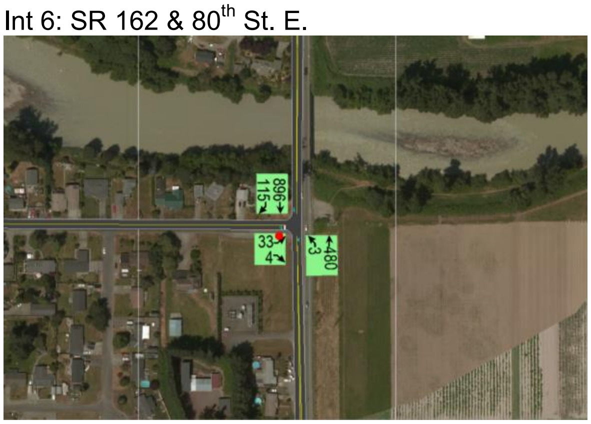
Int 1: Valley Ave. & Meade McCumber Rd. E.

Int 3: SR 162/Valley Ave. & SR 410 WB Ramps

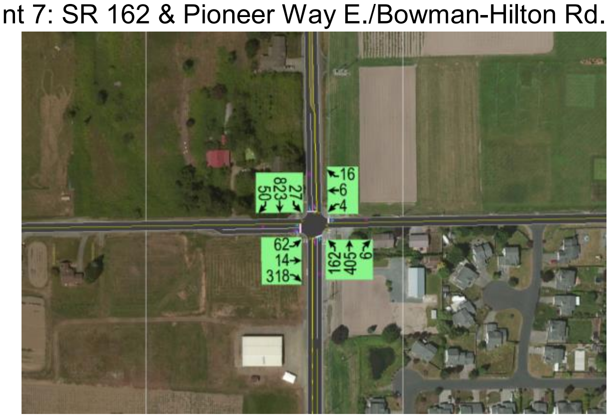
Int 4: SR 162 & SR 410 EB Ramps

Int 5: SR 162 & Rivergrove Dr. E.

Int 6: SR 162 & 80th St. E.



Int 7: SR 162 & Pioneer Way E./Bowman-Hilton Rd. E.



Int 10: SR 162 & 96th St. E.

Int 14: SR 162 & Military Rd. E.

Int 15: SR 162 & 128th St. E.

Int 16: SR 162 & 136th St. E.

Int 21: SR 162 & Williams Blvd. NW/Williams Blvd. NE

Appendix B Analysis results for Future Year strategies Performance

Year 2020

- Intersection Average Delay and LOS

AM Peak Hour		No Action		Signal Optimization		Roundabout	
Synchro ID	Intersection Name	2020		2020		2020	
		Delay	LOS	Delay	LOS	Delay	LOS
1	Valley Ave & Meade McCumber Rd E	91.0	F	41.1	D	41.1	D
3	SR 162/Valley Ave & SR 410 WB Ramps	52.3	D	40.0	D	40.0	D
4	SR 162 & SR 410 EB Ramps	95.2	F	71.6	E	71.6	E
5	SR 162 & Rivergrove Dr E	12.1	B	11.2	B	11.2	B
6	SR 162 & 80th St E	38.1	E	38.1	E	38.1	E
7	SR 162 & Pioneer Way E/Bowman-Hilton Rd E	22.2	C	18.5	B	18.5	B
10	SR 162 & 96th St E	62.0	E	51.8	D	51.8	D
14	SR 162 & Military Rd E	27.1	C	23.0	C	20.5	C
15	SR 162 & 128th St E	75.9	E	74.2	E	56.7	F
16	SR 162 & 136th St E	10.3	B	9.4	A	9.4	A
21	SR 162 & Williams Blvd NW/Williams Blvd NE	26.0	C	23.9	C	23.9	C
		512.2		402.8	-21%	382.8	-25%

PM Peak Hour		No Action		Signal Optimization		Roundabout	
Synchro ID	Intersection Name	2020		2020		2020	
		Delay	LOS	Delay	LOS	Delay	LOS
1	Valley Ave & Meade McCumber Rd E	80.5	F	42.5	D	42.5	D
3	SR 162/Valley Ave & SR 410 WB Ramps	33.2	C	31.2	C	31.2	C
4	SR 162 & SR 410 EB Ramps	92.7	F	78.8	E	78.8	E
5	SR 162 & Rivergrove Dr E	24.9	C	21.9	C	21.9	C
6	SR 162 & 80th St E	72.9	F	72.9	F	72.9	F
7	SR 162 & Pioneer Way E/Bowman-Hilton Rd E	134.8	F	107.8	F	107.8	F
10	SR 162 & 96th St E	55.7	E	44.9	D	44.9	D
14	SR 162 & Military Rd E	144.8	F	139.5	F	48.4	E
15	SR 162 & 128th St E	122.7	F	108.6	F	88.9	F
16	SR 162 & 136th St E	50.2	D	40.4	D	40.4	D
21	SR 162 & Williams Blvd NW/Williams Blvd NE	43.2	D	30.8	C	30.8	C
		855.6		719.3	-16%	608.5	-29%

- Travel Time

AM	2020 NA		2020 Signal Optimization		% Change		2020 Roundabout		% Change	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
Total	517.2	676.9	528.1	630.7	2%	-7%	528.6	1293.1	2%	91%

Segment Travel Time per 1/10 mile (seconds)

AM	2020 NA		2020 Signal Optimization		% Change		2020 Roundabout		% Change	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
AG Segment A - SR 410 WB Ramps - Rivergrove Dr	14.4	22.4	16.8	23.2	17%	4%	16.6	20.6	15%	-8%
AG Segment B - Rivergrove Dr - Pioneer Way	12.6	10.9	12.8	11.1	2%	2%	12.7	10.9	1%	0%
AG Segment C - Pioneer Way - 96th St	8.2	9.6	8.2	9.6	0%	0%	8.3	9.5	1%	-1%
AG Segment D - 96th St - Military Rd	8.6	12.5	8.6	9.7	0%	-22%	7.8	9.4	-9%	-25%
AG Segment E - Military Rd - 128th St	8.1	9.5	8.1	9.5	0%	0%	8.9	14.0	10%	47%
AG Segment F - 128th St - 136th St	8.0	21.0	7.9	18.9	-1%	-10%	9.4	81.7	18%	289%
AG Segment G - 136th St - Williams Blvd	7.8	8.0	7.9	7.9	1%	-1%	7.8	31.6	0%	295%

PM	2020 NA		2020 Signal Optimization		% Change		2020 Roundabout		% Change	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
Total	1062.0	664.3	1102.6	750.1	4%	13%	2421.1	719.3	128%	8%

Segment Travel Time per 1/10 mile (seconds)

PM	2020 NA		2020 Signal Optimization		% Change		2020 Roundabout		% Change	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
AG Segment A - SR 410 WB Ramps - Rivergrove Dr	23.3	39.1	40.7	44.2	75%	13%	36.8	47.5	58%	21%
AG Segment B - Rivergrove Dr - Pioneer Way	19.9	11.4	42.0	11.5	111%	1%	42.6	13.6	114%	19%
AG Segment C - Pioneer Way - 96th St	10.3	10.2	9.9	10.3	-4%	1%	11.9	10.5	16%	3%
AG Segment D - 96th St - Military Rd	34.9	9.3	27.5	9.3	-21%	0%	93.0	9.4	166%	1%
AG Segment E - Military Rd - 128th St	13.6	9.2	10.6	17.2	-22%	87%	63.8	9.7	369%	5%
AG Segment F - 128th St - 136th St	12.7	12.2	11.6	13.6	-9%	11%	11.0	13.4	-13%	10%
AG Segment G - 136th St - Williams Blvd	9.5	8.4	9.4	8.4	-1%	0%	9.0	8.4	-5%	0%

Year 2025

- Intersection Average Delay and LOS

AM Peak Hour		No Action		TDM	
Synchro ID	Intersection Name	2025		2025	
		Delay	LOS	Delay	LOS
1	Valley Ave & Meade McCumber Rd E	112.0	F	46.6	D
3	SR 162/Valley Ave & SR 410 WB Ramps	53.4	D	40.0	D
4	SR 162 & SR 410 EB Ramps	105.7	F	78.2	E
5	SR 162 & Rivergrove Dr E	13.2	B	11.9	B
6	SR 162 & 80th St E	43.0	E	39.6	E
7	SR 162 & Pioneer Way E/Bowman-Hilton Rd E	41.2	D	20.8	C
10	SR 162 & 96th St E	88.8	F	67.9	E
14	SR 162 & Military Rd E	35.4	D	26.7	C
15	SR 162 & 128th St E	118.8	F	100.4	F
16	SR 162 & 136th St E	11.2	B	9.5	A
21	SR 162 & Williams Blvd NW/Williams Blvd NE	30.1	C	25.6	C
		652.8		467.2	-28%

PM Peak Hour		No Action		TDM	
Synchro ID	Intersection Name	2025		2025	
		Delay	LOS	Delay	LOS
1	Valley Ave & Meade McCumber Rd E	108.9	F	47.1	D
3	SR 162/Valley Ave & SR 410 WB Ramps	34.1	C	31.5	C
4	SR 162 & SR 410 EB Ramps	107.6	F	85.0	F
5	SR 162 & Rivergrove Dr E	35.0	D	28.8	C
6	SR 162 & 80th St E	103.9	F	87.6	F
7	SR 162 & Pioneer Way E/Bowman-Hilton Rd E	196.4	F	140.1	F
10	SR 162 & 96th St E	62.5	E	50.9	D
14	SR 162 & Military Rd E	177.1	F	164.2	F
15	SR 162 & 128th St E	144.1	F	127.1	F
16	SR 162 & 136th St E	62.5	E	46.9	D
21	SR 162 & Williams Blvd NW/Williams Blvd NE	55.7	E	36.8	D
		1087.8		846	-22%

- Travel Time

AM	2025 NA		2025 TDM		% Change	
	SB	NB	SB	NB	SB	NB
Total	527.4	877.3	526.9	713.4	-0.1%	-18.7%

Segment Travel Time per 1/10 mile (seconds)

AM	2025 NA		2025 TDM		% Change	
	SB	NB	SB	NB	SB	NB
AG Segment A - SR 410 WB Ramps - Rivergrove Dr	15.2	32.0	14.3	23.2	-6%	-28%
AG Segment B - Rivergrove Dr - Pioneer Way	13.1	12.7	13.4	11.2	2%	-12%
AG Segment C - Pioneer Way - 96th St	8.4	9.8	8.3	9.7	-1%	-1%
AG Segment D - 96th St - Military Rd	8.7	16.8	8.7	10.8	0%	-36%
AG Segment E - Military Rd - 128th St	8.2	9.5	8.3	9.5	1%	0%
AG Segment F - 128th St - 136th St	8.0	37.6	8.1	32.3	1%	-14%
AG Segment G - 136th St - Williams Blvd	7.9	9.3	7.8	8.3	-1%	-11%

PM	2025 NA		2025 TDM		% Change	
	SB	NB	SB	NB	SB	NB
Total	1182.1	678.0	1274.8	920.1	7.8%	35.7%

Segment Travel Time per 1/10 mile (seconds)

PM	2025 NA		2025 TDM		% Change	
	SB	NB	SB	NB	SB	NB
AG Segment A - SR 410 WB Ramps - Rivergrove Dr	27.3	40.7	48.5	54.5	78%	34%
AG Segment B - Rivergrove Dr - Pioneer Way	26.2	11.3	59.9	14.0	129%	24%
AG Segment C - Pioneer Way - 96th St	10.4	10.9	10.0	10.5	-4%	-4%
AG Segment D - 96th St - Military Rd	38.7	9.5	29.5	9.4	-24%	-1%
AG Segment E - Military Rd - 128th St	15.6	9.3	13.0	31.8	-17%	242%
AG Segment F - 128th St - 136th St	12.8	12.2	12.8	14.9	0%	22%
AG Segment G - 136th St - Williams Blvd	9.7	8.4	9.3	8.4	-4%	0%

Year 2035

- Intersection Average Delay and LOS

AM Peak Hour		No Action		TDM		Reversible 3rd Lane		1997 Plan Improvement		Transit - Sounder Rail Extension	
Synchro ID	Intersection Name	2035		2035		2035		2035		2035	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	Valley Ave & Meade McCumber Rd E	148.8	F	63.2	E	112.1	F	114.3	F	63.2	E
3	SR 162/Valley Ave & SR 410 WB Ramps	120.9	F	111.3	F	174.2	F	60.4	E	115.4	F
4	SR 162 & SR 410 EB Ramps	269.6	F	230.5	F	275.0	F	74.5	E	225.9	F
5	SR 162 & Rivergrove Dr E	24.5	C	21.3	C	202.3	F	11.6	B	19.8	B
6	SR 162 & 80th St E	155.1	F	137.9	F	101.0	F	34.0	D	139.0	F
7	SR 162 & Pioneer Way E/Bowman-Hilton Rd E	142.9	F	64.3	E	380.1	F	49.8	D	56.9	E
10	SR 162 & 96th St E	218.3	F	175.8	F	344.1	F	56.1	E	151.1	F
14	SR 162 & Military Rd E	238.2	F	181.9	F	496.6	F	35.2	D	182.6	F
15	SR 162 & 128th St E	1154.9	F	614.9	F	977.4	F	176.4	F	607.5	F
16	SR 162 & 136th St E	11.5	B	10.1	B	10.2	B	7.5	A	11.5	B
21	SR 162 & Williams Blvd NW/Williams Blvd NE	32.5	C	28.8	C	30.2	C	19.3	B	32.5	C
		2517.2		1640	-35%	3103.2	23%	639.1	-75%	1605.4	-36%

PM Peak Hour		No Action		TDM		Reversible 3rd Lane		1997 Plan Improvement		Transit - Sounder Rail Extension	
Synchro ID	Intersection Name	2035		2035		2035		2035		2035	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	Valley Ave & Meade McCumber Rd E	140.2	F	57.7	E	87.4	F	94.9	F	59.0	E
3	SR 162/Valley Ave & SR 410 WB Ramps	92.2	F	74.6	E	344.3	F	98.0	F	74.6	E
4	SR 162 & SR 410 EB Ramps	347.8	F	284.1	F	693.4	F	109.9	F	287.7	F
5	SR 162 & Rivergrove Dr E	84.9	F	86.8	F	349.9	F	7.5	A	84.2	F
6	SR 162 & 80th St E	354.4	F	290.6	F	629.4	F	140.0	F	331.4	F
7	SR 162 & Pioneer Way E/Bowman-Hilton Rd E	319.1	F	242.1	F	528.9	F	164.7	F	227.6	F
10	SR 162 & 96th St E	139.1	F	117.6	F	494.3	F	78.8	E	103.7	F
14	SR 162 & Military Rd E	525.4	F	465.2	F	754.2	F	237.2	F	452.5	F
15	SR 162 & 128th St E	1402.3	F	664.0	F	941.9	F	123.0	F	646.3	F
16	SR 162 & 136th St E	64.7	E	47.8	D	63.4	E	11.9	B	64.7	E
21	SR 162 & Williams Blvd NW/Williams Blvd NE	62.0	E	40.3	D	50.2	D	19.4	B	62.0	E
		3532.1		2370.8	-33%	4937.3	40%	1085.3	-69%	2393.7	-32%

Combinations of Strategies

AM Peak Hour		No Action		TDM + 1997 Plan Improvement		Transit + 1997 Plan Improvement		Transit+TDM + 1997 Plan Improvement	
Synchro ID	Intersection Name	2035		2035		2035		2035	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	Valley Ave & Meade McCumber Rd E	148.8	F	102.2	F	106.3	F	94.4	F
3	SR 162/Valley Ave & SR 410 WB Ramps	120.9	F	57.9	E	60.9	E	58.3	E
4	SR 162 & SR 410 EB Ramps	269.6	F	68.4	E	70.5	E	64.5	E
5	SR 162 & Rivergrove Dr E	24.5	C	11.2	B	11.4	B	11.0	B
6	SR 162 & 80th St E	155.1	F	32.4	D	33.6	D	32.0	D
7	SR 162 & Pioneer Way E/Bowman-Hilton Rd E	142.9	F	25.6	C	24.9	C	23.6	C
10	SR 162 & 96th St E	218.3	F	50.2	D	46.4	D	41.6	D
14	SR 162 & Military Rd E	238.2	F	33.1	C	32.5	C	30.9	C
15	SR 162 & 128th St E	1154.9	F	175.7	F	157.9	F	157.0	F
16	SR 162 & 136th St E	11.5	B	7.4	A	7.5	A	7.4	A
21	SR 162 & Williams Blvd NW/Williams Blvd NE	32.5	C	18.8	B	19.3	B	18.8	B
		2517.2		582.9	-77%	571.2	-77%	539.5	-79%

PM Peak Hour		No Action		TDM + 1997 Plan Improvement		Transit + 1997 Plan Improvement		Transit+TDM + 1997 Plan Improvement	
Synchro ID	Intersection Name	2035		2035		2035		2035	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	Valley Ave & Meade McCumber Rd E	140.2	F	88.8	F	88.9	F	83.1	F
3	SR 162/Valley Ave & SR 410 WB Ramps	92.2	F	92.0	F	92.4	F	86.7	F
4	SR 162 & SR 410 EB Ramps	347.8	F	103.6	F	110.7	F	104.3	F
5	SR 162 & Rivergrove Dr E	84.9	F	5.8	A	6.6	A	5.6	A
6	SR 162 & 80th St E	354.4	F	147.5	F	132.7	F	132.4	F
7	SR 162 & Pioneer Way E/Bowman-Hilton Rd E	319.1	F	150.8	F	151.1	F	137.6	F
10	SR 162 & 96th St E	139.1	F	72.6	E	68.3	E	62.4	E
14	SR 162 & Military Rd E	525.4	F	227.8	F	223.6	F	214.3	F
15	SR 162 & 128th St E	1402.3	F	113.6	F	110.6	F	101.5	F
16	SR 162 & 136th St E	64.7	E	11.6	B	11.9	B	11.6	B
21	SR 162 & Williams Blvd NW/Williams Blvd NE	62.0	E	18.6	B	19.4	B	18.6	B
		3532.1		1032.7	-71%	1016.2	-71%	958.1	-73%

- Travel Time

AM	2035 NA		2035 TDM		% Change		2035 Reversible 3rd Lane		% Change		2035 1997 Plan Improvement		% Change		2035 Transit - Sounder Rail Extension		% Change	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
Total	33898.9	1252.6	29745.5	2546.1	-12.3%	103.3%	4885.4	2595.3	-85.6%	107.2%	533.3	943.4	-98.4%	-24.7%	28982.3	2390.1	-14.5%	90.8%

Segment Travel Time per 1/10 mile (seconds)

AM	2035 NA		2035 TDM + 1997 Plan Improvement		% Change		2035 Transit + 1997 Plan Improvement		% Change		2035 Transit + TDM + 1997 Plan Improvement		% Change	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
AG Segment A - SR 410 WB Ramps - Rivergrove Dr	86.5	60.3	13.0	46.9	-85.0%	-22.2%	13.1	49.5	-84.9%	-17.9%	12.7	48.3	-85.3%	-19.9%
AG Segment B - Rivergrove Dr - Pioneer Way	124.0	40.5	13.8	31.9	-88.9%	-21.2%	13.6	44.7	-89.0%	10.4%	13.2	36.7	-89.4%	-9.4%
AG Segment C - Pioneer Way - 96th St	285.6	13.5	8.3	10.6	-97.1%	-21.5%	8.2	11.4	-97.1%	-15.6%	8.3	10.5	-97.1%	-22.2%
AG Segment D - 96th St - Military Rd	2146.3	9.3	9.3	9.0	-99.6%	-3.2%	9.4	9.0	-99.6%	-3.2%	9.3	9.0	-99.6%	-3.2%
AG Segment E - Military Rd - 128th St	48.1	18.0	8.2	14.8	-83.0%	-17.8%	8.2	19.8	-83.0%	10.0%	8.2	17.2	-83.0%	-4.4%
AG Segment F - 128th St - 136th St	7.5	59.8	8.4	18.7	12.0%	-68.7%	8.5	25.3	13.3%	-57.7%	8.5	19.2	13.3%	-67.9%
AG Segment G - 136th St - Williams Blvd	7.8	12.1	7.8	7.7	0.0%	-36.4%	7.9	7.7	1.3%	-36.4%	7.8	7.7	0.0%	-36.4%

PM	2035 NA		2035 TDM + 1997 Plan Improvement		% Change		2035 Transit + 1997 Plan Improvement		% Change		2035 Transit + TDM + 1997 Plan Improvement		% Change	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
Total	83048.0	1597.5	2362.7	983.5	-97.2%	-38.4%	2104.2	1171.8	-97.5%	-26.6%	2074.5	1039.7	-97.5%	-34.9%

Segment Travel Time per 1/10 mile (seconds)

PM	2035 NA		2035 TDM + 1997 Plan Improvement		% Change		2035 Transit + 1997 Plan Improvement		% Change		2035 Transit + TDM + 1997 Plan Improvement		% Change	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
AG Segment A - SR 410 WB Ramps - Rivergrove Dr	396.8	103.6	17.4	57.7	-95.6%	-44.3%	19.6	74.3	-95.1%	-28.3%	17.1	65.5	-95.7%	-36.8%
AG Segment B - Rivergrove Dr - Pioneer Way	1255.3	68.8	57.2	11.9	-95.4%	-82.7%	60.7	16.9	-95.2%	-75.4%	53.6	16.5	-95.7%	-76.0%
AG Segment C - Pioneer Way - 96th St	2522.1	9.8	17.7	15.6	-99.3%	59.2%	12.1	17.9	-99.5%	82.7%	11.4	16.8	-99.5%	71.4%
AG Segment D - 96th St - Military Rd	3896.7	8.9	101.2	9.0	-97.4%	1.1%	85.8	9.1	-97.8%	2.2%	88.0	9.1	-97.7%	2.2%
AG Segment E - Military Rd - 128th St	119.7	33.5	36.1	18.4	-69.8%	-45.1%	32.5	20.9	-72.8%	-37.6%	31.4	19.2	-73.8%	-42.7%
AG Segment F - 128th St - 136th St	8.5	51.5	9.5	42.2	11.8%	-18.1%	9.7	54.6	14.1%	6.0%	9.5	39.8	11.8%	-22.7%
AG Segment G - 136th St - Williams Blvd	8.6	11.8	8.6	8.9	0.0%	-24.6%	8.7	9.4	1.2%	-20.3%	8.6	8.8	0.0%	-25.4%

Combination of Strategies

AM	2035 NA		2035 TDM + 1997 Plan Improvement		% Change		2035 Transit + 1997 Plan Improvement		% Change		2035 Transit + TDM + 1997 Plan Improvement		% Change	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
Total	33898.9	1252.6	532.5	857.0	-98.4%	-31.6%	533.6	1005.0	-98.4%	-19.8%	527.6	905.0	-98.4%	-27.8%

Segment Travel Time per 1/10 mile (seconds)

AM	2035 NA		2035 TDM + 1997 Plan Improvement		% Change		2035 Transit + 1997 Plan Improvement		% Change		2035 Transit + TDM + 1997 Plan Improvement		% Change	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
AG Segment A - SR 410 WB Ramps - Rivergrove Dr	86.5	60.3	13.0	46.9	-85.0%	-22.2%	13.1	49.5	-84.9%	-17.9%	12.7	48.3	-85.3%	-19.9%
AG Segment B - Rivergrove Dr - Pioneer Way	124.0	40.5	13.8	31.9	-88.9%	-21.2%	13.6	44.7	-89.0%	10.4%	13.2	36.7	-89.4%	-9.4%
AG Segment C - Pioneer Way - 96th St	285.6	13.5	8.3	10.6	-97.1%	-21.5%	8.2	11.4	-97.1%	-15.6%	8.3	10.5	-97.1%	-22.2%
AG Segment D - 96th St - Military Rd	2146.3	9.3	9.3	9.0	-99.6%	-3.2%	9.4	9.0	-99.6%	-3.2%	9.3	9.0	-99.6%	-3.2%
AG Segment E - Military Rd - 128th St	48.1	18.0	8.2	14.8	-83.0%	-17.8%	8.2	19.8	-83.0%	10.0%	8.2	17.2	-83.0%	-4.4%
AG Segment F - 128th St - 136th St	7.5	59.8	8.4	18.7	12.0%	-68.7%	8.5	25.3	13.3%	-57.7%	8.5	19.2	13.3%	-67.9%
AG Segment G - 136th St - Williams Blvd	7.8	12.1	7.8	7.7	0.0%	-36.4%	7.9	7.7	1.3%	-36.4%	7.8	7.7	0.0%	-36.4%

PM	2035 NA		2035 TDM + 1997 Plan Improvement		% Change		2035 Transit + 1997 Plan Improvement		% Change		2035 Transit + TDM + 1997 Plan Improvement		% Change	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
Total	83048.0	1597.5	2362.7	983.5	-97.2%	-38.4%	2104.2	1171.8	-97.5%	-26.6%	2074.5	1039.7	-97.5%	-34.9%

Segment Travel Time per 1/10 mile (seconds)

PM	2035 NA		2035 TDM + 1997 Plan Improvement		% Change		2035 Transit + 1997 Plan Improvement		% Change		2035 Transit + TDM + 1997 Plan Improvement		% Change	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
AG Segment A - SR 410 WB Ramps - Rivergrove Dr	396.8	103.6	17.4	57.7	-95.6%	-44.3%	19.6	74.3	-95.1%	-28.3%	17.1	65.5	-95.7%	-36.8%
AG Segment B - Rivergrove Dr - Pioneer Way	1255.3	68.8	57.2	11.9	-95.4%	-82.7%	60.7	16.9	-95.2%	-75.4%	53.6	16.5	-95.7%	-76.0%
AG Segment C - Pioneer Way - 96th St	2522.1	9.8	17.7	15.6	-99.3%	59.2%	12.1	17.9	-99.5%	82.7%	11.4	16.8	-99.5%	71.4%
AG Segment D - 96th St - Military Rd	3896.7	8.9	101.2	9.0	-97.4%	1.1%	85.8	9.1	-97.8%	2.2%	88.0	9.1	-97.7%	2.2%
AG Segment E - Military Rd - 128th St	119.7	33.5	36.1	18.4	-69.8%	-45.1%	32.5	20.9	-72.8%	-37.6%	31.4	19.2	-73.8%	-42.7%
AG Segment F - 128th St - 136th St	8.5	51.5	9.5	42.2	11.8%	-18.1%	9.7	54.6	14.1%	6.0%	9.5	39.8	11.8%	-22.7%
AG Segment G - 136th St - Williams Blvd	8.6	11.8	8.6	8.9	0.0%	-24.6%	8.7	9.4	1.2%	-20.3%	8.6	8.8	0.0%	-25.4%

Appendix C Year 2035 Forecast Volumes and Intersection Configurations for 1997 Route Development Plan strategy

AM Peak Hour

Int 1: Valley Ave. & Meade McCumber Rd. E.

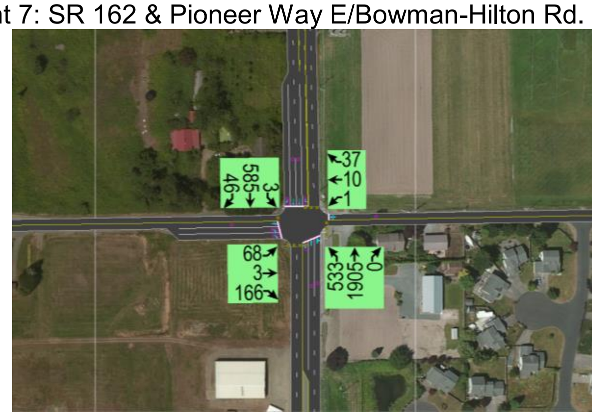
Int 3: SR 162/Valley Ave. & SR 410 WB Ramps

Int 4: SR 162 & SR 410 EB Ramps

Int 5: SR 162 & Rivergrove Dr. E.

Int 6: SR 162 & 80th St. E.

Int 7: SR 162 & Pioneer Way E/Bowman-Hilton Rd. E.



Int 10: SR 162 & 96th St. E.

Int 14: SR 162 & Military Rd. E.

Int 15: SR 162 & 128th St. E.

Int 16: SR 162 & 136th St. E.

Int 21: SR 162 & Williams Blvd. NW/Williams Blvd. NE

PM Peak Hour

Int 1: Valley Ave. & Meade McCumber Rd. E.

Int 3: SR 162/Valley Ave. & SR 410 WB Ramps

Int 4: SR 162 & SR 410 EB Ramps

Int 5: SR 162 & Rivergrove Dr. E.

Int 6: SR 162 & 80th St. E.

Int 7: SR 162 & Pioneer Way E/Bowman-Hilton Rd. E.

Int 10: SR 162 & 96th St E.

Int 14: SR 162 & Military Rd. E.

Int 15: SR 162 & 128th St. E.

Int 16: SR 162 & 136th St. E.

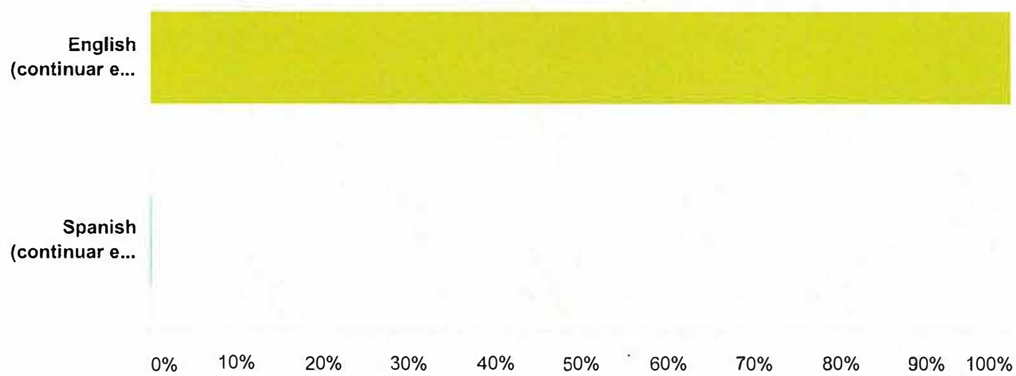
Int 21: SR 162 & Williams Blvd. NW/Williams Blvd. NE

APPENDIX D

Study Information Gathering; Online Survey

Q1 Take this survey in the following language: (Haga esta encuesta en el siguiente idioma:)

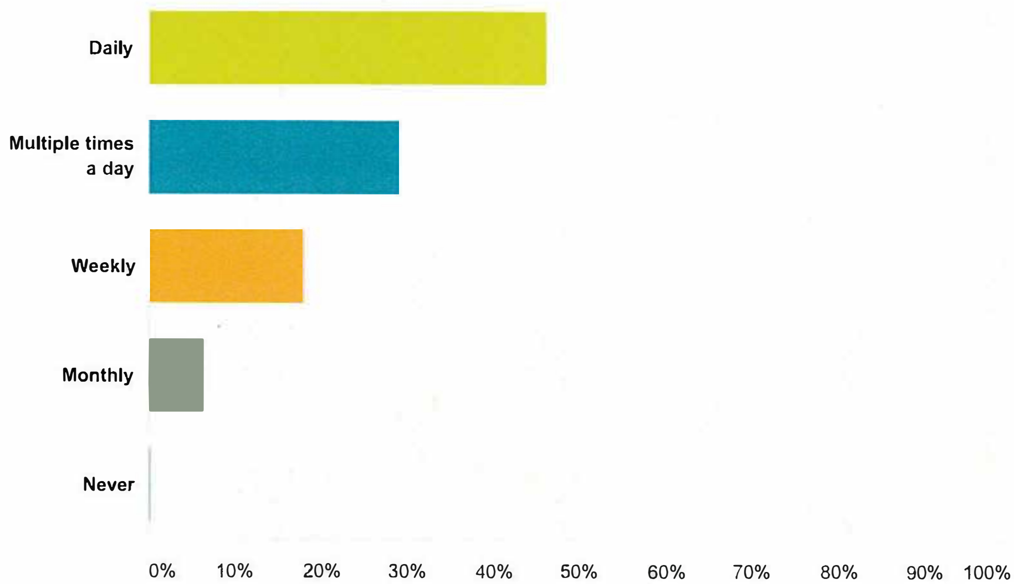
Answered: 2,164 Skipped: 16



Answer Choices	Responses	
English (continuar en inglés)	99.86%	2,161
Spanish (continuar en español)	0.14%	3
Total		**2,164**

Q2 How frequently do you travel on SR 162 between Sumner and Orting?

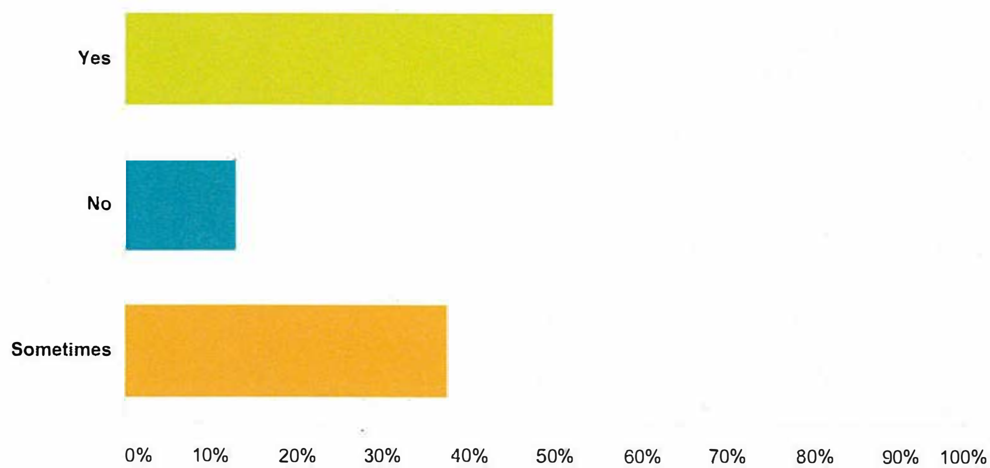
Answered: 2,129 Skipped: 51



Answer Choices	Responses	
Daily	**46.22%**	984
Multiple times a day	**29.07%**	619
Weekly	**17.90%**	381
Monthly	**6.58%**	140
Never	**0.23%**	5
Total		**2,129**

Q3 Do you purposefully time your trips to avoid peak commute hours?

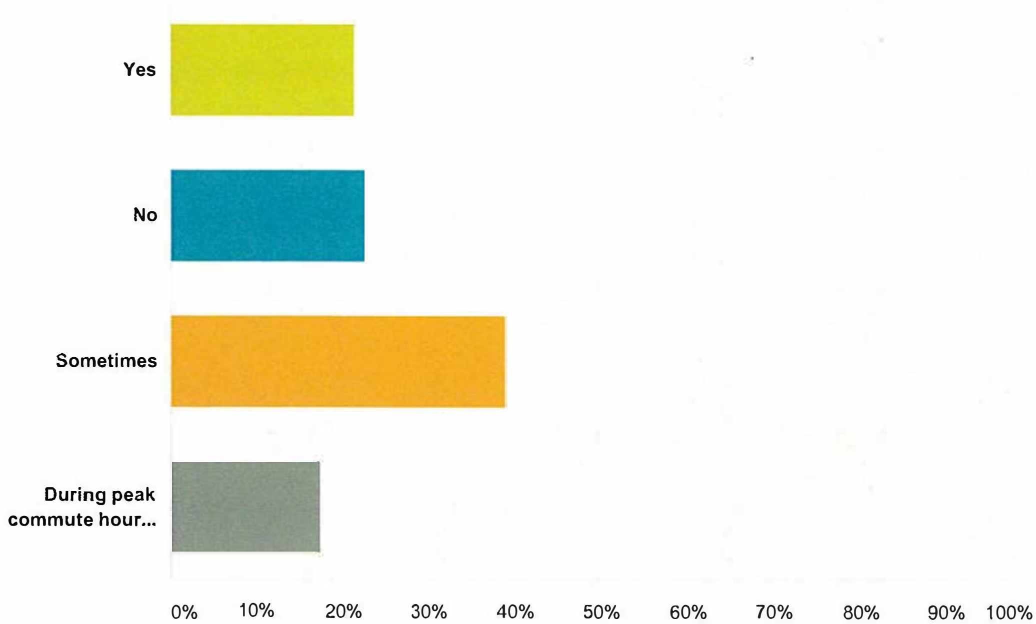
Answered: 2,128 Skipped: 52



Answer Choices	Responses	
Yes	**49.67%**	1,057
No	**12.92%**	275
Sometimes	**37.41%**	796
Total		**2,128**

Q4 Do you take an alternate route to avoid driving on SR 162 between Sumner and Orting?

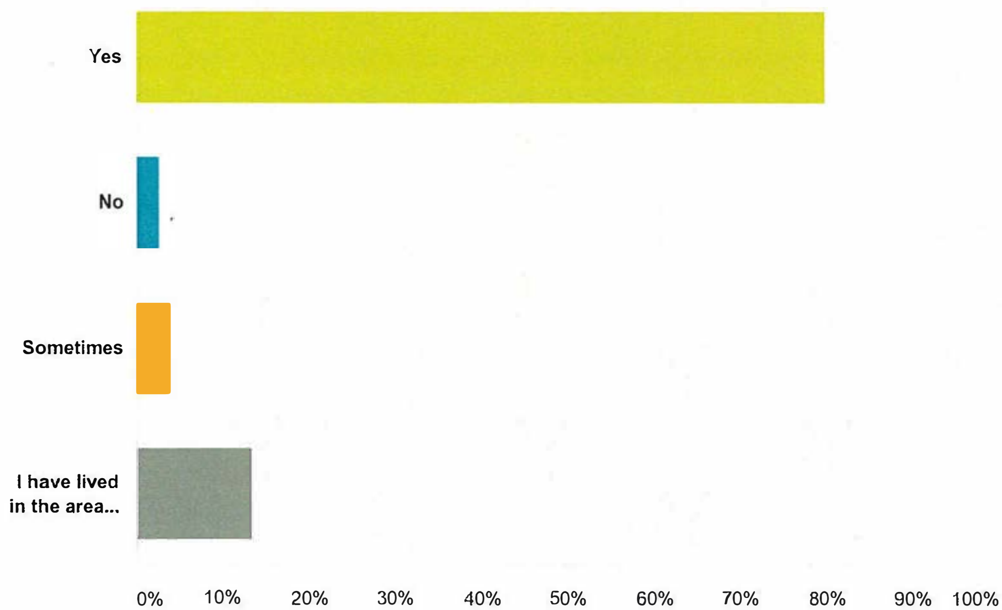
Answered 2,126 Skipped 54



Answer Choices	Responses	
Yes	21.21%	451
No	22.53%	479
Sometimes	38.90%	827
During peak commute hours only	17.36%	369
Total		**2,126**

Q5 Has your average travel time changed between Sumner and Orting over the last five years?

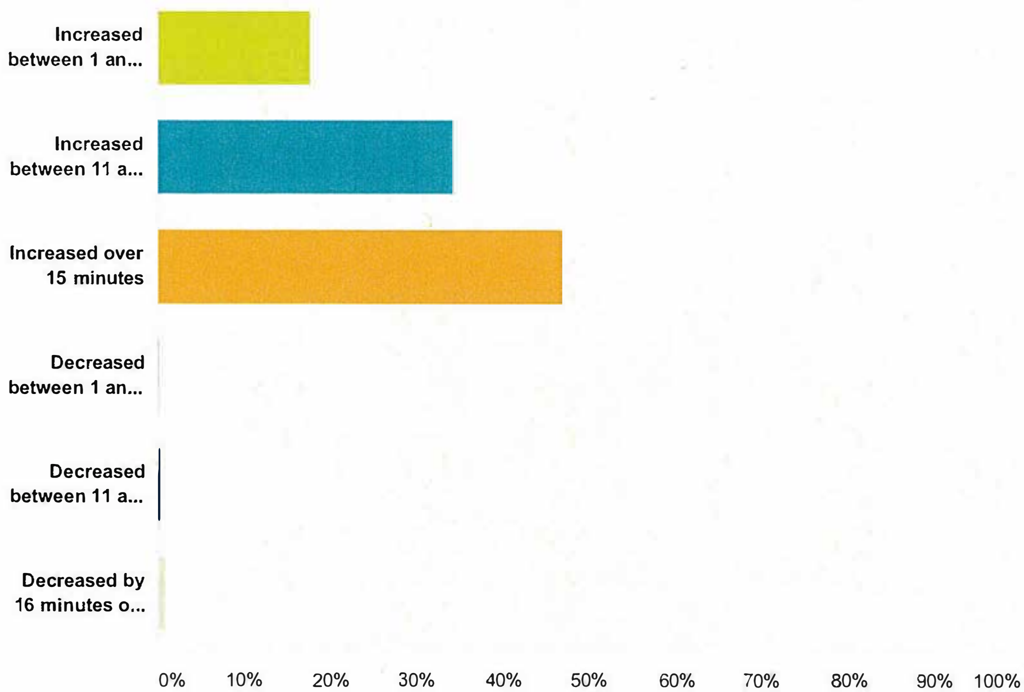
Answered 2 116 Skipped 64



Answer Choices	Responses	
Yes	79.91%	1,691
No	2.65%	56
Sometimes	4.16%	88
I have lived in the area less than five years	13.28%	281
Total		2,116

Q6 Please choose one of the following that best describes how your average travel time has changed over the last five years on SR 162 between Sumner and Orting.

Answered: 1,768 Skipped: 412



Answer Choices	Responses	
Increased between 1 and 10 minutes	17.70%	313
Increased between 11 and 15 minutes	34.33%	607
Increased over 15 minutes	46.72%	826
Decreased between 1 and 10 minutes	0.17%	3
Decreased between 11 and 15 minutes	0.34%	6
Decreased by 16 minutes or more	0.74%	13
Total		1,768

Q7 What highway changes, if any, would you like to see made to SR 162 between Sumner and Orting over the next 10 years?

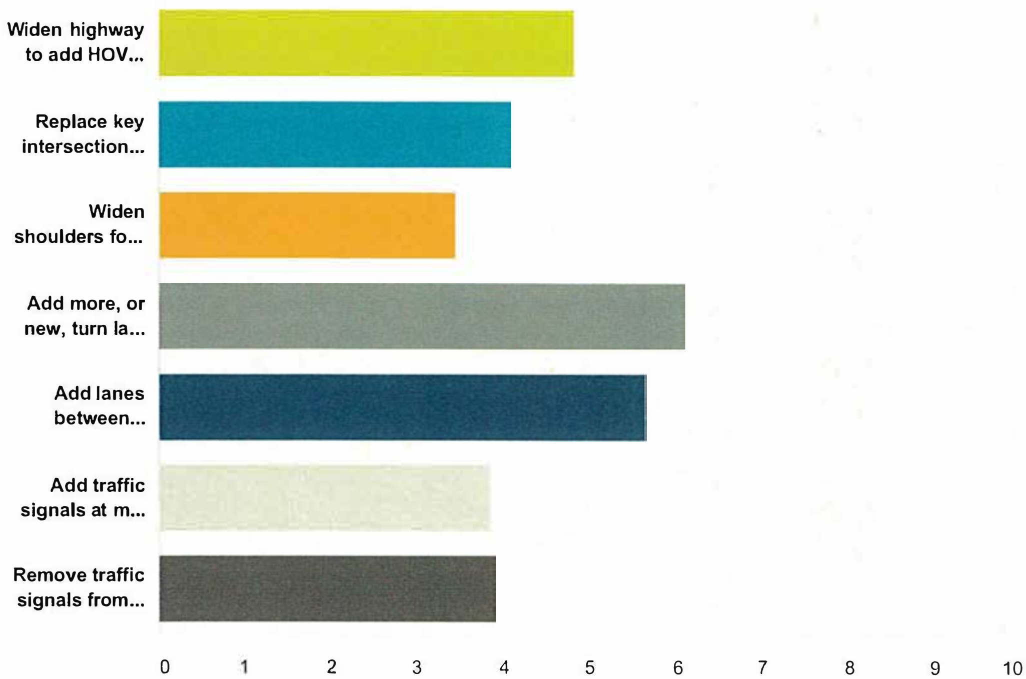
Answered: 1,868 Skipped 312

Q8 What changes, if any, would you like to see made to side streets that connect to SR 162 between Sumner and Orting over the next 10 years?

Answered: 1,394 Skipped: 786

Q9 Some people have asked WSDOT to add more general highway lanes to SR 162 between Sumner and Orting. If that option is not pursued, what other options do you think would be helpful to keep people moving through the Congestion? Please rate up to three options below, with #1 being your top choice.

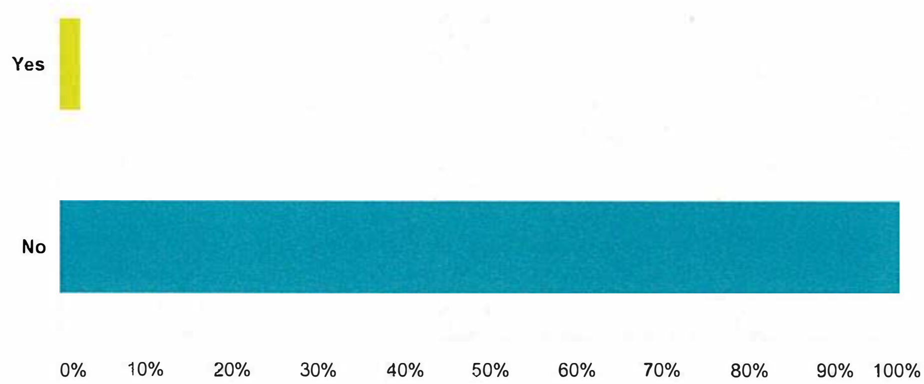
Answered 1,876 Skipped 304



	1	2	3	4	5	6	7	Total	Score
Widen highway to add HOV lanes only	**31.95%** 300	**14.38%** 135	**17.57%** 165	**7.99%** 75	**8.95%** 84	**7.67%** 72	**11.50%** 108	939	4.83
Replace key intersections with roundabouts	**18.68%** 167	**15.77%** 141	**15.55%** 139	**7.94%** 71	**9.51%** 85	**14.43%** 129	**18.12%** 162	894	4.10
Widen shoulders for more bicycle/pedestrian use	**4.91%** 39	**10.83%** 86	**20.40%** 162	**10.96%** 87	**14.61%** 116	**16.75%** 133	**21.54%** 171	794	3.44
Add more, or new, turn lanes to/from SR 162 at side streets	**45.61%** 733	**32.36%** 520	**13.57%** 218	**4.36%** 70	**2.55%** 41	**0.68%** 11	**0.87%** 14	1,607	6.09
Add lanes between signaled intersections	**26.28%** 369	**34.83%** 489	**25.50%** 358	**6.70%** 94	**3.85%** 54	**1.99%** 28	**0.85%** 12	1,404	5.64
Add traffic signals at more intersections	**9.82%** 87	**12.98%** 115	**19.86%** 176	**10.27%** 91	**16.48%** 146	**16.59%** 147	**14.00%** 124	886	3.84
Remove traffic signals from some existing intersections	**10.41%** 88	**13.85%** 117	**15.62%** 132	**18.93%** 160	**13.85%** 117	**12.19%** 103	**15.15%** 128	845	3.91

Q10 Do you own a business on SR 162 between Sumner and Orting?

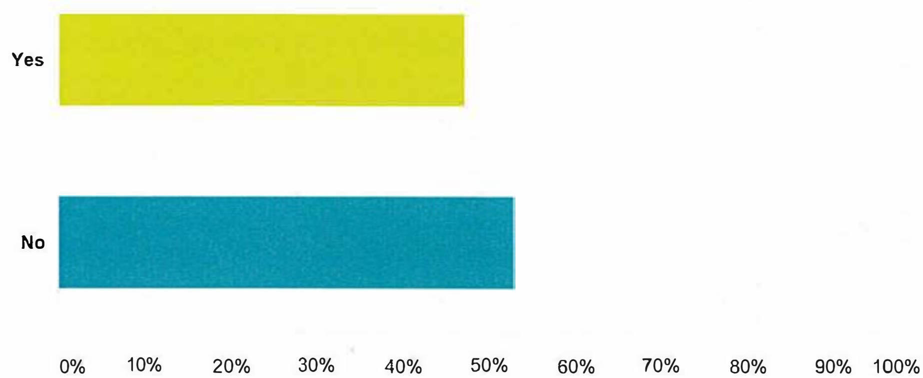
Answered: 1,973 Skipped: 207



Answer Choices	Responses	
Yes	2.53%	50
No	97.47%	1,923
Total		1,973

Q11 Have you made changes to your business operations based on traffic over the past five years?

Answered: 53 Skipped: 2,127



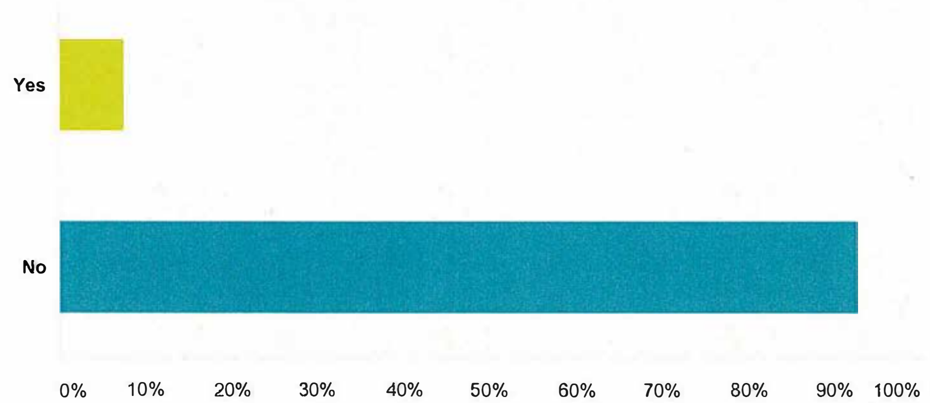
Answer Choices	Responses	
Yes	**47.17%**	25
No	**52.83%**	28
Total		**53**

Q12 Please explain what changes you have made to your business operations based on traffic conditions over the past five years.

Answered: 21 Skipped: 2,159

Q13 Do you work at a business located on SR 162 between Sumner and Orting?

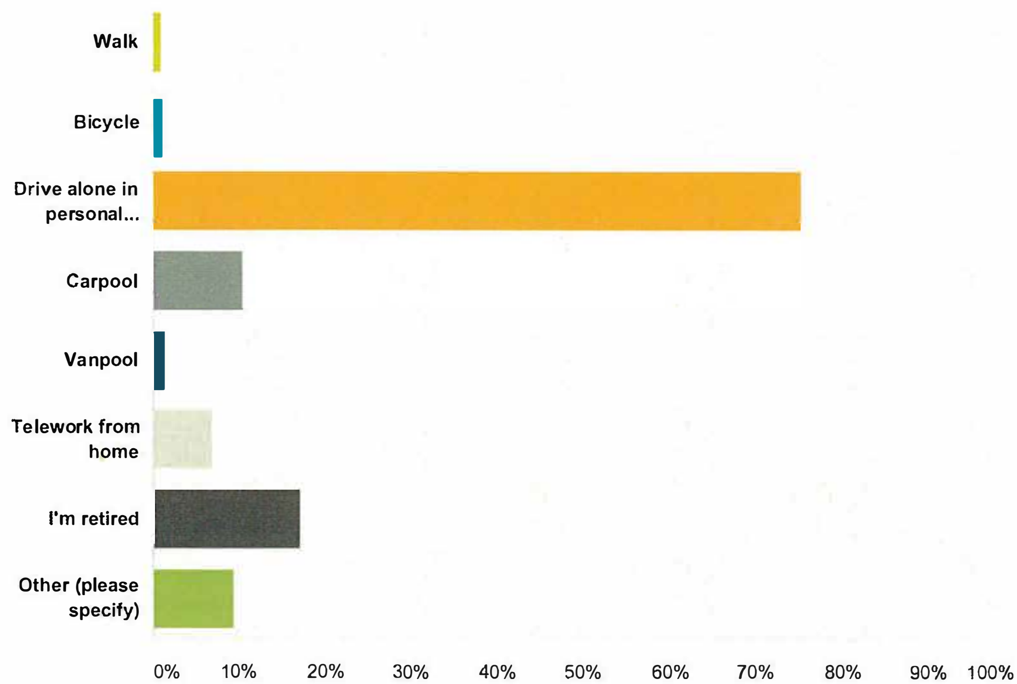
Answered: 1,937 Skipped: 243



Answer Choices	Responses	
Yes	7.59%	147
No	92.41%	1,790
Total		1,937

Q14 How do you normally commute to work? Choose up to three.

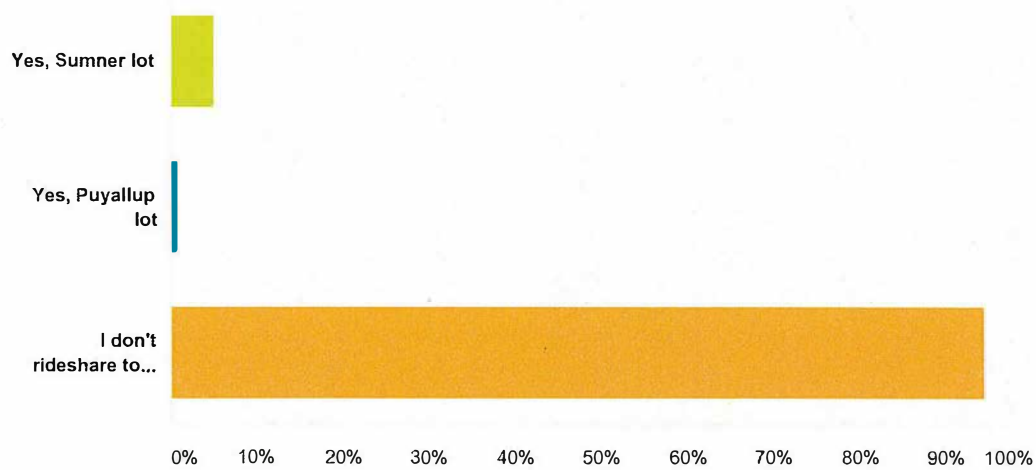
Answered: 1,963 Skipped: 217



Answer Choices	Responses	
Walk	1.12%	22
Bicycle	1.27%	25
Drive alone in personal vehicle	75.39%	1,480
Carpool	10.44%	205
Vanpool	1.38%	27
Telework from home	6.83%	134
I'm retired	17.22%	338
Other (please specify)	9.48%	186
Total Respondents: 1,963		

Q15 If you rideshare to work, do you use the Sumner or Puyallup Sounder Park & Ride lot?

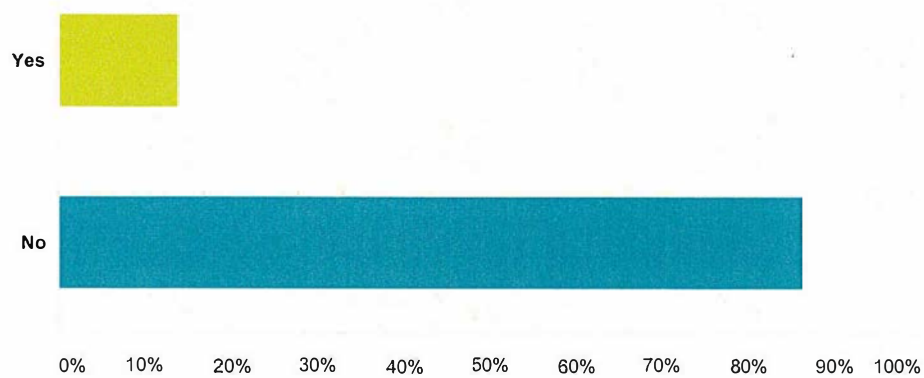
Answered 1,812 Skipped 368



Answer Choices	Responses	
Yes, Sumner lot	4.91%	89
Yes, Puyallup lot	0.77%	14
I don't rideshare to work.	94.32%	1,709
Total		1,812

Q16 Do you ever walk or bicycle along the shoulder of SR 162 between Sumner and Orting?

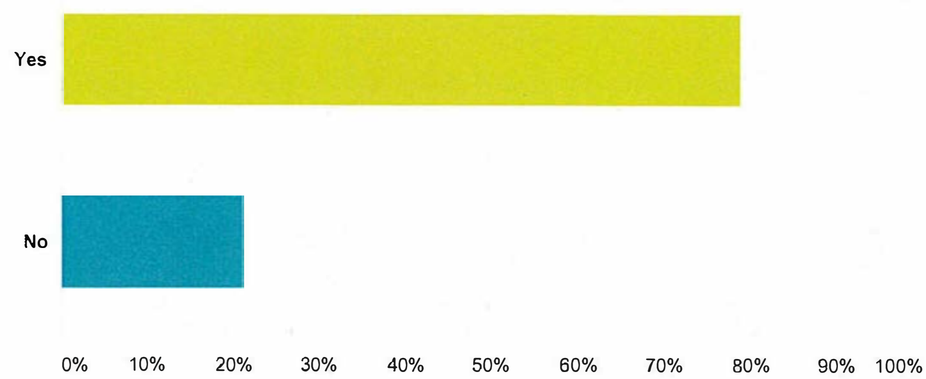
Answered: 1,960 Skipped: 220



Answer Choices	Responses	
Yes	13.72%	269
No	86.28%	1,691
Total		**1,960**

Q17 Do you ever walk or bicycle on the Foothills Trail?

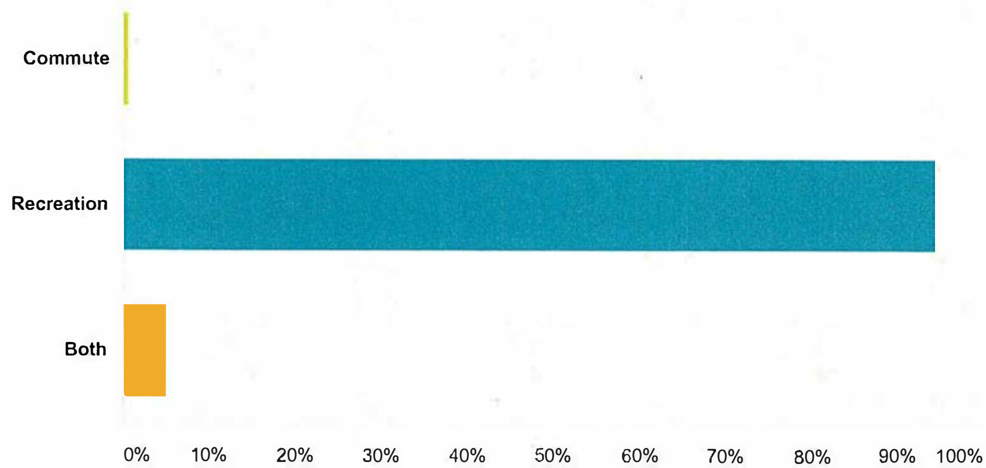
Answered: 1,959 Skipped: 221



Answer Choices	Responses	
Yes	78.82%	1,544
No	21.18%	415
Total		**1,959**

Q18 Do you bicycle or walk mainly for commute or recreational purposes?

Answered: 1,537 Skipped: 643



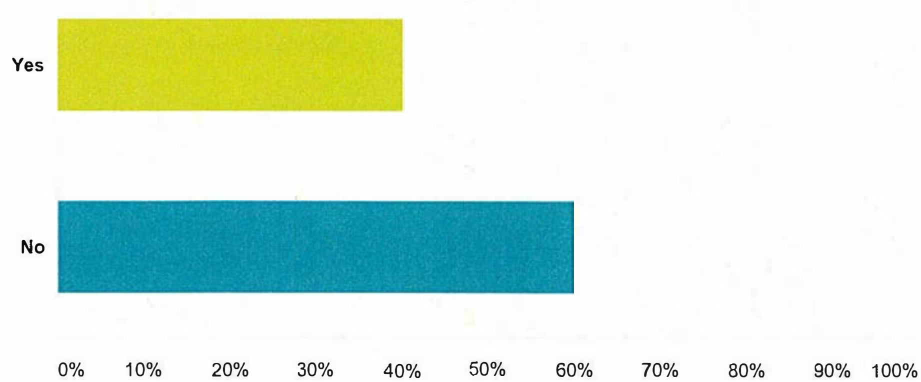
Answer Choices	Responses	
Commute	0.72%	11
Recreation	94.27%	1,449
Both	5.01%	77
Total		**1,537**

Q19 What changes, if any, would you like to see made for pedestrians or bicyclists on SR 162 between Sumner and Orting?

Answered: 957 Skipped: 1,223

Q20 If transit or some other form of public transportation was available from Sumner to Orting, would you use it?

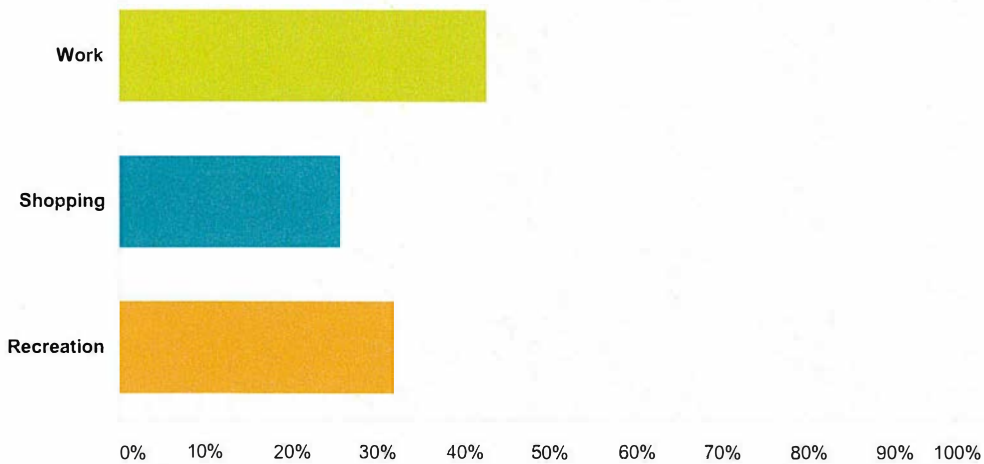
Answered: 1,952 Skipped: 228



Answer Choices	Responses	
Yes	40.06%	782
No	59.94%	1,170
Total		**1,952**

Q21 What would you use public transportation for? Choose all that apply.

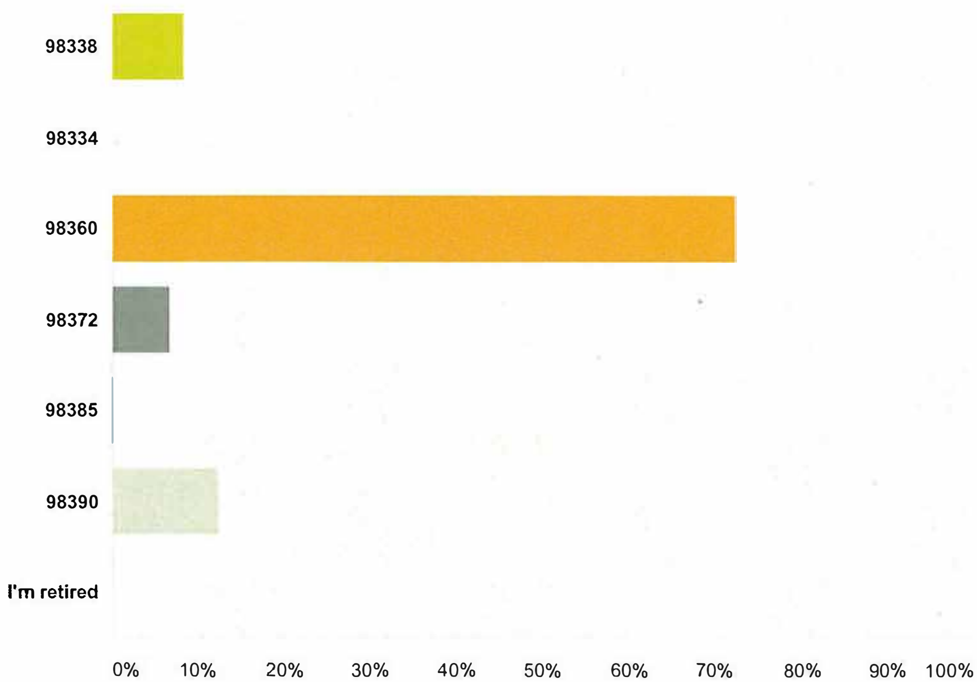
Answered: 754 Skipped: 1,426



Answer Choices	Responses	
Work	**42.57%**	321
Shopping	**25.60%**	193
Recreation	**31.83%**	240
Total		**754**

Q22 To give us an idea of your normal workday commute, please indicate your home zip code.

Answered: 1,614 Skipped: 566



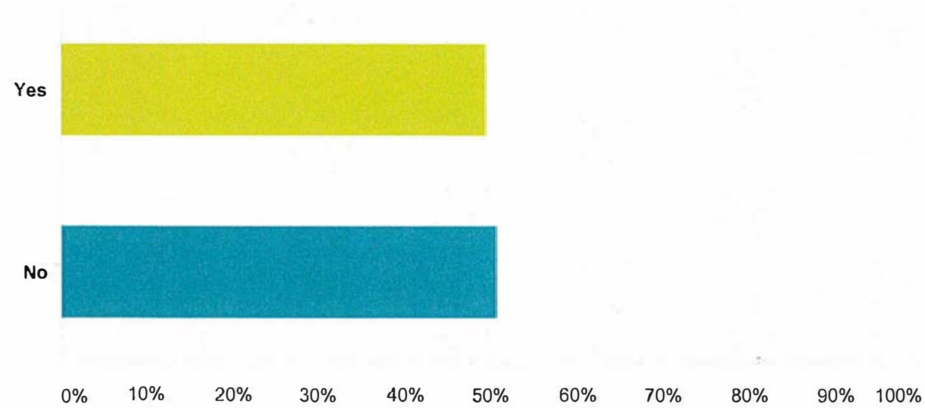
Answer Choices	Responses	
98338	8.30%	134
98334	0.06%	1
98360	72.43%	1,169
98372	6.75%	109
98385	0.19%	3
98390	12.27%	198
I'm retired	0.00%	0
Total		**1,614**

Q23 Did we miss anything? Please share any additional thoughts or comments about SR 162 between Sumner and Orting.

Answered: 869 Skipped: 1,311

Q24 Can WSDOT contact you for further discussion?

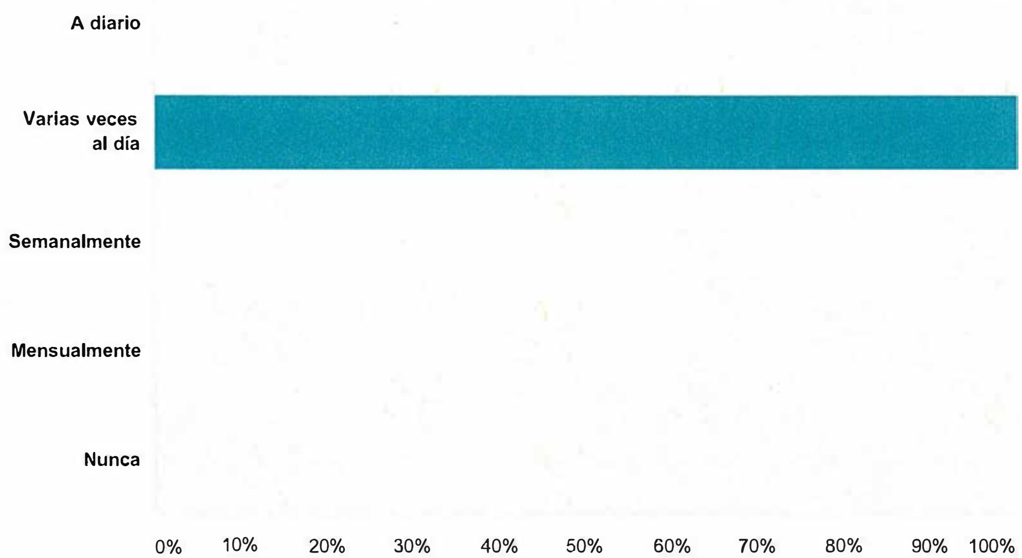
Answered: 1,916 Skipped: 264



Answer Choices	Responses	
Yes	**49.37%**	946
No	**50.63%**	970
Total		**1,916**

Q25 ¿Con qué frecuencia utiliza la SR 162 entre Sumner y Orting?

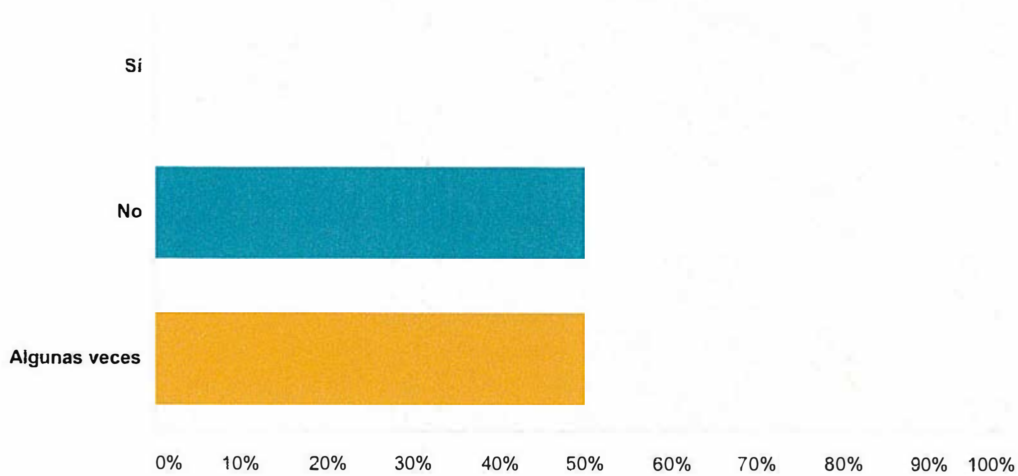
Answered: 2 Skipped: 2,178



Answer Choices	Responses	
A diario	0.00%	0
Varias veces al día	100.00%	2
Semanalmente	0.00%	0
Mensualmente	0.00%	0
Nunca	0.00%	0
Total		**2**

Q26 ¿Usted evita deliberadamente hacer viajes en las horas de más tránsito?

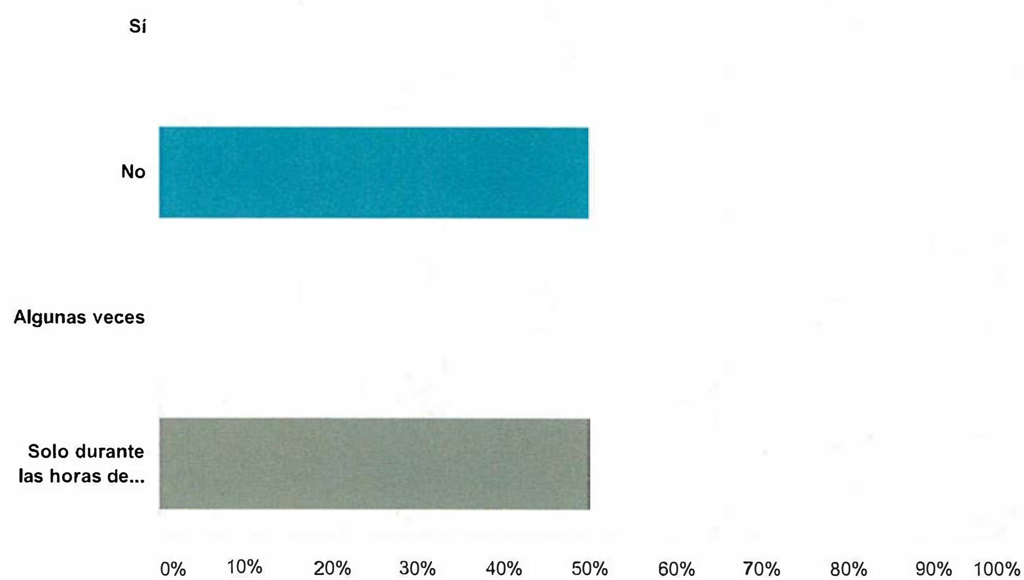
Answered: 2 Skipped: 2,178



Answer Choices	Responses	
Sí	0.00%	0
No	50.00%	1
Algunas veces	50.00%	1
Total		**2**

Q27 ¿Utiliza otras rutas para evitar conducir en la SR 162 entre Sumner y Orting?

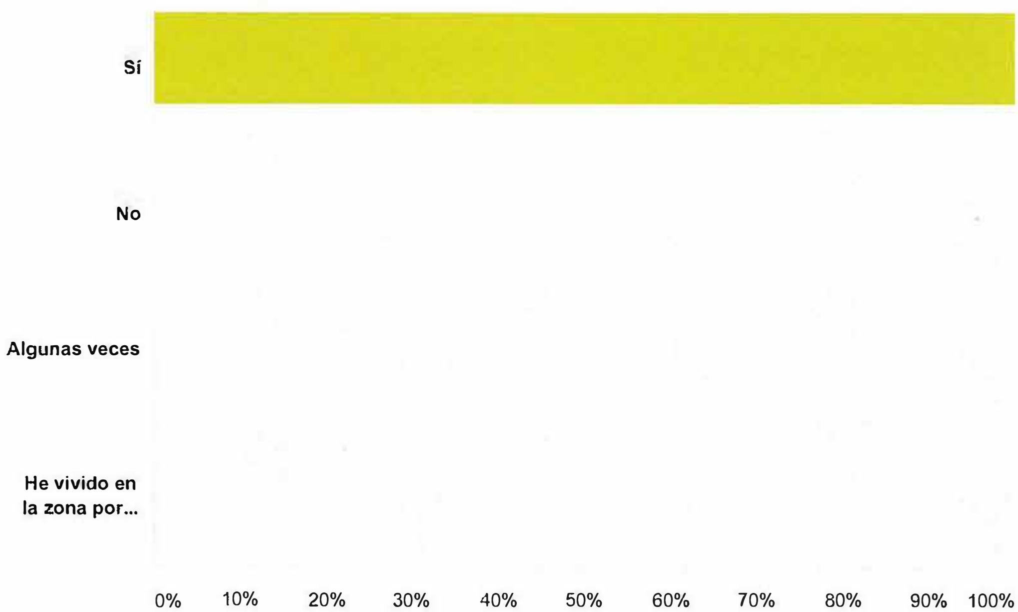
Answered: 2 Skipped: 2,178



Answer Choices	Responses	
Sí	0.00%	0
No	50.00%	1
Algunas veces	0.00%	0
Solo durante las horas de más tránsito	50.00%	1
Total		2

Q28 ¿Ha cambiado su tiempo promedio de viaje entre Sumner y Orting durante los últimos cinco años?

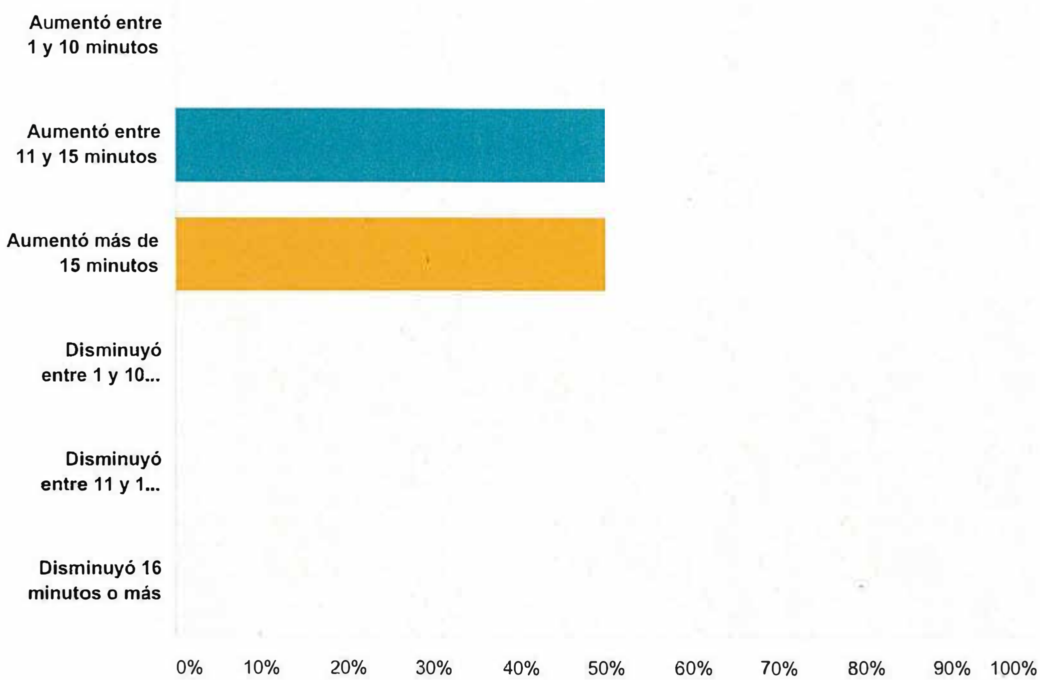
Answered: 2 Skipped: 2,178



Answer Choices	Responses	
Sí	100.00%	2
No	0.00%	0
Algunas veces	0.00%	0
He vivido en la zona por menos de cinco años	0.00%	0
Total		2

Q29 Elija la opción que describa mejor cómo ha cambiado su tiempo de viaje durante los últimos cinco años en la SR 162 entre Sumner y Orting.

Answered: 2   Skipped: 2.178



Answer Choices	Responses	
Aumentó entre 1 y 10 minutos	0.00%	0
Aumentó entre 11 y 15 minutos	50.00%	1
Aumentó más de 15 minutos	50.00%	1
Disminuyó entre 1 y 10 minutos	0.00%	0
Disminuyó entre 11 y 15 minutos	0.00%	0
Disminuyó 16 minutos o más	0.00%	0
Total		**2**

Q30 ¿Qué cambios le gustaría que se hicieran en la SR 162 entre Sumner y Orting durante los próximos 10 años?

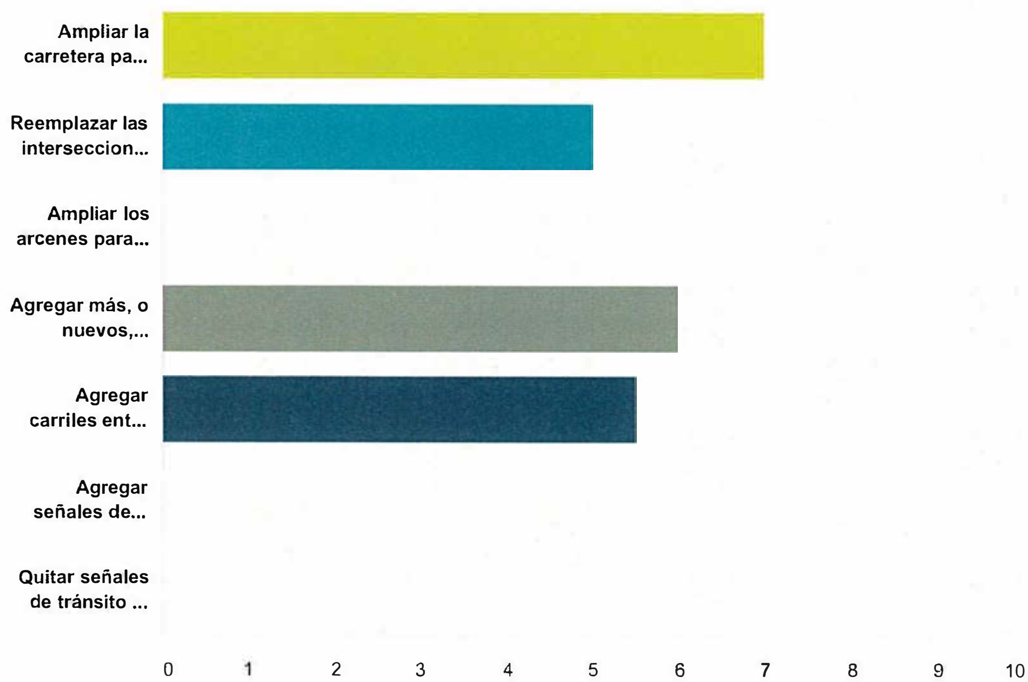
Answered. 2 Skipped· 2,178

Q31 ¿Qué cambios le gustaría que se hicieran en las calles laterales que conectan la SR 162 entre Sumner y Orting durante los próximos 10 años?

Answered: 2 Skipped: 2.178

Q32 Algunas personas le han solicitado a WSDOT que agregue más carriles generales a la SR 162 entre Sumner y Orting. Si no se implementa esa opción, ¿qué otras opciones serían útiles para facilitar el tránsito en el corredor? Califique tres opciones a continuación y asígnele el N.° 1 a su opción principal.

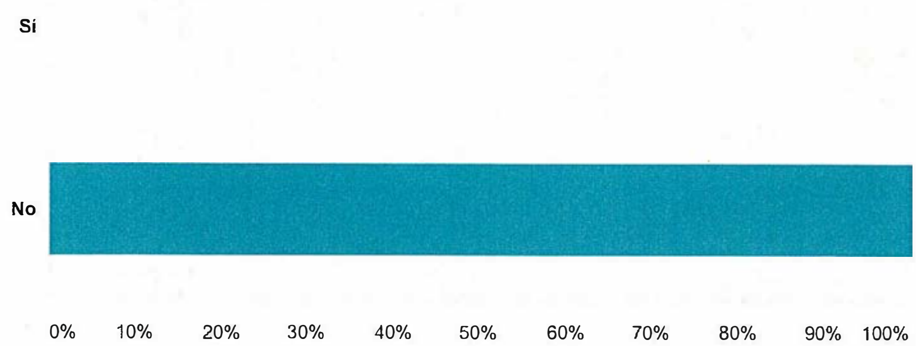
Answered: 2 Skipped: 2,178



	1	2	3	4	5	6	7	Total	Score
Ampliar la carretera para agregar solamente carriles para transporte colectivo	100.00% 2	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	2	7.00
Reemplazar las intersecciones clave con rotondas.	0.00% 0	0.00% 0	100.00% 1	0.00% 0	0.00% 0	0.00% 0	0.00% 0	1	5.00
Ampliar los arcenes para más uso de bicicletas o de transeúntes	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Agregar más, o nuevos, carriles de cruce hacia/desde la SR 162 en las calles laterales	0.00% 0	100.00% 1	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	1	6.00
Agregar carriles entre las intersecciones señalizadas	0.00% 0	50.00% 1	50.00% 1	0.00% 0	0.00% 0	0.00% 0	0.00% 0	2	5.50
Agregar señales de tránsito en más intersecciones	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Quitar señales de tránsito de algunas intersecciones existentes	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00

Q33 ¿Posee usted un comercio en la SR 162 entre Sumner y Orting?

Answered: 2 Skipped: 2,178



Answer Choices	Responses	
Sí	0.00%	0
No	100.00%	2
Total		**2**

Q34 ¿Ha efectuado cambios en sus actividades comerciales debido al tránsito durante los últimos cinco años?

Answered: 0 Skipped: 2,180

No matching responses.

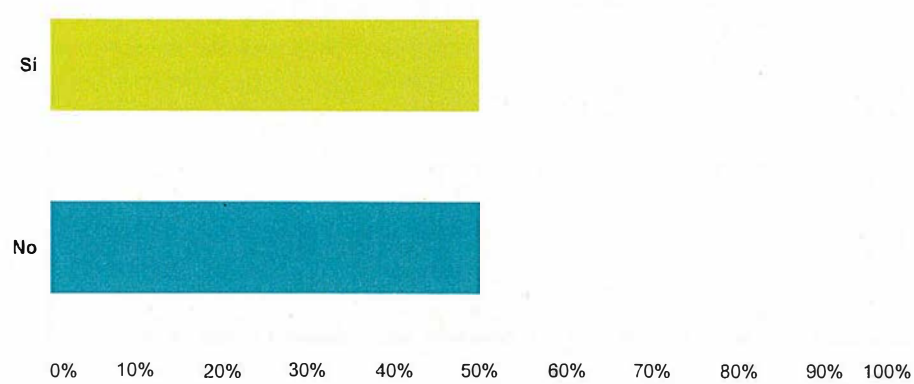
Answer Choices	Responses	
Sí	0.00%	0
No	0.00%	0
Total		**0**

Q35 Explique qué cambios ha efectuado en sus actividades comerciales debido a las condiciones del tránsito durante los últimos cinco años.

Answered: 0 Skipped: 2.180

Q36 ¿Trabaja usted en un comercio ubicado en la SR 162 entre Sumner y Orting?

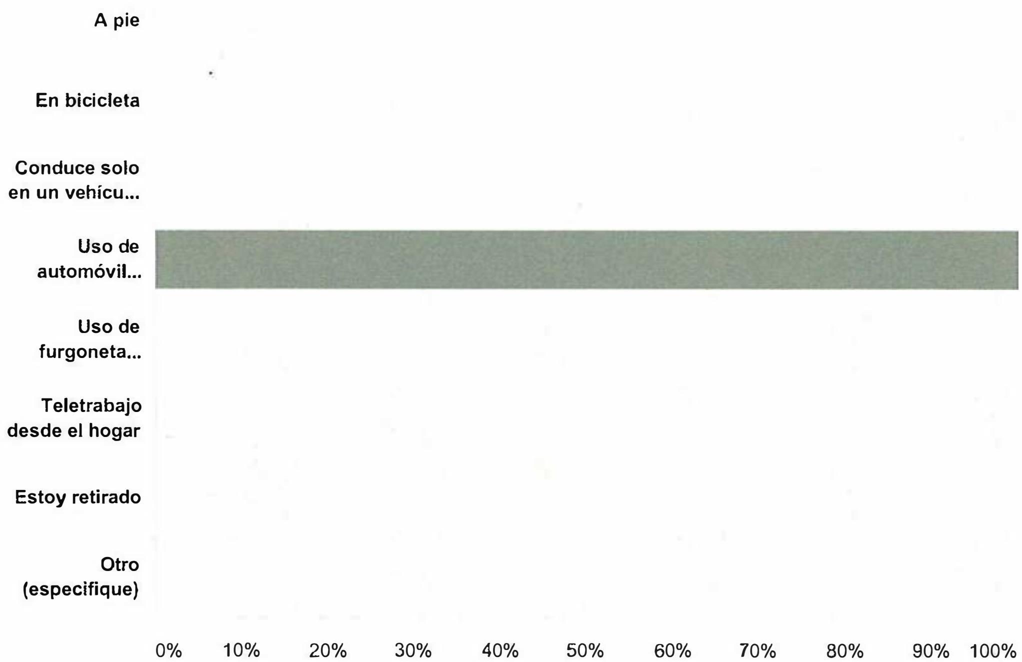
Answered: 2 Skipped: 2,178



Answer Choices	Responses	
Sí	50.00%	1
No	50.00%	1
Total		**2**

Q37 ¿Cómo viaja habitualmente al trabajo? Elija tres opciones como máximo.

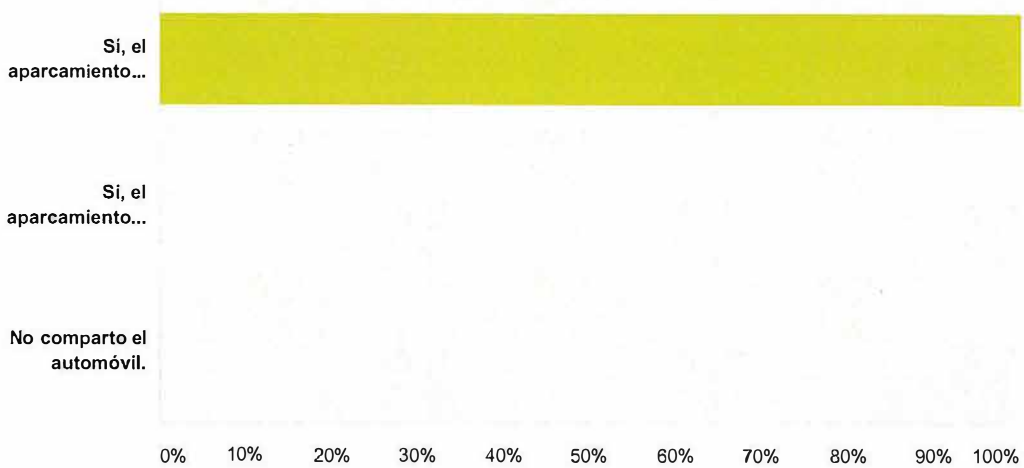
Answered: 2 Skipped: 2,178



Answer Choices	Responses	
A pie	0.00%	0
En bicicleta	0.00%	0
Conduce solo en un vehículo personal	0.00%	0
Uso de automóvil compartido	100.00%	2
Uso de furgoneta compartida	0.00%	0
Teletrabajo desde el hogar	0.00%	0
Estoy retirado	0.00%	0
Otro (especifique)	0.00%	0
Total		2

Q38 Si comparte el automóvil para viajar al trabajo, ¿usa usted los aparcamientos periféricos de Sumner o Puyallup Sounder?

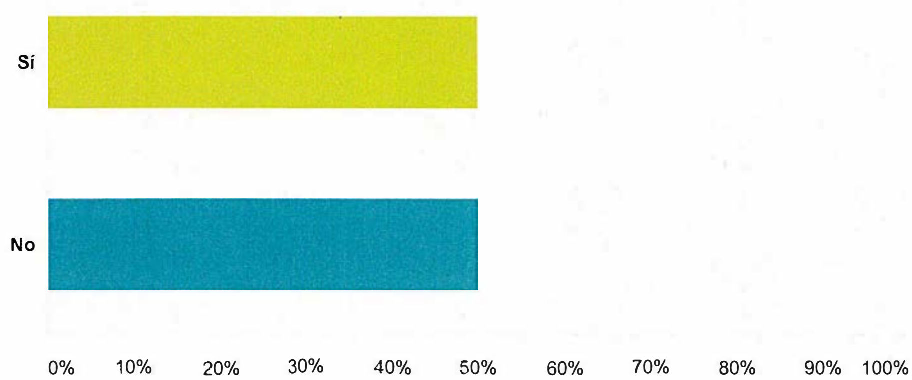
Answered: 2 Skipped: 2,178



Answer Choices	Responses	
Sí, el aparcamiento de Sumner	100.00%	2
Sí, el aparcamiento de Puyallup	0.00%	0
No comparto el automóvil.	0.00%	0
Total		2

Q39 ¿Alguna vez ha caminado o ido en bicicleta por la banquina de la SR 162 entre Sumner y Orting?

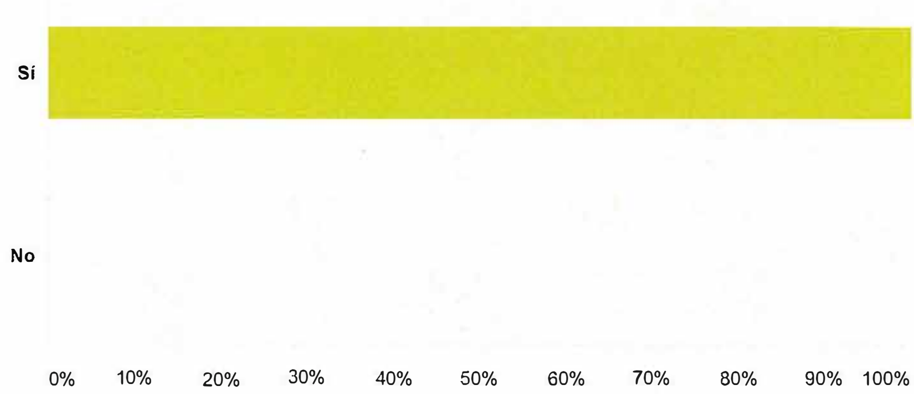
Answered: 2 Skipped: 2,178



Answer Choices	Responses	
Sí	50.00%	1
No	50.00%	1
Total		**2**

Q40 ¿Alguna vez ha caminado o ido en bicicleta por el sendero de la ladera (Foothills Trail)?

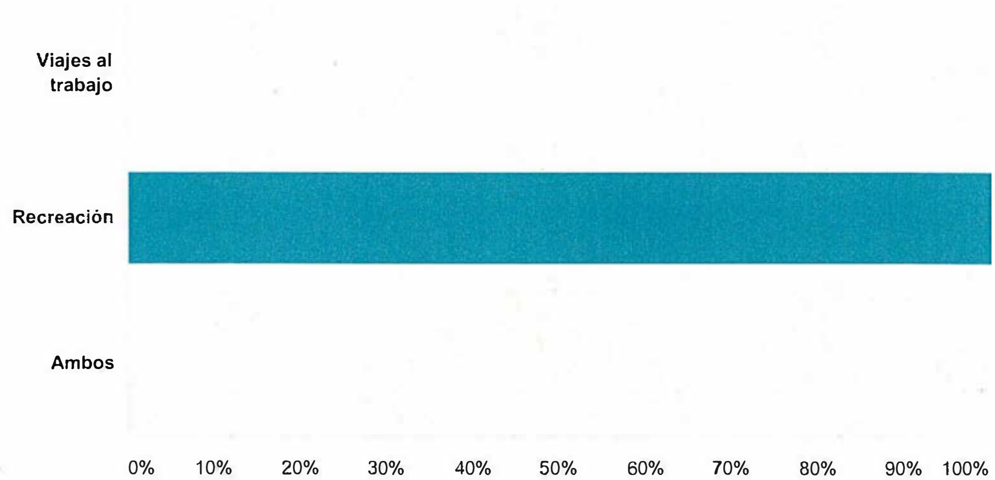
Answered: 2 Skipped: 2.178



Answer Choices	Responses	
Sí	100.00%	2
No	0.00%	0
Total		**2**

Q41 ¿Generalmente va en bicicleta o camina para ir al trabajo o con fines recreativos?

Answered: 2   Skipped: 2,178



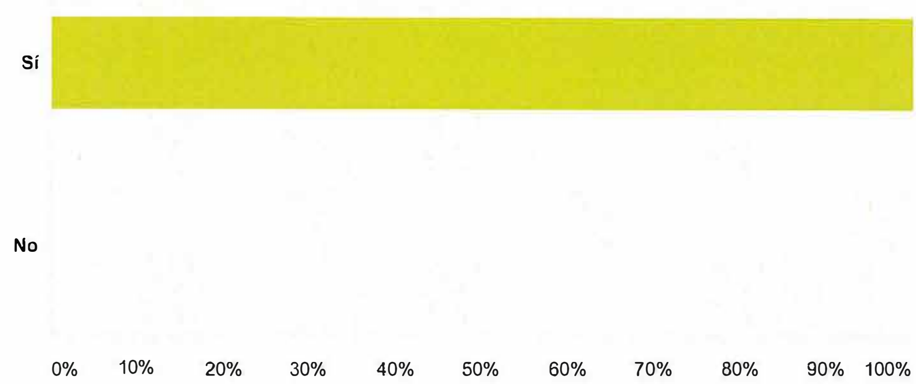
Answer Choices	Responses	
Viajes al trabajo	0.00%	0
Recreación	100.00%	2
Ambos	0.00%	0
Total		**2**

Q42 ¿Qué cambios le gustaría hacer para los transeúntes o los ciclistas en la SR 162 entre Sumner y Orting?

Answered: 2 Skipped: 2,178

Q43 Si hubiera transporte colectivo o algún otro medio de transporte público desde Sumner hasta Orting, ¿lo usaría?

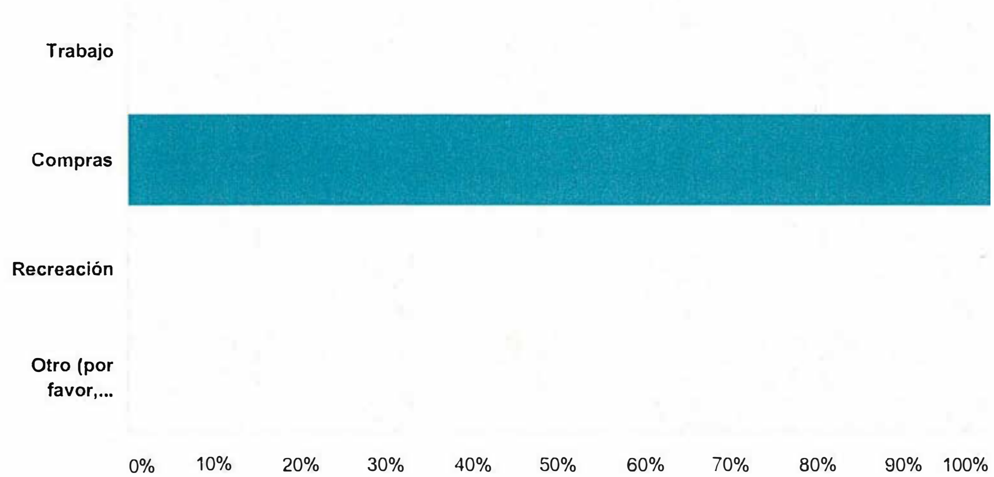
Answered: 2 Skipped: 2,178



Answer Choices	Responses	
Sí	100.00%	2
No	0.00%	0
Total		2

Q44 ¿Para qué usaría el transporte público? Elija todas las opciones que correspondan.

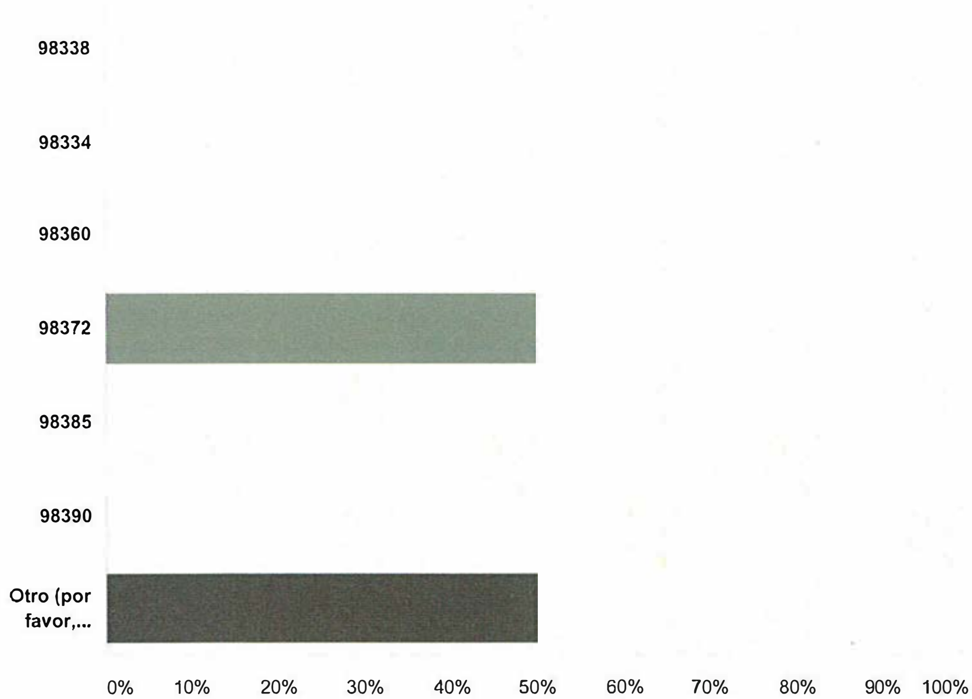
Answered: 2 Skipped: 2,178



Answer Choices	Responses	
Trabajo	0.00%	0
Compras	100.00%	2
Recreación	0.00%	0
Otro (por favor, especifique)	0.00%	0
Total		**2**

Q45 Para darnos una idea de su viaje habitual en un día de trabajo, indique el código postal de su vivienda.

Answered: 2 Skipped: 2,178



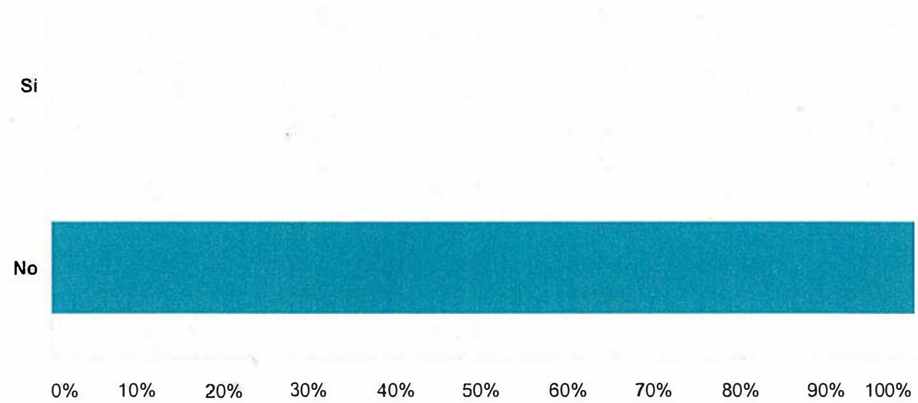
Answer Choices	Responses	
98338	0.00%	0
98334	0.00%	0
98360	0.00%	0
98372	50.00%	1
98385	0.00%	0
98390	0.00%	0
Otro (por favor, especifique)	50.00%	1
Total		2

Q46 ¿Nos faltó hacerle alguna otra pregunta? Por favor, escriba cualquier otra opinión o comentario adicional sobre la SR 162 entre Sumner y Orting.

Answered: 1 Skipped: 2.179

Q47 ¿Puede el WSDOT ponerse en contacto con usted para hacerle otras preguntas?

Answered: 2 Skipped: 2,178



Answer Choices	Responses	
Sí	0.00%	0
No	100.00%	2
Total		**2**

Q48 Please provide the below contact information. Por favor, facilite la siguiente información de contacto.

Answered: 908 Skipped: 1 272

Answer Choices	Responses	
Name (Nombre)	99.34%	902
Company	0.00%	0
Address	0.00%	0
Address 2	0.00%	0
City/Town	0.00%	0
State/Province	0.00%	0
ZIP/Postal Code	0.00%	0
Country	0.00%	0
Email Address (Dirección de correo electrónico)	97.03%	881
Phone Number (Número telefónico)	83.26%	756

APPENDIX E

Stakeholder Meeting Summaries

SR 162 Sumner to Orting Corridor Study

Stakeholder Committee Meeting #1

Thursday, June 30, 2016
9:00 a.m. to 12 noon
Orting Public Safety Building, 401 Washington Avenue

Attendees

Jason Sullivan, City of Bonney Lake	WSDOT
Mark Bethune, City of Orting	Dennis Engel, Olympic Region Planning
Nicola McDonald, City of Orting	Nazmul Alam, Olympic Region Planning
Eric Mendenhall, City of Sumner	T.J. Nedrow, Olympic Region Planning
Rory Grindley, Pierce County	Yvette Liufau, Olympic Region Planning
Jesse Hamashima, Pierce County	Joseph Perez, Olympic Region Traffic
Jason Kennedy, Pierce Transit	Janarthanan, Natarajan, Headquarters TDGO
Eric Chipps, Sound Transit	Ming-Bang Shyu, Headquarters TDGO
Scott Jones, Tehaleh by Newland Communities	Kent Kalisch, Headquarters Design
Tom Uren, Tehaleh by Newland Communities	Rachael Katz, Hqtrs. Multimodal Planning
Shawn Bunney, Concerned Citizen	

Welcome/Introductions

WSDOT's Olympic Region Planning Manager, Dennis Engel gave a brief overview of the study. He commented that the last study conducted by WSDOT in this area was completed in 1997. Since that time, a lot of development has occurred and is still occurring along SR 162.

This study is currently funded as part of the Connecting Washington Projects package approved by the Legislature on June 28, 2015. A total of $450,000 was allocated over the 2015-2017 and 2017-2019 biennium.

By way of the agency's Practical Design policies the study process will offer a ranked listing of improvement concepts. The concepts, or furthermore referred to as solutions can then become the identified list of opportunities suggesting funding the design and construction project solutions. The study solution limits will essentially be from the SR 410 interchange to the north Orting City limits. We are look to have the study completed in spring of 2017.

Agenda Review

WSDOT's Study Lead T.J. Nedrow reviewed the agenda with the group. He noted that today's meeting will give stakeholders a general overview of the study. T.J. expressed the importance of bringing the committee to agreement at key points throughout the study process.

Study Details

T.J. described the study limits as covering an 8.11-mile section of SR 162 from the SR 410 interchange in Sumner to Williams Boulevard in Orting. He also referenced the study's stakeholders list. T.J. asked the group if WSDOT had captured all of the stakeholders. Are there any persons or groups missing?

The following stakeholders were invited to participate in the SR 162 study:

- City of Orting
- City of Sumner
- City of Bonney Lake
- Pierce County
- Pierce Transit
- Sound Transit
- Confederated Tribes & Bands of the Yakama Nation
- Nisqually Indian Tribe
- Puyallup Tribe of Indians
- Squaxin Island Tribe
- Muckleshoot Indian Tribe
- Puget Sound Regional Council
- Tehaleh/Newland Communities
- WSDOT

The group concurred that the appropriate stakeholders are at the table. T.J. is committed to following-up with those individuals not in attendance at each meeting. He also noted that staff will capture concerns and expectations from the following groups under a different venue:

- Foothills Trail Coalition
- Tacoma Washington Bicycle Club
- ForeverGreen Council
- Public Safety Agencies
- Local School Districts

T.J. then presented the study goal, and objectives for the group's consideration. After a short discussion, the group settled on the following versions:

> <u>*Goal*</u>
>
> *The study will identify ranked strategies that address corridor improvements which result in improved travel-time, predictability and the safe operation of the SR 162 corridor from Sumner to Orting.*
>
> <u>*Objectives*</u>
>
> *The study will engage partners, transportation service providers, and the communities to develop a plan that will:*
>
> - *Provide a safe and efficient transportation corridor that enhances the mobility and connectivity within the corridor;*
> - *Provide an appropriate balance between the different users (through mobility and local access) along the corridor;*
> - *Identify ranked near-term, mid-term and long-term improvement strategies for the corridor that include operational improvements and demand management strategies;*
> - *Ensure strategies provide safe alternative modes of transportation;*
> - *Ensure the strategies are compatible with existing land use and transportation plans*

Study Assumptions

T.J. commented that WSDOT will be looking at a variety of strategies to improve congestion in the SR 162 corridor. WSDOT will work with stakeholders on a ranked list of strategies.

For the study analysis, the 2015 Pierce County Model will be used. WSDOT is currently working with Pierce County modelers on additional assumptions and other aspects relating to the model. T.J. thanked Pierce County staff for offering the use of their model for the study.

Study Documents

Stakeholders received a copy of the Study Management Plan for their review and reference. This document incorporates a multitude of items as a one stop shop format of guidance. This plan features a Communication Plan, Study Charter, Schedule, and the link to the SR 162 study webpage and its content. T.J. walked the group through the study schedule further emphasizing the spring 2017 completion period. Next he directed their attention to the study's webpage and the study information available. He then encouraged the stakeholders to take the Study Management Plan back to their respective agencies and share it.

Community Engagement Effort

T.J. described the variety of community engagement tools that would be utilized in the study process. WSDOT will engage the Stakeholder Committee through meetings and communications; local leaders, and elected officials will be regularly briefed on the study as it progresses so that there are no surprises; social media such as Facebook and Twitter will be utilized to get the word out and to encourage public input through online surveys; and citizens will be able to obtain study information by email, phone, public meetings, and via the study's webpage. As means to invite participation in an online survey, WSDOT will also send out by mail, a postcard to nearby residents along the SR 162 corridor. The group was made aware of the intended targeted mail routes within specific zip codes in the study area that will receive a postal customer mailer. Stakeholders will also be emailed an electronic link to the survey and postcard announcement to be forwarded on to interested participants.

Online surveys have proven successful in gathering input with past WSDOT projects. Dennis Engel expressed excitement to implement this communications tool for the study citing the great response and information gathered. The draft survey questions were distributed to the group for their review and reference. Pierce Transit expressed interest in expanding the survey to also collect the ridership and needs for the area. The survey will be available on the internet for a two-week period. T.J. requested that the group email comments and edits for consideration to him by July 8th. The survey will then be finalized and posted.

The Postal Customer Mailer will be sent to 11.025 community members along SR 162 in the following zip code areas:

98344 (Kapowsin) 1,707 P.O. Boxes

98360 (Orting) 3,798 Postal Customers

98372 (Edgewood/N. Puyallup) 789 Postal Customers

98374 (South Hill/Alderton) 1,740 Postal Customers

98390 (Sumner) 2,695 Postal Customers

98391 (Bonney Lake) 296 Postal Customers

T.J. will follow-up with the Bonney Lake representative who had several questions relating to the distribution of the survey.

WSDOT requested stakeholders' assistance with getting the word out. WSDOT will email a link to the electronic survey and postcard announcement. Stakeholders are asked to forward this link to your contacts and other interested parties. The survey link will also be available from the SR 162 study webpage.

WSDOT Corridor Sketch Initiative

Study Team member Nazmul Alam gave an overview of the Corridor Sketch Initiative. He relayed that The Corridor Sketch Initiative is one way the Washington State Department of Transportation (WSDOT) is implementing Practical Solutions at the corridor level. It is also a new way for the WSDOT to work jointly with partners to capture and document consistent baseline information about each transportation corridor around the state in order to inform future investment decisions.

Nazmul also explained that the Corridor Sketch Initiative is being implemented in two phases. WSDOT has just completed the first phase in collaboration with our partners, i.e. cities, counties tribes, transit and planning organizations.

In Pierce County, WSDOT held two workshops on January 22 and 25 of this year to discuss and gather input on corridors within Pierce County. Many of you participated in those workshops. With your help, we have completed all of the corridors within the Olympic Region, and now have SR 162 Corridor Sketch to build on for this study.

He then demonstrated what WSDOT has done with the information you provided at these workshops. Nazmul showed examples of the SR 162 Corridor Sketch Field Report and the supporting data report to give members an idea of what kind of information is included in the database.

Nazmul relayed that we are building on the work that we have done together and the baseline information that we have. WSDOT has begun Phase II, the development of strategies for the corridor.

Existing Conditions

Ming-Bang Shyu, WSDOT's modeler presented existing traffic conditions along the SR 162 corridor. Pierce County's 2015 travel demand forecast model will be used in the study. The study years for the analysis are:

- 2015 base year,
- 2020 and 2025 interim years and
- 2035 horizon year.

The study periods are 6:00 to 9:00 in the AM peak period and 3:00 to 6:00 in the PM peak period.

Ming reviewed the methods and assumptions for validating the existing conditions with the group. Ming commented that once the validation is complete, the next step is to complete the demand modeling for future study years as well as traffic operation analysis and simulation. In conducting the traffic operations analysis, the study will use Synchro and the study years will be 2015, 2020, 2025, and 2035. The study periods will be 6:00 to 7:00 for the AM peak hour and 4:00 to 5:00 for the PM peak hours.

The traffic operation analysis will focus on 11 intersections and look at the overall intersection level of service. Another performance measure that we will conduct is travel time. Ming also discussed the existing daily volumes on the corridor with the highest volumes being slightly above 1800 vehicles in both directions. The average travel time during the AM peak hour was:

AM Peak Hour Travel Time

- 10.1 minutes in the southbound direction from Meade McCumber Rd. E. to Lane Blvd. NW.
- 11.9 minutes in the northbound direction from Lane Blvd. NW. to Meade McCumber Rd. E.

PM Peak Hour Travel Time

- 17.1 minutes average travel time southbound from Meade McCumber Rd. E. to Lane Blvd NW
- 11.5 minutes average travel time northbound from Lane Blvd. NW. to Meade McCumber Rd. E.

Crash History from Jan 2011 to Dec 2015

T.J. presented a high level look at the crash history in the corridor. Crash history from January 2011 to December 2015 entailed the following:

- 409 total crashed
- No fatalities
- 282 (73%) rear-end type crashes
- 4 serious injury type crashes
- Inattention, speeding and following too closely were the most common contributing factors.
- Most intersection related crashes occurred at Pioneer Way E. with vehicle heading northbound.

Crash Data Disclaimer

Under 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.

What isn't working well in the SR 162 corridor?

T.J. facilitated a discussion asking the stakeholders to identify what is working and what is not working well in the SR 162 corridor.

What isn't working well in the SR 162 corridor?

- Turn lanes are insufficient.
- Non-existent shoulders in some areas.
- Intersection at 128th St. E. in the PM peak hour backs-up to the Puyallup River Bridge.
- SR 410/SR 162 Interchange isn't working well.
- SR 167 HOV doesn't extend south enough and affects SR 162.
- SR 167 back-ups are backing up onto SR 162.
- Single occupant drivers traveling to the train station in Sumner use SR 162.
- Travelers experience congestion to parking facilities/need park and ride facilities on SR 162.
- Timing of the 3 signals on SR 162 from Pioneer to SR 410 (Pioneer, River Grove and SR 410).
- Crashes shut down the highway north and south directions.
- Emergency management and lifeline for the area is SR 162.
- Transit opportunities on the corridor and how can we use it better.
- Existing traffic impacts on SR 162 extends to local City of Sumner streets.
- Trail connectivity doesn't extend far enough north or to Bonney Lake.
- Dependable travel time from Orting to Sumner in both directions.
- Seasonal and holiday congestion along SR 162. Parking on shoulders occurs in the area where the trail is present.
- Congestion affects farmers and access to their fields.
- Lack of access to transit. Corridor is outside of the Pierce Transit service area.
- School buses stopping on SR 162 to pick-up/drop-off kids.

What is working well in the SR 162 corridor?

- New bridge on SR 162 is working well.
- Foothills Trail allows for bicycles and pedestrian connections along the corridor.

Draft Purpose and Need Discussion

T.J. led the discussion on the draft purpose and need statements. The stakeholders recommended changes to both the purpose and need statements which were incorporated. The finalized purpose and need statements follow:

> *The purpose of the study is to identify ranked strategies that increase mobility by reducing delay for all users of the corridor, while maintaining or improving the safe operation of the highway.*
>
> *The need exists to address current and future congestion on the corridor and at signalized intersections, most pronounced during the peak commute periods, imposing delays and inconvenience for motorized travelers that creates challenges, and may have a significant impact on reliability and mobility at certain times of day.*

Corridor Vision Discussion

T.J. presented the draft corridor vision for review. After a brief discussion, the corridor vision was finalized as follows:

> *Corridor Vision*
>
> *Actively preserve the essence and character of the Orting and Sumner Valley while managing corridor performance that supports the local communities and the traveling public.*

Next Steps

T.J. outlined the next steps for the study. The group noted their gratefulness for the study because it puts the SR 162 roadway issues back in the spotlight. The stakeholders also relayed how excited they are about the opportunity for collaborating together to discuss corridor issues.

July will conclude the elected officials study introduction. The next Stakeholder Committee meeting is scheduled for 9:00 a.m. on July 27th in Sumner. The specific meeting location is yet to be determined. T.J. closed with a reminder that any comments regarding the Online Survey are due to staff by July 8th.

SR 162 Sumner to Orting Corridor Study

Stakeholder Committee Meeting #2

Wednesday, July 27, 2016
9:00 a.m. to 12 noon
Sumner City Hall, 1104 Maple Street, Sumner

Attendees Signed In

Jason Sullivan, City of Bonney Lake	<u>WSDOT</u>
Mark Bethune, City of Orting	Dennis Engel, Olympic Region Planning
Eric Mendenhall, City of Sumner	Nazmul Alam, Olympic Region Planning
Rory Grindley, Pierce County	T.J. Nedrow, Olympic Region Planning
Jesse Hamashima, Pierce County	Yvette Liufau, Olympic Region Planning
Sean Ardussi, Puget Sound Regional Council	Joseph Perez, Olympic Region Traffic
Jason Kennedy, Pierce Transit	Janarthanan, Natarajan, Headquarters TDGO
Eric Chipps, Sound Transit	Ming-Bang Shyu, Headquarters TDGO
Tom Uren, Tehaleh/Newland Communities	Rachael Katz, Headquarters Multimodal Planning

Welcome/Introductions

Eric Mendenhall with the City of Sumner welcomed everyone. WSDOT Olympic Region's Planning Manager, Dennis Engel led the introductions around the table and pointed out the main purpose of the meeting today is to gather brainstormed ideas for improving SR 162. Dennis mentioned the study survey is now online and the survey postcards have been mailed out. WSDOT's Study Lead T.J. Nedrow reviewed the meeting agenda with the group.

Study Progress Update

Referring to the meeting summary sent out by email on the 25th T.J. Nedrow provided a recap of the previous stakeholder committee meeting in June. As a reminder, the Study Management Plan will be used throughout the study and spells out the procedures and responsibilities of the stakeholder members. He briefly summarized the study corridor and expected outcome by describing SR 162 as an important north-south link for the Orting and Sumner communities as well as the surrounding areas of southeast Pierce County. The challenge of the study will be to recommend suitable strategies along the 8.11-mile segment of SR 162 that will meet current and future travel needs. The end result will be a study report identifying a ranked list of strategies for a 20-year vision.

T.J. reviewed with the committee members the Study Goals, the Corridor Vision, Study Objectives, the Purpose and Need Statement and the Study Assumptions which were discussed and agreed upon at the previous June 30th stakeholder committee meeting. The committee reviewed the information and had no further comments.

T.J. reviewed the Study Assumptions information with the group. A suggestion was made to add the year 2015 to the bullet stating "Pierce County Model will be used for modeling effort" to further clarify the model being used in the data analysis. Ming-Bang Shyu of WSDOT's Transportation Data & GIS Office explained the 2015 and 2030 Pierce County model is being used. After a brief discussion no changes were approved.

The Community Engagement portion of the SR 162 Corridor Study effort, as T.J. explained, is well underway. Briefings to provide elected officials with information about the study have been conducted and additional briefings to update officials on the study's progress will be scheduled around September 2016. The online survey to collect public input and comments about SR 162 was made available on July 25th and 150 responses have already been received. The WSDOT Olympic Region Communications Office has and will announce the survey through social media feeds and sent out information to media outlets, and local homeowner associations and veterans groups. T.J. explained to the committee that the next phased notification effort about the survey will be through Facebook and Twitter. He also encouraged the stakeholder committee to add the link to the survey onto their blogs and/or websites and to forward the survey information to others who are interested in the study. The online survey will close on August 19th, and a summary of the responses will be provided to the stakeholder committee. Jesse Hamashima of Pierce County asked if the survey response information would include where respondents live. T.J. explained the survey allows respondents to choose the zip code they live in.

Traffic Conditions – Existing & Future

Ming-Bang Shyu, WSDOT Transportation Data, GIS & Modeling Office provided a recap of information about the study's Travel Demand Model. The study years used in the analysis are 2015, 2020, 2025 and 2035, and the study periods for travel demand modeling are 6:00 to 9:00 in the AM peak period and 3:00 to 6:00 in the PM peak period. The 2015 model validation results show they meet the criteria and measures in 85% to 87% of the cases for both AM and PM peak periods.

Ming explained the land use data that's being used in the model was interpolated based on Pierce County's 2015 and 2030 land use data. The anticipated development of the Tehaleh community (specifically the Alternative 3 version) was assumed to be an additional 9,800 households and 10,300 jobs in Year 2035. The question was asked about whether additional new developments such as the Plateau 465 community have been included in the data. Ming mentioned other new developments that were included in the County's recently updated comprehensive plan have been included in the modal analysis. Additional questions were asked about the employment growth assumptions and whether the growth numbers being used is the highest growth scenario.

Ming explained the growth numbers being used were the result of discussions between WSDOT and Pierce County staff. He will check the model to verify the land use data includes new developments as part of the growth rate and send out an email to inform the group.

After the meeting, Ming confirmed with the County that their model has assumed 500 housing units and zero employment for the Plateau 465 community for the Year 2030 based on the direction from the County Planning and Land Service Division. The 500 housing units were carried over and extrapolated with the estimated growth rates to Year 2035 model.

The base year travel time model during both the AM and PM peak periods meets the targets, however the data shows significant growth between the years 2025 and 2035. A suggestion from the committee was made that future maps include landmarks to make it easier for members to orient themselves with locations of concern. The AM peak period demand to capacity ratio showed that by 2035 in the northbound direction between 128th St. E. and the SR 410 interchange, the V/C (volume to capacity) ratio is greater than 0.8 and 1.0. In the PM peak period, the V/C ratio showed that between 2025 and 2035 in the southbound direction is greater than 0.8 and 1.0 mostly from 128th St. E. north to the SR 410 interchange. The question was raised whether an LOS D threshold should be used as the baseline. Ming mentioned LOS D was based on the maximum service volume for two-lane undivided signalized arterial. Ming explained the average of 10 runs from SimTraffic simulation were used to compare against the observed travel time. The validation results showed the difference between the two is within the 15% criteria and the model is validated. Ming presented the intersection LOS results. There were 11 intersections, mostly signalized, that were analyzed. In the current year of the AM peak hour, there doesn't seem to be much congestion, except at SR 162 and SR 410 eastbound ramp which shows LOS F. In the year 2025 there are four intersections showing LOS F and in 2035 the majority of intersections are at LOS F. In the PM peak hour the current year shows four intersections with LOS F and in 2020, 2025 and 2035 the majority of the 11 intersections are at LOS F. In the PM peak hour the intersections of Rivergrove Dr. E. Pioneer Way E., Military Rd. and 128th St. E. are showing LOS F during all four years.

Travel time was measured between Meade McCumber Rd. E. and Lane Blvd. using SimTraffic software. The results showed that the southbound traffic in the AM and PM periods are congested in Year 2035 and mostly due to the volume of traffic making left turns at 128th Street. Further analysis of arterial travel time reliability showed both northbound and southbound directions the travel time index, which is the ratio of peak hour travel time to free flow travel time, would be higher than the reliability threshold 1.5. The key findings are the critical locations to focus on are 128th St. E. and Military Rd. In concluding, Ming mentioned the possibility of making adjustments to the signal timing as needed in the analysis of future scenarios. Adjusting (or optimizing) signal timing including timing splits and cycles (with the same hardware) to better serve the future demand will be applied along with the proposed strategies for all other future scenario runs.

Considerations, Challenges and Opportunities

T.J. Nedrow presented a summary of elements that comprise the considerations, challenges and opportunities that are presented in this study. The Legislature has outlined the geographical limits of the study. He explained that the guiding documents which will drive the agreed upon strategies for the study are the goals, corridor vision, the study objectives, purpose and need and the assumptions. The study will take into consideration the expectations of the community as well as the greater Pierce County region when considering the screening criteria.

WSDOT, T.J. mentioned, will follow the practical solutions approach to recommending strategies that provide the greater value and opportunity for corridor improvement. The safety of the traveler is important and Target Zero strategies will be taken into consideration. The study will incorporate elements that promote and improve mobility, economic vitality, current technologies, events and environmental resources. T.J. noted the challenges facing the study as being funding constraints, future growth forecasting, access management, topography, environmental concerns, maintaining the local area vision and time constraints. He mentioned the study is an opportunity to engage the community in identifying meaningful strategies to carry forward, address local and regional needs, encourage practical solution approaches, partner onto other improvement opportunities, encourage other funding sources and involve other resource agencies.

Screening Criteria & Ranking Methodologies

WSDOT Olympic Region's Nazmul Alam gave an overview of the process of compiling a list of ideas, developing the screening criteria and ranking methodologies. Ideas and improvement strategies are compiled from brainstorming sessions, public input, plans, studies and other sources. The study team typically will perform a screening analysis of the ideas to identify strategies that can be further evaluated and screened. Nazmul mentioned sometimes the screening can be as simple as determining if the idea is reasonable or if it meets the study purpose and need, vision and goals.

After the initial screening, the study team will conduct further evaluation to be used in a more detailed screening process. Nazmul presented to the group the screening process that will be used in the study. The study team will conduct an initial screening of the brainstormed ideas generated during the meeting, public input through online survey, and from other sources, and present the results at the next stakeholder committee meeting in August. During the August meeting the team will conduct a detailed screening with the committee. Some of the detailed screening will include discussions about mobility, safety and feasibility.

Following the third stakeholder committee meeting, the study team will conduct further analysis of the remaining strategies and generate information that will be used in the scoring/ranking process. At meeting #4, the screening results will be presented as an unranked list of strategies. The study team will lead the stakeholder committee in an exercise to create a ranked list of strategies.

A fifth and final stakeholder committee meeting will be held to discuss the recommended ranked strategies. A question was asked whether the next stakeholder meeting will include information about the results of the online survey. T.J. Nedrow responded that the study team will to the extent feasible share the survey results with the committee.

Brainstorming Exercise

T.J. Nedrow presented the list of what was not working well on SR 162 that was created during the June 30th stakeholder committee meeting. The group took the opportunity to review and clarify the bulleted list. The result of the committee's discussion is the following revised list:

- (Many Signalized Intersection) Turn lanes are missing left turn lanes with enough storage length to accommodate traffic volume.
- (Deficient Shoulder widths in portions of the corridor) Nonexistent shoulders in some areas
- (Significant PM queues) at the intersection at 128th St. E.
- SR 410/SR 162 Interchange (Ramps are not operating well during AM & PM peak periods)
- SR 167 (NB) HOV doesn't extend south enough and affects SR 162 (westbound AM travel)
- SR 167 (NB AM) backups are backing up onto SR 162. Traffic diverts off SR 167 and onto SR 162 in Sumner vicinity.
- Too many single occupant drivers travelling from Orting to the Sumner train station use SR 162. Prefer to see more transit available.
- Travelers experience congestion resulting from (agricultural event) parking on highway shoulders (need park and ride facilities)
- Signal (coordination) timing of the 3 signals on SR 162 from Pioneer Way E. to SR 410 (Pioneer Way, River Grove Dr. E. and SR 410)
- Crashes shut down the highway. Need for better coordination.
- Significant intersection related crashes occurred at Pioneer Way E. intersection (Northbound)

T.J. led the committee through a brainstorming exercise listing the following ideas of what could be done to improve the SR 162 corridor:

- Improving Riverside Road and McCutcheon Road to use as an alternate route to SR 162
- Left turn channelization at SR 162
- Consider roundabouts at key locations
- Restricting left turns at unsignalized intersections to right in/right out
- Linking the Foothills Trail to the Sumner train station
- Add a park and ride lot at 128th and SR 162
- Add park and pool lots
- Opportunities to utilize park and ride lots for event parking
- Look at existing TDM along the SR 162 corridor
- HOV lanes are needed on SR 162 during peak periods

- Bus rapid transit service is needed between Orting and Sumner
- Public transit service needed on SR 162
- 3 lane configuration on SR 162
- Increase incident response along the SR 162 corridor
- ITS devices needed along the SR 162 corridor
- Train or commuter rail service needed and to include a stop at 128th St. E./SR 162
- Intersection transit queue jumps along SR 162
- Expand existing vanpool availability
- Put tolls on SR 162
- Add reversible 3rd lane in key locations or throughout the SR 162 corridor
- Use historic bridge as a 3rd lane at river crossing
- Separated bus way
- Dedicated incident turnout areas along the SR 162 corridor
- Increase law enforcement presence along the SR 162 corridor
- SR 162/SR 410 interchange overpass to increase capacity
- Adequate shoulders for bicyclists, vehicle breakdowns and transit
- 3 lanes with transit in middle lane
- Reduce Tehaleh growth based on employment growth
- Constrain development
- Improve pedestrian and bicycle access into Sumner
- Increase bicycle storage at Sumner train station
- Implementing 1997 Route Development Plan improvements
- Assure that roadway facilities are provided along with development proposals
- Potential state policy changes to make it easier for cities to join back into Pierce Transit's benefit area
- Consider formation of transportation benefit or transit district

In consideration of the brainstorming improvements T.J. presented to the committee some of the major recommendations from WSDOT's 1997 SR 162/SR 410 to Junction SR 162 Route Development Plan (RDP). Those recommendations included

- Widen SR 162 from SR 410 to Pioneer Way E. near South Sumner as a five lane roadway
- From Pioneer to 144th St. E. near Orting, this section should be widened to a four lane highway with median barrier used to separate opposing direction of travel. Selected intersections in this segment would remain accessible to left turns and possible U-turns.
- Highway access management (befitting the corridor operation should be considered)
- Between 144th (E. MP 7.17) and Whitesell St. (MP 9.34) in Orting, the RDP recommends widening SR 162 similar to the five lane roadway SR 410 to 114th St. E. Either a center two-way left-turn (if warranted) or raised islands should be used as a median treatment in this section of SR 162.
- Park and Ride lots; the route would benefit from such facilities.
- The Route Development Plan also called for increased emphasis and infrastructure improvement in the area of Transportation Demand Management (TDM) i.e. carpool/vanpools, walking and bicycling, and public transportation (Express Bus)

He also emphasized other areas that WSDOT plans to focus on; Demand Management strategies such as real time notifications to inform travelers of road and travel conditions, modal improvements and park and ride facilities will be reviewed and analyzed. The committee was reminded that the study team will also consider transit and rail improvement opportunities, highway safety improvements, and mobility opportunities in the strategy building process.

Schedule Review and Next Steps

T.J. reviewed with the committee the study schedule and outlined the next steps will be to provide the results of the online survey, present the initial screening results and discuss the strategies that will be further analyzed. Dennis Engel, WSDOT's Planning Manager mentioned the study team will determine the possibility of having two public information sharing meetings instead of one and let the committee know. The next Stakeholder Committee meeting was scheduled for 9:00 a.m. on August 25th at the City Hall in Sumner.

Recap / Actions

The committee was thanked for their efforts and participation today. The study team will be creating an initial screening of the items raised in the brainstorming exercise, and captured in the online survey effort. T.J. reminded the stakeholder committee that the brainstormed list of ideas that was developed will be sent out by email to the committee. Any comments, revisions or additional ideas should be emailed to T.J. by August 2.

SR 162 Sumner to Orting Corridor Study

Stakeholder Committee Meeting #3

Thursday, August 25, 2016

9:00 a.m. to 12 noon

Sumner City Hall, 1104 Maple Street, Sumner

Attendees

Jason Sullivan, City of Bonney Lake
Bill Drake, City of Orting
Eric Mendenhall, City of Sumner
Rory Grindley, Pierce County
Jesse Hamashima, Pierce County
Jason Kennedy, Pierce Transit
Eric Chipps, Sound Transit
Scott Jones, Tehaleh/Newland Communities
Joe Pestinger, City of Orting
Josh Penner, City of Orting
Shawn Bunney, Observer

WSDOT
Dennis Engel, Olympic Region Planning
Nazmul Alam, Olympic Region Planning
T.J. Nedrow, Olympic Region Planning
Yvette Liufau, Olympic Region Planning
Ray Crumbley, Olympic Region Traffic
Janarthanan Natarajan, Headquarters TDGO
Ming-Bang Shyu, Headquarters TDGO

Welcome/Introductions

T.J. Nedrow, WSDOT's study lead welcomed everyone and led the introductions around the table. The meeting agenda was reviewed and committee reminded of the decision making process of thumbs up, sideways and thumbs down.

Study Progress

T.J. reviewed with the committee members the study challenge to recommend suitable strategies to move forward that meet current and future travel needs along the SR 162 corridor. He mentioned the study team performed an initial screening which will be covered later in the meeting. Secondary stakeholder outreach efforts were conducted by T.J. with WSDOT Maintenance, school district transportation staff, law enforcement, local fire and rescue staff. The following significant points were raised in those conversations:

- Narrow shoulders
- Left turns are an impedance to throughput
- Congestion makes travel predictability difficult
- Crashes close the highway

- Congestion is getting worse
- Extreme weather events create terrible travel conditions

He also noted a study briefing with elected officials has been scheduled for September 15th.

Preliminary Online Survey Results

Dennis Engel, WSDOT Olympic Region's Planning Manager reported on the preliminary online survey results to the group. He explained a total of 2,214 surveys were completed and 2 were filled out in Spanish. The online survey window closed on Friday, August 19th. He summarized some interesting results that were picked up from the following six survey questions:

Q5. Has your average travel time changed between Sumner and Orting over the last 5 years?

80% of the surveys answered yes

Q6. Please choose one of the following that best describes how your average travel time has changed over the last 5 years on SR 162 between Sumner and Orting?

Approximately 46% said it increased over 15 minutes, 34% said it increased 11-15 minutes, and 18% said it increased 1-10 minutes

Q14. How do you normally commute to work?

Approximately 75% drive alone, 18% are retired, 10% carpool, 8% telework, and 1% walk, bicycle or vanpool

Q15. If you rideshare to work, do you use the Sumner or Puyallup Sounder Park & Ride lot?

Approximately 95% don't rideshare, 5% rideshare and use the Sumner lot, and less than 1% rideshare and use the Puyallup lot

Q20. If transit or some other form of public transportation was available from Sumner to Orting, would you use it?

Approximately 6% said no while 40% said yes

Q22. To give us an idea of your normal workday commute, please indicate your home zip code.

Approximately 72% from 98360 (Orting), 12% from 98390 (Sumner), 9% from 98338 (Graham) and 8% from 98372 (Puyallup)

Dennis provided some additional comments that were noted in the surveys:

- You should have been asking this question 15 years ago.
- The lights coming out of Sumner are a pain.
- Add extra lanes. Add an alternate route. Only allow Fords, no Chevys.
- Have another highway above the current one just specifically for those traveling from one end to the other.
- Bus lines, maybe a light rail.
- This year add 3 more lanes.
- Fewer or removing all street lights.
- More lights to allow residents to access road.
- Any unnecessary death due to poor traffic planning will be on your hands.
- Turn lanes, turn lanes, turn lanes, turn lanes, turn lanes, turn lanes…did I make my Point?!
- Drive thru pot shops needed, please.

There were 24 categories of responses to the question of what highway changes would you like to see and they are:

Add Lanes	Speed
Alternate Routes	Turn Lanes
Signals	Street Lighting
Transit/Rail	Roundabouts
Restrict Development	New Freeway
Address SR 167/SR 410	Restrict Trucks
Sight Distance	Sidewalks
No 4 lane	Enforcement
SR 410 Interchange	Center Guardrail
Toll Road	School Bus
Better Maintenance	No Shoulder Parking
Complete Solution	Limited Access

Some of the main comments in the online survey that were received are 60% suggested widening the roadway. Of that 60%, 33% said widen to 4 lanes, 15% said add a turn lane down the middle and 13% said they want 4 lanes with a turn lane in the middle. Dennis mentioned a few suggestions were to widen the shoulders and construct a reversible lane. Alternative routes were made up of 5% of the total number of comments. Of that number, 54% preferred an alternative route from Orting to Sumner, with 17% suggesting an alternative route up to Puyallup/SR 161. There were 10% who wanted a Bonney Lake route and even received a few who wanted Cross Base to relieve SR 162. There were 9% of the comments that were about signals. Of those, 52% suggested changes in signal timing or synchronizing, 15% said less signals are needed, 18% said more signals are needed, and 15% asked for specific intersections which the most requests seemed to be for the High Cedars/146th Ave. E. vicinity. There were 4% of the survey comments which were related to speed. Of them, 9% commented about deceleration and acceleration turn lanes to side streets. Two percent of the public surveyed wanted to restrict development. Transit/rail received 3% of the survey comments and 44% of them asked for rail, 39% asked for transit while 13% were interested in mass transit.

Some of the group commented that the percentage of the public interested in widening SR 162 is the same as the percentage who wouldn't use transit. WSDOT will provide Pierce Transit with any transit information from the online survey.

Backup Data for Detailed Screening

Ming-Bang Shyu, WSDOT Transportation Data, GIS & Modeling Office provided a brief review of the existing and future no action conditions. For the households and job growth between 2015 and 2035 land use maps, street names have been added to make it easier to find and discuss locations of concern. Ming explained that following the last stakeholder meeting, the study team reviewed the volume to capacity calculation, particularly the assumptions of the roadway capacity. Based on the three full days of traffic counts conducted in April 2016 at six locations along the study corridor, the team found that the maximum throughputs are about 1200 vehicles per hour at a 50 mph speed limit and 1100 vehicles per hour at a 35 mph speed limit. The study team updated the capacity assumptions based on the observed maximum throughputs to reflect better the actual roadway conditions. The calculation of volume to capacity ratios for both the AM and PM peak periods has been updated. Ming mentioned after the last meeting, the study team also received updates of signal timing settings at several intersections. The signal timing inputs were updated in Synchro and re-calculated the intersection delays and LOS. The travel time and travel time reliability was also updated after re-running the SimTraffic simulation.

Safety, Environmental, Feasibility/Constructability

T.J. Nedrow presented the safety, environmental and feasibility/constructability data to the committee. The Five-Year motor vehicle crash data shared. The information was gathered from January 2011 to December 2015 period. The Study team broke the analysis up into logical segments and major intersections. The intersections along SR 162 of focus were:

SR 410 westbound and eastbound ramps

- Rivergrove Dr. E.
- Pioneer Way E.
- 96th Street E.
- Military Rd.
- 128th St. E.
- 136th St. E.
- Williams Blvd.

The segments where crashes were analyzed:

- SR 410 to Rivergrove Dr. E.
- Rivergrove Dr. E. to Pioneer Way E.
- Pioneer Way E. to 96th St. E.
- 96th St. E. to Military Rd.
- Military Rd. to 128th St. E.
- 128th Street E. to 136th St. E.
- 136th St. E. to Williams Blvd.

The WSDOT's highway safety focus is on Serious Injury and Fatal motor vehicle crashes as a goal emphasis of the Washington Traffic Safety Commissions 2013 "Target Zero" Strategic Highway Safety Plan. Crash history records between 2011 and 2015 noted that there were 0% fatal crashes on the corridor, however serious crashes were recorded at the SR 410 eastbound ramp, Rivergrove Dr., Williams Blvd. intersections, and the highway segment from 96th St. E. to Military Rd. T.J. referred to the powerpoint slide noting the common types of crashes included rear ends, single vehicle/object, entering at angle and opposite direction. The main contributing circumstances in these types of crashes were following too closely, not granting right of way, alcohol and inattention.

T.J. presented the environmental features map which showed fish passage barriers, wetlands, groundwater well, and leaky underground storage tank locations. The committee was provided with a detailed listing of utility providers known to be located within the SR 162 highway corridor. This information is intended to aid in screening the feasibility/constructability category. He mentioned that generally with any roadway improvement, some form of utilities will be impacted. If, for example, PS&E transmission lines need to be relocated due to a highway project, WSDOT would have a heavy cost to relocate the utilities. The existing utilities along the SR 162 corridor study area include:

- Comcast Telecommunications
- AT&T Telecommunications
- CenturyLink Telecommunications
- City of Sumner Communications
- City of Tacoma Water lines
- PS&E Power lines
- PS&E Natural Gas lines
- Valley Water District Water lines
- Wave Broadband Telecommunications
- Zayo Group Telecommunications

Another piece of information T.J. shared with committee members was the existing right of way information. With the Meeker Southern rail line and Pierce County Foothills trail corridor on the west side of SR 162, PS&E power lines to the east, and residential or business properties mixed throughout, the SR 162 corridor is narrow (generally at 60') and therefore large scale widening of the highway could be problematic and overly expensive.

Initial Screening Results

T.J. Nedrow presented the listing of 46 ideas created with stakeholder committee input, online survey suggestions and input from WSDOT staff and 1997 162 route development plan. The WSDOT study team conducted an initial screening based on the following actions:

1. Does not meet the study purpose and need
2. Will not compete regionally (in the sense of larger projects of regional significance)
3. Does not meet corridor vision or study goals
4. Not viable given existing technology or practices
5. Not practical/not applicable
6. Advanced to detailed screening
7. Pursued by others (others would have lead in promoting, establishing or financing idea)

The ideas that matched with Actions 1 through 5 were removed from the list and no longer considered. The ideas that matched action 7 were determined to be outside the influence of the study and also removed from the list for stakeholder screening purposes.

The following ideas that were screened out based on Actions 1-5 and 7 were:

E	Linking the Foothills Trail to the Sumner train station
F	Add a park and ride lot at 128th St. E. and SR 162
G	Add park and pool lots
H	Opportunities to utilize park and ride lots for event parking
I	Look at existing TDM along the SR 162 corridor
K	Bus rapid transit service is needed on SR 162 during peak period times
L	Public transit service needed on SR 162
Q	Train or commuter rail service is needed on SR 162
R	Intersection transit queue jumps along SR 162
S	Expand existing vanpool availability
T	Put tolls on SR 162
AC	Reduce Tehaleh growth based on employment growth
AD	Constrain development
AE	Improve pedestrian and bicycle access into Sumner
AF	Increase bicycle storage at Sumner Sound Transit train station
AH	Assure that roadway facilities are provided along with development proposals
AI	Potential state policy changes to make it easier for cities to join Pierce Transit's benefit area
AJ	Consider formation of transportation benefit transit district
AK	Utilize District School Bus associated with commuter fixed commuter travel
AO	Improve School Bus Routing
AP	Speed enforcement
AQ	Limit parking on shoulders (access management)
AU	Driver education/user outreach

The ideas that matched Action 6 are:

A	Improving Riverside Road and McCutcheon Road to use as an alternate route to SR 162
B	Channelization on at SR 162
C	Consider roundabouts at key locations
D	Restricting left turns at unsignalized intersections to right in/right out
E	Linking the Foothills Trail to the Sumner Sound Transit train station
F	Add a park and ride lot at 128th St. E. and SR 162
G	Add park and pool lots
I	Look at existing TDM along the SR 162 corridor
J	HOV lanes are needed on SR 162 during peak periods
K	Bus rapid transit service is needed on SR 162 during peak period times
L	Public transit service needed on SR 162
M	3 lane configuration on SR 162 (TWLTL)
O	Increase incident response along the SR 162 corridor
P	ITS devices needed along the SR 162 corridor
Q	Train or commuter rail service needed and to include a stop at 128th/SR 162
R	Intersection transit queue jumps along SR 162
S	Expand existing vanpool availability
V	Add reversible 3rd lane in key locations or throughout the SR 162 corridor
W	Use historic bridge as a 3rd lane at river crossing
X	Separated bus way
Y	Dedicated incident turnout areas along the SR 162 corridor
Z	Increase law enforcement presence along the SR 162 corridor
AA	SR 162/SR 410 interchange overpass to increase capacity
AB	Adequate shoulders for bicyclists, vehicle breakdowns and transit
AC	3 lanes with transit in middle lane
AE	Improve pedestrian and bicycle access into Sumner
AF	Increase bicycle storage at Sumner Sound Transit train station
AG	Implementing 1997 Route Development Plan improvements
AL	Improve Signal Timing
AM	Signal Interconnections
AN	Improve sight distance at intersections
AO	Improve School Bus Routing
AR	Two step left turn from side streets at appropriate locations?
AS	Implement narrow roads, wide nodes concept through appropriately designed modern roundabouts?
AT	Provide school bus turnouts at appropriate locations?

The ideas which were advanced forward to the Stakeholder Committee screening process were:

B Channelization on SR 162, AR – two-step left turn from side street at appropriate locations
C Consider roundabouts at key locations. Implement narrow roads, wide nodes concept through appropriately designed modern roundabouts?
D Restricting left turns at unsignalized intersections to right in/right out
I Looking at existing TDM along the SR 162 corridor, AF – increase bicycle storage at Sumner train station
K K - Bus rapid transit service is needed on SR 162 during peak period times
L Public transit service is needed on SR 162
U Intersection transit queue jumps along SR 162
X Separated bus way
AI Potential state policy changes to make it easier for cities to join Pierce Transit's benefit area
AJ Consider formation of transportation benefit or transit district
M 3 lane configuration on SR 162 (TWLTL)
AC 3 lanes with transit in middle lane
AA SR 162/SR 410 interchange overpass to increase capacity
AB Adequate shoulders for bicyclists, vehicle breakdowns and transit
AG Implementing 1997 Route Development Plan improvements
W Use historic bridge as a 3rd lane at river crossing
AL – Improve signal timing
AM – signal interconnections

The process then compiled the ideas into seven categories that the committee endorsed:

- Channelization
- Intersection improvements
- Access management
- TDM
- Public Transportation
- Capacity improvements
- Signals

T.J. concluded that of the 46 original ideas, through the process so far, seven categories emerged and moved forward into the next phase of the exercise, the stakeholder committee screening process led by Nazmul Alam. The question was asked if the ideas that have been initially screened out will be mentioned in the final study report. T.J. responded that they will be mentioned in the report. The committee gave thumbs up in agreement of how the initial screening process and results were accomplished.

Detailed Screening Process

WSDOT Olympic Region's Nazmul Alam reviewed the list of ideas which came out of the initial screening with the group. He proceeded to walk the group through the four criteria categories and the scoring ranges for each category. The criteria were Mobility/Congestion, Safety, Environmental and Feasibility/Constructability. He mentioned the option of including additional criteria, suggesting the idea of public acceptability if the committee felt the need to. The Stakeholder committee didn't see need for additional criteria. Below are the ranges for each of the categories.

Mobility/Congestion

Intersection LOS	*Segment v/c ratio*
LOS A-C = 0	<0.5 = 0
LOS D = 3	0.5-0.8 = 3
LOS E = 4	0.8-1.0 = 4
LOS F = 5	>1.0 = 5

Safety

% Fatal or Serious Injury Crashes

0% = 0

1-2% = 1

3-4% = 3

5%->5% = 5

Environmental

Number of environmental features

0 Feature = 5

1 Feature = 4

2 Feature = 3

3 Feature = 2

4 Feature = 1

Feasibility/Constructability

Relative Cost
Very low (<$250K) = 5

Low (<$1m) = 4

Medium ($1-5m) 3

High ($5-10m) = 2

Very high (>$10m) = 1

The committee members discussed the criteria and specifically the need to determine weighting some criteria different than others. A suggestion was made to consider weighing cost heavier than the rest of the categories. Some members felt environmental should be weighted less and safety should be given a heavier weight. Nazmul showed the group some preliminary scoring which the study team processed based on WSDOT's data to help expedite the stakeholder committee's screening of ideas. He noted every score is open to discussion and the preliminary scores can change if the committee sees the need.

The members questioned whether they had enough information to be able to score ideas or is the level of detail appropriate for this screening process? Members asked if fixing intersections should be the priority and directed the Study team to determine which intersections are more critical to make improvements to. A suggestion was made to add a column under mobility to include current 2015 LOS information and not just base screening off of future 2035 LOS, which mostly equals the same number of points for every idea. A decision was made by the stakeholder committee to let them further review the list and currently agreed upon preset scores. Stakeholders were instructed to communicate to the study team which scores if any, they're concerned about. It was suggested that the Study team craft a map depicting the locations corresponding to the alpha (idea) designator to make it easier for the committee to review each idea. This was to be considered given staff resources.

Recap / Actions

T.J. offered to email the list of ideas along with the study team's preliminary scores to the stakeholder committee for review and to provide comments on. The next stakeholder committee meeting (#4) is scheduled for Tuesday, September 27th in the City of Orting's Public Safety building. Stakeholder committee meeting #5 will be held on Wednesday, October 26th where the committee will approve the ranked strategies. Study public information sharing sessions are tentatively planned for November 15 & 16.

SR 162 Sumner to Orting Corridor Study

Stakeholder Committee Meeting #4

Tuesday, September 27, 2016

9:00 a.m. to 12 noon

Orting Public Safety Building, 401 Washington Avenue

Attendees

Mark Bethune, City of Orting
Josh Penner, City of Orting
Nicola McDonald, City of Orting
Eric Mendenhall, City of Sumner
Jesse Hamashima, Pierce County
Gary Hendricks, Pierce County
Eric Chipps, Sound Transit
Scott Jones, Tehaleh/Newland Communities
Shawn Bunney, Citizen

WSDOT
Dennis Engel, Olympic Region Planning
Nazmul Alam, Olympic Region Planning
T.J. Nedrow, Olympic Region Planning
Yvette Liufau, Olympic Region Planning
Joseph Perez, Olympic Region Traffic
Ming-Bang Shyu, Headquarters TDGO
Courtney Rudy, Headquarter MMP

Welcome/Introductions

T.J. Nedrow, WSDOT's study lead welcomed everyone and led the introductions around the table. The meeting agenda was reviewed with no suggested changes.

Study Status

T.J. reviewed with the committee members the study challenge to recommend suitable strategies to move forward that meet current and future travel needs along the SR 162 corridor. He mentioned the end result of the study will be to produce a list of prioritized strategies to address the SR 162 corridor needs for the next 20 years. The next stakeholder committee meeting will be a review and discussion of the ranked list of ideas.

T.J. explained to the members the latest tasks the study team has been engaged in. An initial screening of ideas was completed by the study team, the unranked list of strategies composed and study model and evaluations. Dennis Engel, summarized a briefing to elected officials held on September 15th where 18 people, 7 elected and 8 agency staffers along with 3 citizens attended to hear an update of the study.

The stakeholder committee was briefed on the study schedule. T.J. described the adjustments made reflected in the current meeting agenda and the importance of further explaining the modeling and what the results are forecasting for the corridor over the 20-year horizon.

At Meeting #5 the study staff will walk the committee through the ranking process. The stakeholder committee will be expected to take concurrence action on the Study's ranked strategies. It was also noted that two public information sharing sessions will be scheduled for November 15 and November 16 (REVISED date). Following the public meetings, study staff will focus on composing the study report scheduled to be published in the spring of 2017.

T.J. expressed appreciation to the members for their efforts in participating in the study and on the committee. Of the previous three meetings, Meeting #1 provided an orientation of the study and introduced documents used to guide the study. Meeting #2 saw the approval of the study's guiding documents, a presentation and discussions about the existing conditions, and the brainstorming of ideas for strategies to improve the corridor. Meeting #3 covered the results of the online survey and a discussion of the Study Team's initial screening and Stakeholders' detailed screening of the brainstormed ideas.

This meeting (Meeting #4), T.J. explained, will include an in depth discussion about the modeling results and scenarios that were analyzed and the upcoming ranking efforts for the next stakeholder committee meeting.

Modeling and Evaluation Results

Ming-Bang Shyu, WSDOT Headquarters gave a detailed presentation on the results of the modeling that's been conducted to date. Three main categories of strategies were evaluated and presented, the recommendations are listed below.

- Travel Demand Management (TDM)
    - TDM along SR 162 corridor
- Roadway Improvements
    - Signal optimization
    - Roundabouts
    - Reversible lanes (evaluated – not recommended)
    - 1997 Route Development Plan improvements
- Public Transportation Improvement
    - Train or commuter rail service needed and to include a route-end stop at 128th/SR 162. Rail service would connect the McMillin station to the Puyallup Sound Transit Sounder Station.

These categories could also be grouped into Short-Term, Mid-Term or Long-Term strategies. The signal optimization and roundabout would be Short-Term strategies. TDM would be Mid- and Long-Term strategies. The Public transportation improvement such as extension of commuter rail and widening or adding capacity type of strategy would be Long-Term strategies.

Ming again reminded the committee that the TDM strategy includes the following effective tools and techniques that could be applied such as Commute Trip Reduction programs, telework, vanpool programs and ride-matching, and a flexible work shift. Transportation Demand Management is defined as “a community-based approach that relies on collaboration, commuter information and incentives to influence the travel patterns and commuter choices.” Based on WSDOT’s experience, with ideal TDM techniques employed with an overall reduction in travel demand set at 3% for the years 2025 and 2035. The question came up whether Orting has looked into setting up park and ride lots at the park or at Safeway store. The park is being used currently as a park and ride lot, but staff have not yet discussed it with Safeway management. The thinking is the parking area is near capacity now in supporting the area business complex.

The Public Transportation improvement strategy includes the S-16 Rail extension from Puyallup to Orting, ST3. Ming explained this is one of the candidate projects Sound Transit has provided in the 2016 ST3 voters package, which would provide some improvement actions for the study corridor. The following information is the overall ST16 proposal and forecast:

- Peak headway: 30 minutes
- By 2040 Daily Boarding would be approximately 1,000 passengers
- 125 car surface parking at proposed station location in McMillin/128th St. E. vicinity

The modeling assumptions include:

- The ridership would be constrained by the capacity of the park & ride lot which has been restrained further by the amount of suitable property. Sound Transit forecasted that the riders would be proportioned by the following modes: 120 SOV (60%) riders, 20 Carpool/vanpool (10%) riders, and 60 riders who walk, bike or are dropped off. Total is 200 riders at peak hour.
- The proportion of total riders who would have used SR 162 between McMillan and Sumner if they drove is 30%. Thirty percent of 200 vehicles are 60 vehicles can be reduced on SR 162 at peak hour.
- Given the apportion of the ridership and the park and ride lot utilization, we assumed 50% more trips can be reduced on SR 162. One hundred and fifty percent of 60 vehicles equals 90 vehicles can be reduced on SR 162 at peak hour generally between 128th St. E. and Pioneer Way East. Two thirds of the vehicles are traveling to/from Pioneer Way E. and 1/3 is traveling to/from Sumner.
- The reduction would be northbound in AM traffic and southbound in PM traffic.
- For long-term Year 2035.

Eric Chipps of Sound Transit also explained that this is one of the candidates in ST3. The land use nearby and the current ridership at the near stations were considered for the ridership forecast for the proposed station at 128th St. East. He also mentioned Sound Transit plans to expand parking at the Sumner station.

In Ming's discussion of the Development of Roadway strategies, he explained the following roadway improvement strategies were analyzed and evaluated.

- Short-Term Strategies (Year 2020):
  - Signal Optimization using Synchro
  - Roundabout at 128th St. E. and Military Rd.
- Long-Term Strategies (Year 2035)
  - Reversible lanes
    - One additional lane in the peak direction (northbound in AM and southbound in PM)
    - Signal modification would be needed to accommodate the middle reversible lane movements, which would be left-turn and through shared lane. It would become split phases for northbound and southbound approaches. They can no longer run concurrently.
  - 1997 Route Development Plan improvements
    - Highway Mobility Recommendations
    - SR 410 to Pioneer Way E. would include widening to a five lane roadway
    - Pioneer Way to 144th St. E. would include widening to a four lane roadway
    - 144th St. E. to Whitesell St. would include widening to a five lane roadway

The proposed lane configurations at intersections under the AG list were also included and modeled. The study team evaluated and analyzed each strategy individually. Intersection LOS and travel time per 1/10 mile were used as performance measures.

Ming discussed with the group the traffic operation analysis for 2020 that was conducted. Intersection LOS was analyzed and with a signal optimization strategy, comparing it to no build (or no action) in the AM peak hour the average intersection delay per vehicle could be reduced by 21% for the 11 intersections combined. In the PM it would be reduced by 16%, although there still are four intersections showing a LOS F. If the intersections at 128th St. E. and Military Rd. were converted to roundabouts in 2020, the average intersection delay would be reduced about 3 seconds at Military Rd. and about 18 seconds at 128th St. E. in the AM peak hour.

In the PM peak hour the intersection delay would be reduced about 91 seconds and 20 seconds at Military Rd. and 128th St. E. intersections.

Ming provided for the group some information about travel time in 2020. He explained signal optimization considers the intersection efficiency for all approaches. Therefore, the optimization may not only favor the northbound and southbound directions. In the travel time analysis, the Synchro modeling of signal optimization and roundabout strategies suggest an increase in total travel time for the entire study corridor. This is mainly due to the signal optimization while analyzing the travel time for northbound and southbound directions. Both northbound and southbound directions are no longer favored approaches. It is to compensate and tradeoff with other approaches during the optimization.

With roundabout conversions at two intersections, there would be fewer delays at those two locations and vehicles will go through more quickly. However, without any changes on the rest of the corridor, the traffic would be more congested on the remaining segments along the corridor.

Ming described the traffic operation analysis for 2025. With the TDM strategy, comparing it to the no build scenario (or no action) in AM peak hour, the average intersection delay per vehicle could be reduced by 28% for 11 intersections combined with one intersection, which is at 128th Street, still would operate at a LOS F. In the PM it would be reduced by 22%, although there are still five intersections showing LOS F. Looking at travel time with the TDM strategy, in the AM peak hour the travel time would be reduced by almost 19% in the northbound direction for all segments combined. However, in the PM peak hour, the TDM would increase the travel time. The reason is the travel pattern and the trip distribution would change due to the overall 3% trip reduction per the Pierce County model. The volumes along SR 162 are actually very similar to the no action option. Plus, the signal optimization which considers all approaches would not favor the northbound and southbound directions only. A question was asked as to why the LOS at 128th St. E. would be so bad during the AM peak hour in 2025? The study team responded that with the growth and without any roadway improvements (intersection geometry changes or roadway widening), the westbound and northbound shows significant delays, particularly the westbound left turn and right turn movements.

The traffic operation analysis for 2035 resulted in four strategies being analyzed and evaluated for Year 2035. In the AM peak hour except reversible lane strategy, TDM, 1997 plan and Public transportation strategies would reduce the average intersection delay by approximately 35%, 75% and 36%. Similarly, in the PM peak hour the average intersection delay would be reduced by 32% to 69%. The 1997 Route Development Plan strategy shows the highest reduction in intersection delay in both the AM and PM peak hours and fewer intersections would operate at LOS F.

Pierce County staff asked the study team to provide the lane configuration diagrams at each intersection so people could easily understand and visualize the improvements. The study team agreed to provide snapshots from Synchro model at each intersection and put them in the final report.

The Reversible Lane strategy would increase the average intersection delay in both the AM and PM peak hours Ming explained. Because of the middle reversible lane configuration, it has to become left turn and through shared lane. The signal phases for the northbound and southbound direction can no longer run concurrently. It has to become split phase setting and intersection performance would not operate as efficient as regular signal phase setting. Similar to the Year 2025 TDM strategy, the travel time would not be reduced. It is because the travel pattern and the trip distribution would change due to the overall 3% trip reduction county wide. The volumes along SR 162 are actually very similar to the no action option in 2035. Signal optimization was also applied to consider the efficiency for all approaches. The analysis resulted in the reversible lane strategy being dropped, due to the poor performance. The 1997 plan would reduce the travel time the most with the proposed intersection lane configurations as in the strategy list under AG.

After evaluating and analyzing the strategies individually, each strategy does not improve the corridor back to an acceptable level over the long-term. Several intersections would still operate at LOS F and much longer travel time comparing to existing condition. It was stressed that the per WSDOT's Practical Solutions approach the introduction of incremental short and mid-term strategies must be further refined and consider over time to manage corridor performance. The study team developed the following three combinations of strategies:

- TDM + Roadway improvement
- Public transportation improvement + Roadway improvement
- Public transportation improvement + TDM + Roadway improvement

Ming explained the average intersection delay would be reduced with more strategies combined. However, several intersections would still experience LOS F condition. Travel time also shows more reduction when strategies were combined, but delays would still occur at several key locations. To wrap all of the information up, the results of the analysis are:

- Given the high travel demand on SR 162 in the future, all the strategies evaluated thus far and others yet to be conceived would be needed in order to improve desired corridor performance long term.
- The strategies that were analyzed and evaluated indicated that it is not enough to make the corridor to the acceptable level or meeting the expectations (as noted in the study goal). The strategies would need to be continuously implemented and enhanced, for example more and better TDM techniques, reintroduction of public transportation services, and increased services to meet demands, etc. More strategies could be considered as they emerge in the future and be introduced to influence the travel patterns and improve performance along the corridor.

Ranking Discussion

T.J. raised the strategy ranking with the committee members. He presented to the group a map tying the location of ideas and strategies for the study corridor. T.J. showed the following formal identified strategies that shall be included in the reported strategies outside of ranking:

I TDM opportunities for the SR 162 corridor

Strategies aimed at changing behavior rather than expanding the transportation network to meet travel demand. Such Strategies can include the promotion of work hour changes, rideshare options, parking policies, and telecommuting.

Q Public Transportation Services

Train and transit service opportunities that could advance in the short, mid or long-term.

Y Dedicated incident turnout areas located along the SR 162 corridor

WSDOT outside of the study may address this as funding opportunities are available.

AG 1997 RDP improvements (specifically, TDM, PnR lots, and non-motorized improvements. Does not include roadway widening and intersection and channelization strategies.)

Implementing various improvements documented in the 1997 report

AL Improve signal timing & signal interconnect (#AM) (WSDOT Operational actions)

WSDOT will continue to address signal timing and interconnect as a course of doing business.

T.J. suggested the study team take the strategies list and rank it based upon the data that has been shared at this meeting. The study team will provide the stakeholder committee members with a recommended draft of the ranked list to review a week prior to (REVISED date) November 9th stakeholder committee meeting. The committee was in agreement with the process and reviewing the ranked strategies list prior to the October meeting. The ranking shall include planning level cost estimates for the strategies recommended.

Meeting Recap / Next Steps

T.J. reviewed with the committee the next steps moving forward. The next stakeholder committee meeting #5 will be held on Wednesday, October 26th at the City of Orting Public Safety Building. At this meeting members will have reviewed the ranked strategies and come prepared to discuss and approve them.

Study public information sharing sessions are tentatively planned for November 15th & 16th in Orting and in Sumner. T.J. noted to the group that the study report is scheduled for release in the spring 2017. The draft will be made available for each committee member to review and offer comments. The stakeholder committee expressed their appreciation to the study team of all of the good work that's been done. Meeting was adjourned at 12:00pm.

SR 162 Sumner to Orting Corridor Study

Stakeholder Committee Meeting #5

Tuesday, November 9, 2016

9:00 a.m. to 12 noon

Orting Public Safety Building, 401 Washington Avenue

Attendees

Jason Sullivan, City of Bonney Lake
Mark Bethune, City of Orting
Joachim Pestinger, City of Orting
Nicola McDonald, City of Orting
Eric Mendenhall, City of Sumner
Jesse Hamashima, Pierce County
Rory Grindley, Pierce County
Jason Kennedy, Pierce Transit
Eric Chipps, Sound Transit
Scott Jones, Tehaleh/Newland Communities
Tom Uren, Tehaleh/Newland Communities
Shawn Bunney, Citizen

<u>WSDOT</u>
Dennis Engel, Olympic Region Planning
Nazmul Alam, Olympic Region Planning
T.J. Nedrow, Olympic Region Planning
Forest Sutmiller, Olympic Region Planning
Yvette Liufau, Olympic Region Planning
Joseph Perez, Olympic Region Traffic
Brian Walsh, Headquarters Traffic
Kent Kalisch, Headquarters Design
Ming-Bang Shyu, Headquarters TDGO
Courtney Rudy, Headquarter MMP

Welcome/Introductions

T.J. Nedrow, WSDOT's study lead welcomed everyone and thanked those in attendance for the quality participation. T.J. led the introductions around the room.

Agenda Review / Study Status

T.J. reviewed the 5th and final stakeholder committee meeting agenda with the group who were in agreement with the agenda as submitted. He also reminded the committee of the agreed upon decision making process to be employed at each decision point during the meeting.

T.J. then reviewed with the group the study background elements referencing the traffic congestion in a growing area and the end result of the process developed strategies to address the corridor needs for the current and future timeframe. He also reminded the committee of the stakeholder participants including a secondary group, i.e. school districts, public safety, non-motorized advocate groups and the substantial community engagement efforts.

It was pointed out the successes considering the aggressive study schedule, completion of a study model and evaluations, ranking of strategies, and scheduling two public meetings. T.J. gave an overview of the work that has been done in stakeholder meetings #1 through #4 to include committee instructions for the study team to further analyze and provide a ranking document to stakeholders for meeting #5.

Strategy Ranking Results

T.J. highlighted a partial listing of what the study team, and the stakeholder committee has learned, determined and concluded throughout the study process.

- Preserve the character of the area
- Concerns about highway performance due to growth
- Unreliable travel times
- Effects of traffic on SR 162 impacts local roads
- Transportation Demand Management (TDM) strategies are important
- Improved bicycle and pedestrian accommodations are needed
- Park and ride lots and public transportation services are needed
- The Foothills Trail and agriculture in the community are important to locals
- Short and Mid-Term strategies are more achievable than Long-term high cost strategies. Road widening alone can't solve the problem
- The Study's online survey received 2,214 comments and gathered a significant amount of information. The upcoming public meetings on November 15th and 16th is another opportunity to gather comments about the corridor and the study outcomes.

It was stressed to the committee that a combination of strategies can and will aid in closing the gap on deficiencies along the corridor. There were three distinct groups of strategies he covered. The first group; TDM/Operations/ITS which could create incentives programs for ride sharing, signal efficiencies and information sharing opportunities for travelers. The second group consisted of park and ride lots, public transportation services, and bicycle and pedestrian accommodations. The third group entailed access management and intersection and corridor improvements. All of these strategies work together to make up a practical solutions approach to making improvements over the Short-, Mid-, and Long-Term periods.

Discussion on Ranked Strategies

T.J. led the stakeholder committee in a discussion about the ranking of strategies for the corridor. He again outlined WSDOT's Practical Solutions approach to strategies and the order of cost effective measures includes operational type improvements first, second is demand management opportunities, and the third and last focus is capital investments. Per stakeholder discretion, the study team ranked the proposed strategies that have been advanced today for committee consideration and actions.

The following process was employed by the study team for ranking strategies:

- Establish ranking criteria and associated performance measures
- Perform 'planning level cost estimates' of strategies and associated elements
- Prepare data (performance measurements) to allow scoring from 1-25 range
- Establish a scoring scale from 1-25 range for criteria & performance measures
- Compile the ranking matrix
- Score strategies based on data and scoring ranges from 1-25. Strategies were ranked based on total average score by Short-, Mid-, and Long-Term.

T.J. walked the committee members through the definitions that the study team developed for the ranking criteria and the performance measures which included:

- **Phasing** – The potential phase of strategy implementation. The performance measure used near-term which was worth 25 points and based on a low cost/high return investment potential, mid-term, worth 15 points used moderate to higher cost potential and long-term, worth 1 point considered higher cost and maximum type fix.
- **Cost** – A range of planning level cost estimates for strategy implementation and the performance measure was used based on year 2015 costs and estimated costs greater than $10 million equaled 1 point.
- **Mobility** – Mobility improvements in terms of percentage of performance gap reduction by means of delay reduction and travel time savings or improvements. The performance measures were delay and travel time reduction. The traffic analysis data about percentage reduction was interpolated into a score of between 1 and 25 points.
- **Partnerships** – Partnership contributions. The performance measure was the number of partners participating with no partnership likely scoring 1 point, one partnership scoring 15 points and two or more partnerships likely assigned 25 points.

T.J. asked for committee observations to consider with the recommended ranked strategies.

- The City of Orting mentioned their observation that ¾ of the traffic on SR 162 travels through Orting to Kapowsin Highway.
- Pierce County provided comments related to the interchange at SR 410/SR 162 for possible bridge widening with roundabouts at ramp terminals to prolong the need to widen the existing bridge.

- City of Bonney Lake commented that the Partnerships criteria were scored too high. A suggestion was made that the “Mobility Improvements” criteria should be assigned a heavier weight. It was also suggested the study team check the formula in the Short-, Mid-, and Long-Term tables for accuracy.
- The stakeholder group agreed to delete the “Other” row from the short, mid and long-term strategies matrix since the local improvements are already listed in other categories.
- There was concern that the public will not be on board with the strategies and that it may be helpful to show the estimated cost it would take to widen the roadway.
- A question was asked whether the study report will result in putting projects on a list for getting funds. Dennis Engel, WSDOT Olympic Region’s Planning Manager mentioned the strategies are next steps to fund scoping, design, and the projects are what will come out of the strategies once funding is received. Nazmul Alam of WSDOT, Olympic Region, reminded the group that as part of Practical Solutions, the team looked at low-cost short term practical improvements first because the low-cost preventative measures could receive funding sooner.
- The committee recognized that TDM strategies scored well and felt it might be a great opportunity to pursue mobility grant funding. The group also agreed that the TDM strategy, which received the highest scores in the matrix, should be executed first. The committee suggested a pilot project could be provided which would make it necessary to add the “Public Transportation Services” strategy to short-term criteria.

After considerable time discussing a few minor changes to the ranking matrices the final strategy documents were reviewed with no additional changes. Consensus action resulted on the ranking document with a unanimous vote of the stakeholders present.

Meeting Recap / Next Steps

T.J. discussed the next steps for the study which included two public meetings scheduled for November 15 and 16 from 4:30 – 6:30 pm in Sumner and Orting. The study team will now prepare a draft study report that will be offered to the stakeholders for review. The final report is expected to be published in the spring of 2017. T.J. ended the meeting thanking the committee for their participation. The committee members expressed their appreciation for the study leadership; the team’s efforts, especially faced with such a fast paced schedule.

APPENDIX F

Public Meeting Information

SR 162 Study

- Home
- Location Map
- Study Library

SR 162 Sumner to Orting Corridor Planning Study

SR 162 Sumner to Orting Corridor Planning Study Open House

Interested in hearing what the community told us about SR 162? You're invited to join WSDOT at one of two open houses to hear the results of State Route 162 Corridor Study. No formal presentations are scheduled. Come at your convenience and WSDOT staff will be available to answer questions and use displays to explore study conclusions, explore strategies and hear about next steps.

Corridor Study Purpose

State Route 162 is an important north-south link for the Orting community and the surrounding area of southeast Pierce County. The purpose of the study is to identify ranked strategies that increase mobility by reducing delay for travelers using the highway corridor while maintaining or improving safe operation of the highway.

Needs & Benefits

SR 162 is the major travel corridor through the Orting valley. In the event of an emergency, there is no good alternate route. The area is experiencing a high level of growth and development resulting in peak hour congestion that places demands on the highway system.

Using WSDOT's Practical Solutions approach, the effort will evaluate and document the roadway conditions in this area on the state transportation system.

Challenges

WSDOT will recommend suitable strategies to meet current and future travel needs and highway corridor accommodations.

The End Result

WSDOT will produce ranked strategies addressing the corridor needs for the 20-year vision. The study report will guide WSDOT moving forward in identifying future solutions.

Funding the Study

The study was funded through the Legislative Evaluation & Accountability Program (LEAP) as part of the Connecting Washington Projects package as developed on June 28, 2015. A total of $450,000 was allocated over the 2015-2017 and 2017-2019 bienniums.

Timeline

2016 Spring

- Stakeholder communication
- Community engagement
- Data collection & analysis

2016 Summer

- Travel dem and model development
- Refine options with stakeholder concurrence

2016 Fall

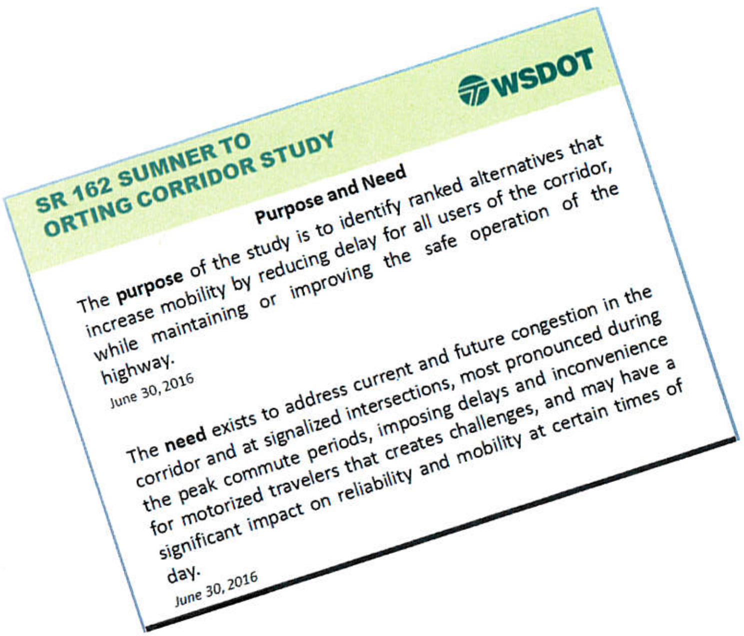
- Finalize strategies
- Community engagement information session
- Concurrence

2017 Spring

- Study report completed
- Publish report

SR 162 Sumner to Orting Corridor Study

In 2015, the Washington State Legislature provided a state appropriation in the amount of $450,000 of the motor vehicle account solely for the SR 162 Congestion Study (Ref. 2ESSB 5988 PL L2000107). The Study was funded through the Legislative Evaluation & Accountability Program (LEAP) as part of the Connecting Washington Projects package.


SR 162 SUMNER TO ORTING CORRIDOR STUDY

WSDOT

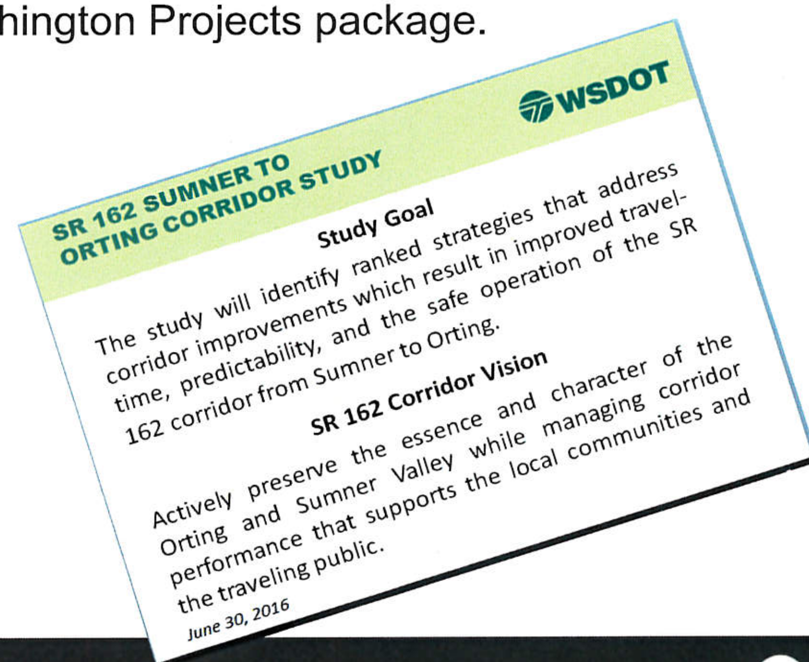
Purpose and Need

The **purpose** of the study is to identify ranked alternatives that increase mobility by reducing delay for all users of the corridor, while maintaining or improving the safe operation of the highway.

June 30, 2016

The **need** exists to address current and future congestion in the corridor and at signalized intersections, most pronounced during the peak commute periods, imposing delays and inconvenience for motorized travelers that creates challenges, and may have a significant impact on reliability and mobility at certain times of day.

June 30, 2016


SR 162 SUMNER TO ORTING CORRIDOR STUDY

WSDOT

Study Goal

The study will identify ranked strategies that address corridor improvements which result in improved travel-time, predictability, and the safe operation of the SR 162 corridor from Sumner to Orting.

SR 162 Corridor Vision

Actively preserve the essence and character of the Orting and Sumner Valley while managing corridor performance that supports the local communities and the traveling public.

June 30, 2016

SR 162 Sumner to Orting Corridor Study

Traffic congestion will continue to grow and impact the viability and predictability of State Route 162.

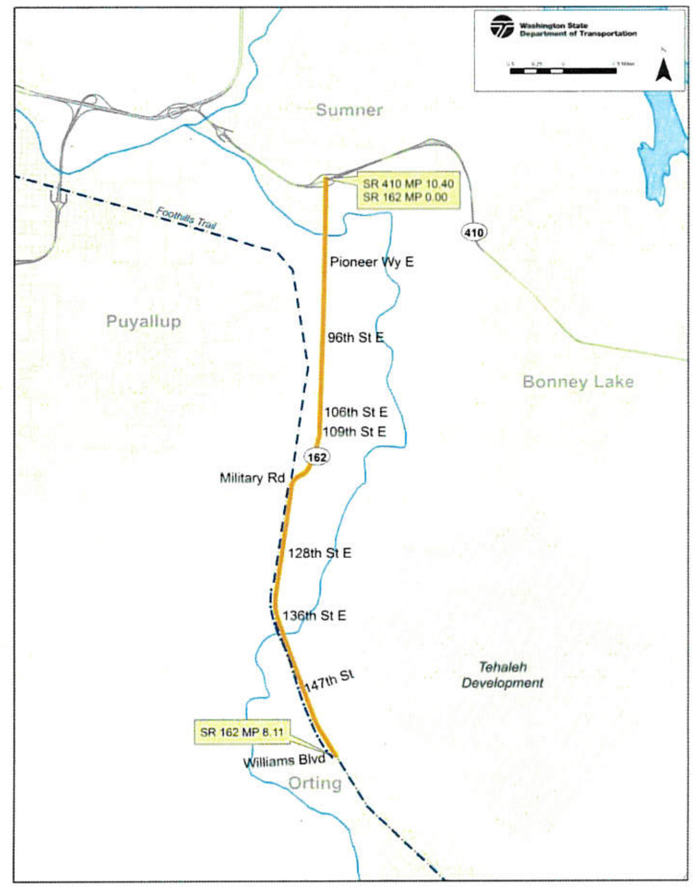
Study Challenge
WSDOT will recommend suitable strategies to meet current and future travel needs and highway corridor accommodations.

The End Result
WSDOT will produce a list of strategies addressing the corridor needs for the 20-year vision.

Stakeholder recommendations will be in ranked order.

The study report will guide WSDOT moving forward in identifying future solutions.

Study Limits



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Community Coordination

Local Area Stakeholder Committee:

City of Orting
City of Sumner
City of Bonney Lake
Pierce County
Pierce Transit
Puget Sound Regional Council
Sound Transit
Tehaleh/Newland
WSDOT
Muckleshoot Indian Tribe
Nisqually Indian Tribe
Puyallup Tribe of Indians
Squaxin Island Tribe
Confederated Tribes and Bands of the Yakama Nation

Online Survey:

- *2,214 public responses were received*!

General comments:

> Add more lanes

> No more signals, more signals

> Disallow bikes/peds on highway

> Should have made Puyallup River Bridge wider when recently built (note this bridge can be widened relatively easily)

Community Engagement

Survey Question 7: What highway changes, if any, would you like to see made to SR 162 between Sumner and Orting?

60% said "widen roadway"

- 38% of those said widen (not specific)
- 33% 4 lanes
- 15% turn lane
- 13% 4 lanes with turn lane down the middle

9% of all comments concerned signals

- 52% suggest changes in signal timing or synchronizing
- 15% less signals
- 18% more signals
- 15% signals at specific intersections

5% of all comments want to see more alternate routes, including additional routes up to SR 161 and SR 410

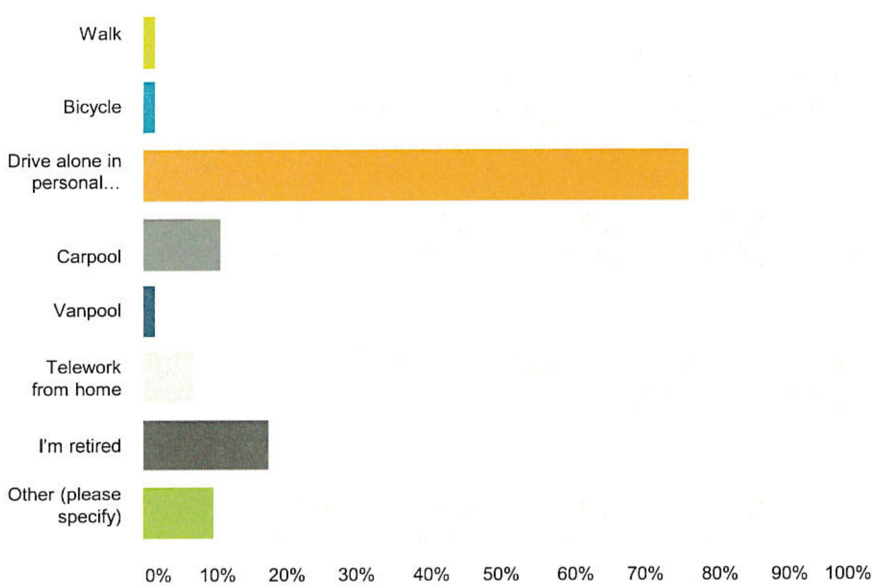
4% of all comments concerned speed, most concerned about vehicles driving too slowly, 35 mph

3% of all comments want Transit or Rail

Community Engagement

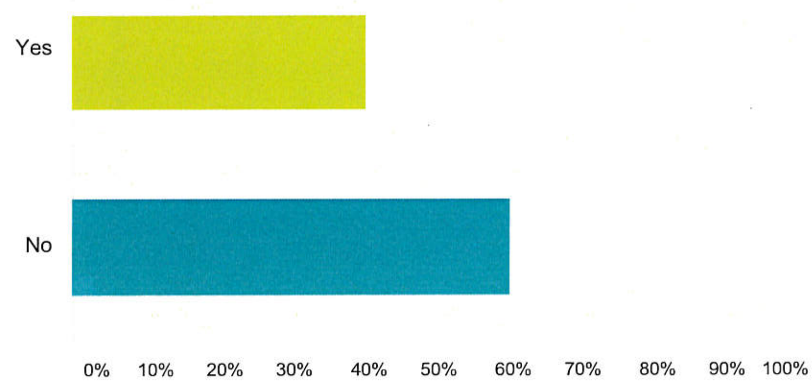
Q14 – How do you normally commute to work? Choose up to three.

Answered: 1,994 Skipped: 220

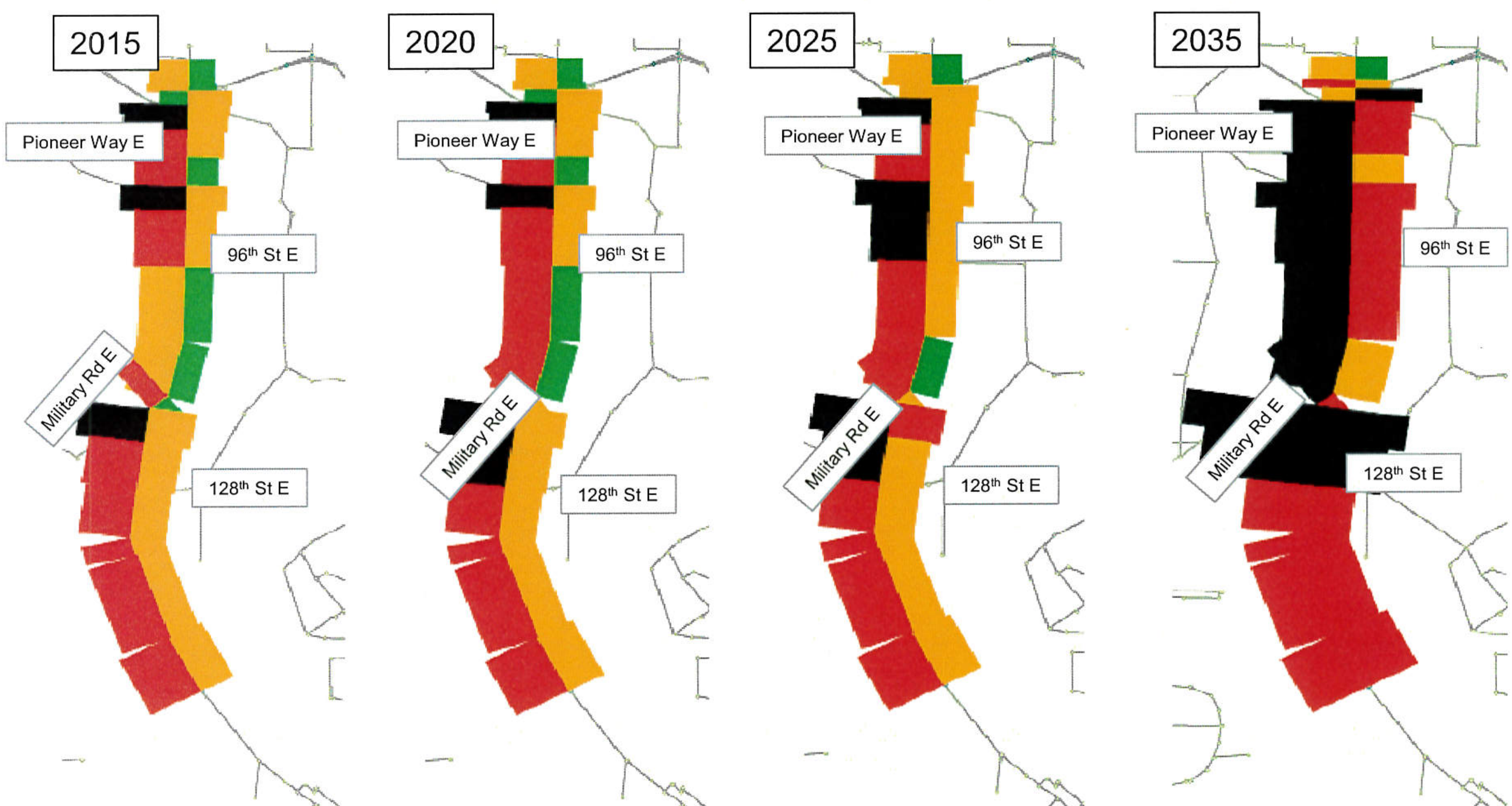


Q20 – If transit or some other form of public transportation was available from Sumner to Orting, would you use it?

Answered: 1,982 Skipped: 232



Existing and Future Forecasted Travel Conditions



Travel Demand Model – PM Peak Period Demand to Capacity Ratio

The Capacity is based on the maximum throughputs of most existing 72-hour counts.

- For 50 mph posted speed limit – 1200 veh/h
- For 35 mph or lower posted speed limit – 1100 veh/h

V/C < 0.5
0.5 <=V/C < 0.8
0.8 <= V/C < 1.0
V/C >= 1.0

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Study Ideas Advanced to Screening Process

- Improve Riverside and McCutcheon Roads and use as alternative to SR 162
- Add park & ride lots along the corridor
- Restrict left turns at unsignalized intersections to right-in right-out only
- Consider roundabouts at key locations
- Public transit or bus rapid transit service is needed on the corridor
- Intersection transit queue jumps at signalized intersections
- Link the Foothills trail to the Sumner train station
- Train or commuter rail service is needed along the corridor
- HOV lanes on the SR 162 corridor
- Add reversible lane on the SR 162 corridor or at key locations
- Improve school bus routing and increase the number of bus pullouts
- Improve WSDOT incident response presence and resources

Study Ideas Advanced to Screening Process

- Incorporate elements of the WSDOT 1997 Route Development Plan
- Improve signal timing and increase signal interconnects
- Adequate shoulders for bicycles, more connections to the foothills trail
- Improve sight distance at intersections
- Increase capacity of the SR 162/410 Interchange
- Improve bicycle & pedestrian access into Sumner
- 3 lanes with transit in the middle lane, or separated busway
- Expand existing vanpool program and increase TDM resources available to commuters
- ITS devices needed along the SR 162 corridor
- Increase bicycle storage at the Sumner train station
- Increase law enforcement presence
- Use historical bridge as a third lane crossing the river
- Add two-way left turn lane

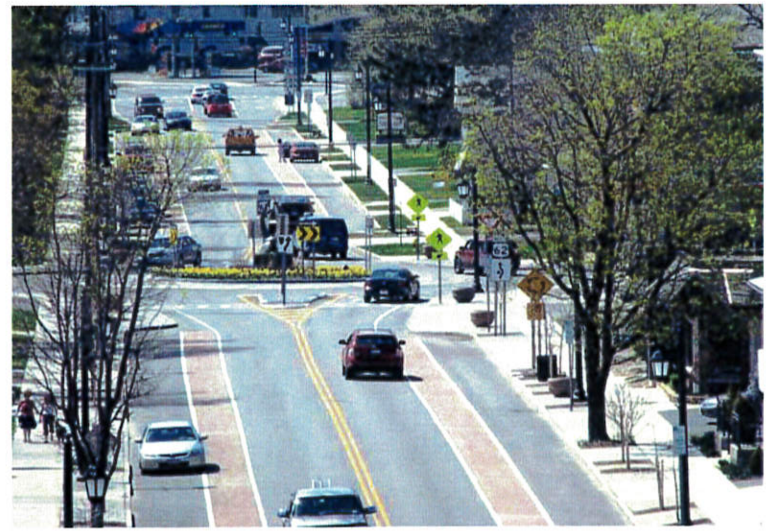
Ranked Strategy Summary

	Ranked Strategy Summary		SHORT TERM (2020)	MID TERM (2025)	LONG TERM (2035)
	SHORT DESCRIPTION OF STRATEGY	Strategy	RANK	RANK	RANK
STRATEGIES	TDM (Assume 3% volume reduction similar to Mid-Term 2025 Mobility Results)	A	1	1	1
	Ops/ITS/Incident Management	B	4	2	3
	Public Transportation Services (2020 Pilot*)	C	3*	5	4
	PnR Facilities, Bike & Ped Improvements. Minor Access Management measures	D	5	4	2
	Intersection Control/ Corridor Improvements	E	2	3	5

Study Strategy Definitions

	SHORT DESCRIPTION OF STRATEGY	DEFINITIONS / STRATEGIES
STRATEGIES	TDM (Assume 3% volume reduction similar to Mid-Term 2025 Mobility Results)	**TDM:** (Transportation Demand Management) TDM Strategies are aimed at changing travel behavior rather than expanding the transportation network to meet travel demand. Such strategies may include the promotion of work hour changes, rideshare options, parking policies, and telecommuting.
	Ops / ITS / Incident Management	**Ops:** Operations include such elements as traffic signal timing/optimization and interconnect actions. **ITS:** Intelligent Transportation Systems improve transportation safety and mobility through the use of advanced wireline and wireless communications technologies. ITS strategies proposed include electronic traveler information, Highway Advisory Radio, and road & weather information systems. **Incident Management:** WSDOT Incident Response resources clear traffic incidents safely and quickly, minimizing congestion and risk of secondary incidents. Strategies include multiple shoulder pullout areas and incident response resources during peak travel times.
	Public Transportation Services (2020 Pilot*)	**Public Transportation Services:** Strategies included multiple elements of transit service and rail service.
	PnR Facilities, Bike & Ped Improvements, Minor Access Management measures	**PnR Facilities:** Public park and ride facilities are envisioned to be in the form of small to medium size lots, both public and privately owned which may or may not be served by transit. **Bicycle & Pedestrian Improvements:** Strategies include shoulder widening and improved accessibility. **Minor Access Management:** Includes improved delineation of highway access to SR 162.
	Intersection Control / Corridor Improvements	**Intersection Channelization:** A strategy employed that increases mobility and capacity at highway intersections with turn lanes and striping. **Roundabouts:** Modern Roundabouts create continuous, one-way traffic flow, reduce collisions by 37%, and cost less to maintain than traditional intersections. **Corridor Segment Widening:** Capital improvements that create significant widening of the existing roadway.

Intersection Improvement Alternative



Benefits of roundabout intersections:

Roundabouts create less delay than signals for similar volumes and lane arrangements.

Corridors experience the most delay at intersections. Roundabout intersections reduce delay by 20 - 89 % depending on time of day when compared to signalized intersection locations.

Roundabout intersection control works best on corridors where widening is unrealistic or cost prohibitive.

Next Steps

- Compile and produce draft Study Report
- Complete and release Study Report in Spring 2017
- The Study Report will guide WSDOT's decisions on future solutions

WSDOT

Welcome to SR 162 Corridor Study Open House

Provided By the Olympic Region Transportation Planning Office

Questions and Inquires?

Contact

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Claudia Bingham Baker , Communications Manager
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Study Website

http://www.wsdot.wa.gov/planning/Studies/SR162Corridor.htm

APPENDIX G

Idea Screening, Strategy Definitions and Scoring Process

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SR 162 Sumner to Orting Corridor Study

Appendix G Section 1

Section 1 on page 4 highlights the process and selection of ideas presented at the August 2016 stakeholder committee meeting.

SR 162 SUMNER TO ORTING CORRIDOR STUDY

WSDOT

Initial Screen Process

46 Original Ideas

List created from 1. Stakeholder Input 2. Online Surveys 3. Other

	Idea description		Idea description
A	Improving Riverside Road and McCutcheon Road to use as an alternate route to SR 162	AA	SR 162/SR 410 interchange overpass to increase capacity
B	Channelization on at SR 162	AB	Adequate shoulders for bicyclists, vehicle breakdowns and transit
C	Consider roundabouts at key locations	AC	3 lanes with transit in middle lane
D	Restricting left turns at unsignalized intersections to right in/right out	AC	Reduce Tehaleh growth based on employment growth
E	Linking the Foothills Trail to the Sumner train station	AD	Constrain development
F	Add a park and ride lot at 128th and SR 162	AE	Improve pedestrian and bicycle access into Sumner
G	Add park and pool lots	AF	Increase bicycle storage at Sumner train station
H	Opportunities to utilize park and ride lots for event parking	AG	Implementing 1997 Route Development Plan improvements
I	Look at existing TDM along the SR 162 corridor	AH	Assure that roadway facilities are provided along with development proposals
J	HOV lanes are needed on SR 162 during peak periods	AI	Potential state policy changes to make it easier for cities to join Pierce Transit's benefit area
K	Bus rapid transit service is needed on SR 162 during peak period times	AJ	Consider formation of transportation benefit or transit district
L	Public transit service needed on SR 162COMBINE	AK	Utilize District School Bus associated with commuter fixed commuter travel 8/2 Orting
M	3 lane configuration on SR 162 (TWLTL)	AL	Improve Signal Timing
O	Increase incident response along the SR 162 corridor	AM	Signal Interconnections
P	ITS devices needed along the SR 162 corridor	AN	Improve sight distance at intersections
Q	Train or commuter rail service needed and to include a stop at 128th/SR 162	AO	Improve School Bus Routing
R	Intersection transit queue jumps along SR 162	AP	Speed Enforcement
S	Expand existing vanpool availability	AQ	Limit Parking on Shoulders (Access Management)
T	Put tolls on SR 162	AR	Two step left turn from side streets at appropriate locations?
V	Add reversible 3rd lane in key locations or throughout the SR 162 corridor	AS	Implement narrow roads, wide nodes concept through appropriately designed modern roundabouts?
W	Use historic bridge as a 3rd lane at river crossing	AT	Provide school bus turnouts at appropriate locations
X	Separated bus way	AU	Driver education/user outreach
Y	Dedicated incident turnout areas along the SR 162 corridor		
Z	Increase law enforcement presence along the SR 162 corridor		

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SR 162 SUMNER TO ORTING CORRIDOR STUDY

WSDOT

Initial Screen Process

Initial Staff Screening

1. Does Not Meet Purpose and Need
2. Will not compete Regionally
3. Does not meet Corridor Vision or Study Goal
4. Not viable given existing technology or practices
5. Not practical/Not applicable

   OR

6. <u>Advanced to Detailed Screening</u>
7. <u>Pursued By Others</u>

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SR 162 SUMNER TO ORTING CORRIDOR STUDY

WSDOT

Initial Screen Results

Ideas Screened Out (Criteria 1-5)

	Idea Description
H	Opportunities to utilize park and ride lots for event parking
T	Put tolls on SR 162
AC	Reduce Tehaleh growth based on employment growth
AD	Constrain development
AH	Assure that roadway facilities are provided along with development proposals
AI	Potential state policy changes to make it easier for cities to join Pierce Transit's benefit area
AJ	Consider formation of transportation benefit or transit district
AK	Utilize District School Bus associated with commuter fixed commuter travel
AO	Improve School Bus Routing

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SR 162 SUMNER TO ORTING CORRIDOR STUDY

WSDOT

Initial Screen Results

Ideas (#6) Advanced to Stakeholder Detailed Screening

	Idea Description		Idea Description
A	Improving Riverside Road and McCutcheon Road to use as an alternate route to SR 162	V	Add reversible 3rd lane in key locations or throughout the SR 162 corridor
B	Channelization on at SR 162	W	Use historic bridge as a 3rd lane at river crossing
C	Consider roundabouts at key locations	X	Separated bus way
D	Restricting left turns at unsignalized intersections to right in/right out	Y	Dedicated incident turnout areas along the SR 162 corridor
E	Linking the Foothills Trail to the Sumner train station	Z	Increase law enforcement presence along the SR 162 corridor
F	Add a park and ride lot at 128th and SR 162	AA	SR 162/SR 410 interchange overpass to increase capacity
G	Add park and pool lots	AB	Adequate shoulders for bicyclists, vehicle breakdowns and transit
I	Look at existing TDM along the SR 162 corridor	AC	3 lanes with transit in middle lane
J	HOV lanes are needed on SR 162 during peak periods	AE	Improve pedestrian and bicycle access into Sumner
K	Bus rapid transit service is needed on SR 162 during peak period times	AF	Increase bicycle storage at Sumner train station
L	Public transit service needed on SR 162	AG	Implementing 1997 Route Development Plan improvements
M	3 lane configuration on SR 162 (TWLTL)	AL	Improve Signal Timing
O	Increase incident response along the SR 162 corridor	AM	Signal Interconnections
P	ITS devices needed along the SR 162 corridor	AN	Improve sight distance at intersections
Q	Train or commuter rail service needed and to include a stop at 128th/SR 162	AO	Improve School Bus Routing
R	Intersection transit queue jumps along SR 162	AR	Two step left turn from side streets at appropriate locations?
S	Expand existing vanpool availability	AS	Implement narrow roads, wide nodes concept through appropriately designed modern roundabouts?
V	Add reversible 3rd lane in key locations or throughout the SR 162 corridor	AT	Provide school bus turnouts at appropriate locations?

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SR 162 SUMNER TO ORTING CORRIDOR STUDY

WSDOT

Initial Screen Results

Ideas Screened Out (Criteria #7 - Pursue By Others)

	Idea description
E	Linking the Foothills Trail to the Sumner train station
F	Add a park and ride lot at 128th and SR 162
G	Add park and pool lots
I	Look at existing TDM along the SR 162 corridor
K	Bus rapid transit service is needed on SR 162 during peak period times
L	Public transit service needed on SR 162
Q	Train or commuter rail service needed and to include a stop at 128th/SR 162
R	Intersection transit queue jumps along SR 162
S	Expand existing vanpool availability
AE	Improve pedestrian and bicycle access into Sumner
AF	Increase bicycle storage at Sumner train station
AP	Speed Enforcement
AQ	Limit Parking on Shoulders (Access Management)
AU	Driver education/user outreach

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SR 162 SUMNER TO ORTING CORRIDOR STUDY

WSDOT

Initial Screen Results

Categories

- Channelization
- Intersection Improvements
- Access Management
- TDM
- Public Transportation
- Capacity Improvements
- Signals

B	Channelization on at SR 162 AR - Two-step Left turn from side street at appropriate locations
C	Consider roundabouts at key locations Implement narrow roads, wide nodes concept through appropriately designed modern roundabouts?
D	Restricting left turns at unsignalized intersections to right in/right out
I	Look at existing TDM along the SR 162 corridor AF - Increase bicycle storage at Sumner train station
K	K - Bus rapid transit service is needed on SR 162 during peak period times L - Public Transit service needed on SR 162 U - Intersection transit queue jumps along SR 162 X - Separated bus way AI - Potential state policy changes to make it easier for cities to join Pierce Transit's benefit area AJ - Consider formation of transportation benefit or transit district
M	3 lane configuration on SR 162 (TWLTL) AC - 3 lanes with transit in middle lane
AA	SR 162/SR 410 interchange overpass to increase capacity
AB	Adequate shoulders for bicyclists, vehicle breakdowns and transit
AG	Implementing 1997 Route Development Plan improvements W - Use historic bridge as a 3rd lane at river crossing
AL	Improve Signal Timing AM - Signal Interconnections

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SR 162 SUMNER TO ORTING CORRIDOR STUDY

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Detailed Screening Process

1. Start with Initial Screening Results
2. Give generic ideas specific location or detail.
   For example, "*Consider Roundabouts at Key Locations*" may result in
3. "Roundabout at SR 162/128th St E Intersection"
4. List of Ideas Advanced for Stakeholder Committee Detailed Screening
5. Create Data Matrix and fill in appropriate supporting data
6. Create Scoring Matrix
7. Stakeholder Committee review data, discuss, and agree on Score based on supporting data and scoring ranges
8. Stakeholder Committee decide on Ideas not to advance for further consideration

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SR 162 SUMNER TO ORTING CORRIDOR STUDY

WSDOT

Detailed Screening Process

Criteria and Scoring Range

Congestion/Mobility		Safety	Environmental	Feasibility/ Constructability
Intersection LOS	Segment v/c ratio	% Fatal or Serious Injury Crashes	Number of Environmental Features	Relative Cost
LOS A-C = 0 LOS D = 3 LOS E = 4 LOS F = 5	<0.5 = 0 0.5-0.8 = 3 0.8-1.0 = 4 >1.0 = 5	0% = 0 1-2% = 1 3-4% = 3 5%->5% = 5	0 Feature = 5 1 Feature = 4 2 Feature = 3 3 Feature = 2 4 Feature = 1	Very low (<$250K) = 5 Low (<$1m) = 4 Medium ($1-5m) = 3 High ($5-10m) = 2 Very high (>$10m) = 1

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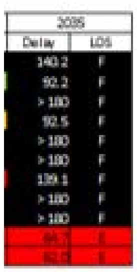
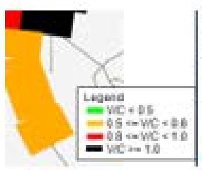
SR 162 SUMNER TO ORTING CORRIDOR STUDY

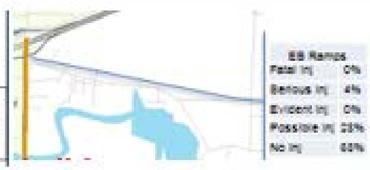
Detailed Screening Process

Supporting Data Source

Congestion/Mobility		Safety	Environmental	Feasibility/ Constructability
Intersection LOS	Segment v/c ratio	% Fatal or Serious Injury Crashes	Number of Environmental Features	Relative Cost
LOS A-C = 0 LOS D = 3 LOS E = 4 LOS F = 5	<0.5 = 0 0.5-0.8 = 3 0.8-1.0 = 4 >1.0 = 5	0% = 0 1-2% = 1 3-4% = 3 5%->5% = 5	0 Feature = 5 1 Feature = 4 2 Feature = 3 3 Feature = 2 4 Feature = 1	Very low (<$250K) = 5 Low (<$1m) = 4 Medium ($1-5m) = 3 High ($5-10m) = 2 Very high (>$10m) = 1







Cost Assumptions

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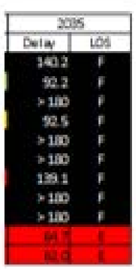
SR 162 SUMNER TO ORTING CORRIDOR STUDY

WSDOT

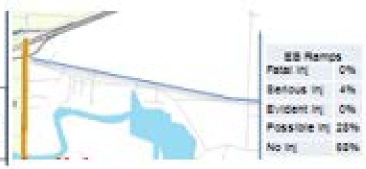
Detailed Screening Process

Supporting Data Source

Congestion/Mobility		Safety	Environmental	Feasibility/ Constructability
Intersection LOS	Segment v/c ratio	% Fatal or Serious Injury Crashes	Number of Environmental Features	Relative Cost
LOS A-C = 0 LOS D = 3 LOS E = 4 LOS F = 5	<0.5 = 0 0.5-0.8 = 3 0.8-1.0 = 4 >1.0 = 5	0% = 0 1-2% = 1 3-4% = 3 5%->5% = 5	0 Feature = 5 1 Feature = 4 2 Feature = 3 3 Feature = 2 4 Feature = 1	Very low (<$250K) = 5 Low (<$1m) = 4 Medium ($1-5m) = 3 High ($5-10m) = 2 Very high (>$10m) = 1



2035	
Delay	LOS
140.2	F
92.2	F
> 180	F
92.5	F
> 180	F
> 180	F
139.1	F
> 180	F
> 180	F
[illegible]	E
[illegible]	E



Cost Assumptions

August 25, 2016

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SR 162 SUMNER TO ORTING CORRIDOR STUDY

WSDOT

Detailed Screening Exercise

Supporting Data Source

Congestion/Mobility		Safety	Environmental	Feasibility/ Constructability
Intersection LOS	Segment v/c ratio	% Fatal or Serious Injury Crashes	Number of Environmental Features	Relative Cost
LOS A-C = 0 LOS D = 3 LOS E = 4 LOS F = 5	<0.5 = 0 0.5-0.8 = 3 0.8-1.0 = 4 >1.0 = 5	0% = 0 1-2% = 1 3-4% = 3 5%->5% = 5	0 Feature = 5 1 Feature = 4 2 Feature = 3 3 Feature = 2 4 Feature = 1	Very low (<$250K) = 5 Low (<$1m) = 4 Medium ($1-5m) = 3 High ($5-10m) = 2 Very high (>$10m) = 1

List of Ideas for Detailed Screening: DATA MATRIX

	Mobility	Safety	Environmental	Feasibility/ Constructability	Total	Star
Idea	Intersection LOS/ Segment v/c ratio	% Fatal or Serious Injury Crashes	Number of Environmental Features	Relative Cost		

List of Ideas for Detailed Screening: SCORING MATRIX

	Mobility	Safety	Environmental	Feasibility/ Constructability	Total	Star
Idea	Intersection LOS/ Segment v/c ratio	% Fatal or Serious Injury Crashes	Number of Environmental Features	Relative Cost	Max = 20	1-5 = 1 Star 6-10 = 2 Star 11-15 – 3 Star 16-20 = 4 Star

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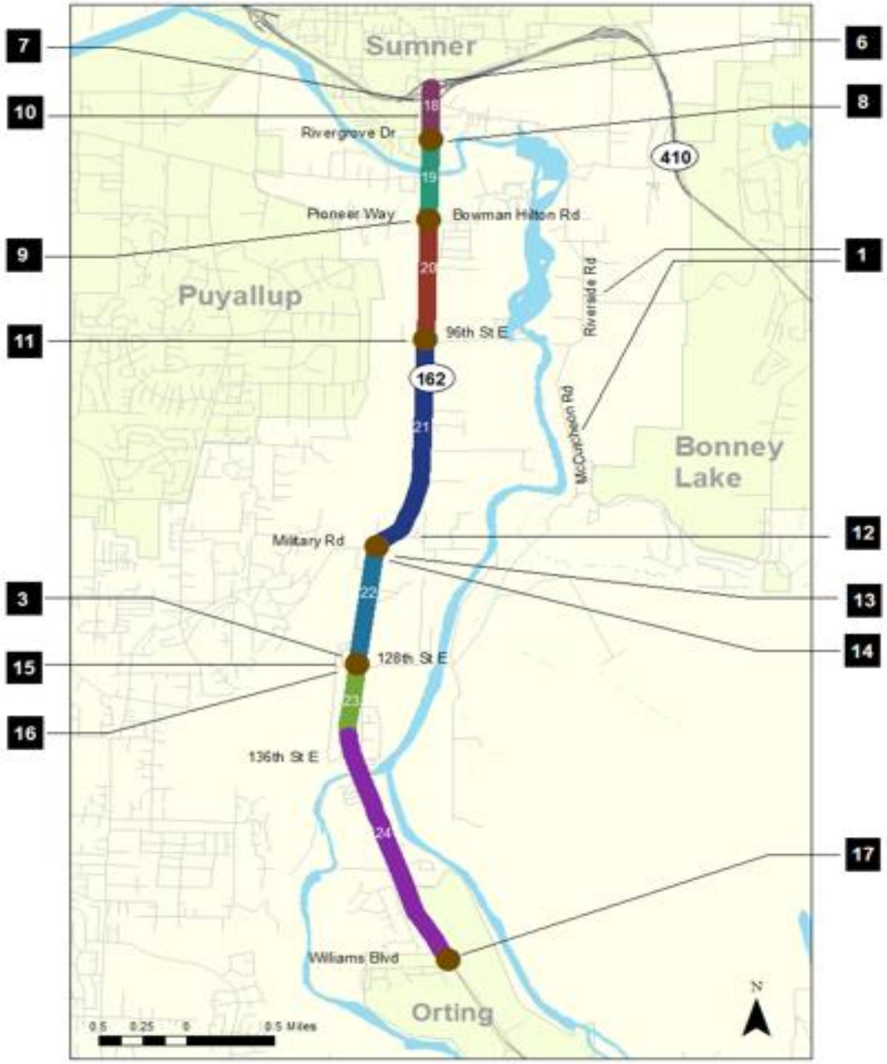
The following Ideas were condensed into 26 for Stakeholder deliberations.



	#	SR 162 - Ideas
1	A	Improving Riverside Road and McCutcheon Road to use as an alternate route to SR 162
2	I	Look at existing TDM along the SR 162 corridor
3	Q	Train or commuter rail service needed and to include a stop at 128th/SR 162
4	Y	Dedicated incident turnout areas along the SR 162 corridor
5	AG	Implementing 1997 Route Development Plan improvements
6	AG I/S 1	410 WB = Dbl NB Left Turn Lane & Dbl SB Right Turn Lane (2035)
7	AG I/S 2	410 EB = Dbl EB Left Turn Lane, Dbl EB Right Turn Lane, and NB Right Pocket
8	AG I/S 3	Rivergrove = SB Right Turn Lane
9	AG I/S 5	Pioneer = SB Right Turn Lane, Dbl EB Right Turn Lane
10	AG I/S 6	74th = Compact Roundabout
11	AG I/S 7	96th = NB Right Turn Lane
12	AG I/S 8	115th = SB Left Turn Lane
13	AG I/S 9	Military = Dbl NB Left Turn Lane, Dbl EB Right Turn Lane
14	AG I/S 9	Compact Roundabout at Military (will be combined with above)
15	AG I/S 10	128th = Dbl SB Left, Dbl NB Right, Dbl WB Left, Dbl WB Right Turn Lanes
16	AG I/S 10	128th = Roundabout (will be combined with above)
17	AG I/S 12	Williams = Compact Roundabout
18	AG Segment A	410 to Rivergrove Rd. = TWLTL (3 or 5-lane undivided. 3-lane could be 2 lanes SB and 1 lane NB per HSP)
19	AG Segment B	Rivergrove to Pioneer = TWLTL (3 or 5-lane undivided. 3-lane could be 2 lanes SB and 1 lane NB per HSP)
20	AG Segment C	Pioneer to 96th = (2 or 3 lane divided with jersey barrier. 3-lanes could be 2-lanes SB and 1 lane NB)
21	AG Segment D	96th to Military = 2 or 3 lane divided Configuation, Access Management (3-lane divided could be 2-lanes SB and 1-lane NB or there could be a SB Left turn lane into 121st and 122nd)
22	AG Segment E	Military to 128th = 2 or 3 lane divided configuation, Access Management. 3-lane divided could be 2-lanes SB and 1-lane NB
23	AG Segment F	128th to 136th = 2 or 3 lane divided configuation, Access Management (3-lane divided could be 2-lanes SB and 1-lane NB)
24	AG Segment G	136th to Williams Rd. = 2 or 3 lane divided configuation, Access Management. 3-lane divided could be 2-lanes SB and 1-lane NB
25	AL	Improve Signal Timing
26	AM	Signal Interconnections

Appendix G Section 2

Section 2 relates to the documents in the Study's strategy selection.

The figure below was employed to convey the five agreed upon strategies and their definitions.

	SHORT DESCRIPTION OF STRATEGY	DEFINITIONS / STRATEGIES
STRATEGIES	TDM (Assume 3% volume reduction similar to Mid-Term 2025 Mobility Results)	<u>TDM:</u> (Transportation Demand Management) TDM Strategies are aimed at changing travel behavior rather than expanding the transportation network to meet travel demand. Such strategies may include the promotion of work hour changes, rideshare options, parking policies, and telecommuting.
	Ops / ITS / Incident Management	<u>Ops:</u> Operations include such elements as traffic signal timing/optimization and interconnect actions. <u>ITS:</u> Intelligent Transportation Systems improve transportation safety and mobility through the use of advanced wireline and wireless communications technologies. ITS strategies proposed include electronic traveler information, Highway Advisory Radio, and road & weather information systems. <u>Incident Management:</u> WSDOT Incident Response resources clear traffic incidents safely and quickly, minimizing congestion and risk of secondary incidents. Strategies include multiple shoulder pullout areas and incident response resources during peak travel times.
	Public Transportation Services (2020 Pilot*)	<u>Public Transportation Services:</u> Strategies included multiple elements of transit service and rail service.
	PnR Facilities, Bike & Ped Improvements, Minor Access Management measures	<u>PnR Facilities:</u> Public park and ride facilities are envisioned to be in the form of small to medium size lots, both public and privately owned which may or may not be served by transit. <u>Bicycle & Pedestrian Improvements:</u> Strategies include shoulder widening and improved accessibility. <u>Minor Access Management:</u> Includes improved delineation of highway access to SR 162.
	Intersection Control / Corridor Improvements	<u>Intersection Channelization:</u> A strategy employed that increases mobility and capacity at highway intersections with turn lanes and striping. <u>Roundabouts:</u> Modern Roundabouts create continuous, one-way traffic flow, reduce collisions by 37%, and cost less to maintain than traditional intersections. <u>Corridor Segment Widening:</u> Capital improvements that create significant widening of the existing roadway.

The stakeholder committee was presented a proposed equal weighed score for Phasing, Cost Range, Mobility Improvement, and Partnerships. After an in-depth discussion it was agreed that the scoring weights be adjusted. Mobility improvement assigned an additional 50 points to 1.50 and Partnership weight reduce from 100 to 50 to points. The committee's justification dealt with concerns over the mobility category failing reflect the importance to the committee and public's sentiments express through the online survey and local participation. Additional categories i.e., Feasibility and Construction were considered and eliminated given the lack of quantifiable information for scoring.

The table below the final results of stakeholder scoring of the five strategies.

Ranked Strategy Summary

	SHORT DESCRIPTION OF STRATEGY	Strategy	SHORT TERM (2020) RANK	MID TERM (2025) RANK	LONG TERM (2035) RANK
STRATEGIES	TDM (Assume 3% volume reduction similar to Mid-Term 2025 Mobility Results)	A	1	1	1
	Ops/ITS/Incident Management	B	4	2	3
	Public Transportation Services (2020 Pilot*)	C	3*	5	4
	PnR Facilities, Bike & Ped Improvements. Minor Access Management measures	D	5	4	2
	Intersection Control/ Corridor Improvements	E	2	3	5

	SHORT DESCRIPTION OF STRATEGY	SHORT-TERM (2020) Strategy	Criteria				
			Phasing	Cost Range ③	Mobility Improvements	Partnerships ④	TOTAL
	WEIGHT		1.00	1.00	1.50	0.50	Avg.
STRATEGIES	Transportation Demand Management (3% volume reduction similar to Mid-Term 2025 Mobility Results)	A	25	25	20	13	83
	Operations/Intelligent Transportation Systems/Incident Management Measures	B	25	24	10	2	62
	Public Transportation Services (*2020 Pilot)	C	25	24	5	13	66
	Park & Ride Facilities, Bike & Pedestrian Improvements. Minor Access Management measures	D	25	25	3	8	61
	Intersection Control/ Corridor Improvements	E	25	18	23	5	71

The Table above shows outlines the stakeholder committee scoring of five strategies for the short-term 2020 year.

	11/9/2016	MID-TERM (2025)					
	SHORT DESCRIPTION OF STRATEGY	Strategy	Criteria				
			Phasing	Cost Range ③	Mobility Improvements	Partnerships ④	TOTAL
	WEIGHT		1.00	1.00	1.50	0.50	Avg.
STRATEGIES	Transportation Demand Management (3% volume reduction similar to Mid-Term 2025 Mobility Results)	A	15	25	20	13	73
	Operations/Intelligent Transportation Systems/Incident Management Measures	B	15	23	15	4	57
	Public Transportation Services (*2020 Pilot)	C	15	13	5	8	40
	Park & Ride Facilities, Bike & Pedestrian Improvements. Minor Access Management measures	D	15	21	4	4	44
	Intersection Control/ Corridor Improvements	E	15	13	22	1	50

The Table above shows outlines the stakeholder committee scoring of five strategies for the mid-term 2025 year

	11/9/2016	LONG-TERM (2035)					
	SHORT DESCRIPTION OF STRATEGY	Strategy	Criteria				
			Phasing	Cost Range ⑧	Mobility Improvements	Partnerships ④	TOTAL
	WEIGHT		1.00	1.00	1.50	0.50	Avg.
STRATEGIES	Transportation Demand Management (3% volume reduction similar to Mid-Term 2025 Mobility Results)	A	1	25	23	13	61
	Operations/Intelligent Transportation Systems/Incident Management Measures	B	1	25	14	1	40
	Public Transportation Services (*2020 Pilot)	C	1	8	12	8	29
	Park & Ride Facilities, Bike & Pedestrian Improvements. Minor Access Management measures	D	1	25	8	8	41
	Intersection Control/ Corridor Improvements	E	1	5	21	1	28

The Table above shows outlines the stakeholder committee scoring of five strategies for the short-term 2035 year.

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Note: Planning Level Estimations Only

Short Description of Strategy	Strategy	GOAL Priorities	Short Term 2020	Mid Term 2025	Long Term 2035	1	2	3	4		Measures Scoring 4 points Minimum 100 points Maximum ①	②
		#1 Low Cost #2 Med Cost #3 High Cost				PERFORMANCE MEASURES Phasing	Cost Range ②	Mobility Improvements	Partnerships ①	TOTAL	Phasing Near = 25 Phasing Mid = 15 Phasing Long = 1 No partnership = 1 One partnership = 15 Two or more partnerships = 25	Low (<$250) = 25 to High (>$10m) = 1 Scoring is based on $390,000 increments (Cost ranking is $10m - $.25m divided by 25)
						1 - 25	1 - 25	1 - 25	1 - 25	Avg.		
TDM (3% in 2020 and 2025 with 10 % in 2035 for reduction)	A		x	x	x	14	25	14	25	75		
A. Car/Vanpool initiative (2020)			x			25	25	14	25	55	Averaged mobility score of 13 for AM and 14 for PM	Assume cost to implement strategy is less than .25M
A. Car/Vanpool initiative (2025)				x		15	25	14	25	79	Averaged mobility score of 13 for AM and 14 for PM	Assume cost to implement strategy is less than .25M
A. Car/Vanpool initiative (2035)					x	1	25	15	25	66	Averaged mobility score of 14 for AM and 16 for PM	Assume cost to implement strategy is less than .25M
B. Telework/Flexible work shifts (2020)			x			25	25	14	25	89	Averaged mobility score of 13 for AM and 14 for PM	Assume cost to implement strategy is less than .25M
B. Telework/Flexible work shifts (2025)				x		15	25	14	25	79	Averaged mobility score of 13 for AM and 14 for PM	Assume cost to implement strategy is less than .25M
B. Telework/Flexible work shifts (2035)					x	1	25	15	25	66	Averaged mobility score of 14 for AM and 16 for PM	Assume cost to implement strategy is less than .25M
C. Worksite Parking Management/Incentive, Subsidies (2020)			x			25	25	14	25	89	Averaged mobility score of 13 for AM and 14 for PM	Assume cost to implement strategy is less than .25M
C. Worksite Parking Management/Incentive, Subsidies (2025)				x		15	25	14	25	79	Averaged mobility score of 13 for AM and 14 for PM	Assume cost to implement strategy is less than .25M
C. Worksite Parking Management/Incentive, Subsidies (2035)					x	1	25	15	25	66	Averaged mobility score of 14 for AM and 16 for PM	Assume cost to implement strategy is less than .25M
D. Ridematching (2020)			x			25	25	14	25	89	Averaged mobility score of 13 for AM and 14 for PM	Assume cost to implement strategy is less than .25M
D. Ridematching (2025)				x		15	25	14	25	79	Averaged mobility score of 13 for AM and 14 for PM	Assume cost to implement strategy is less than .25M
D. Ridematching (2035)					x	1	25	15	25	66	Averaged mobility score of 14 for AM and 16 for PM	Assume cost to implement strategy is less than .25M
Ops/ITS/Incident Management	B		x	x	x	21	24	10	1	56		
A. Traffic Signal Efficiencies for 2020 (Interconnects/Optimization Near-Term) SR 410 to Rivergrove			x			25	24	9	1	59		Optimization occurs about every 6 years by Traffic Ops
1. Valley Ave & Mead McCumber Rd E			x			25	25	25	1	76	$0 updated every 6 years by Traffic Ops (Averaged 25 & 25)	1.284M
2. SR 162 Valley Ave & SR 410 WB Ramps			x			25	23	8	1	57	Could replace copper with fiber optic (Averaged 12 and 3)	Cost to replace existing copper with fiber optic interconnect in short term is $1.28M
3. SR 162 & SR 410 EB Ramps			x			25	23	11	1	60	Could replace copper with fiber optic (Averaged 13 and 8)	
4. SR 162 & Rivergrove Dr. E			x			25	23	5	1	54	Could replace copper with fiber optic (Averaged 4 and 6)	
5. SR 162 & 80th St E			x			25	25	1	1	52	Updated every 6 years by Traffic Ops (Averaged 1 and 1)	Less than 0.25M to perform counts
6. SR 162 & Pioneer Way E/Bowman-Hilton Rd E			x			25	25	10	1	61	Updated every 6 years by Traffic Ops (Averaged 9 and 11)	Less than 0.25M to perform counts

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Short Description of Strategy	Strategy	GOAL Priorities	Short Term 2020	Mid Term 2025	Long Term 2035	1	2	3	4		Measures Scoring 4 points Minimum 100 points Maximum ①	②
						PERFORMANCE MEASURES					Phasing Near = 25 Phasing Mid = 15 Phasing Long = 1 No partnership = 1 One partnership = 15 Two or more partnerships = 25	Low (<$250) = 25 to High (>$10m) = 1 Scoring is based on $390,000 increments (Cost ranking is $10m - $.25m divided by 25)
		#1 Low Cost #2 Med Cost #3 High Cost				Phasing	Cost Range ②	Mobility Improvements	Partnerships ①	TOTAL		
						1 - 25	1 - 25	1 - 25	1 - 25	Avg.		
7. SR 162 & 96th St E			x			25	25	10	1	61	Updated every 6 years by Traffic Ops (Averaged 1 and 1)	Less than 0.25M to perform counts
8. SR 162 & Military Rd E			x			25	25	5	1	56	Updated every 6 years by Traffic Ops (Averaged 9 and 11)	Less than 0.25M to perform counts
9. SR 162 & 128th St E			x			25	25	4	1	55	Updated every 6 years by Traffic Ops (Averaged 1 and 1)	Less than 0.25M to perform counts
10. SR 162 & 136th St E			x			25	25	8	1	59	Updated every 6 years by Traffic Ops (Averaged 9 and 11)	Less than 0.25M to perform counts
11. SR 162 & Williams Blvd NW/Williams Blvd NE			x			25	25	10	1	61	Updated every 6 years by Traffic Ops (Averaged 1 and 1)	Less than 0.25M to perform counts
A. Traffic Signal Efficiencies for 2025 (Optimization Mid-Term) SR 410 to Rivergrove				x		15	25	12	1	53	Averaged mobility score of 11 for AM and 12 for PM	Assume cost to optimize based upon updated counts is less than .25M
A. Traffic Signal Efficiencies for 2035 (Optimization Long-Term) SR 410 to Rivergrove					x	1	25	1	1	28		Assume cost to update optimization is less than 0.25M
B. Electronic Traveler Info *			x			25	25	12	1	63		Assume 0.25M placeholder
C. Highway Advisory Radio (HAR) *			x			25	25	12	1	63		0.10 M
D. Road & Weather Information System (RWIS) *			x			25	25	12	1	63		0.07 M
E. Hwy. Activity Pullouts * 1. IRT Assignment Parking 2. MVA pull out areas 3. Enforcement Activity A relatively Low-cost			x			25	18	12	1	56		#2 $316,000 for each incident pullout (1 per mile N&S bound about 10 total for 5.73 miles or 11.46 lane miles)
F. Signing other*			x			25	25	12	1	63		Assume less than 0.25 M by state forces
G. Illumination*			x			25	25	12	1	63		25K per pole. 1 per I/S x 10 locations for .25M by state forces
Public Transportation Services	C			x	x	3	8	10	16	37		
A. Establish Bus Transit service						6	23	9	18	56		
1. Basic, 3 AM and 3 PM service trips; Orting to Sumner				x		15	24	9	15	63	Mobility not measured	0.79M
2. Standard: Express and limited daytime service trips					x	1	24	9	15	49		1.19M
3. Enhanced : Express bus service 3 hr. AM & 3 hr. PM with 30 minute headways. On the hour headways between Peak					x	1	21	9	25	56		2.066M
B. Establish Rail Service					x	1	1	11	15	28	Averaged Mobility AM and PM Intersection and NB AM and SB PM segments	202-224M
C. Establish Shuttle Service with Coach-level shuttle					x	1	1	9	15	26		

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Measures Scoring
4 points Minimum
100 points Maximum

Short Description of Strategy	Strategy	GOAL Priorities	Short Term 2020	Mid Term 2025	Long Term 2035	1	2	3	4		①	②
						PERFORMANCE MEASURES					Phasing Near = 25 Phasing Mid = 15 Phasing Long = 1 No partnership = 1 One partnership = 15 Two or more partnerships = 25	Low (<$250) = 25 to High (>$10m) = 1 Scoring is based on $390,000 increments (Cost ranking is $10m - $.25m divided by 25)
		#1 Low Cost #2 Med Cost #3 High Cost				Phasing	Cost Range ②	Mobility Improvements	Partnerships ①	TOTAL		
						1 - 25	1 - 25	1 - 25	1 - 25	Avg.		
PnR Facilities, Bike & Ped Improvements. Minor Access Management measures.	D		x	x	x	14	22	9	10	56		
A1 PnR lots 136th				x		15	15	9	15	54		4.5 million 125 stall incl r/w (2025)
A2 Park & Pool facilities (2020)			x			25	25	9	15	74		existing private properties
A2 Park & Pool facilities (2025)				x		15	25	9	15	64		existing private properties
A2 Park & Pool facilities (2035)					x	1	25	9	15	50		existing private properties
B. Improved Bike & Peds. Accommodations (6' shoulder widening corridor wide NB & SB)				x		15	18	9	1	43	Averaged score of A through G Individual Segments	
D. 96th to Military				x		15	16	9	1	41	Mobility not measured	4.143M
E. Military to 128th				x		15	20	9	1	45	Mobility not measured	2.291M
F. 128th to 136th				x		15	23	9	1	48	Mobility not measured	1.356M
G. 136th to Williams				x		15	14	9	1	39	Mobility not measured	4.587M
C. Minor Access Mgmt. (Rt. in Rt. out at selected locations)				x		15	25	9	1	50	Mobility not measured	Assume less than 0.25K for placeholder (one location)
Intersection Control/Corridor Improvements	E		x	x	x	11	11	9	2	33		
A. Intersection Channelizaton				x	x	12	14	7	1	34		
1. SR 410 WB Off/On ramp Dbl. NBL & Dbl SBR Channelization (5 lane bridge with channelization and ITS)					x	1	1	5	1	8	Averaged AM and PM Mobility (9+1)/2	55.91M
2. SR 410 EB Off/On Ramp Dbl EBL, Dbl EBR , NBR Pocket Channelization (5 lane bridge with channelization and ITS)					x	1	1	8	1	11	1997 Plan Improvement (Averaged AM and PM Mobility of 9 and 7)	55.91M (low10)
3. Rivergrove SBR Channelization				x		15	23	3	1	42	1997 Plan Improvement (Average AM and PM Mobility of 1 and 5)	1.35 M High Cost
4. Pioneer SBR & Dbl EBR Channelization				x		15	23	16	1	55	1997 Plan Improvement (Averaged AM and PM Mobility of 21 and 11)	1.295M
5. 96th NBR Channelization				x		15	22	7	1	45	1997 Plan Improvement (Averaged AM and PM Mobility of 8 and 6)	1.689M
6. Military Dbl NBL & Dbl EBR Channelization				x		15	16	5	1	37	1997 Plan Improvement (Averaged AM and PM Mobility of 9 and 1)	4.115M
7. 115th SBL Channelization				x		15	22	9	1	47	Assume Mobility 9 for placeholder	1.579M

STRATEGIES

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Measures Scoring
4 points Minimum
100 points Maximum

Short Description of Strategy	Strategy	GOAL Priorities	Short Term 2020	Mid Term 2025	Long Term 2035	1	2	3	4		①	②
						PERFORMANCE MEASURES					Phasing Near = 25 Phasing Mid = 15 Phasing Long = 1 No partnership = 1 One partnership = 15 Two or more partnerships = 25	Low (<$250) = 25 to High (>$10m) = 1 Scoring is based on $390,000 increments (Cost ranking is $10m - $.25m divided by 25)
		#1 Low Cost #2 Med Cost #3 High Cost				Phasing	Cost Range ②	Mobility Improvements	Partnerships ①	TOTAL		
						1 - 25	1 - 25	1 - 25	1 - 25	Avg.		
8. 128th Dbl SBL, Dbl NBR, Dbl WBL, and Dbl WBR Channelization				x		15	4	3	1	23	1997 Plan Improvement (Averaged AM and PM Mobility of 4 and 2)	8.68M
B. Roundabout			x	x	x	16	17	9	5	46		
1. SR 410 WB Ramp (Single lane)				x		15	14	9	1	39	Single lane LOS D with 52.0 seconds in 2025 PM	4.62 M (Adding SB slip lane could result in LOS A with 8.6 seconds in 2025 PM)
2. SR 410 EB Ramp (Single lane)				x		15	14	9	1	39	Single lane LOS F with 123.4 seconds in 2025 PM	4.62M (Adding EB slip lane could result in LOS B with 15.2 seconds in 2025 PM)
3. 74th compact RBT			x			25	24	9	1	59	Likely to be LOS A based upon 80th Mid Term Results. OR Traffic Priority Location	1.01M (not counted)
4. Rivergrove (possible compact RBT with 35 mph posted)				x		15	24	9	1	49	Single lane LOS A with 7.1 seconds in 2025 PM	1.01M
5. 80th (possible compact RBT with 35 mph posted)				x		15	24	9	1	49	Single lane LOS A with 5.4 seconds in 2025 PM	1.01M
6. Pioneer/Bowman Hilton (Single lane RBT transition from 35 mph to 50 mph)				x		15	14	9	1	39	Single lane LOS F with 118.4 seconds in 2025 PM	4.62m (Adding EB slip lane could result in LOS D with 38.4 seconds in 2025 PM)
7. 96th (Single lane RBT with 50 mph posted speed))				x		15	14	9	1	39	Single lane LOS F with 82.3 seconds in 2025	4.62m (Could be LOS E in 2020 PM if delay is less than 80 seconds)
8. Military Rd. (Single lane RBT)			x			25	14	9	15	63	Single lane LOS F in 2025 PM with 167.9 seconds. OR Traffic Priority Location	4.74M
8. Military Rd. (Multilane)				x		15	14	9	15	53		4.74M
9. 128th (Single lane)			x			25	15	9	15	64	Single lane LOS F in 2025 PM with 129.8 seconds. OR Traffic Priority Location	4.50M
9. 128th (Multilane)				x		15	15	9	15	54		4.50M
10. 136th (Single lane with 50 mph posted speed)						15	14	9	1	39	Single lane LOS A with 8.5 seconds in 2025 PM	4.62M (Could be compact if posted speed reduced from 50 mph to 35 mph)
11. Williams compact			x			25	24	9	1	59	Single lane LOS C in 2025 PM. OR Traffic Priority Location	1.01M
11. Williams (multilane)					x	1	14	9	1	25		4.62M
12. Multilane Roundabout (Other)					x	1	14	9	1	25	4.62M (Averaged Military and 128th)	
C. Corridor Segment widening				x	x	5	2	12	1	20		
1a. SR 410 to Rivergrove (Undivided 2 SB, 1 NB lane, and TWLTL)				x		15	7	9	1	32	Highway System Plan 2007-2026 solution (PSRC 2040)	7.43M

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Short Description of Strategy	Strategy	GOAL Priorities	Short Term 2020	Mid Term 2025	Long Term 2035	1	2	3	4		Measures Scoring 4 points Minimum 100 points Maximum ①	②
						PERFORMANCE MEASURES					Phasing Near = 25 Phasing Mid = 15 Phasing Long = 1 No partnership = 1 One partnership = 15 Two or more partnerships = 25	Low (<$250) = 25 to High (>$10m) = 1 Scoring is based on $390,000 increments (Cost ranking is $10m - $.25m divided by 25)
		#1 Low Cost #2 Med Cost #3 High Cost				Phasing	Cost Range ②	Mobility Improvements	Partnerships ①	TOTAL		
						1 - 25	1 - 25	1 - 25	1 - 25	Avg.		
1b. SR 410 to Rivergrove (Undivided 5 lanes with TWLTL)					x	1	4	16	1	22	1997 Plan Improvement (Mobility NB AM 8 + SB PM 24 divided by 2)	8.64M
2a. Rivergrove to Pioneer (Undivided 2 SB and 1 NB lane)				x		15	1	9	1	26	Highway System Plan 2007-2026 solution (PSRC 2040)	19.41M
2b. Rivergrove to Pioneer (Undivided 5 lanes with TWLTL)					x	1	1	12	1	15	1997 Plan Improvement (Mobility NB AM 0 + SB PM 24 divided by 2)	27.72M
3a. Pioneer to 96th (Divided 3 lanes: 2 SB and 1 NB)				x		15	1	9	1	26	Highway System Plan 2007-2026 solution (PSRC 2040)	10.30M
3b. Pioneer to 96th (Divided 4 lanes)					x	1	1	16	1	19	1997 Plan Improvement (Mobility NB AM 6 + SB PM 25 divided by 2)	12.97M
4b. 96th to Military (Divided 4 lanes)					x	1	1	14	1	17	1997 Plan Improvement (Mobility NB AM 2 + SB PM 25 divided by 2)	25.40M
5b. Military to 128th (Divided 4 lanes)					x	1	1	14	1	17	1997 Plan Improvement (Mobility NB AM 10 + SB PM 18 divided by 2)	16.32M
6b. 128th to 136th (Divided 4 lanes)					x	1	1	13	1	16	1997 Plan Improvement (Mobility NB AM 25 + SB PM 0 divided by 2)	17.424M
7b. 136th to Williams (Divided 4 lanes)					x	1	1	9	1	12	1997 Plan Improvement (Mobility NB AM 15 + SB PM 3 divided by 2)	
Other	G		x	x	x	14	1	1	15	31		
A. Local Agency led Improvement (2020)			x			25	1	1	15	42		
A. Local Agency led Improvement (2025)				x		15	1	1	15	32		
A. Local Agency led Improvement (2035)					x	1	1	1	15	18		
B. Developer Initiated Improvements (2020)			x			25	1	1	15	42		
B. Developer Initiated Improvements (2025)				x		15	1	1	15	32		
B. Developer Initiated Improvements (2035)					x	1	1	1	15	18		

Other	G		x	x	x	14	1	1	15	31		
A. Local Agency led Improvement (2020)			x			25	1	1	15	42		
A. Local Agency led Improvement (2025)				x		15	1	1	15	32		
A. Local Agency led Improvement (2035)					x	1	1	1	15	18		
B. Developer Initiated Improvements (2020)			x			25	1	1	15	42		
B. Developer Initiated Improvements (2025)				x		15	1	1	15	32		
B. Developer Initiated Improvements (2035)					x	1	1	1	15	18		