

South Pierce Multimodal Connectivity Study

SEPTEMBER 2023



**Washington State
Department of Transportation**

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Washington State Department of Transportation
Olympic Region Multimodal Planning
Lacey, Washington

South Pierce Multimodal Connectivity Study

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Federal, State, and Regional

- Federal Highway Administration
- Freight Mobility Strategic Investment Board
- Joint Base Lewis-McChord
- Washington State Patrol
- Puget Sound Regional Council
- South Sound Military and Communities Partnership

Tribes

- Nisqually Indian Tribe
- Yakama Nation

Local Government

- City of Bonney Lake
- City of Orting
- City of Puyallup
- City of Roy
- City of Sumner
- City of Tacoma
- Puyallup City Council
- Pierce County Council
- Pierce County Emergency Management
- Pierce County Executive Office
- Pierce County Parks & Recreation
- Pierce County Planning & Public Works
- Pierce County Sheriff
- Pierce County Transportation Advisory Commission
- Orting Valley Fire Rescue

Transit Agencies

- Pierce Transit
- Sound Transit

School Districts

- Bethel School District
- Orting School District

Freight and Business Representatives

- Puyallup Sumner Chamber of Commerce
- Port of Tacoma/Northwest Seaport Alliance
- Tacoma-Pierce County Chamber

Community Based Organizations and Groups

- Blue Zones
- Center for Independence
- ForeverGreen Trails
- Korean Women's Association
- SR 162 Community Group
- Sunrise Community, South Hill
- Tacoma Bicycle Club
- Walk and Roll Pierce County Coalition

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Executive Summary

The Washington State Legislature allocated funding in the 2021-2023 Transportation Budget (SSB 5165, Section 218 (7)) for the Washington State Department of Transportation (WSDOT) to conduct a planning study for additional connectivity in the area between State Route (SR) 161, SR 7, SR 507, and I-5 in South Pierce County. In the 2022 Regular Session Supplemental Transportation Budget (ESSB 5689, Section 305 (30)), the legislature added a new task to examine the need for additional connectivity in the area between SR 162, south of Military Road East and north of Orting, and SR 161. The study was subsequently named the South Pierce Multimodal Connectivity Study (SPMCS).

The study area (**Figure ES-1**) was determined based on the legislature's direction and serves diverse communities and varying land use contexts, from urban to rural. Safety performance issues and the completeness of the multimodal transportation system also vary across the study area. Needed transportation improvements vary widely across the study area.

Safety is Our Top Priority

This study's emphasis on fatal and serious injury crash reduction aligns with policy direction from federal, state, and local government. This direction is clear and unambiguous:

- USDOT's National Road Safety Strategy begins with the statement: "Our priority ... is to make our transportation system safe for all people".
- Washington State law prioritizes safety and preservation over all other transportation system policy goals (RCW 47.04.280).
- WSDOT's Strategic Plan points to the agency's mission to "provide safe, reliable and cost-effective transportation options."
- Through Resolution R2022-118, the "Pierce County Council endorses Vision Zero as part of a comprehensive effort to strive to achieve zero traffic deaths and serious injuries on Pierce County Roadways by 2035."
- In a July 27, 2022 letter to WSDOT, a majority of Pierce County council members stated that "every traffic fatality is tragic and unacceptable."

This study's recommendations emphasize protecting vulnerable road users through expanded investments in active transportation infrastructure, roadway operational improvements, and transit coverage and service levels. These recommendations directly support Pierce County's Resolution R20201-125, which states that "capital facility investments that support walking, bicycling, and other forms of active transportation ... shall be an area of emphasis in future capital facility planning efforts undertaken by Pierce County."

WSDOT takes its transportation safety role seriously. Transportation system user safety is the foundational principle for all planning studies that WSDOT undertakes. When the state legislature directed WSDOT to study "additional connectivity" in South Pierce County, it did not alter the underlying policy direction. Connectivity and mobility cannot come at the expense of protecting the lives and health of Pierce County's residents and visitors.

The broad participation by various community members and the work of two advisory committees provided a unique opportunity for partners and stakeholders to come together to produce a coordinated plan to help address transportation safety performance issues; improve multimodal mobility, accessibility, and connectivity; and enhance economic vitality. This report provides a recommended Strategic Vision Package of potential transportation investments to better serve the mobility needs of all users in the study area, regardless of their mode of travel.

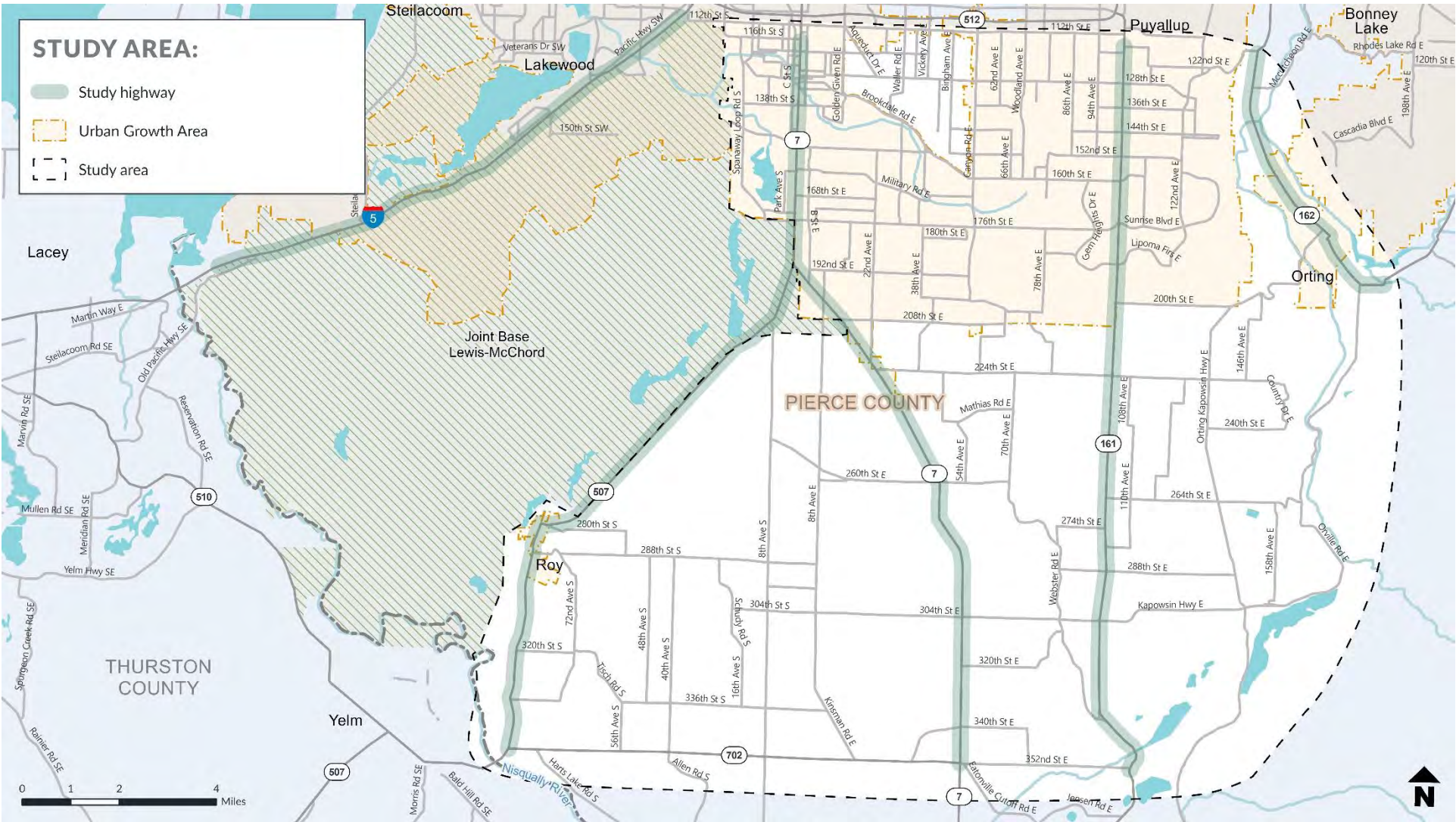


Figure ES-1. SPMCS Study Area

Study Engagement

WSDOT established the technical advisory committee (TAC) and policy advisory committee (PAC) to provide input on study direction, share useful information and data, and help build consensus and support for strategies and solutions.

While the TAC was primarily focused on detailed technical issues and consisted of technical agency staff, the PAC focused on policy issues and included elected officials from local jurisdictions and leadership from other public agencies. The TAC met six times throughout the study, while the PAC met five times.

Community engagement to help inform the analysis occurred in two phases during the study process: in the first phase, during fall 2022 and winter 2023, the study team gathered input that advanced our understanding of existing conditions and challenges through an online open house and project website; in the second phase, during spring 2023, the study team worked with agencies, community-based organizations (CBO), and advisory committees to propose a broad range of multimodal improvement strategies. In spring 2023, the study team also shared feedback with the public from the online open house, provided an update on the study improvement strategy development process, and provided information on the initial study performance results.

Policy Guidance

The study team collaborated with stakeholders, including the TAC and PAC, to develop a vision and problem statement for the study. Transportation policy guidance from the state legislature, WSDOT, the Puget Sound Regional Council, and Pierce County all note that transportation planning efforts must consider all travel modes, address equity concerns and disparate impacts, and develop safety improvements for all road users.

Transportation Policy Guidance Excerpts

- Preservation and safety are priorities within the State's Transportation System Policy Goals—RCW 47.04.280
- The Pierce County Council endorses Vision Zero as part of an effort to achieve zero traffic deaths and serious injuries within the County—PC Resolution R2022-118
- The Council also stated that “Every traffic fatality is tragic and unacceptable,” and “We all need to work together to [...] ensure the safety of every user through better road design and calmer streets”—Office of the County Council Roadway Safety Letter dated July 27, 2022
- The Growth Management Act “encourages development in urban areas where adequate public facilities and services exist or can be provided in an efficient manner” and the reduction of low-density development—RCW 36.70A.020
- The Puget Sound Regional Council's (PSRC) Vision 2050 Multicounty Planning Policies state that the region should have a “sustainable, equitable, affordable, safe, and efficient multimodal transportation system”

Performance Gaps and Problem Statement

The study began by evaluating the existing conditions of the multimodal transportation system to identify performance gaps. This evaluation incorporated all modes of transportation, including passenger vehicles, freight, transit, bicycles, and pedestrians. A safety evaluation was also completed.

The study team also evaluated future conditions in 2050. This analysis considered forecasted population and employment growth as well as funded or very likely to occur transportation improvements. Future transportation operations will be poor without additional infrastructure investments and improvements to the efficiency of the system. Although a better jobs-to-housing balance shortens trip lengths and therefore congestion, the large amount of growth leads to a system that is more congested. Very limited transit service, active transportation infrastructure, and safety improvements are currently funded.

Based on the performance gaps identified, the study team and stakeholders crafted a problem statement to identify areas for improvement and to guide the development of multimodal improvement recommendations. The TAC and PAC ranked the problem statement in the priority order shown in **Table ES-1**.

The problem statement informed the development and analysis of transportation improvement strategies and ultimately the SPMCS Strategic Vision Package.

Table ES-1. SPMCS Problem Statement

Priority Order	Performance Gap/ Problems Identified	Supporting Data Findings
1	Safety performance does not meet Target Zero goals	There were approximately 300 people seriously injured and 85 fatalities between 2017-2021 on study area roadways. ¹ Target Zero sets the acceptable level of serious and fatal collisions as zero.
2	Multimodal options are lacking	There is a lack of active mode infrastructure such as sidewalks, trails, and bike facilities throughout the study area. There are a handful of transit routes serving the north part of the study area along SR 7 and SR 161, but not the central or south area due to the current Pierce Transit service area boundary.
3	North-south roadway congestion	Major north-south roadways are congested during peak traffic periods. Most of the congestion occurs near SR 512 at the north of the study area, but SR 161 and SR 7 experience peak congestion as far south as 200 th Street.
4	Freight access and congestion	The Frederickson Manufacturing/Industrial Center is an economic driver in South Pierce County and results in heavy freight usage in the study area, primarily along Canyon Road. Canyon Road is classified as a T-1 freight route (more than ten million tons per year), the highest possible designation. The state routes within the study area are designated as T-2 freight routes. Freight congestion increases the costs of goods and services.
5	East-west connectivity lacking	Connections between SR 161 and SR 162 are limited and experience heavy congestion. This congestion is expected to increase with the planned connection between SR 162 and Tehaleh. Per the study proviso, connection alternatives were studied.
6	Resiliency, environment, and climate change concerns	In 2019, transportation accounted for 39% of all greenhouse gas emissions in Washington State. There are concerns about the disconnected nature of the roadway network in portions of the study area as well as evacuation capacity concerns for events such as lahar flows or wildfires that are becoming more frequent with climate change.
7	Health and mobility disparities	The study area boundaries include historically disadvantaged community tracts and areas with environmental and economic disparities according to state and county analyses. Historically, transportation investments have not been equitably distributed. The Healthy Environment for All Act (HEAL Act) requires WSDOT to evaluate and reduce these disparities.

¹ Under 23 U.S. Code 148 and 23 U.S. Code 407, safety data, reports, surveys, schedules, list 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 report, surveys, schedules, lists, or data.

SPMCS Strategic Vision Package

The study team developed a multi-level screening and evaluation process that considered improvement strategies from past agency plans, stakeholder input, and community requests. This process ultimately developed a Strategic Vision Package of improvements.

The package was divided into four types of strategies:

- Transportation systems management and operations (TSMO), intelligent transportation systems (ITS), and safety improvements
- Multimodal infrastructure improvements
- Transit improvements
- Capacity and connectivity improvements

The first two types of strategies were developed programmatically, meaning that specific locations were not identified for improvements; transit and capacity improvements were developed based on location.

The recommended Strategic Vision Package meets the study vision and addresses the problem statement. The package constitutes a major investment in multimodal travel within the study area. A broad set of partners and stakeholders support the improvement strategies.

Implementing the Vision

The Strategic Vision Package represents a bold vision to address the expected transportation challenges faced within the study area over the next 30 years. Partner and community engagement has been critical throughout the study process. While the development of the Strategic Vision Package represents a major step forward in improving multimodal transportation and mobility in the South Pierce County area, there is still a long way to go to fund, design, and implement the package. Further analysis will be necessary for all improvement strategies. WSDOT will use the Practical Solutions framework² to collaborate with partners to make the right investments, in the right places, at the right time, using the right approach to achieve an integrated, sustainable transportation system in South Pierce County.

The Practical Solutions framework (**Figure ES-2**) lays out the next steps toward implementation of these strategies:

1. **Further planning:** assess alternative strategies at a refined and localized level
2. **Scoping:** refine solutions and develop a scope of work for each improvement strategy
3. **Programming:** assign resources such as funding and engineering staff capacity for each improvement strategy
4. **Designing:** develop engineering designs for each improvement strategy

² <https://performanceframework.wsdot-sites.com/>

Overview of the Strategic Vision Package

- Intersection improvements and signal upgrades
- Safety improvements
- Access management to reduce conflict points
- Pedestrian crossing improvements
- New active mode infrastructure (such as sidewalks, bike paths, and trails) to serve schools and fill gaps
- Transit improvements including new routes and increased service
- Capacity and connectivity improvements on county roads

5. **Implementing:** construct or implement each improvement strategy

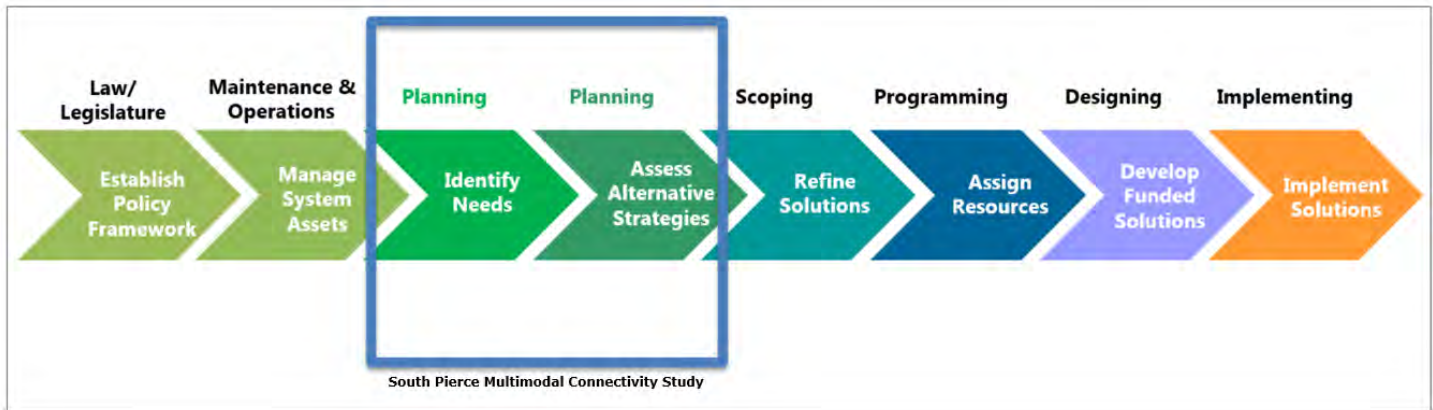


Figure ES-2. Practical Solutions Framework

Further analysis is needed to better define strategy prioritization metrics with a strong equity lens. This prioritization process should also develop a funding strategy and identify necessary environmental reviews needed for each strategy. Ongoing collaboration between WSDOT, agency partners, and the community will be critical to implementing the identified improvements. As many of the improvements identified are not under the jurisdiction of WSDOT, agency partners will need to prioritize and seek funding for identified improvements using their own project development processes.

Unresolved Issues

Through the course of the study, a set of unresolved issues that greatly impact the performance of the transportation system was identified. These issues will require partner agencies to work together to resolve key challenges such as existing land use and development patterns that do not support transit and active mode transportation options, expansion of the Pierce Transit service area to provide transit options to growing areas within (and potentially adjacent to) the urban growth area (UGA), and whether additional capacity is needed for emergency evacuation. These are not issues WSDOT can resolve on its own, and they are key to delivering many of the improvements in the recommended Strategic Vision Package.

SR 161 and SR 162 Connection Alternatives

Separate from the Strategic Vision Package, the study analyzed alternatives for additional connectivity in the area between SR 162, south of Military Road East and north of Orting, and SR 161. Three alternative connections were evaluated using the following criteria: travel demand, cost, environmental constraints, and constructability. The three alternatives are presented in **Figure ES-3**.



Figure ES-3. SR 161-162 Connection Alternatives

All connection alternatives provided negligible changes in traffic volumes along regional routes, and each is estimated to cost over \$100 million due to topography and other constructability issues, as well as numerous environmental constraints. Each of the alternatives would be a Pierce County lead improvement and will need further analysis. Due to the limited regional impact and the responsibility for any of these improvements resting with Pierce County, the SPMCS is not making a specific alignment or implementation recommendation.

Conclusions

The Strategic Vision Package represents a bold yet realistic plan to address the transportation challenges this study area is expected to experience over the next 30 years. While the development of the Strategic Vision Package represents a major step forward in improving transportation and mobility in the SPMCS study area, there is still a long way to go to further plan, fund, design, and implement the roughly \$1.1-\$1.5 billion in transportation capital improvements (plus ongoing operations and maintenance costs related to capital improvements) recommended by this study.

Chapter 1. Study Foundations

This chapter covers the foundation of the study, including the study origin, policy guidance that helped shape the scope of the study, performance gaps and the resulting study problem statement, and unresolved issues.

Study Origin

The Washington State Legislature allocated funding in the 2021-2023 Transportation Budget (SSB 5165, Section 218 (7)) for the Washington State Department of Transportation (WSDOT) to assess additional connectivity needs in the area between State Route (SR) 161, SR 7, SR 507, and I-5 in South Pierce County. In the 2022 Regular Session Supplemental Transportation Budget (ESSB 5689, Section 305 (30)), the legislature also directed WSDOT to study the need for additional connectivity in the area between SR 162, south of Military Road East and north of Orting, and SR 161.

The study was named the South Pierce Multimodal Connectivity Study (SPMCS). This document focuses on the key recommendations of the study. Technical and process information is included in the appendices.

The study area was determined based on legislative direction. As shown in **Figure 1-1**, the study area includes portions of Puyallup, Roy, and Orting, but is mostly composed of the unincorporated areas of South Pierce County including Parkland, Spanaway, Frederickson, South Hill, Elk Plain, and Graham. The study area is home to about 303,000 people and over 35,000³ jobs. The study area varies from relatively dense urban areas toward the north and along key arterial roadways, to suburban low density housing developments, to fully rural areas further to the south.

³ 2020 US Census data for block groups (population) or study area boundary (jobs), excludes JBLM.

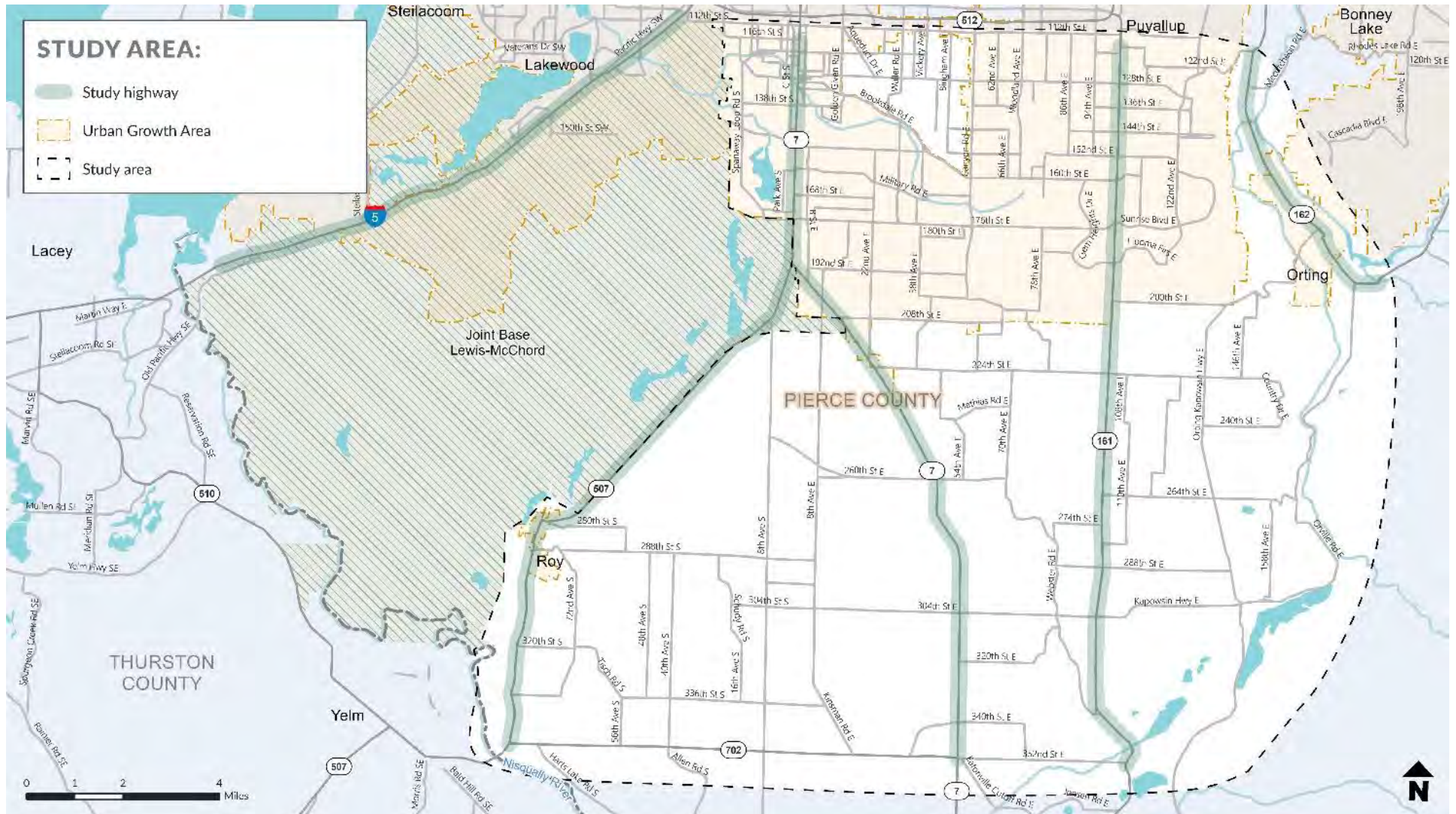


Figure 1-1. SPMCS Study Area

Policy Guidance

Transportation policy guidance from the state legislature, WSDOT, the Puget Sound Regional Council (PSRC), and Pierce County were reviewed and incorporated in the framework for this study. Key guidance that shaped the study is identified below:

- Preservation and safety are priorities within the State’s Transportation System Policy Goals-RCW 47.04.280
- WSDOT Duties outlined in RCW 47.01.078 include requirements to
 - “Balance system safety and convenience through all phases of a project to accommodate all users of the transportation system to safely, reliably, and efficiently provide mobility to people and goods”
 - “Develop strategies to gradually reduce the per capita vehicle miles traveled”
 - “Consider efficiency tools, including high occupancy vehicle and high occupancy toll lanes, corridor-specific and systemwide pricing strategies, active traffic management, commute trip reduction, and other demand management tools”
 - “...design environmentally sustainable, context-sensitive transportation systems”
- The Growth Management Act “encourages development in urban areas where adequate public facilities and services exist or can be provided in an efficient manner,” the reduction of low-density development and sprawl, and an efficient multimodal transportation system-RCW 36.70A.020
- The Healthy Environment for All Act (HEAL Act) requires WSDOT to identify and address environmental health disparities in overburdened communities and underserved populations-RCW 70A.02
- PSRC’s Vision 2050 Multicounty Planning Policies state that the region should accommodate growth in urban areas while reducing greenhouse gas emissions and have a “sustainable, equitable, affordable, safe, and efficient multimodal transportation system”
- The Pierce County Council “endorses Vision Zero as part of an effort to strive to achieve zero traffic deaths and serious injuries on Pierce County Roadways by 2035”-PC Resolution R2022-118
- The Council directed future planning efforts to include “investments that support walking, bicycling, and other forms of active transportation within the corridor and provide linkages to bus rapid transit facilities...”-PC Resolution R2021-125
- The Council also stated that “Every traffic fatality is tragic and unacceptable,” and “We all need to work together to [...] ensure the safety of every user through better road design and calmer streets”-Office of the County Council Roadway Safety Letter dated July 27, 2022
- WSDOT Secretary’s Executive Order Number E 1085.01 states that “WSDOT intends to systematically reduce fatal and serious injury crash potential statewide,” and incorporates the Safe System Approach which prioritizes the elimination of fatal and serious injury crashes. The order also prioritizes “design and operational decisions that support safety for all users [...] particularly in locations affected by legacy state transportation facilities and where gaps in walking and biking facilities exist...”

Common themes in this policy guidance are as follows:

- Safety for all road users is a priority
- Multimodal transportation systems are supported by dense urban development
- The system should consider and plan for all modes of travel
- Equity and health disparities must be addressed

Performance Gaps and Problem Statement

The study team completed an existing and future conditions analysis as detailed in the following appendices:

- **Appendix A: Streetlight Travel Patterns Memo**
- **Appendix B: Bike Level of Traffic Stress Methodology and Results Memo**
- **Appendix C: Crash Analysis Memo**
- **Appendix D: Existing and Future Conditions Memo**

The analysis considered all modes of travel within and through the study area, including private vehicles, transit, freight, and active modes such as walking, biking, and rolling. An analysis of crash data from 2017-2021 was also included to better understand the safety performance of the study area roadways, with a particular emphasis on serious injury and fatality crashes in line with the state's Target Zero goal.

Existing study area transportation conditions are generally poor. The study area experiences peak period north-south roadway congestion and disjointed east-west connectivity for vehicles and freight, non-frequent and limited transit service that does not reach most of the study area, few active transportation options, and many high-crash locations. Current land use trends have resulted in an imbalance between fast-growing housing development combined with much slower job growth, resulting in longer commutes to work and services. This imbalance contributes to increased vehicle miles traveled (VMT) and congestion, particularly during peak commuting periods in the morning and afternoon.

Following the existing deficiencies assessment, the study team developed a travel demand model to forecast baseline conditions in 2050. The future baseline scenario included only those transportation improvements already funded or very likely to be implemented by 2050. Future land use growth forecasts provided by PSRC and Pierce County were also included.

This assessment demonstrated that future transportation operations will be poor without additional infrastructure investments beyond the baseline improvements. The baseline assessment identified that very few transit service, active transportation infrastructure, and safety improvements are funded or likely to be in place by 2050. The implementation of the baseline projects and future land use patterns do result in a better jobs-to-housing balance, leading to an average trip length decrease of approximately 16%. However, total study area trips increase approximately 19% and the number of trips internal to the study area increases by 28% due to rapid housing and employment growth.

Based on the performance gaps identified, the study team and stakeholders crafted a problem statement to identify areas for improvement and to guide the development of improvement recommendations. The TAC and PAC ranked the problem statement in the priority order shown in **Table 1-1**.

Table 1-1. SPMCS Problem Statement

Priority Order	Performance Gap/ Problems Identified	Supporting Data Findings
1	Safety performance does not meet Target Zero goals	There were approximately 300 people seriously injured and 85 fatalities between 2017-2021 on study area roadways. ⁴ Target Zero sets the acceptable level of serious and fatal collisions as zero.
2	Multimodal options are lacking	There is a lack of active mode infrastructure such as sidewalks, trails, and bike facilities throughout the study area. There are a handful of transit routes serving the north part of the study area along SR 7 and SR 161, but not the central or south due to the current Pierce Transit service area boundary.
3	North-south roadway congestion	Major north-south roadways are congested during peak traffic periods. Most of the congestion occurs near SR 512 at the north of the study area, but SR 161 and SR 7 experience peak congestion as far south as 200 th Street.
4	Freight access and congestion	The Frederickson Manufacturing/Industrial Center is an economic driver in South Pierce County and results in heavy freight usage in the study area, primarily along Canyon Road. Canyon Road is classified as a T-1 freight route (more than ten million tons per year), the highest possible designation. State routes within the study area are designated as T-2 freight routes. Freight congestion increases the costs of goods and services.
5	East-west connectivity lacking	Connections between SR 161 and SR 162 are limited and experience heavy congestion. This congestion is expected to increase with the planned connection between SR 162 and Tehaleh. Per the study proviso, connection alternatives were studied.
6	Resiliency, environment, and climate change concerns	In 2019, transportation accounted for 39% of all greenhouse gas emissions in Washington State. There are concerns about the disconnected nature of the roadway network in portions of the study area as well as evacuation capacity concerns for events such as lahar flows or wildfires that are becoming more frequent with climate change.
7	Health and mobility disparities	The study area boundaries include historically disadvantaged community tracts and areas with environmental and economic disparities according to state and county analyses. Historically, transportation investments have not been equitably distributed. The Healthy Environment for All Act (HEAL Act) requires WSDOT to evaluate and reduce these disparities.

⁴ Under 23 U.S. Code 148 and 23 U.S. Code 407, safety data, reports, surveys, schedules, list 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 report, surveys, schedules, lists, or data.

Unresolved Issues

Several planning issues remain unresolved at the conclusion of this study. Each of these issues contributes to the performance gaps identified by the study and they cannot be solved by WSDOT alone. Furthermore, many of the improvements identified as part of the Strategic Vision Package require resolution of these issues. A summary of these unresolved issues is below, while further details are included in **Appendix E: Unresolved Issues List**.

SR 512 Corridor Study

The SR 512 Corridor Study concluded in June 2023. A summary of the study is included below:

The SR 512 Corridor Study evaluation process yielded 42 recommended strategies to address transportation performance gaps, both corridor-wide and location-specific, that will lead to the realization of a strong vision for integrated, sustainable, and equitable mobility in the SR 512 corridor.

Corridor-wide strategies include Transportation System Management and Operations, Active Transportation and Crossings, Managed Lanes, and Transit. Location-specific strategies address Active Transportation and Crossings, and Strategic Bottlenecks at the SR 7, Canyon Road E, and 31st Avenue SW interchanges.

The strategies identified in the study report are recommended for consideration by WSDOT and other agencies going forward. The next step is to refine and reconcile the strategies with local and regional plans and incorporate them as those plans are updated. Once the strategies are included in planning documents, funding assistance can be sought and additional project definition, refinement, permitting, and design activities can begin. These strategies (and specifically the strategic bottlenecks improvements) will likely improve congestion at the north end of the SPMCS study area.

Ongoing and future planning efforts include the Pierce County Comprehensive Plan Update, the Pierce County Active Transportation Plan, updates to the county's trail plan and integration of regional trail connections into the transportation improvement program, incorporation studies for many of the communities in the SPMCS study area, a Sound Transit study for commuter rail between Orting and the Sumner Sounder Station, the SR 167 Master Plan, the SR 512 Study, the I-5 Master Plan, the Ultra-High Speed Ground Transportation study, and the I-5 Marvin Road to Mounts Road Planning and Environmental Linkage Study.



The Pierce County Comprehensive Plan Update will result in different land use and growth patterns which may not be consistent with the land use assumptions used for the SPMCS analysis given different timelines for each. Additionally, level of service standards and zoning may change as part of this update.

Each of these ongoing or future studies could impact travel patterns within the SPMCS study area. We recommend that the outcomes of these studies be tracked by WSDOT and Pierce County for impacts to the SPMCS recommendations.

Existing and approved low density developments have been built over the past few decades in South Pierce County. Sunrise, Tehaleh, and other developments have all been approved as primarily low-density single-family communities. A prior WSDOT study (SR 162 Sumner to Orting Corridor Planning Study) developed long term recommendations to provide a series of mobility and operational improvements on SR 162 between SR 410 and Orting, which are largely driven by these low-density developments.



Past development patterns and approved low density housing within unincorporated Pierce County drive demand for peak period high-cost auto network improvements. In contrast, recent upzoning along 176th Street and SR 7 may result in several thousand new multi-family homes in a denser development pattern that is more supportive of multimodal transportation options.

Low density development patterns within the study area are beginning to change as the county focuses more growth on key urban arterials. WSDOT supports more compact development patterns within UGAs.

Transportation system funding shortfalls have affected both the preservation and maintenance of the existing system and the ability of agencies to deliver planned projects. Transportation projects assumed to be completed by 2050 (and therefore not included in this study's Strategic Vision Package) are at risk of not being implemented if funding falls through or continued cost increases make these improvements too expensive. The State Legislature has partially funded major projects in and around the study area (see the In-Process Mega Projects unresolved issue), but additional funding sources will be needed to implement the assumed and recommended strategies identified in this study.



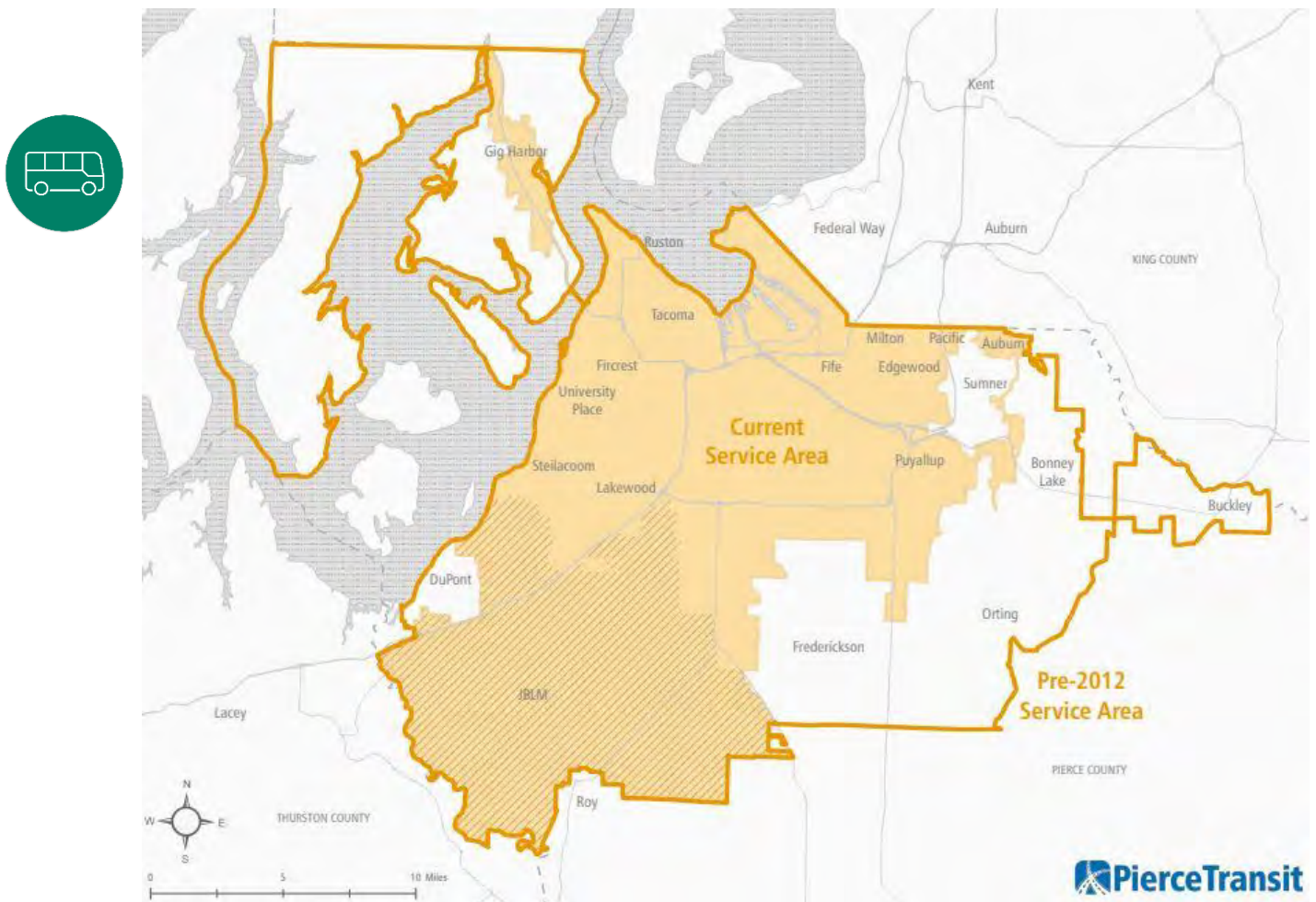
Pierce Transit Service Area

A large portion of the SPMCS study area withdrew from the boundaries of Pierce Transit's service area in 2012, as indicated in **Figure 1-2** below. The elimination of transit service for areas within and adjacent to the UGA limits the transportation options available to residents. Additionally, the lack of transit service can lead to lower density and more expensive development as most residents will need to drive and park private vehicles, increasing development costs for parking.

Study stakeholders have expressed a strong desire to reinstate the discontinued service area. Pierce County Council members supported this desire but also stated that rejoining the study area is a very complicated process. This would require a vote of the people to impose additional taxes to fund an expanded service area.

WSDOT supports expanding the transit service area to provide transit options to this growing area. Alternatively, other agencies or organizations could provide transit service to this area.

Figure 1-2. Current versus Pre-2012 Pierce Transit Service Area



Source: Pierce Transit



Transportation system natural disaster resiliency and evacuation capacity concerns raised by stakeholders. There are currently no adopted plans or studies that provide a quantitative evacuation capacity analysis.

WSDOT recommends that Pierce County or other emergency planning agencies study this topic further and provide a quantitative analysis of the capacity needs.



In-process mega projects include the Canyon Road Regional Connection Project, the SR 167 Completion Project, and the I-5 Mounts Road to Steilacoom-DuPont Road Corridor Improvements.

Each of these mega projects could affect travel patterns within the SPMCS study area. We recommend monitoring the status of each project and determining if changes to the Strategic Vision Package improvements need to be made upon mega project opening or a change in project viability status.



Joint Base Lewis-McChord (JBLM) considerations include unknown growth forecasts and the planned but unfunded SR 704 Cross-Base Highway project.

WSDOT recommends that growth of JBLM be monitored for impacts to the SPMCS study area. No further action is recommended on the SR 704 Cross-Base Highway Project given a lack of funding for further development of this alignment.



Active mode improvements are lacking, and multimodal level of service (MMLOS) standards do not currently exist for Pierce County. There are limited and discontinuous sidewalks, trails, and bike facilities within the SPMCS study area. Conventional vehicle-based level of service (LOS) standards neglect all other travel modes. Pierce County is working to adopt MMLOS standards as part of their Comprehensive Plan Updates.

WSDOT recommends that Pierce County implement robust MMLOS standards and that agencies work together to fund and implement active mode improvements throughout the study area.



A Pierce County Equity Analysis indicates that portions of the SPMCS study area (such as Parkland and Spanaway) have high concentrations of equity priority populations. These areas have historically had less access to many county resources, resulting in minimal investment in transportation facilities, particularly for active modes.

WSDOT recommends further equity analysis be completed and that transportation improvements be prioritized for disadvantaged areas. Active transportation improvements should be prioritized near school facilities.

Chapter 2. Agency and Public Coordination

Throughout the duration of the SPMCS process, the study team gathered information and input from agencies, elected officials, and community members. This section summarizes the agency and public coordination for the study and highlights feedback received and engagement activities conducted during the study between July 2022 and June 2023. **Appendix F: SPMCS Engagement Report** provides a full summary of agency and public coordination, and key feedback received.

Community engagement took place in two phases. During the first phase, in fall 2022 and winter 2023, the study team gathered input that advanced our understanding of existing conditions, priorities, and challenges. During the second phase, which began in spring 2023, the study team worked with agencies and advisory committees to propose strategies and improvements. The study team also shared feedback from the online open house with the public, provided an update on study strategies development, and provided information on the initial study results. The final Strategic Vision Package, incorporated into this report, was shared with stakeholders in July 2023.

The study team conducted a public engagement process that identified community issues, concerns, and priorities through four distinct efforts:

1. Advisory committees
2. Agency interviews and community-based organization conversations
3. Online open house and questionnaire
4. Briefings and presentations

Study Engagement Goals

- Inform the public about the study's need and purpose to promote awareness, encourage involvement in the process, and build support for future actions.
- Ensure all community members have meaningful opportunity to share their issues, concerns, and priorities relevant to study scope and prospective outcomes.
- Ensure study recommendations reflect community input by involving the public and key stakeholders in all phases of the study process.

Agency Coordination

Advisory Committees

WSDOT established the TAC and PAC to provide input on study direction, share useful information and data, and help build consensus and support for strategies and solutions. WSDOT consulted with the two advisory committees throughout the study development and their feedback heavily influenced the recommendations from the study.

While the TAC was primarily focused on detailed technical issues and consisted of technical agency staff, the PAC focused on policy issues and included elected officials from local jurisdictions and leadership from other

public agencies. Both advisory committees provided robust feedback on study elements such as the problem statement, existing conditions, evaluation criteria, strategy packages, and the draft strategic vision.

Technical Advisory Committee

The TAC consisted of tribal, government, community, and other agency representatives within the study area that met six times throughout 2022 and 2023.

The TAC included representatives from the following agencies and communities:

- Federal Highway Administration
- Joint Base Lewis-McChord
- Washington State Patrol
- Washington State Department of Transportation
- Nisqually Indian Tribe
- Muckleshoot Indian Tribe
- Squaxin Island Tribe
- Yakama Nation
- Puyallup Tribe of Indians
- Puget Sound Regional Council
- Sound Transit
- Pierce County Sheriff's Department
- Pierce Transit
- Pierce County Parks and Recreation
- Pierce County Planning and Public Works
- Pierce County Transportation Advisory Commission
- Pierce County Parkland – Spanaway – Midland Land Use Advisory Commission
- Bethel School District
- Port of Tacoma
- City of Bonney Lake
- City of Puyallup
- City of Orting
- City of Roy
- City of Tacoma
- Puyallup Sumner Chamber of Commerce
- Tacoma-Pierce County Chamber
- SR 162 Community Group
- Washington Trucking Association
- ForeverGreen Trails
- South Sound Military & Communities Partnership
- Sunrise Developer (Corliss Resources), South Hill
- Korean Women's Association

Policy Advisory Committee

The PAC consisted of tribal, government, and other agency representatives within the study area and met five times in 2022 and 2023.

The PAC invited representatives from the following agencies:

- Federal Highway Administration
- Joint Base Lewis—McChord
- Washington State Department of Transportation
- Muckleshoot Indian Tribe
- Nisqually Indian Tribe
- Puyallup Tribe of Indians
- Yakama Nation
- Pierce County Council
- Pierce County Executive Office
- Pierce County Planning and Public Works
- Pierce Transit
- Bethel School District
- Orting School District
- City of Bonney Lake
- City of Orting
- City of Puyallup
- City of Sumner

Other Agency Coordination Efforts

Agency Interviews

In summer and fall 2022, the study team met with 11 agency partners to learn about their perspectives on transportation issues and priorities for the study area. These conversations were held virtually. Information from these conversations informed the study's process, sparked further collaboration, and informed decision-making. See **Appendix F** for the full list of agencies.

Community-Based Organizations Interviews

The study team interviewed representatives from community-based organizations (CBOs) in fall 2022 and early 2023. The purpose of these interviews was to engage in personal conversations with CBOs, understand their key priorities and concerns about the study area, and identify the best ways to engage with their respective communities and constituencies.

The conversations also provided the opportunity for the study team to ask for referrals or suggestions on additional individuals or groups with whom to engage.

The study team conducted four CBO interviews. See **Appendix F** for the list of organizations interviewed.

Public and Community Participation

WSDOT committed to conducting an inclusive planning process that aims to break down barriers to involvement for all members of the community. The following sections describe the public and community participation for this study.

Community Briefings

The study team contacted community groups and organizations to see if they were interested in learning more about the study through a briefing or presentation. The goals of the briefings and presentation efforts was to promote awareness of the study, increase participation and engagement, involve organizations that serve overburdened communities, and provide opportunities for a tailored conversation and direct dialogue with the WSDOT study team.

Between September 2022 and June 2023, WSDOT presented to 15 community organizations. See **Appendix F** for the list of organizations.

Online Open House and Questionnaire

WSDOT hosted an online open house and community questionnaire from December 1–16, 2022, to inform the public about the study and collect their input to inform near-, mid-, and long-term strategies to address the multimodal transportation gaps that exist within the study area.

The online open house and questionnaire were provided in Khmer, Korean, Spanish, and English. The questionnaire consisted of 21 questions and optional demographic questions.

Between December 1 and 16, 5,356 individuals visited the online open house. The website received more than 14,900 total pageviews (the total number of times all pages were viewed). The website received 80 pageviews in Khmer, 52 pageviews in Spanish, and 44 pageviews in Korean. Some 1,574 people completed the questionnaire. Nearly all responses were in English, with one response each in Korean and Spanish.

Feedback

Feedback from community members and the public informed this study by providing the following:

- Input on multimodal transportation challenges, needs, priorities, and opportunities for the study area.
- Feedback on the direction of improvement package themes and potential strategies.
- Feedback that helped shape the problem statement and evaluation criteria.
- Information on related projects and programs to reference, and recommendations on coordination with community groups and agencies.

Full details of the online open house can be found in **Appendix G: Online Open House Report**.

Information Distribution

The study used a variety of information distribution methods and techniques for outreach, including WSDOT social media, website updates, emails to organizations, advisory committee notices, coordination with school districts, and a media release. WSDOT used hardcopy flyers in Spanish, English, Khmer, and Korean to advertise the online open house at more than 20 community gathering spaces throughout the study area.

Refer to **Appendix G** for more information on the online open house and questionnaire, and how that information was distributed.

Chapter 3. Illustrative Package Evaluation

The SPMCS study team developed an illustrative strategy list based on existing agency plans and studies, feedback from SPMCS stakeholders, and public feedback from the online open house. The initial strategy list included approximately 500 strategies, some of which overlapped as they existed in multiple plans or included different extents or phases of the same strategy.

A first screening was developed to narrow these 500 strategies into a more manageable list. This first level screening identified and removed strategies that were not located within the SPMCS study area, strategies that did not address the SPMCS problem statement, and strategies that would likely not have a measurable regional effect on the multimodal transportation system. After this initial screening, approximately 200 illustrative strategies remained. Of these, approximately 55 strategies were developed based on stakeholder feedback, online open house ideas, or the gaps analysis completed as part of this study. The remaining were from prior planning or other studies.

Based on the input received at early TAC and PAC meetings and information from agency and CBO interviews, the study team developed three illustrative strategy packages to assess different visions for how transportation investment could be focused on the South Pierce County region as a result of this study. The three illustrative packages were structured around the following investment focuses:

- A. Transportation systems management and operations (TSMO) (**Figure 3-1**) and safety focus
- B. County road connectivity and capacity focus
- C. State route capacity focus

SR 161/162 Alternatives

SR 161 to SR 162 alternative connections were evaluated separately from the illustrative packages discussed in this chapter and the Strategic Vision discussed in the next chapter. Please refer to **Chapter 5: SR 161 to SR 162 Connection Alternatives** and **Appendix K** for details on those alternatives.

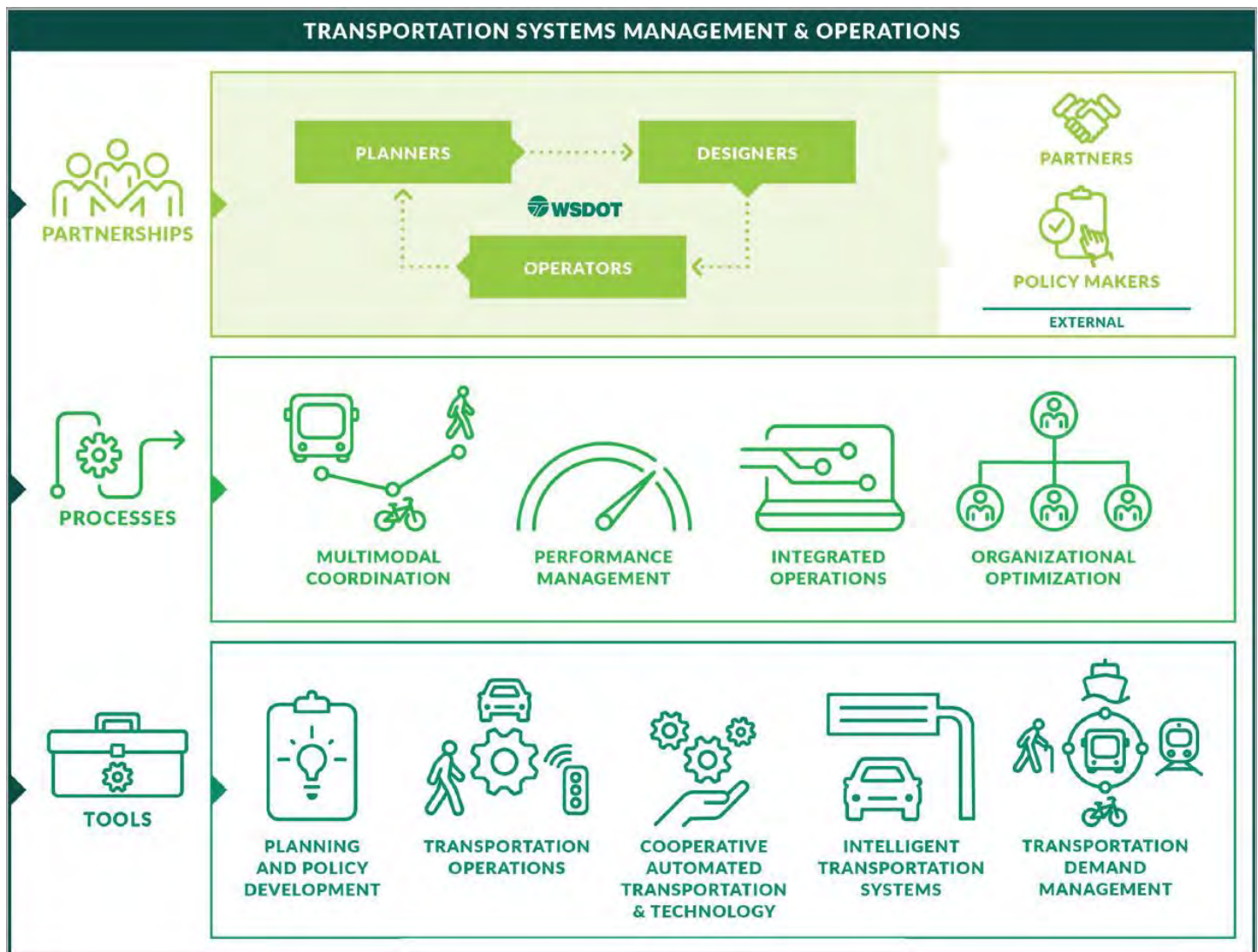


Figure 3-1. TSMO Components

Each of the illustrative packages was built to include all the strategies forwarded from screening 1 that fell into the categories of the focus of each package. For example, Package A included all TSMO and safety improvements, while Package B included all county road widening and new connection projects. Each package had some amount of strategies from other focuses to provide packages that were nominally the same level of investment.

The illustrative strategy package analysis was not designed to select any one package as the ultimate SPMCS recommendation package. Evaluating the three illustrative strategy packages allowed us to examine the overall effects of the different investment approaches and to better understand the key illustrative strategies that help address the problem statement.

The three illustrative packages were evaluated against each other across nine performance measures, two of which were broken down by modes. Full analysis methods and results are included in **Appendix H: SPMCS Illustrative Packages Evaluation Memo**, while a summary of the results is depicted in **Figure 3-2**.

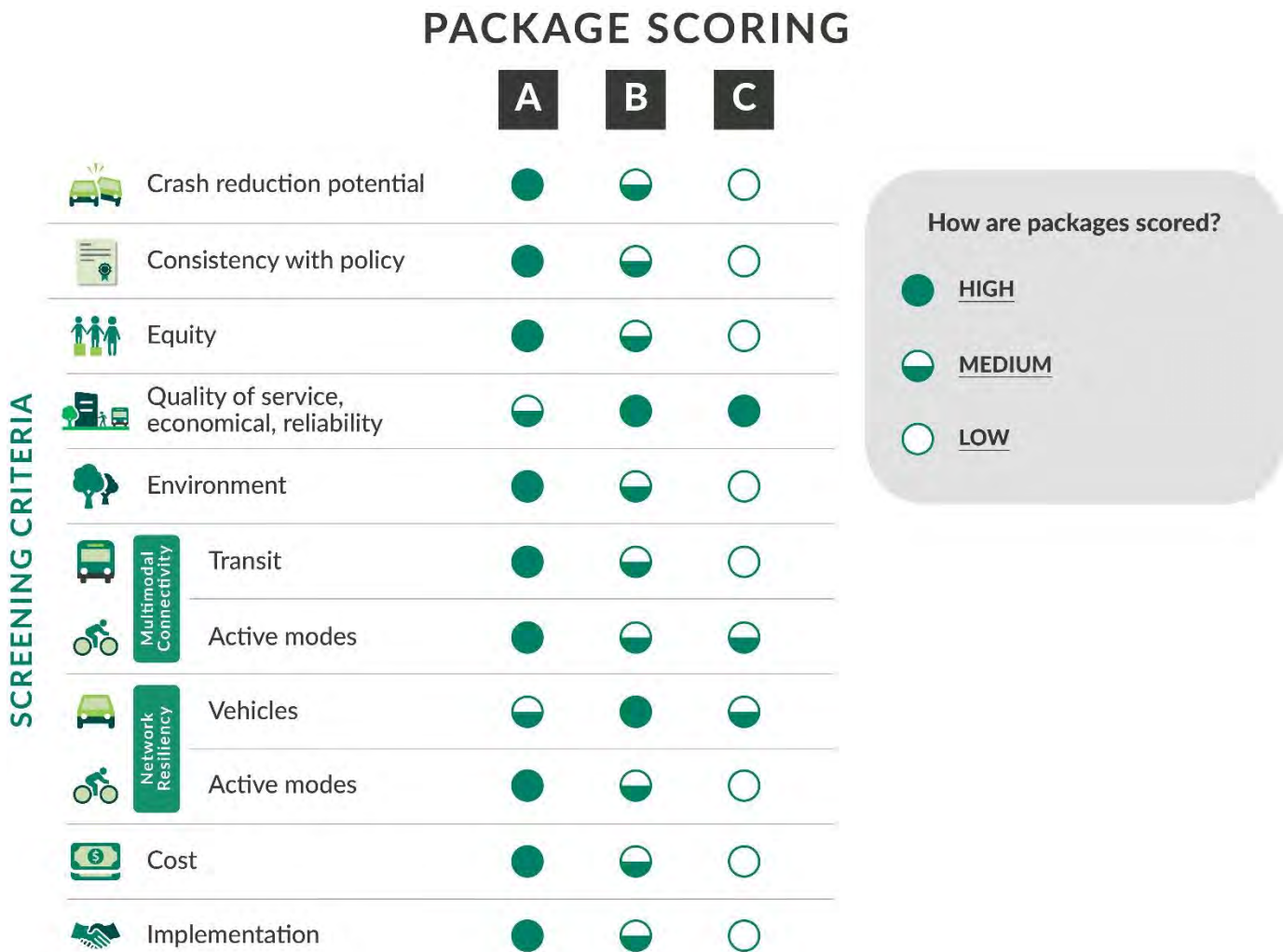


Figure 3-2. Illustrative Package Performance Measure Evaluation Results

Package A focused on strategies that generally have a lower cost and seek to increase the efficiency and safety of the existing system before adding additional capacity. This includes items like enhanced signal timing, spot widening at bottlenecks, transit improvements that can decrease the need to drive alone, and safety improvements.

Because of the mix of strategies included in Package A, it performed the highest across most metrics, while Package C performed the lowest across most metrics. Based on the results of the analysis and feedback from stakeholders, the study team determined that Package A best addressed the study problem statement.

The next chapter will show how the development of the Strategic Vision Package started from Package A. Key strategies from Packages B and C were added to develop a more well-rounded vision for the future multimodal transportation system in South Pierce County.

Chapter 4. Strategic Vision Package

Developing the Strategic Vision Package

Based on the results of the illustrative package evaluation and stakeholder feedback, the study team developed a draft and final Strategic Vision Package. This package is intended to provide a bold vision for a more multimodal and connected transportation system for South Pierce County. The Strategic Vision will require additional planning and engineering, funding identification and allocation, agency partnerships, and strong project development and delivery to be implemented over the next few decades. All strategies identified in this Strategic Vision may not be implemented.

The study team also developed the Strategic Vision Package while considering the likely phasing of strategies over the next 30 years, and identified key implementation considerations and funding sources that may pair well with the identified strategies.

What is in the Strategic Vision Package?

While location-specific illustrative strategies are included, the Strategic Vision Package also includes large programmatic investments that will be spread across the study area. The Strategic Vision Package advances strategies and programs that will do the following:

- Enhance crash reduction potential and protect vulnerable users
- Improve efficiency of the existing transportation system
- Resolve active transportation network gaps
- Expand transit service within and adjacent to the UGA
- Extend or widen select county roadways to improve regional connectivity

The Strategic Vision Package started from Package A: TSMO and Safety Focus. Key strategies from Packages B and C were added to develop a more well-rounded vision for the future multimodal transportation system in South Pierce County. The Strategic Vision Package also removed some strategies from Package A. Strategies were removed if they did not enhance system performance or if agency partners noted that the strategies were likely not feasible due to key constraints or other planned improvements. Refer to **Appendix H** for a list of strategies removed from Package A as well as strategies added from Packages B and C. A similar process was completed after the presentation of the Draft Strategic Vision Package to the TAC and PAC, with only minor changes to the recommended strategies.

Table 4-1 lists the strategies included in the final Strategic Vision Package by type, and includes information on the agency responsible, cost estimates, estimated annual maintenance costs,⁵ and phasing information. Phases listed in the table are considered loose guidelines and include near- (before 2030), medium- (2030-2040), and long-term (2040 and beyond). **Figure 4-1** maps the transit strategies, **Figure 4-2** maps the capacity and

⁵ Estimated annual maintenance costs are based on WSDOT’s “Maintenance guidance for planning studies,” which estimates that biennial maintenance costs are approximately 0.5% of capital costs, or 0.25% annually. <https://wsdot.wa.gov/engineering-standards/planning-guidance/planning-study-guidance/maintenance-guidance-planning-studies>

connectivity strategies, and **Figure 4-3** maps all proposed trails identified by Pierce County Parks & Recreation's Regional Trails Plan.

Table 4-1. Strategic Vision Package Improvement Strategies

Strategies	Agencies	Cost Estimates	Estimated Maintenance Costs (Annual)	Phasing
TSMO, ITS, and Safety Strategies				
Programs like Commute Trip Reduction, demand management, vanpool and carpool education, etc.	Pierce County Employers Pierce County Pierce Transit and others	\$500,000-\$1M annually for CTR, demand management, and carpool education program for county, \$3.5M to roughly double Pierce Transit's existing vanpool program		Near
Roundabouts at key intersections <i>(Potential locations include but are not limited to SR 7 & 112th Street, SR 7 & 121st Street, SR 7 & 138th Street, SR 7 & 146th Street, SR 7 & Military Road, SR 7 & SR 507, and Canyon Road & 160th Street)</i>	WSDOT-State Routes Pierce County-County Roads	\$80M (about ten intersections)	\$200,000	Near
Traffic signal upgrades along arterial corridors	WSDOT-State Routes Pierce County-County Roads	\$3M	\$7,500	Near
Adaptive traffic signals and well-coordinated signal timing (pending WSDOT support for each corridor)	WSDOT-State Routes Pierce County-County Roads	\$14M	\$35,000	Near
Transit Signal Priority	WSDOT-State Routes Pierce County-County Roads	\$2M	\$5,000	Near
Transit Queue Jumps at key intersections <i>(Potential locations include but are not limited to SR 7 & 112th Street, SR 7 & Military Road, SR 7 & SR 507, SR 7 & 8th Ave, Canyon Road & 112th Street, and SR 161 & 152nd Street)</i>	WSDOT-State Routes Pierce County-County Roads Pierce Transit	\$11M	\$27,500	Near
Turn Lanes at key intersections	WSDOT-State Routes Pierce County-County Roads	\$11M	\$27,500	Near
Access management to reduce conflict points, increase multimodal safety, reduce congestion	WSDOT-State Routes Pierce County-County Roads	\$18M	\$45,000	Near

Strategies	Agencies	Cost Estimates	Estimated Maintenance Costs (Annual)	Phasing
Street lighting improvements	WSDOT-State Routes Pierce County-County Roads	\$2.5M/mile	\$6,250/mile	Near
Paved shoulders and roadside safety improvements	WSDOT-State Routes Pierce County-County Roads	\$3.2M/mile	\$8,000/mile	Near
Advanced signal warning beacons	WSDOT-State Routes Pierce County-County Roads	\$900,000 (three locations)	\$2,250	Near
Pedestrian crossing treatment improvements ⁶	WSDOT-State Routes Pierce County-County Roads	\$500,000 per location	\$1,250/location	Near
Active Mode Strategies				
30 miles of new sidewalks/shared use paths to create Safe Routes to School	School Districts WSDOT-State Routes Pierce County-County Roads Pierce County Parks & Recreation	\$120M	\$300,000	All phases
50 miles of missing sidewalk gap fills along arterials	WSDOT-State Routes Pierce County-County Roads Pierce County Parks & Recreation	\$200M	\$50,000	All phases
30 miles of new bike facilities that provide Level of Traffic Stress of 1 or 2	WSDOT-State Routes Pierce County-County Roads Pierce County Parks & Recreation	\$200M	\$50,000	All phases
50 miles of new trails	Pierce County Parks & Recreation	\$220M	\$550,000	All phases
Transit Strategies				
Bus Rapid Transit Routes along SR 161 and 112 th Street	Pierce Transit Agency Partners	\$127M (capital costs) ⁷	(Not available)	Long
Increased frequency and earlier/later service on existing routes	Pierce Transit	\$163/service hour (2022), \$3M total per year	(Not available)	Near

⁶ Crossing treatments are included as part of TSMO strategies instead of active mode strategies as they will likely be funded by WSDOT's traffic safety program.

⁷ Capital costs for BRT routes provided by Pierce Transit Stream BRT System Expansion Study, Appendix L – Cost Estimate and represent the highest cost corridor options for Route C (SR 161) and Route D (112th Street).

Strategies	Agencies	Cost Estimates	Estimated Maintenance Costs (Annual)	Phasing
On demand service area expansion (e.g., Spanaway PT Runner, may be outside current Pierce Transit service area)	Pierce Transit or other transit provider	Approximately \$100/service hour, \$0.5-2M per year	(Not available)	Medium
On demand service along 224 th Street that connects BRT 1 and BRT C (outside current Pierce Transit service area)	Pierce Transit or other transit provider	Approximately \$100/service hour, \$1.2M per year	(Not available)	Long
New east-west bus route on 176 th Street between SR 7 and SR 161 (outside current Pierce Transit service area)	Pierce Transit or other transit provider	\$163/service hour (2022), \$1.8M per year	(Not available)	Medium
Potential new park-and-ride lots (50 stalls or less)	Pierce Transit Other agencies	\$5-10M	\$2,500-\$5,000	Long
Vehicle and Freight Capacity Strategies				
78 th Avenue East extension from 160 th Street East to 176 th Street East	Pierce County-County Roads	\$22M	\$55,000	Long
Waller Road East turn lane and active facilities from Brookdale Road East to 176 th Street East	Pierce County-County Roads	\$33M	\$82,500	Medium
200 th Street East turn lanes from SR 161 to Orting Kapowsin Highway East	Pierce County-County Roads	\$40M	\$100,000	Medium
144 th Street East turn lanes and active facilities from 86 th Avenue East to 122 nd Avenue East	Pierce County-County Roads	\$46M	\$115,000	Medium
152 nd Street East widening from 160 th Avenue East/74 th Avenue East to 156 th Street East/78 th Avenue East to 122 nd Avenue East	Pierce County-County Roads	\$66M	\$165,000	Long
94 th Avenue East widening from 136 th Street East to 152 nd Street East	Pierce County-County Roads	\$21M	\$52,500	Long
94 th Avenue East extension from 152 nd Street East to 160 th Street East	Pierce County-County Roads	\$15M	\$37,500	Long
Shaw Rd/122 nd Avenue East widening from 39 th Avenue Southeast to 136 th and Sunrise Parkway East to Sunrise Boulevard East	Pierce County-County Roads	\$45M	\$112,500	Long
86 th Avenue East extension from 152 nd Street East to 176 th Street East	Pierce County-County Roads	\$26M	\$65,000	Long

Strategies	Agencies	Cost Estimates	Estimated Maintenance Costs (Annual)	Phasing
Spanaway Loop Road South new northbound lane from SR 704/176 th Street East to Tule Lake Road South	Pierce County-County Roads	\$65M	\$162,500	Long
70 th Avenue East (Woodland Avenue East) extension from 160 th Street East to 204 th Street East	Pierce County-County Roads	\$64M	\$160,000	Long
Canyon Road East South extension from 208 th Street East to 224 th Street East	Pierce County-County Roads	\$30M	\$75,000	Long

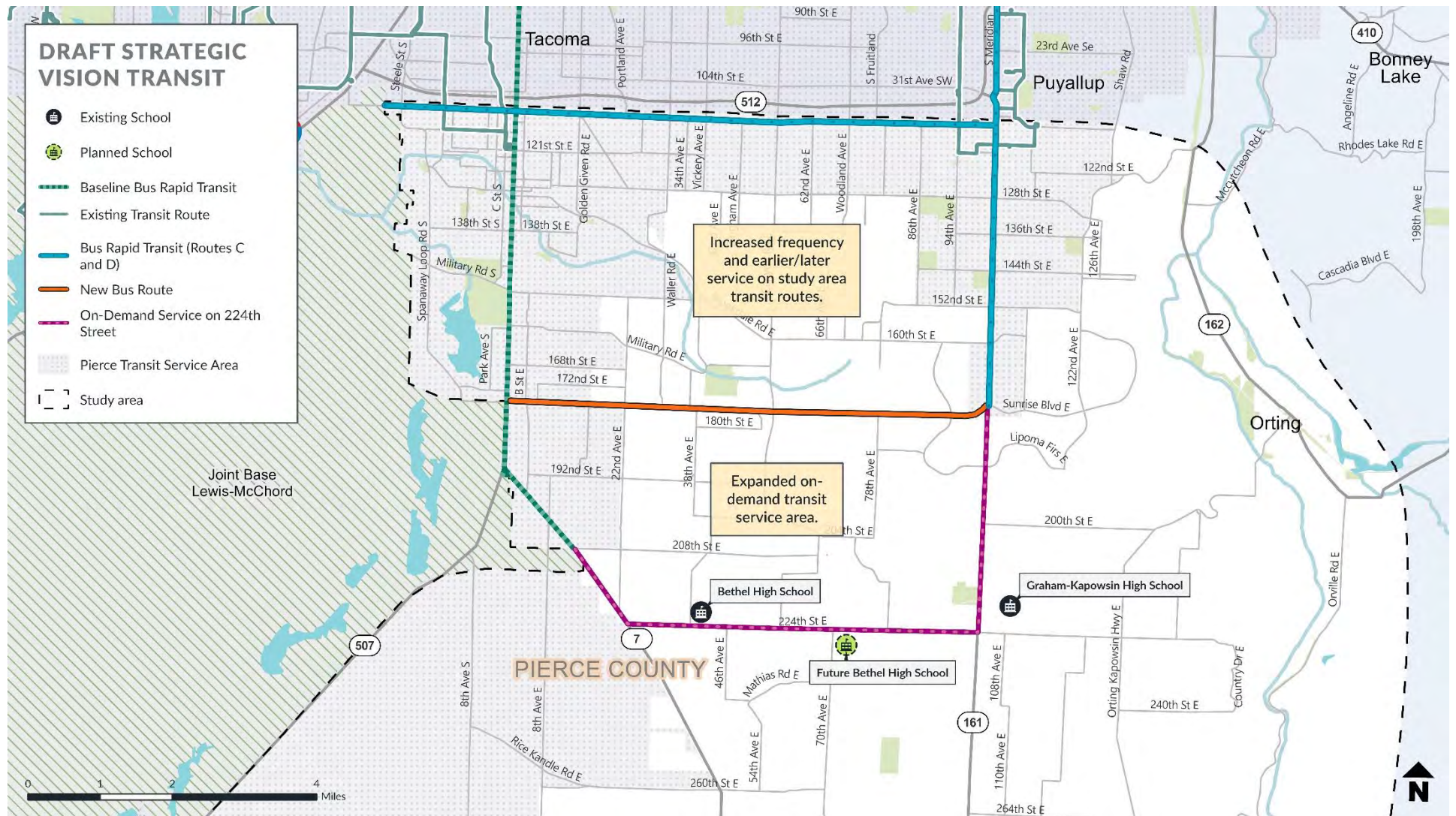


Figure 4-1. Strategic Vision Package Transit Strategies

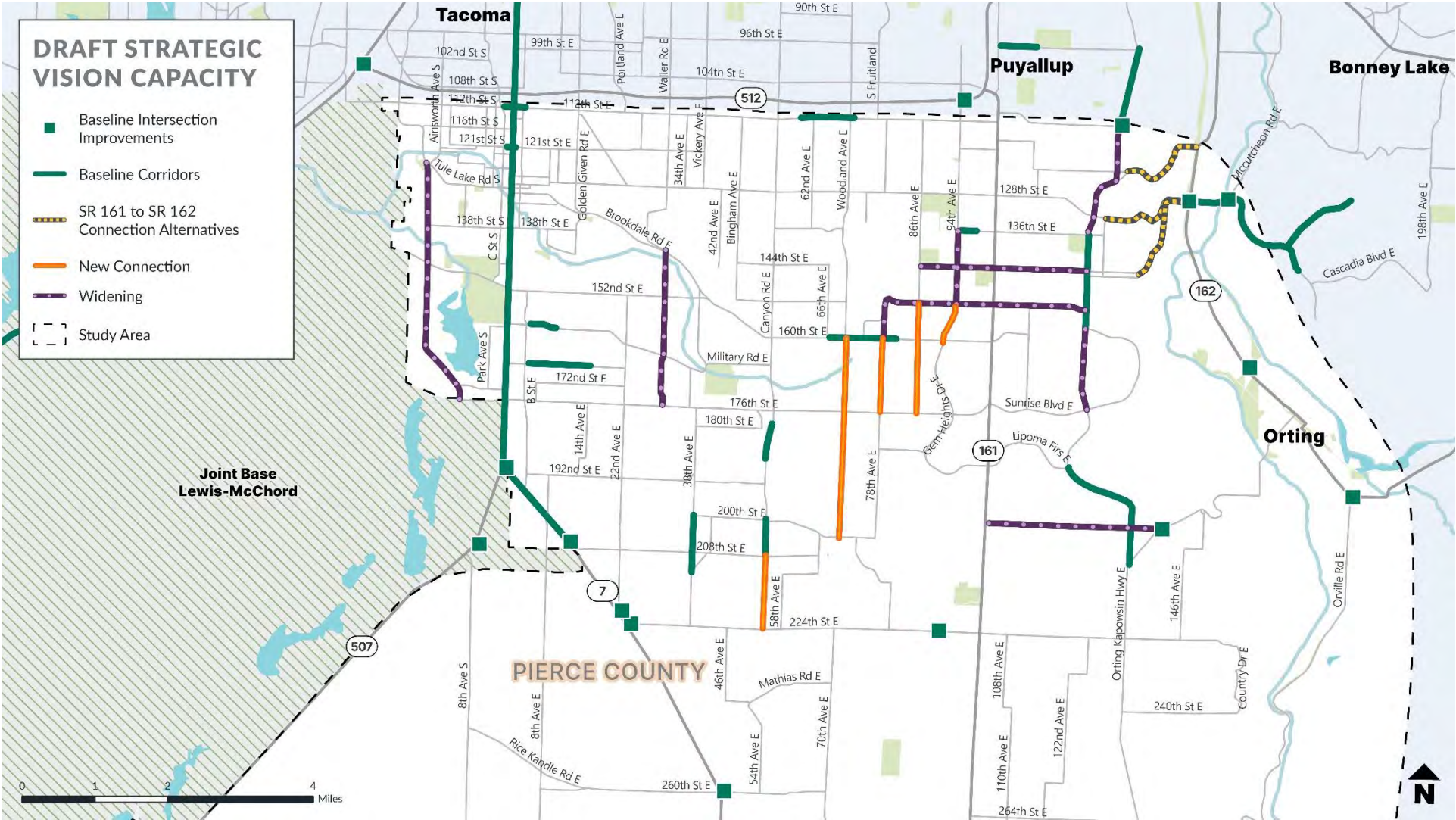


Figure 4-2. Strategic Vision Package Capacity Strategies



Figure 4-3. Strategic Vision Package Trails

Evaluation

The Strategic Vision Package was evaluated by strategy type. The programmatic investments in the TSMO, ITS, and Safety category (as detailed in **Table 4-2** below) were evaluated by reviewing the high-level benefits of several strategies based on a literature review of academic research. Information on the collision reduction potential of each strategy was separated by severity, if available in the literature.

Table 4-2. TSMO, ITS, and Safety Strategies and Benefits

Strategy	Collision Reductions	Congestion Improvements
Roundabouts	Injury – 75% Fatality – 90% Pedestrian – 40%	50%
Adaptive Traffic Signals	All – 10% Injury – 20%	10%, up to 50% for poor existing conditions
Transit Signal Priority	All-Up to 20%	5–25% for transit
Access Management (improvements for every 10 fewer access points per mile)	All – 30%	2.5 MPH increase in average speeds
Turn lanes at intersections	Injury – 20–40%	–
Roadway lighting	Injury – 15–60%	–
Paved shoulders	Injury – 40%	–
Advanced signal warning beacons	Injury – 20%	–
Pedestrian crossing treatment improvements	All-10–55%	–

Collision reduction information from <https://www.cmfclearinghouse.org/> and <https://wsdot.wa.gov/travel/traffic-safety-methods/roundabouts>

Congestion improvement information from <https://wsdot.wa.gov/travel/traffic-safety-methods/roundabouts>, <https://www.fhwa.dot.gov/innovation/everydaycounts/edc-1/asct.cfm>, https://nacto.org/docs/usdg/transit_signal_priority_handbook_smith.pdf, and https://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_420.pdf

Active mode improvements were compared to existing levels of built infrastructure in the study area. Thirty miles of new Safe Routes to Schools improvements would average out to about one half-mile of new safe routes per public school within the study area, although some schools likely need more investment in safe routes than others that have more established active mode networks. Fifty miles of new sidewalks along arterial roadways would fill about one third of the existing arterial sidewalk gaps, resulting in about half of all arterials having a sidewalk on at least one side of the road. Thirty miles of new bike facilities that provide a Level of Traffic Stress (LTS) of 1 or 2 would represent the only low stress bike specific infrastructure in the study area. Fifty miles of new trails would be a major increase as the Foothills Trail is the only major regional existing trail in the study area.⁸ Furthermore, the Foothills Trail is separated from most of the study area by terrain and other barriers such as a lack of low stress active mode connections.

Transit improvements identified in the Strategic Vision Package would reach a large number of people and jobs, most that are not currently served by transit. The number of people and jobs currently located within one half-mile of each of the proposed transit improvements is listed in **Table 4-3**. With additional growth in the study area, these improvements would put transit within walking distance of even more households and jobs.

⁸ There are additional primarily recreational trails such as the Nathan Chapman Trail within the study area.

Table 4-3. Population and Jobs within One Half-Mile of Proposed Transit Routes

Transit Improvement	Population	Jobs
Proposed 176 th Route (outside current Pierce Transit service area)	25,000	7,200
Proposed 224 th Route (outside current Pierce Transit service area)	26,400	4,400
Increased Frequency on Existing Study Area Routes	64,000	27,500

Capacity and connectivity improvements were analyzed using the travel demand model developed for the study. Key results from the model indicate that vehicle miles traveled per person decreased 20% between existing and future baseline and Strategic Vision Package scenarios. The model also indicates a reduction of about 10% in vehicle hours of delay between the future baseline and the Strategic Vision Package model, representing a sizable decrease in study area delay. Freight movement would benefit from this reduction in overall vehicle delay, and key parallel routes like Spanaway Loop Road widening would provide resiliency and alternative parallel routes for freight to access regional freeways during recurring and incident-related congestion. Other strategies in the package are not anticipated to degrade freight mobility in the study area.

Chapter 5. SR 161 to SR 162

Connection Alternatives

Pierce County identified the need for additional capacity between SR 161 and SR 162 due to a forecasted concurrency failure of Military Road. A large factor behind this forecasted failure is the new roadway connection planned between the Tehaleh Development and SR 162 and continued low density development in the area. Building on prior analysis completed by Pierce County, this study further analyzed three alternatives adding additional east-west capacity:

1. **Military Road Widening:** Widen Military Road to add an additional uphill/westbound lane from SR 162 to approximately 136th Avenue East and widens to four or five lanes from 136th Avenue East to Shaw Road
2. **128th Street Connection:** Create a new two-lane connection between 128th Street at SR 162 and 128th Street/Reservoir Road
3. **144th Street Connection:** Create a new two-lane connection between 128th Street at SR 162 and 144th Street at Hunt Elementary School

These three alternatives are mapped in **Figure 5-1** and preliminary concept designs are shown in **Appendix K: SR 161 to SR 162 Connection Alternatives Memo**. Please note that these are very preliminary designs; further study will be needed to determine any property and environmental impacts and the alignment of each alternative.

The potential travel pattern changes resulting from each alternative were analyzed using the 2050 travel demand model developed for the study. Each alternative provided localized congestion benefits, although volume changes on regional roadways like SR 161, SR 162, and SR 410 were minimal under all alternatives. The alternatives do provide additional east-west capacity and serve as additional routes to distribute traffic in the event of incident-related congestion or potential evacuations affecting the Orting Valley. Of the three alternatives, the 144th Street connection was forecasted to serve the lowest traffic volumes.

Due to the heavy traffic volumes forecasted to travel east-west from Tehaleh through these new connections, widening of SR 162 between 128th Street and Military Road would likely be needed under the Military Road alternative. This widening would probably not be needed for the 128th Street connection alternative due to the traffic continuing east-west across SR 162.

A preliminary civil engineering analysis of the alternatives identified several challenges:

- Military Road widening is difficult due to large amounts of earthwork, existing utilities, bad soil, adjacent properties, and safety concerns given the curvy nature of the roadway.
- The 128th Street and 144th Street alternatives also include large amounts of earthwork, require large retaining walls or bridge structures, include long sections with steep grades, and cut through forested terrain.
- Construction impacts would be more disruptive for Military Road than the new connections due to existing housing along the route versus primarily open space construction.

SR 161 to SR 162 Connection Alternatives

Table 5-1. Preliminary Cost Estimates for SR 161 to SR 162 Connection Alternatives

SR 161/162 Connection Alternatives	Capital Cost (in millions)	Maintenance Costs (Annual)
Military Road Widening (includes widening SR 162 from Military to 128 th)	\$114	\$285,000
128 th Street Connection	\$127	\$317,500
144 th Street Connection	\$152	\$380,000

Preliminary cost estimates based on high level conceptual designs. Costs are in 2023 dollars. Maintenance costs based on WSDOT estimates, see Chapter 4.

As listed in **Table 5-1**, the costs for each alternative are very high given the extreme elevation changes between the Orting Valley and the new connection points. Additional details on this analysis are included in **Appendix K**.

This study has not identified an alternative recommendation for capacity improvements between SR 161 and SR 162 as this will not be a WSDOT facility. This information will be provided for further evaluation by Pierce County.

Chapter 6. Implementation Considerations and Next Steps

Implementation Considerations

There are several overarching considerations for implementing the Strategic Vision package. The package includes investments across agencies, including WSDOT, Pierce County, transit providers, school districts, and other local agencies. Each of these agencies has differing priorities and different funding resources that will impact which of the identified strategies can move forward and when.

Agency Agreements

Some strategies identified as part of the Strategic Vision Package will require interagency agreements to identify which agency will fund and oversee construction, conduct ongoing maintenance, and operate each strategy.⁹ For example, active mode strategies may be located within state route right of way but maintained by local agencies. Additionally, WSDOT and local agencies will be updating the “City Streets as Part of State Highways Guidelines” that delineate the responsible party for various maintenance costs for roadways with shared responsibility.

Prioritization and Funding Plans

A prioritization and funding plan is needed for each agency that will implement strategies from this study. A successful project prioritization framework would build on the analysis completed to date and include the following:

- An equity analysis and prioritization framework which ensures investments are staged to reduce historic underinvestment in equity focus areas. This is particularly important for the programmatic investments that did not have locations identified as part of this study.
- Additional analyses to ensure proper project sequencing as the strategies are built out over time.
- More detailed engineering design and environmental analyses to determine feasible delivery timelines, minimize potential impacts, evaluate long-term maintenance needs, and develop refined cost estimates.
- Collaboration with the community to ensure improvements can be delivered in a way that is compatible with land use plans and community desires.
- Further funding of resource development and beginning the process to secure funding.

With all strategy types, considerations must be made for how capital investments will create additional operations and maintenance costs. Many agencies already have a large and growing backlog of deferred maintenance for the current transportation system without the addition of new capital investments.

⁹ WSDOT and local agencies will need to identify the financial needs and responsibilities related to maintenance of the newly preserved, reconstructed, or new assets and define what is and is not covered by city, county, state agreement. Detailing the on-going permit costs that extend beyond construction agreements, in order to clarify roles of financial responsibility will be necessary. See also RCW47.24.020 (6) (13) and (17) for more information on the jurisdiction and responsibilities for maintenance, control and other duties, and the updated population thresholds for these agreements.

The Bethel School District has developed a prioritized list of safety improvements that could be used to help prioritize Safe Routes to Schools funding for active mode improvements (**Appendix I: Bethel School District Community Safety Project Needs Assessment Table**).

Active Mode Strategies

Agencies will need to identify and prioritize specific active mode strategies based on a variety of factors, including the following:

- State, county, and city road standards for active mode infrastructure
- Analysis based on WSDOT's Complete Streets policy
- The upcoming Pierce County Comprehensive Plan Update and Active Transportation Plan
- Active transportation projects identified by existing planning documents such as Pierce County's Pacific Avenue Consolidated Capital Improvement Plan and Local Road Safety Plan

Additionally, a prioritization map for active mode strategies was developed (**Figure 6-1**). The prioritization map considers population density, schools, existing and proposed transit corridors, and medical and library locations within the study area. As higher density development occurs over the life of this plan, the prioritization map may need to be updated.

Active mode strategies should be implemented in an interconnected manner, connecting schools and other key destinations to existing and future active mode strategies as much as possible and avoiding islands of active mode infrastructure that do not connect to the larger network. A complete active mode system can increase the number of users that replace vehicle trips with active mode trips.

To ensure that active mode facilities are comfortable for all ages and abilities (LTS 1 or 2), adding facilities directly next to high-speed and high-volume arterials may be difficult or very expensive. Right of way constraints and the level of separation needed to achieve LTS 1 or 2 is difficult in these locations. One approach is to provide lower stress (and likely lower cost) improvements on parallel facilities with lower vehicle volumes and speeds. Regardless of whether active mode improvements are added to key arterials or parallel facilities, it is imperative that not only the corridor but also crossing treatments are safe and comfortable for all users.

Implementation Considerations and Next Steps

Funding Resources

Funding the Strategic Vision Package will likely require an amalgamation of grant funds, budget allocations, and other funding sources. To assist in the identification of funding sources, **Appendix J: Funding Sources Table** lists 62 federal, state, and regional grant sources as well as 12 local taxing mechanisms and which strategy types they are most likely to fund.

Speed Limits

As part of WSDOT's commitment to Target Zero, reducing speed limits could be considered for study area roadways. Speed limits on state highways are set based on a variety of factors such as context of the highway, speed data, types of roadway users, crash history, and other factors, such that the speed limit achieves compliance by the majority of drivers. Properly set speed limits should result in predictable, consistent, and reasonable vehicle speeds that consider the mobility, safety, accessibility, and convenience for all users. Speed limits will be evaluated as part of pre-design and preliminary engineering for individual projects. This study does not recommend reducing speed limits without accompanying design changes, as the roadway design can have more influence on the speed of drivers than the statutory speed limit.

Next Steps

Unresolved Issues

Agencies should work together to address the unresolved issues identified in this study (**Chapter 1** and **Appendix E**). There are two issues that could greatly improve transportation outcomes in the study area:

- Shifting to denser development patterns that support transit and multimodal trips
- Expanding transit service to areas that are densifying (this would be difficult and require a vote of the people to increase taxes to fund an expanded service area)

These issues should be a priority for area agencies.

Decisions should also be made regarding the SR 161 to SR 162 connection alternatives, either as part of Pierce County's Comprehensive Plan or another county planning process.

Conclusion

The Strategic Vision Package represents a bold yet realistic plan to address the transportation challenges this study area is expected to experience over the next 30 years. Throughout the SPMCS process, partner and community engagement has been critical. Partners and community members reviewed data, provided invaluable insight into transportation issues and potential solutions, and strongly shaped the Strategic Vision Package.

While the development of the Strategic Vision Package represents a major step forward in improving transportation and mobility in the SPMCS study area, there is still a long way to go to further plan, fund, design, and implement the roughly \$1.1-\$1.5 billion in transportation improvements recommended by this study. In addition to the capital costs of each improvement, agencies will need to identify ongoing funding for operations and maintenance of additional infrastructure (estimated at \$2.75M-\$3.75M per year) and transit service.¹⁰

¹⁰ Per the state's transportation system policy goals, any new infrastructure must be maintained in a State of Good Repair. WSDOT estimates that maintenance costs of new infrastructure on the state highway system is about 0.5% of the total capital cost per biennial budget, or 0.25% per year. Cities, counties, and transit agencies also must maintain new infrastructure so that it has long-term value, but the costs of maintenance for these non-WSDOT facilities varies.

Appendix A:

Streetlight Travel Patterns Memo



Prepared by:
Fehr & Peers

In association with:
Stepherson & Associates
Parametrix

Memorandum

Date: October 13, 2022
To: Ariel Heckler and Nazmul Alam, WSDOT
From: Marissa Milam and Nicholas Harris, Fehr & Peers
Subject: **Final South Pierce Multimodal Connectivity Study StreetLight Travel Pattern Technical Memo**

TC22-0040

Introduction

This memorandum summarizes the StreetLight analysis performed for the South Pierce Multimodal Connectivity Study (SPMCS). The purpose of this analysis is to understand origin-destination patterns and trip distributions within the study area, which will be used in the existing conditions analysis, travel demand model validation, as well as strategy development.

StreetLight Data Overview

StreetLight Data combines Location-Based Services (LBS) data with machine learning algorithms to understand travel behavior across the country. Each month, StreetLight data processes approximately 40 billion anonymized location records from smart phones and navigation devices in connected cars and trucks and uses machine learning to transform these records into aggregated and normalized route-based travel patterns. Trips are created from the location records by starting a trip once a device is traveling at a reasonable speed, snapping records to road network data to create the trip route, and creating a trip end once the device has not moved 100 meters within 5 minutes. Data is validated using permanent traffic counters and embedded sensors, and normalized with multiple data sources, including parcel data, digital road network data, and census information to calculate vehicle volume estimates. StreetLight data is used to better understand the existing travel patterns within the study area.

For this project, two types of analyses were used: Origin-Destination (OD) analysis and Top Routes Analysis. The Origin-Destination analysis identifies the vehicle volumes between study locations and a chosen census geography for a designated time period. The Top Routes Analysis output

shows the top routes taken to/from an analysis zone using OpenStreetMap segments; this provides a more granular understanding of travel patterns beyond the OD analysis.

Data Considerations

The following data considerations are noted as they influenced the methodology or outputs of this analysis:

- The data was obtained through WSDOT's StreetLight subscription, which has a distinct boundary for analysis, shown in **Figure 1**.
 - The WSDOT subscription boundary is at the very edge of this study area, however, the Origin-Destination to Pre-Set Geography analysis allows the user to capture all origin-destination interactions within the study area by summarizing data at the census block group level outside the boundary.
- StreetLight truck analysis includes medium- and heavy-duty trucks by incorporating GPS data from telematics from larger fleets with the appropriate telematics devices.
 - Fehr & Peers has noted in previous validation efforts that the data sources used in StreetLight's truck data may not include owner-operated fleets or smaller fleets without telematics.
- The Origin-Destination to Pre-Set Geography graphics use graduated colors to represent the relative amount of vehicle trips to each census block group.
 - The color scale is not normalized, so census block groups with large areas (such as the southeastern part of Pierce County) tend to show up as higher volume destinations, when in reality, the large geographic area is skewing the visualization.
- WSDOT's StreetLight subscription includes all modes of travel, including non-motorized data. However, evaluations of the non-motorized data have shown that the data is not robust enough yet for project use.
 - The greatest concentration of bike/ped activity is within the denser areas of South Hill, Brookdale, Spanaway, south Puyallup, and near the Pacific Lutheran University campus.
- This analysis uses fall 2019 data (Tuesdays-Thursdays in September-October 2019) and uses the All-Day time period. Fehr & Peers investigated the All-Day versus PM Period travel patterns for this analysis and did not find a significant difference. To increase the sample size of analysis, the All-Day time period was used.
- The study team also investigated the difference in traffic volumes in summer 2019 versus fall 2019 for the AM, Midday, and PM periods to understand if summer recreational travel caused significantly higher roadway volumes than the typical PM period in fall.

- This investigation showed that while the summer midday travel was slightly higher than the fall peak periods, ADT was within 1% between seasons. Therefore, all analysis uses the fall 2019 dataset.



Figure 1: WSDOT StreetLight Subscription Boundary

Findings and Results

This section explores study area travel patterns for passenger vehicles and freight trucks by analyzing origin and destination results to/from census block groups, as well as the top routes for travelers destined to or leaving zones within the study area.

Origin Destination Analysis along Study Roadways

SR 7 between Parkland and Spanaway

SR 7 is a segment of a longer north-south corridor in the western part of the study area. The road has connections to regional corridors like SR 512 and Interstate 5. **Figure 2** shows there are three primary destinations for trips on this segment of road. The first are local trips concentrated in the Roy and Yelm areas. The second are areas around downtown Tacoma and the Port. Lastly are the industrial centers in the Green River Valley, such as Auburn, Kent, and Tukwila. There are very few destinations from this segment that end in the eastern part of the study area around South Hill and virtually none to Orting.

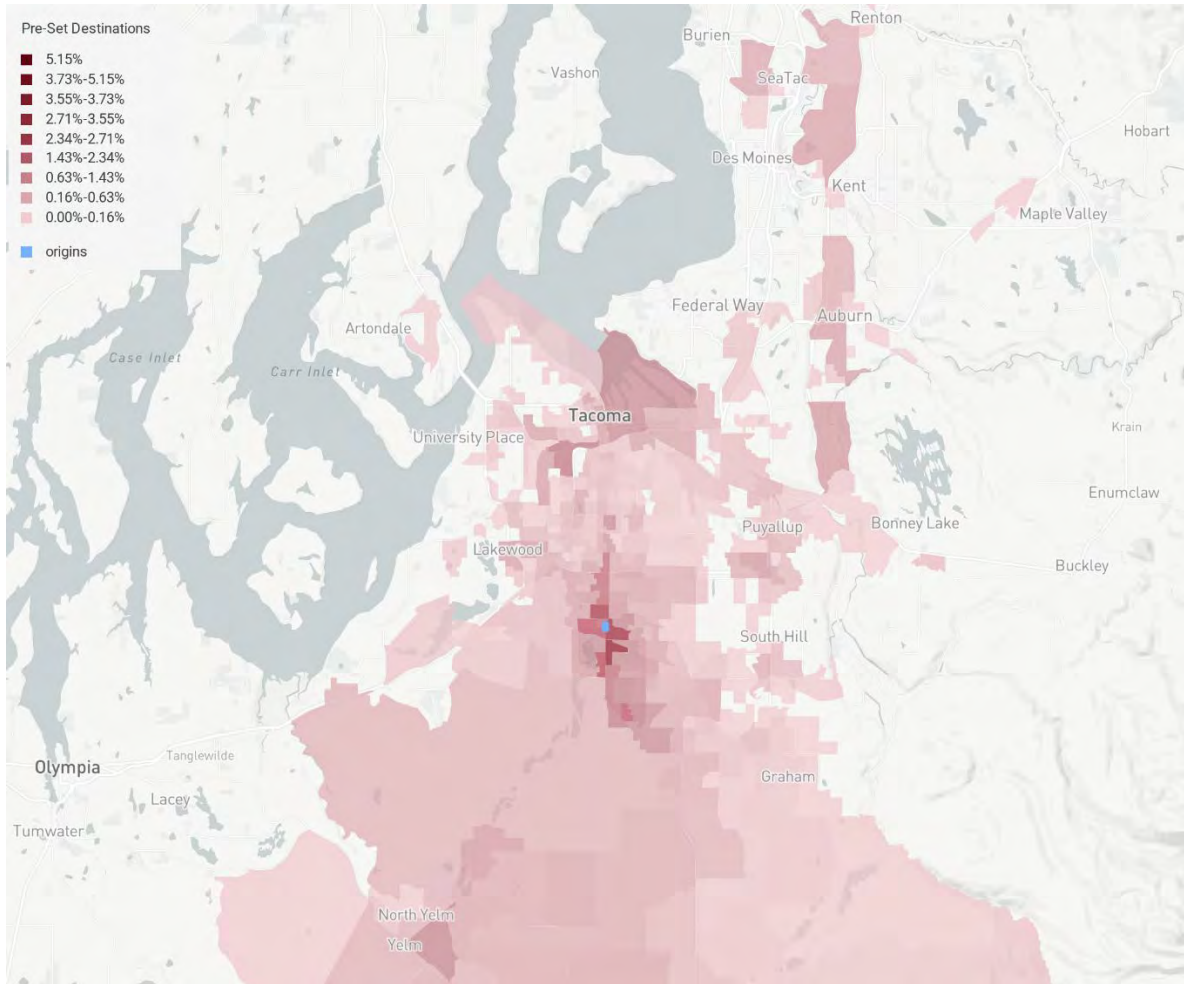


Figure 2: Origin Destination to/from SR 7 (between Parkland and Spanaway)

SR 161 between Graham and Eatonville

This section of SR 161 is at the southern edge of the study area. **Figure 3** shows the travel destinations on the corridor from south of Graham are primarily confined to three main corridors, SR 161 itself, SR 512, and SR 167. There are few destinations east or west of the corridors. For SR 161, the number of destinations quickly decreases east and west beyond the corridor, and there are virtually no destinations in the western portion of the study area and few to Tacoma. SR 161 is used to connect to industrial centers in the Green River Valley via SR 167.

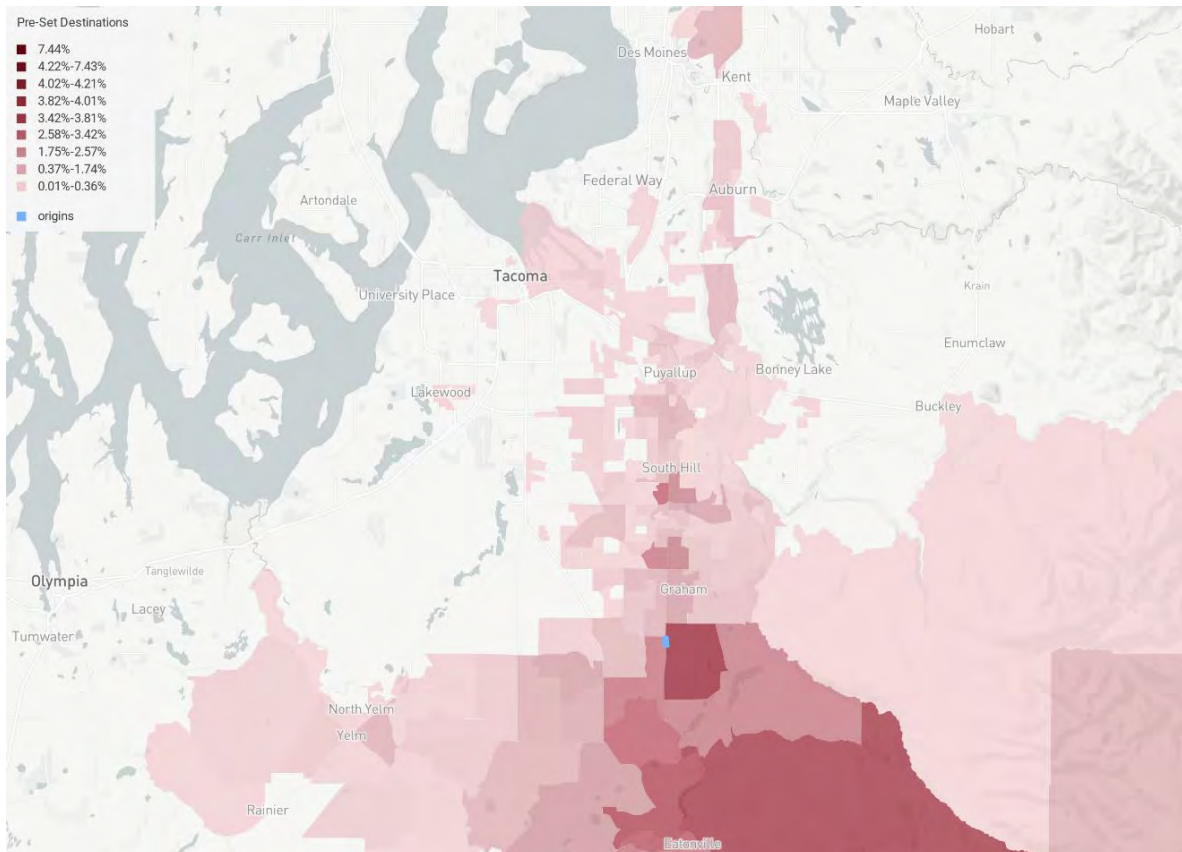


Figure 3: Origin Destination to/from SR 161 (between Graham and Eatonville)

SR 161 between 144th St E and 152nd St E

This segment of SR 161 though South Hill has a similar origin/destination pattern as other points on the corridor. Along SR 161 the destinations are mainly confined to areas directly adjacent to the corridor, but the distribution of east-west travel stretches further than other locations like Graham. **Figure 4** shows many of the destinations are local within the eastern portion of the study area or north to the industrial centers in the Green River Valley. There are more destinations north toward Puyallup than south toward Graham.

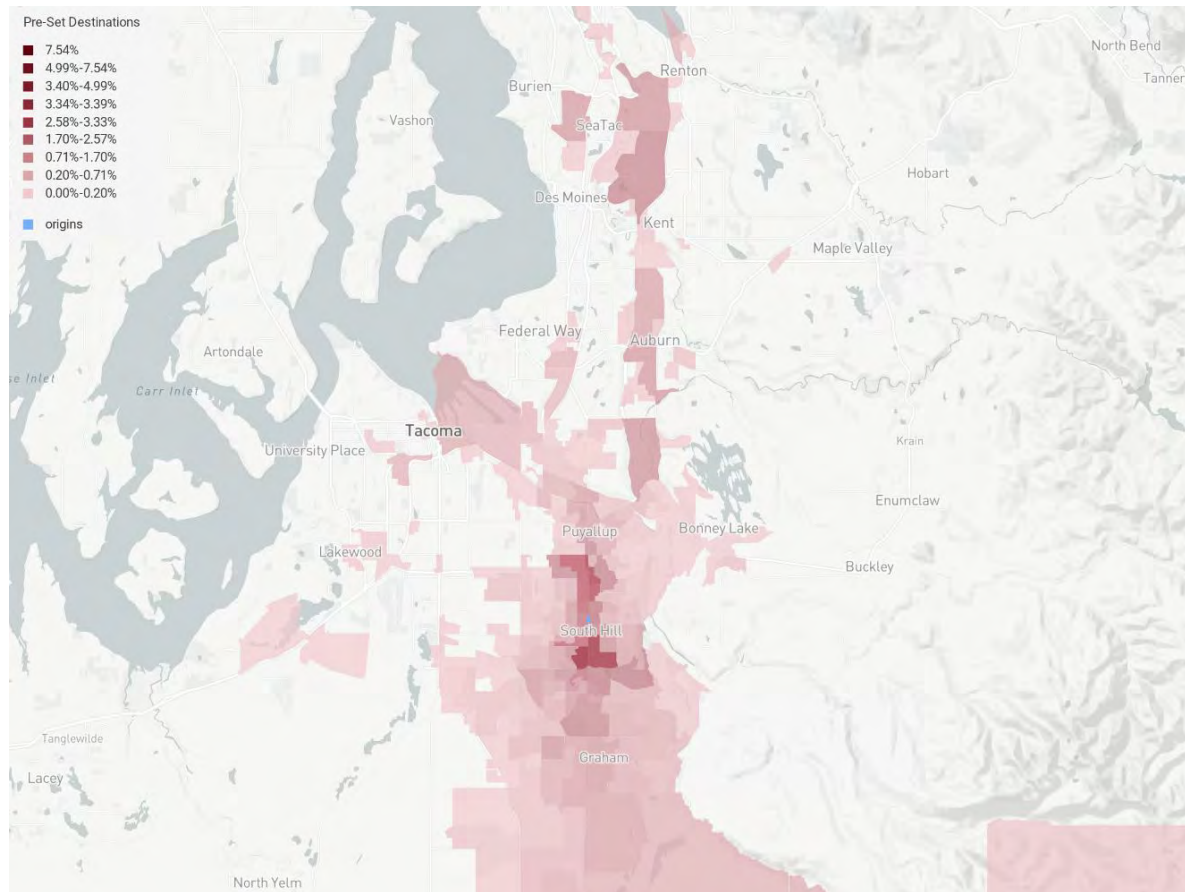


Figure 4: Origin Destination to/from SR 161 (between 144th St E and 152nd St E)

SR 162 north of downtown Orting

SR 162 is a long north south corridor that has connections to other regional corridors like SR 410, and SR 167. There are few connections to the west, limiting the distribution of trips from this part of the study area compared to other corridors. The short connection to SR 167 via SR 410 allows distribution of destinations to employment centers to the north. **Figure 5** shows the minimal destinations to the west even though they are close to the corridor.

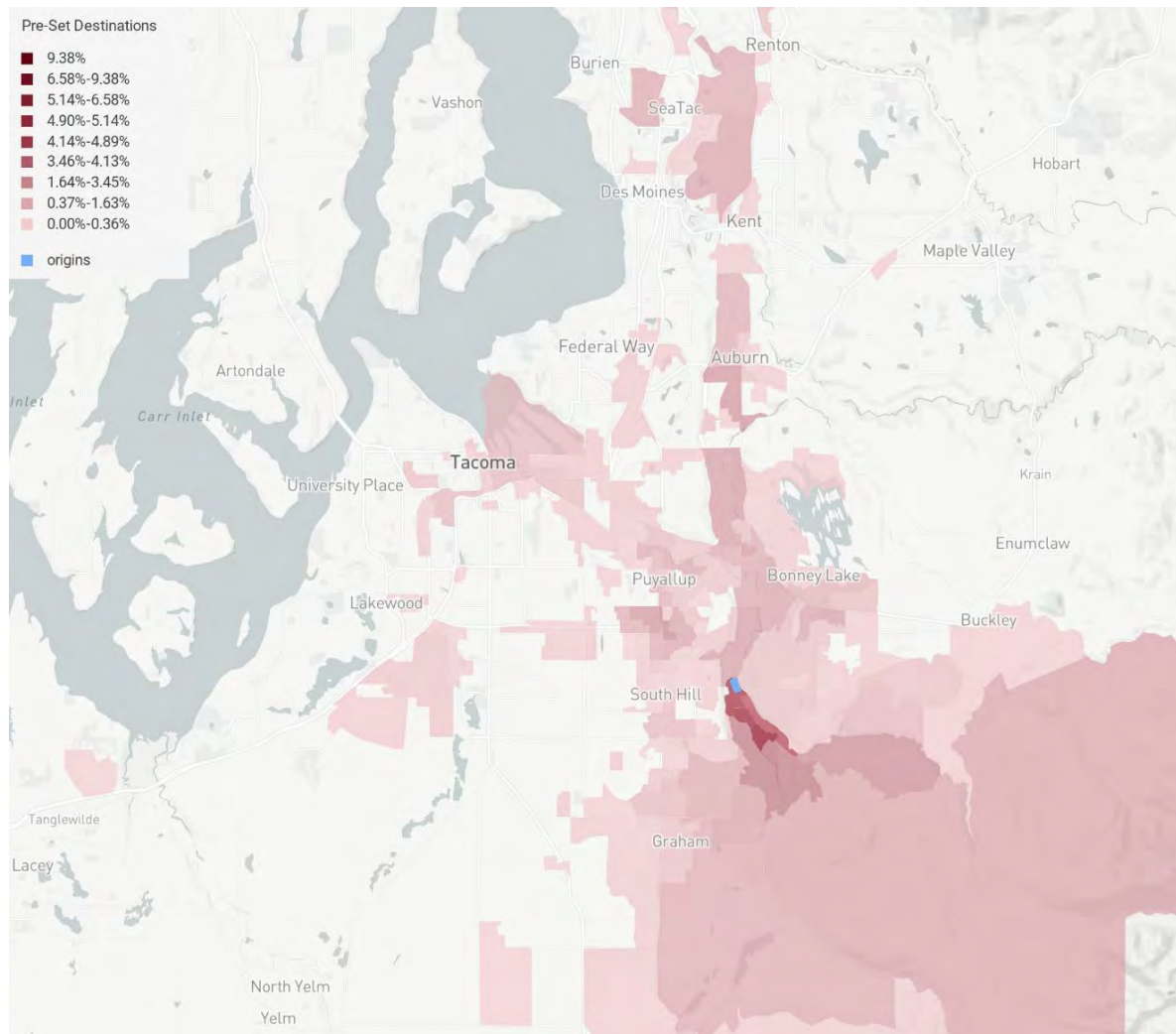


Figure 5: Origin Destination to/from SR 162 north of downtown Orting

SR 507 north of Roy

SR 507 is the main corridor connecting the City of Yelm and southwest Pierce County to areas north of Joint Base Lewis-McChord. **Figure 6** shows most of the trip destinations are concentrated along the corridor between Yelm and Roy.

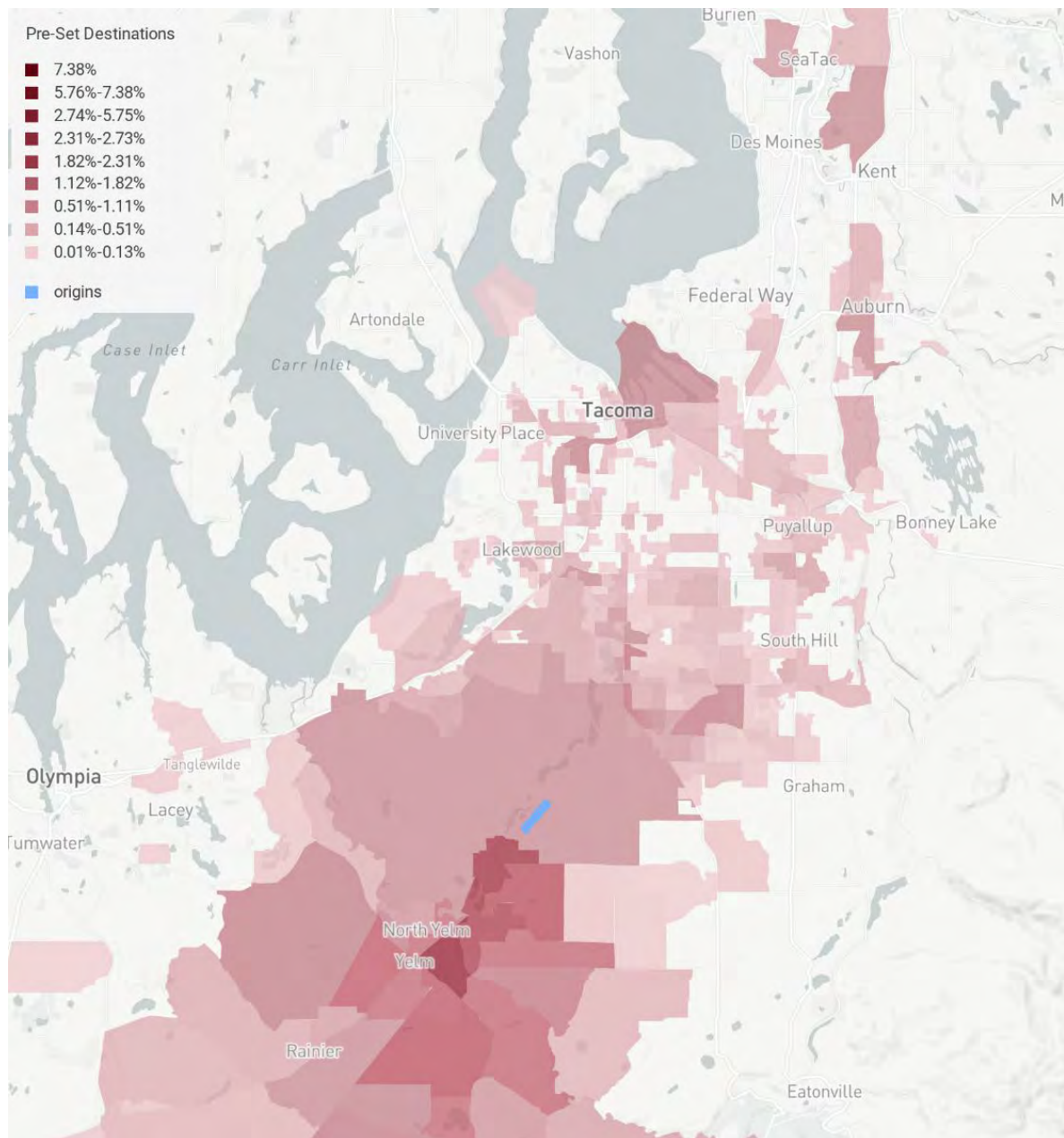


Figure 6: Origin Destination to/from SR 507 north of Roy

SR 7 North of 260th St E

Most of the trips on SR 7 from this location are contained within the southern part of the study area and south Pierce County generally. **Figure 7** shows the highest concentration of destinations are areas directly around the SR 7/SR 507 split and areas adjacent to the corridor going north. There are a few destinations in the Green River Valley. Similar to SR 7 between Parkland and Spanaway, this area has a higher number of trips to locations around Tacoma than others in the study area.

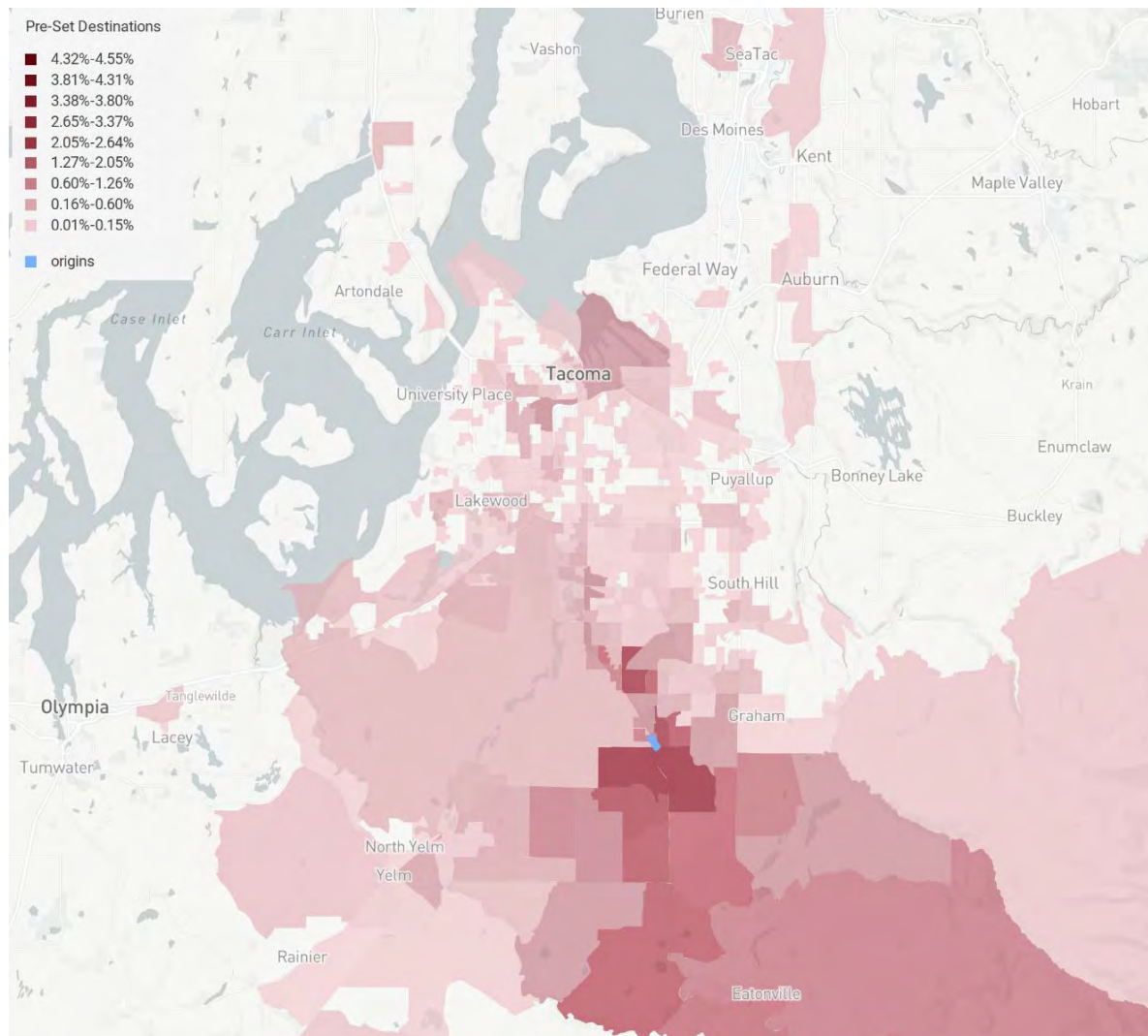


Figure 7: Origin Destination to/from SR 7 north of 260th St E

Study Area

Figure 8 represents the origin/destination patterns for all analysis roadways described above. Most trips tend to start and end in local destinations concentrated around the analysis zone, or closely adjacent to the corridor. Another large portion of trips start and end outside the study area and are mainly facilitated by the available corridor connections. Destinations like Olympia and Lacey via SR 510 or more broad areas of Tacoma via SR 7 are examples of this. **Figure 2 – 7** show consistent destinations outside of the study area for nearly all the study corridors, such as the industrial centers in the Green River Valley, which are highlighted as key destinations in **Figure 8**.

Figure 9 represents the origin/destination of all trips that start or end within the study area, regardless of what roadway they traveled on. Generally, many of the trips to/from the study area are within Pierce County and the south Sound: 70% of trips stay within Pierce County, 25% start/end within King County, and 5% start/end within Thurston County.

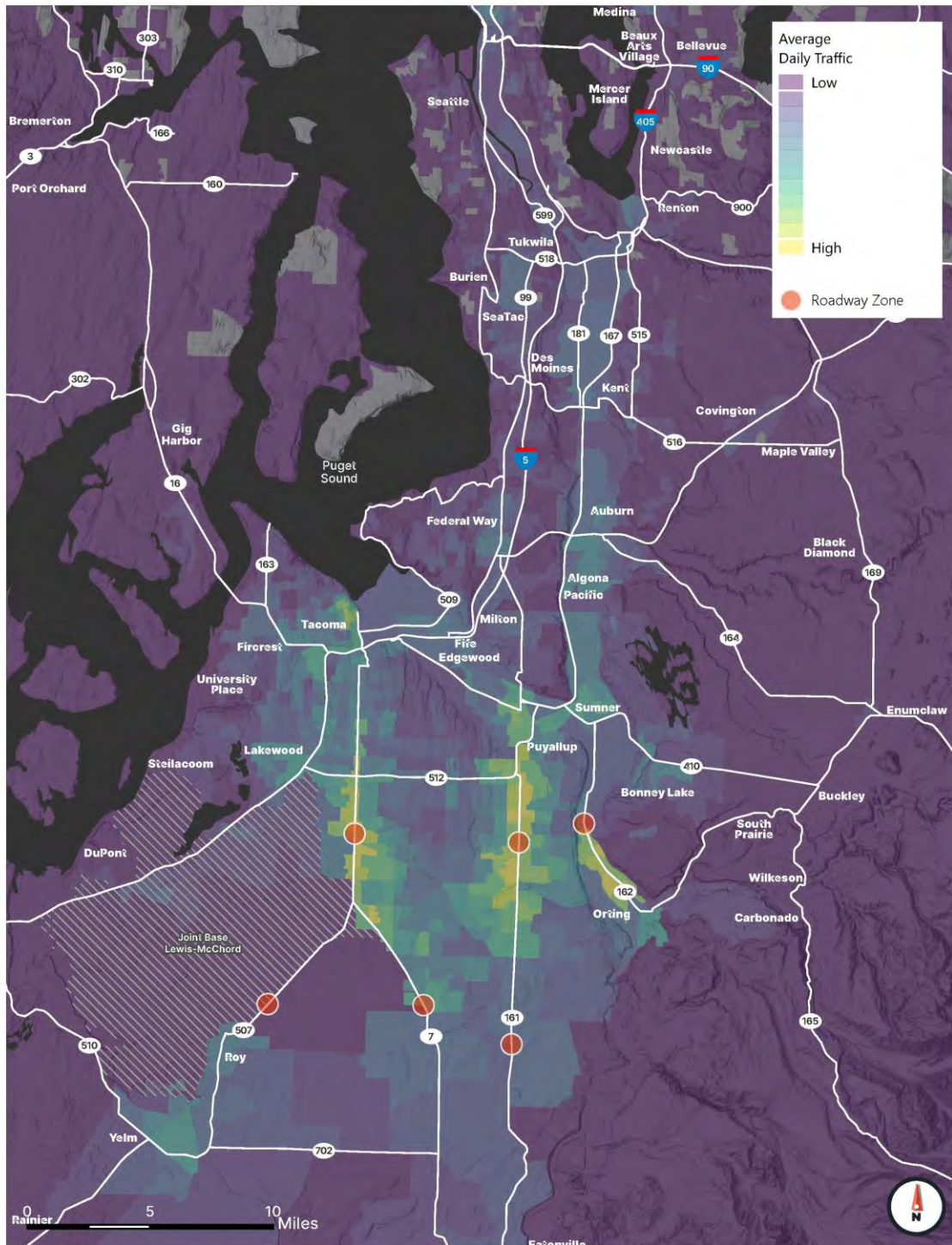


Figure 8: Origin Destination to/from all study roadways

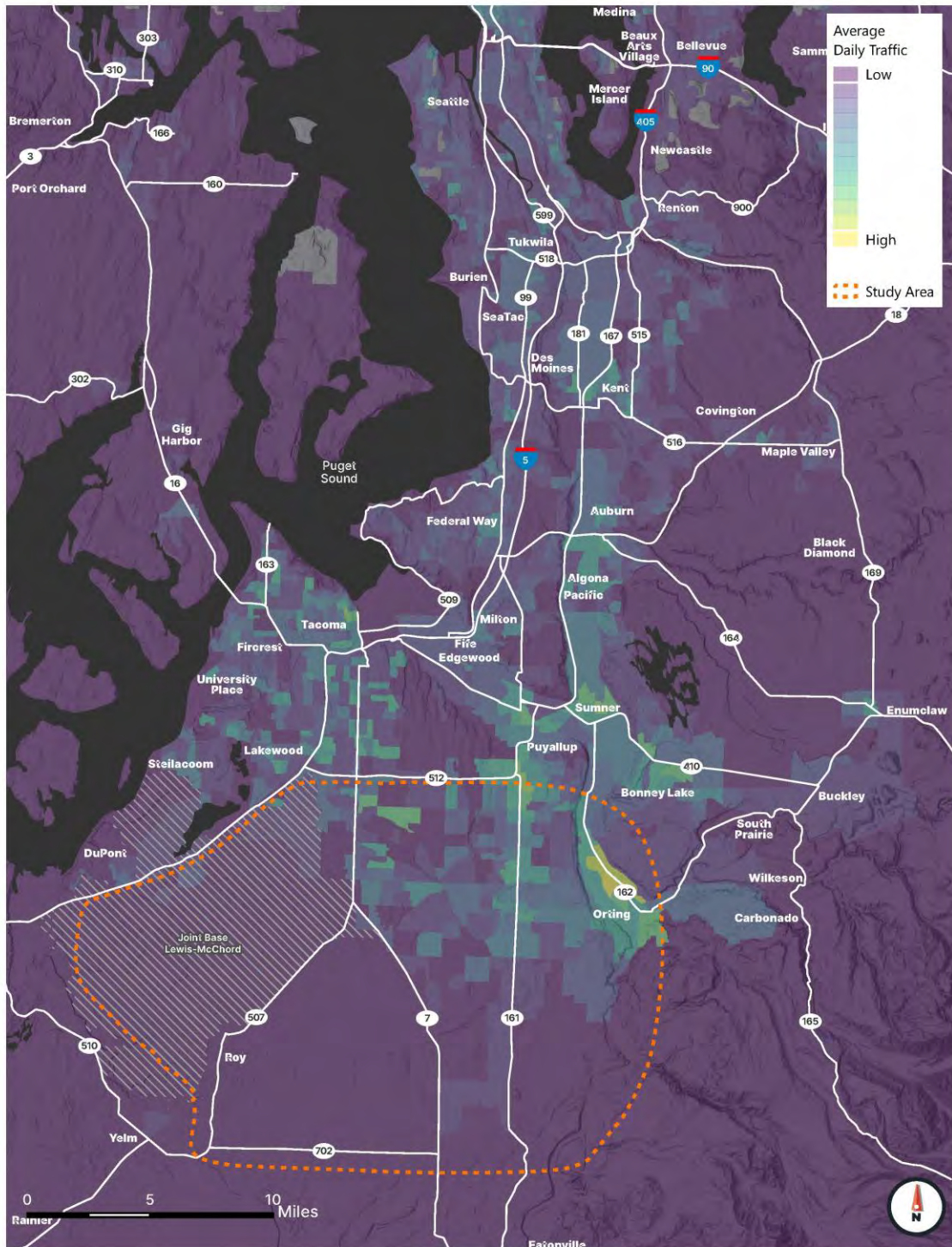


Figure 9: Origin Destination to/from study area

Top Routes Analysis

Frederickson

The Frederickson area is identified as a Manufacturing Industrial Center (MIC) by the Puget Sound Regional Council, and the MIC generates the most freight vehicle trips within the study area.

Figure 10 shows that trucks leaving the MIC primarily travel north on Canyon Road E until reaching State Route (SR) 512. At SR 512 they continue either east or west to connect to regional corridors, such as Interstate 5 and SR 167. A much smaller subset of trips continue north past SR 512 on Canyon Road E and Portland Avenue E.

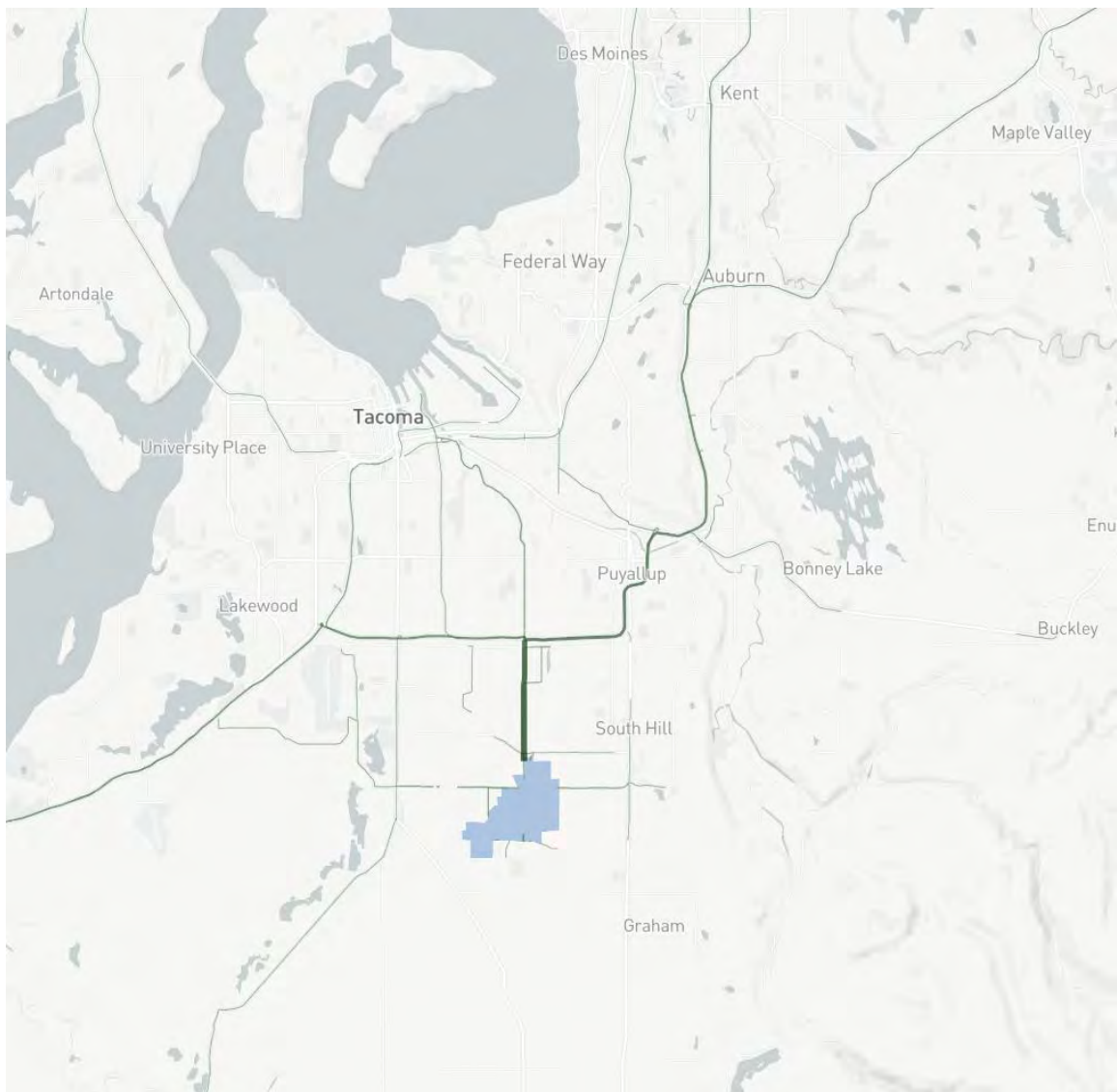


Figure 10: Top Routes for Freight to/from Frederickson

The route distribution is similar for vehicles in this area. **Figure 11** shows that for regional connections, Canyon Road E is the corridor primarily used to reach SR 512. For local trips there is more use of east-west corridors; 176th Street E and Brookdale Road E/160th Street E are used to connect to other significant corridors in the study area to the east and west.

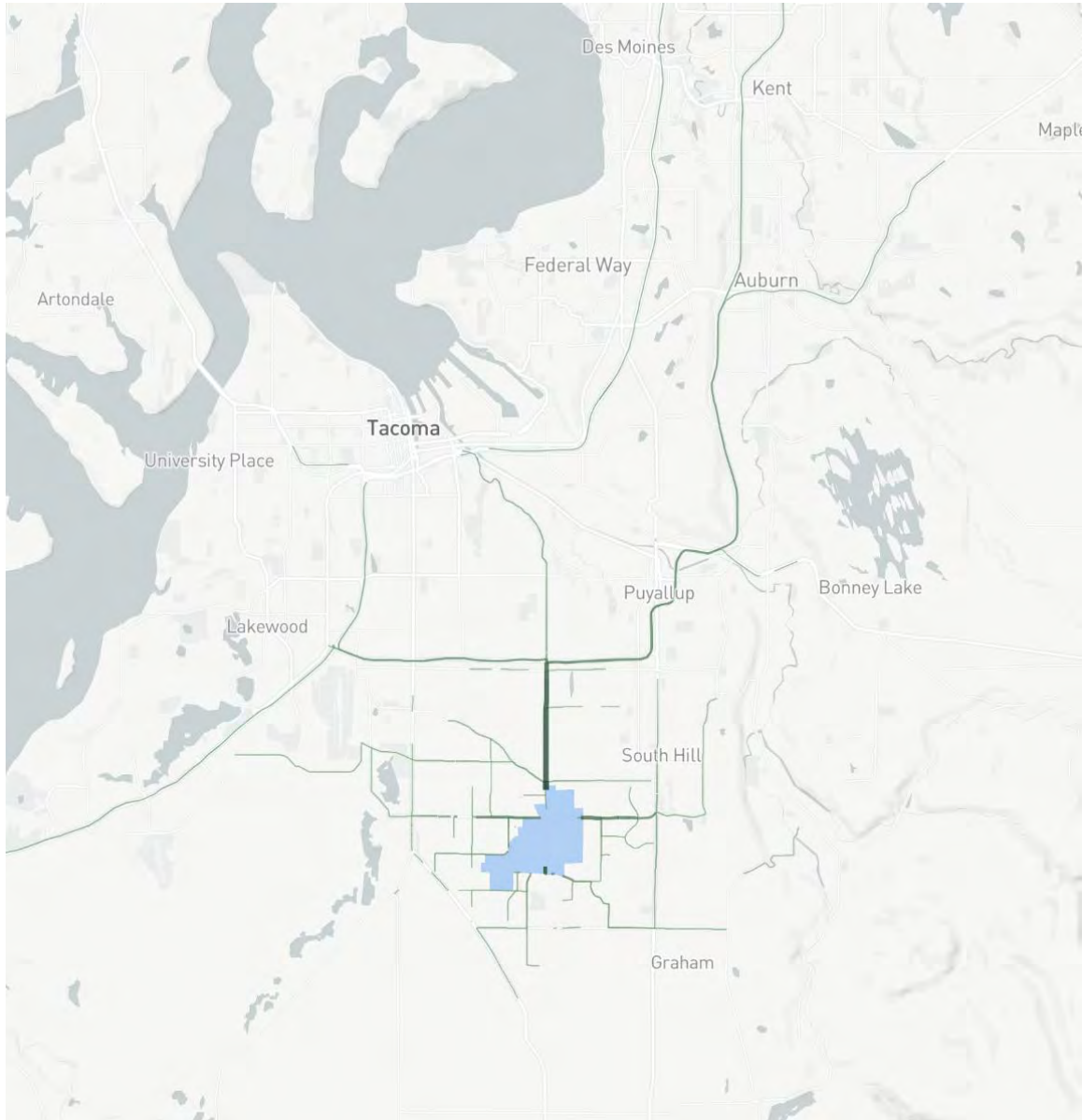


Figure 11: Top Routes for Vehicles to/from Frederickson

Spanaway

Spanaway has a more balanced distribution of north-south trips than other locations in the study area. **Figure 12** shows that vehicle travel is split primarily between four corridors: Spanaway Loop Road S, SR 7, Waller Road E, and Canyon Road E carry most northbound trips until SR 512. SR 512 distributes these trips to regional corridors with a few trips continuing north on SR 7 and Waller Road E to Tacoma. 176th Street E and Brookdale Road E/ 152nd Street E are prominent east-west connections that facilitate the distribution of volumes across the four corridors.

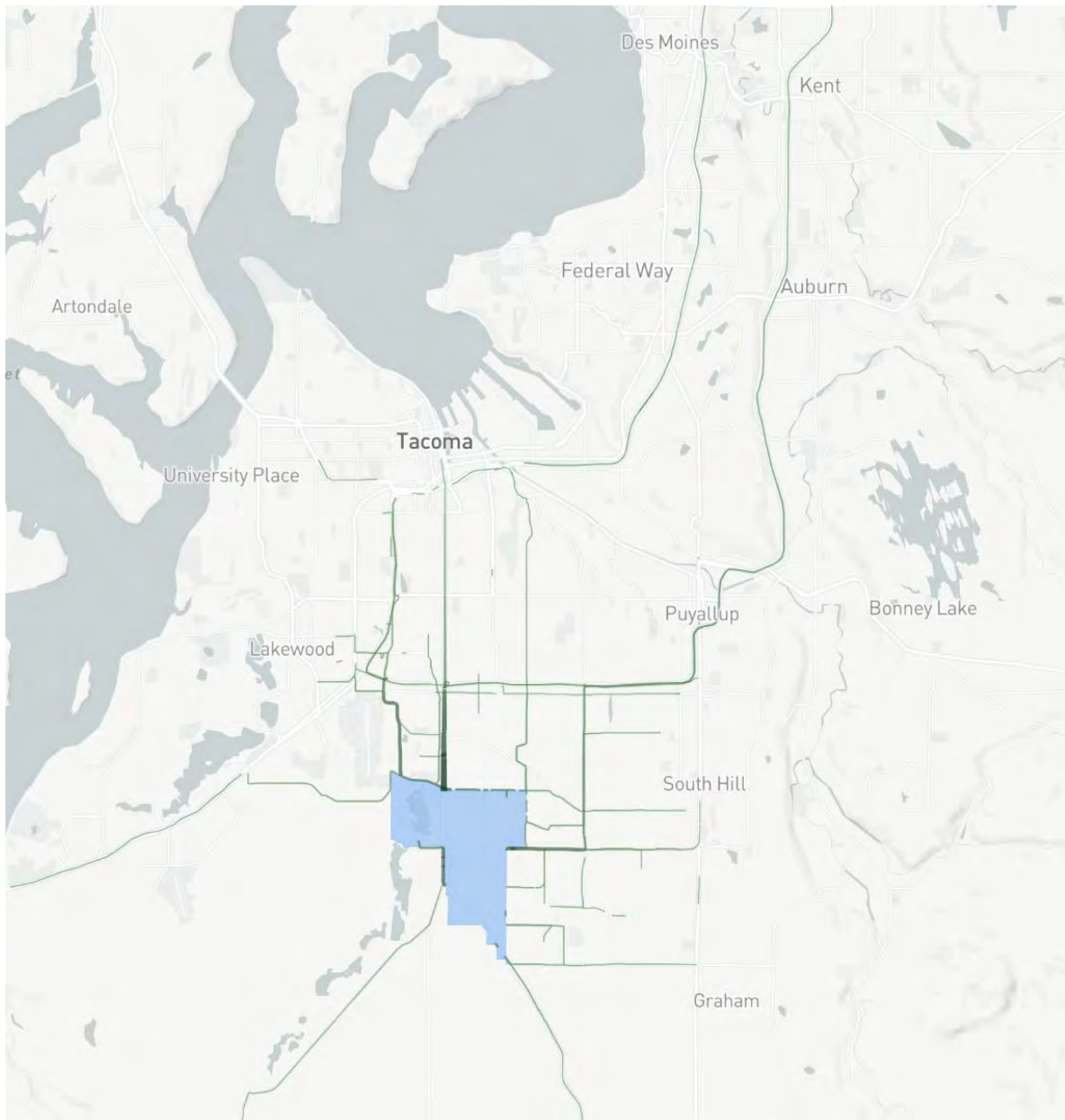


Figure 12: Top Routes for Vehicles to/from Spanaway

Graham

Trips from Graham primarily use SR 161 and Canyon Road E as the two north-south corridors in the study area, as shown in **Figure 13**. Like other locations, SR 512 distributes these trips to regional corridors with fewer trips continuing north on Canyon Road E to Tacoma. 176th Street E and 160th Street E are the east-west connections that are used to access the major north-south corridors. 224th Street E is used as an east-west connection for local trips to the west side of the study area.

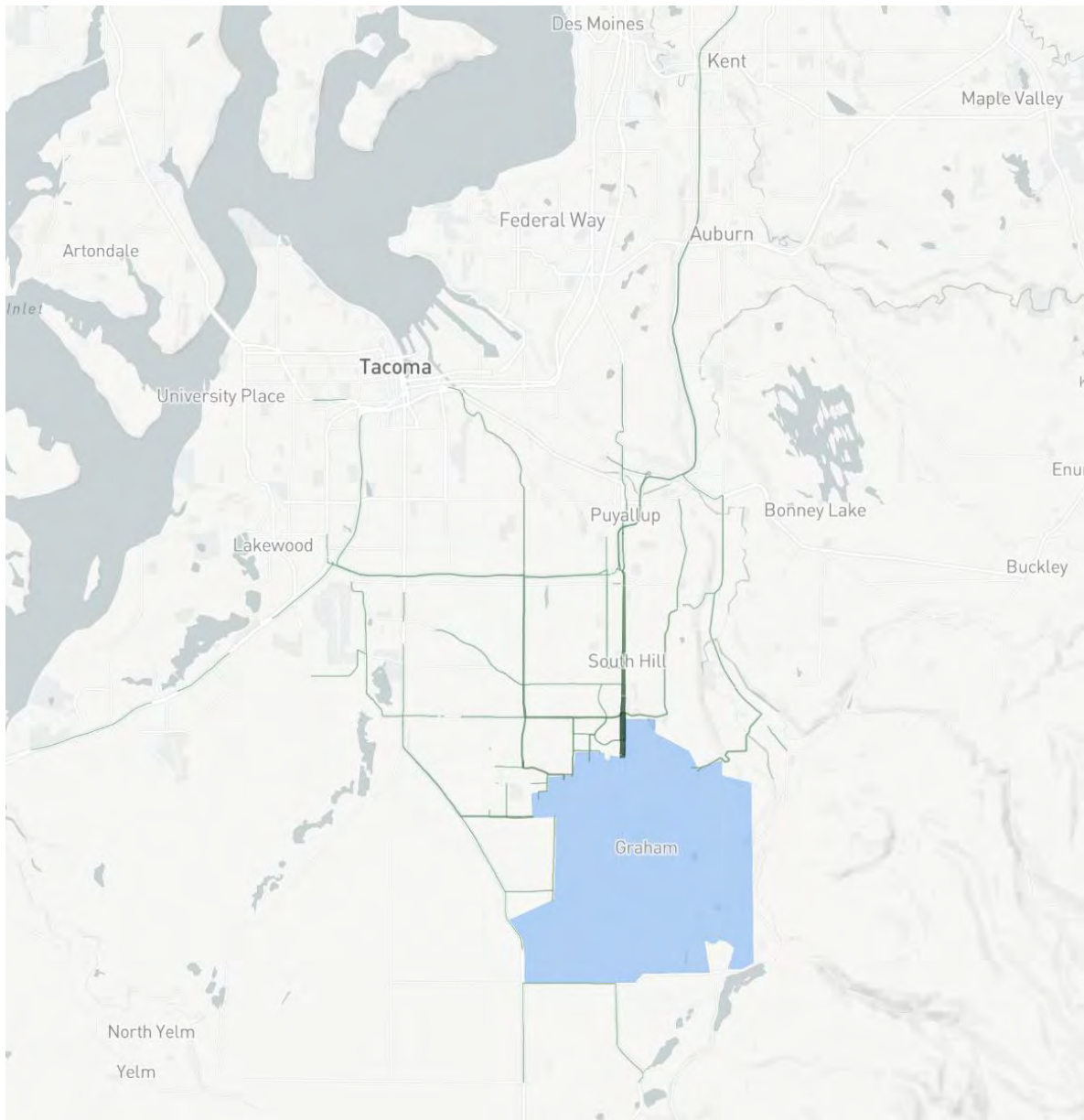


Figure 13: Top Routes for Vehicles to/from Graham

South Hill

Longer trips from South Hill use two north-south corridors with SR 161 carrying more trips than Canyon Road E. **Figure 14** shows for shorter north-south trips, 94th Avenue E carries a similar proportion of trips as SR 161. Because of South Hill's proximity to SR 512 and the density of access points to the freeway, there are multiple other smaller north-south roads that carry volume between the east-west connections. Like other locations, SR 512 distributes these trips to regional corridors. 176th Street E, 160th Street E, 128th Street E, and 112th Street E all connect these north-south roads.

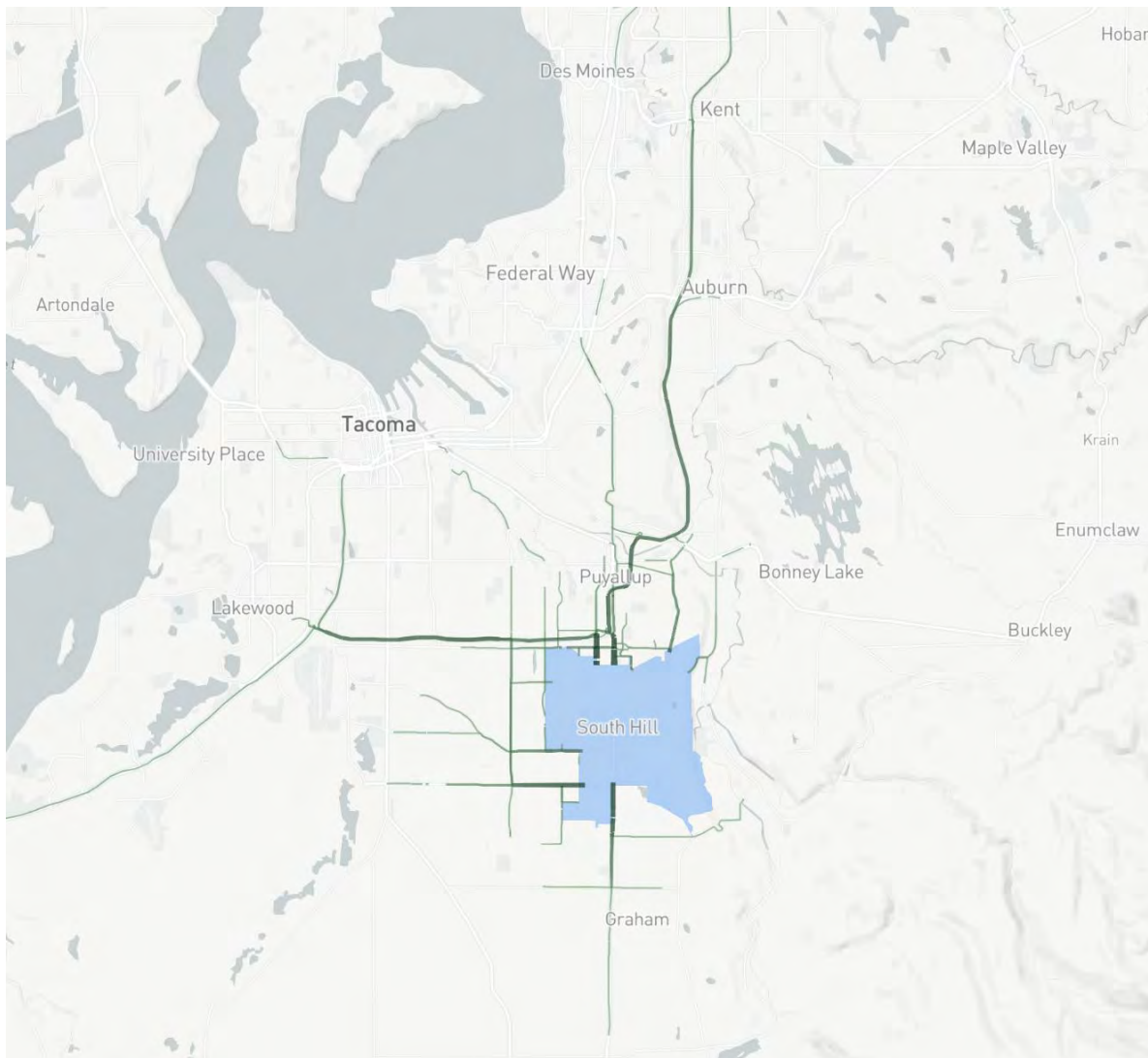


Figure 14: Top Routes for Vehicles to/from South Hill

Alderton-McMillin/Orting

The Alderton-McMillin/Orting area has limited connections to other locations in the study area.

Figure 15 and **Figure 16** show that Military Road E and Orting Kapowsin Hwy E are the only meaningful east-west access points to the rest of the study area. SR 162 is the primary north-south corridor in this area and the only road available to access these limited east-west connections. For regional trips on Interstate 5, SR 162 is used to access SR 512 via Military Road E. For trips North, SR 162 is used to access SR 167 via SR 410.

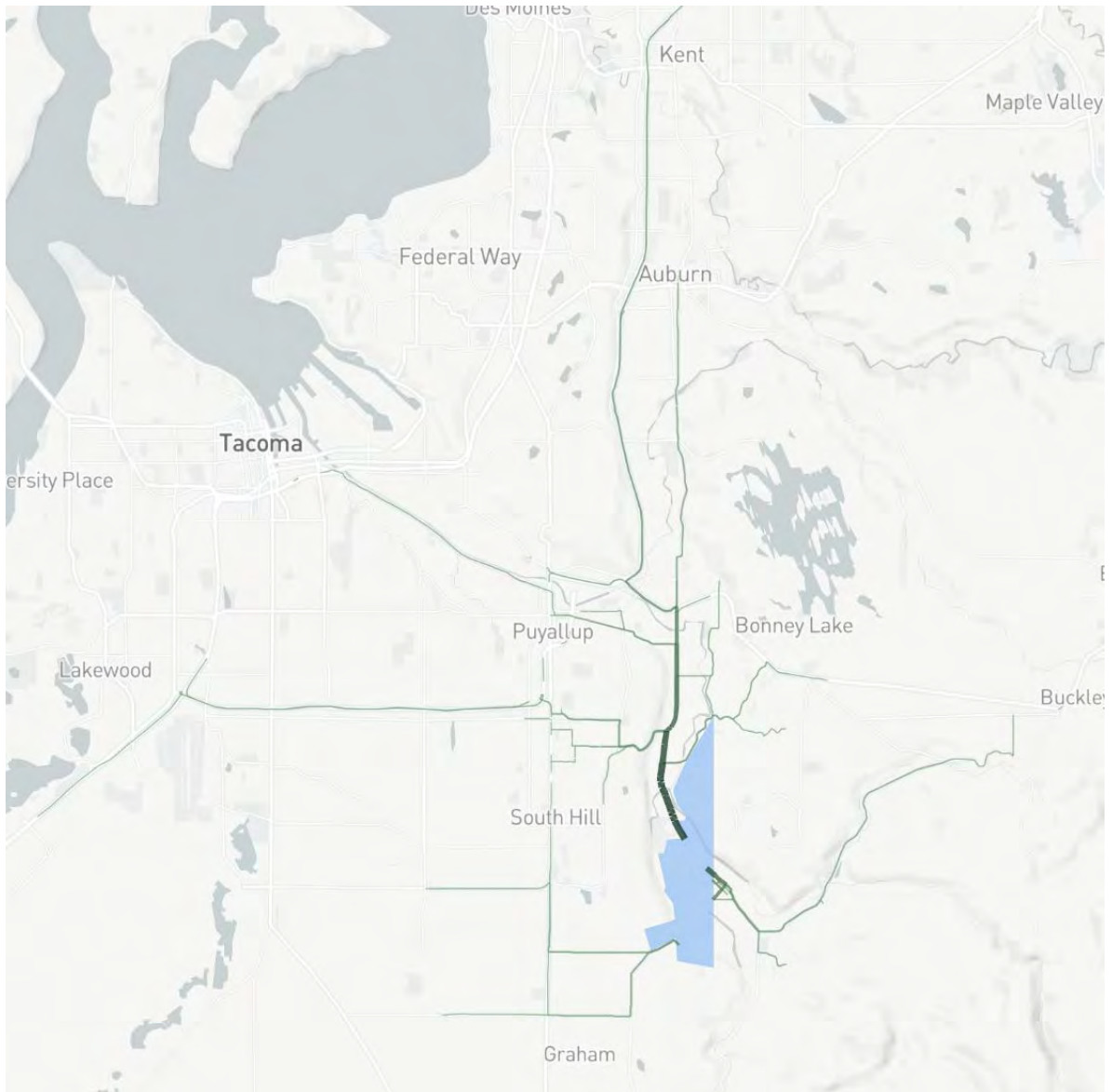


Figure 15: Top Routes for Vehicles to/from Orting

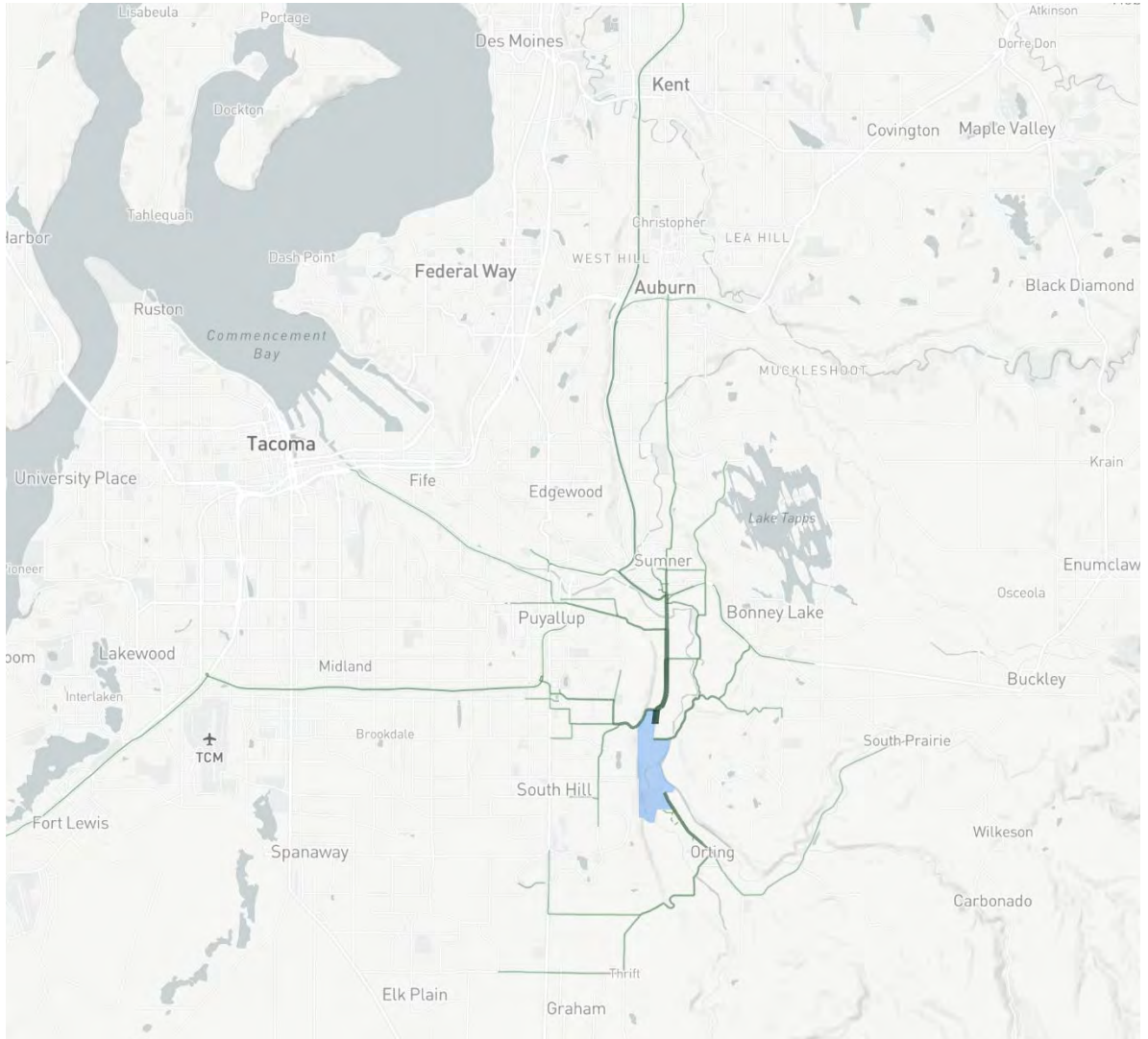


Figure 16: Top Routes for Vehicles to/from Alderton/McMillan

Study Area

For vehicle trips in the study area, many of the consistent findings identified above are represented in **Figure 17**. Study area trips rely on the north-south corridors (Spanaway Loop Road S, SR 7, Waller Road E, and Canyon Road E, SR 161, and SR 162) to access regional routes (SR 512, SR 410, SR 167, and Interstate 5). This figure also shows the few east-west corridors that are used to access multiple analysis zones within the study area. 176th Street E, 160th Street E, and Brookdale Road E/ 152nd Street E are the main east-west connection corridors within the study area. The lack of east west connections in the eastern portion of the study is shown in the figure, as there are only two roadway connections (Military Road E and Orting Kapowsin Hwy E) between the Orting Valley area and the Graham-South Hill areas.

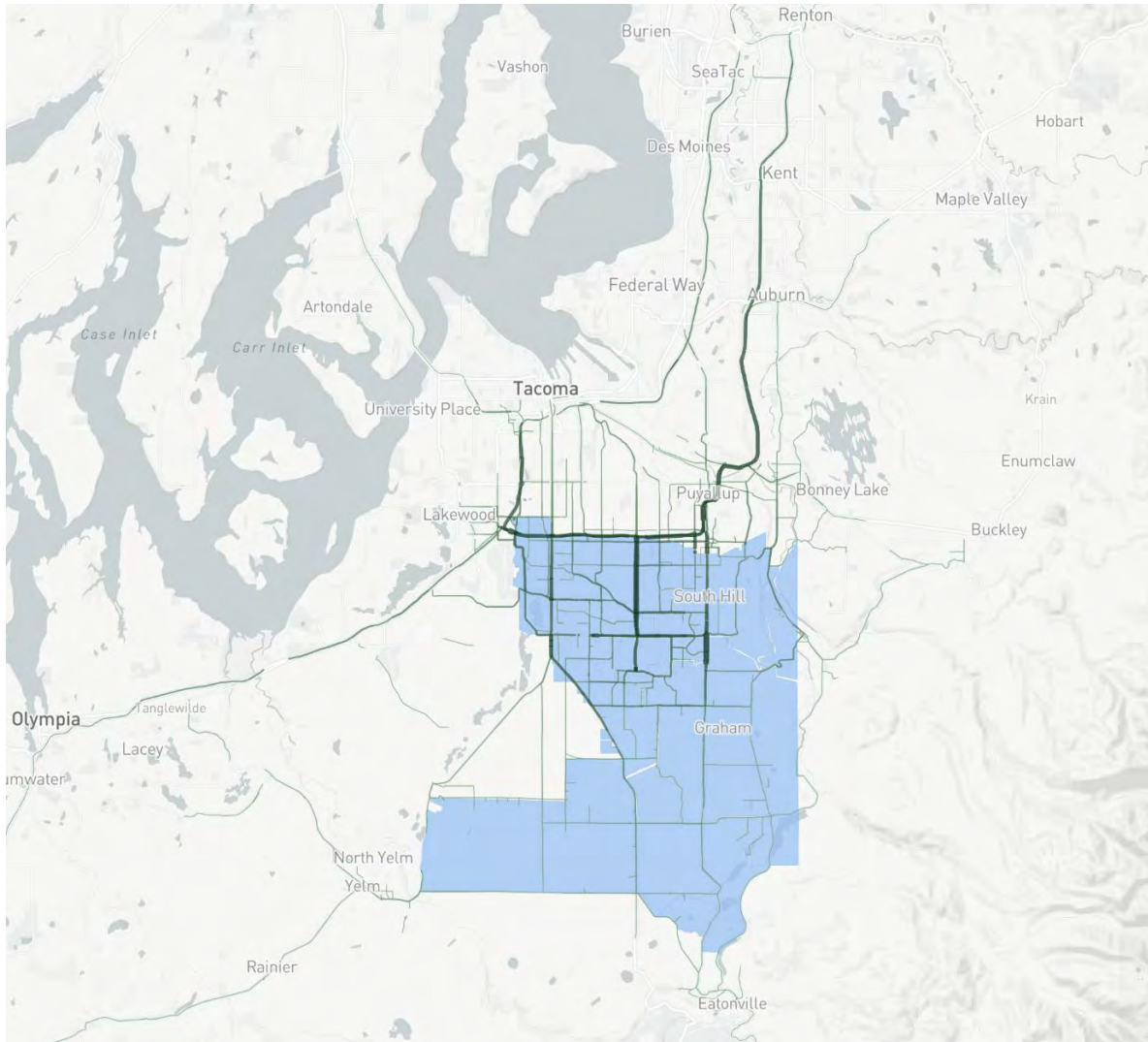


Figure 17: Top Routes for Vehicles to/from Study Area

Because Frederickson is the most significant generator of freight trips in the study area, the freight trip distribution for the study area shown in **Figure 18** is very similar to the trip distribution for Frederickson.

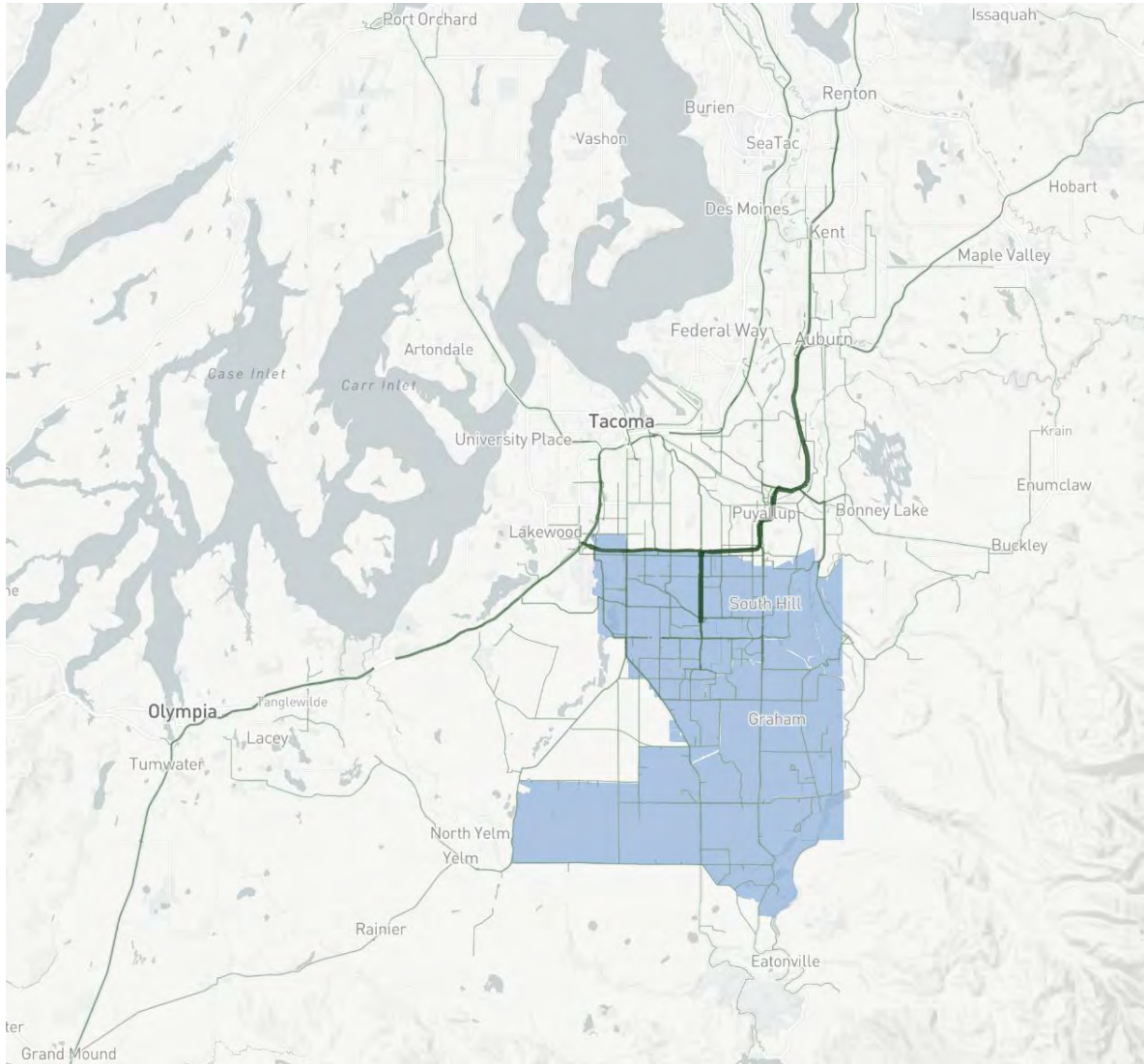


Figure 18: Top Routes for Freight to/from Study Area

Trip Length Distributions

From **Figure 9**, it is apparent that roadways within the study area facilitate many short trips internal to the study area, as well as very long trips to employment centers in Tacoma and King County. While the StreetLight Data does not provide robust data on active mode trips, some key observations can be made by investigating the trip length distributions for trips within the study area as seen in **Figure 19**. For example, areas with higher proportions of trips less than 2 miles may be more amenable to conversion to active mode trips, such as Orting and Puyallup. This data can help prioritize potential areas where active mode improvements may have a larger impact on conversion to active mode trips.

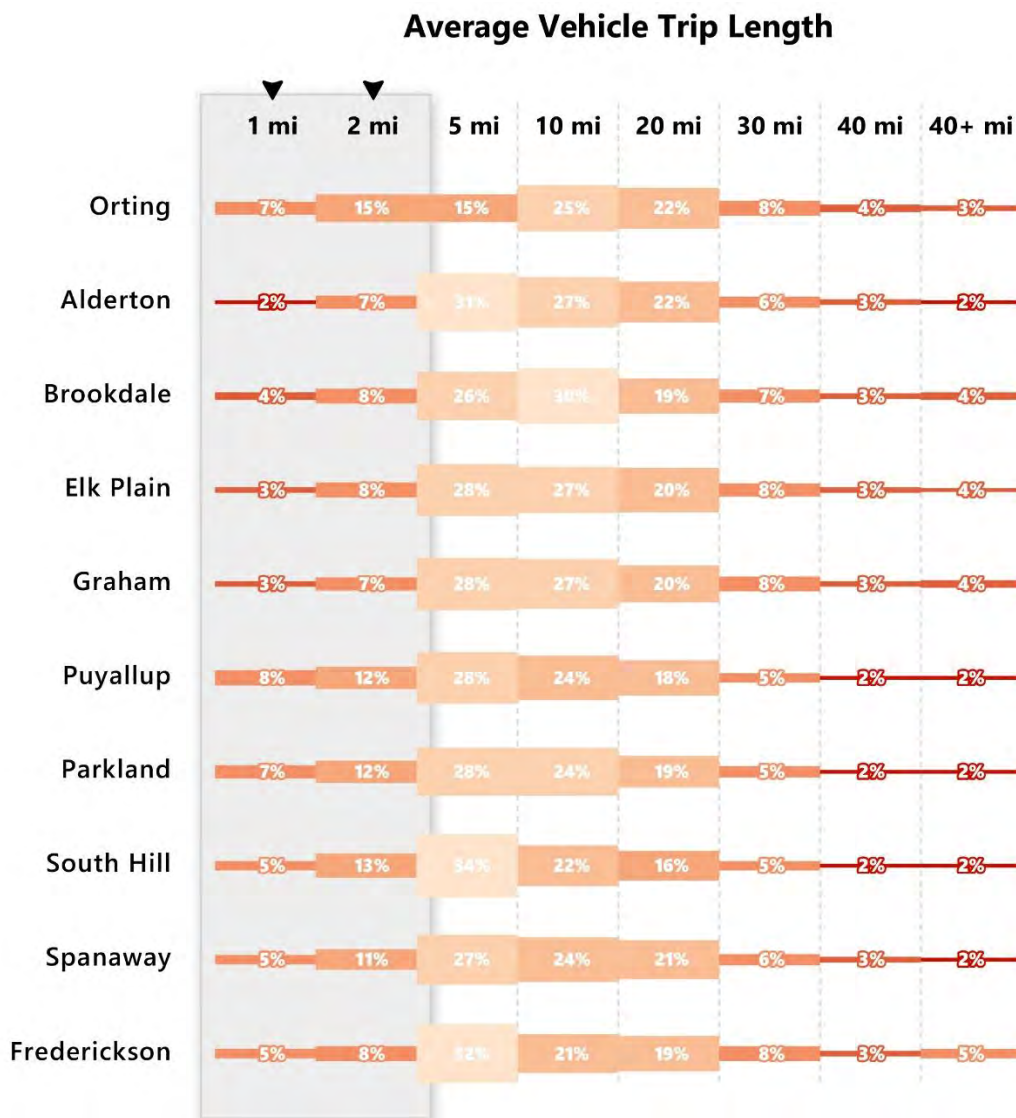


Figure 19: Vehicle Trip Length Distribution

Takeaways

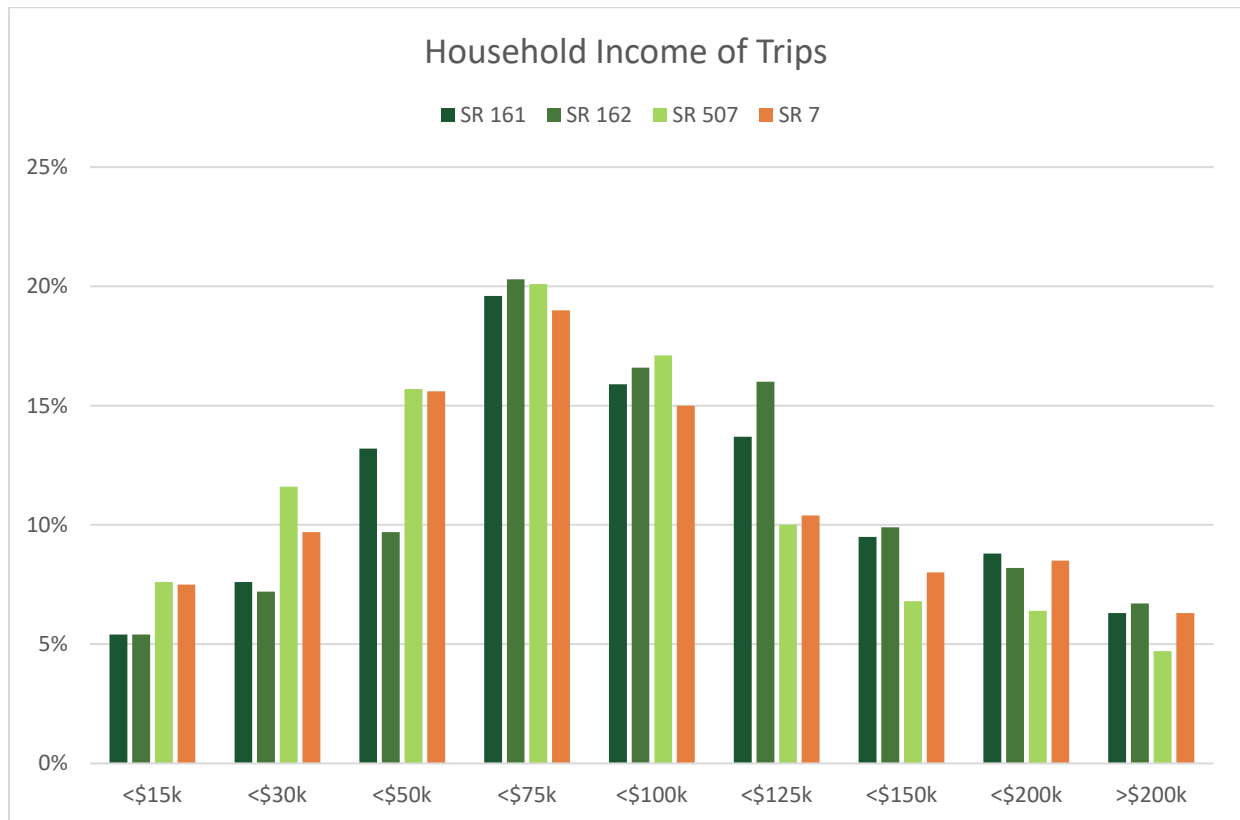
The key takeaways from the StreetLight analysis are described below. These takeaways will be used to better understand existing conditions and to better identify potential strategies to address key issues identified by stakeholders.

- Regional intercounty trips influence travel within the study area. The predominant travel outside of the study area was to the north, particularly to Tacoma and the Green River Valley.
- Overall, there is limited travel demand to and from south of the study area and the primary demand for those trips was generated from the City of Yelm.
- The trip distribution showed that there are high levels of travel (especially for freight) funneling to SR 512 to travel east or west to connect to regional freeways such as I-5 and SR 167.
- Freight traffic uses Canyon Road E almost exclusively within the study area to travel to SR 512.
- North of SR 512, there is a substantial decrease in the vehicle trips on the major north-south corridors. Other than SR 512, there are a few east-west corridors within the study area that aid in distributing the volumes on the main north-south corridors to different origins and destinations. 176th Street E is the primary east-west connector, with 160th Street E, Brookdale Road E/ 152nd Street E 224th Street E, and 304th Street E carrying lower volumes.
- East-west connectivity between SR 161 and SR 162 is very limited. Within the study area, there are only two routes connecting the corridors (Military Road E and Orting Kapowsin Hwy E). The analysis for destinations from SR 162 did not show much travel to and from South Hill, but this could be due to limited connections.
- Almost all locations have between 10 and 20% of trips that are shorter than 2 miles, these trips have the greatest potential to be able to be taken via active modes.

Other Data

The following charts utilize StreetLight data to show the distribution of household income of trips on study area roadways.

Figure 20: Household Income of Trips



Most travelers on study area roadways have household incomes near the median for Pierce County, which is about \$75,000. SR 7 has a slightly higher income distribution than the other roadways, while SR 507 has a slightly lower distribution.

Additional demographic information will be analyzed using Census data for the study area.

Appendix B:

Bicycle Level of Traffic Stress

Methodology and Results Memo



Prepared by:
Fehr & Peers

In association with:
Stepherson & Associates
Parametrix

Memorandum

Date: August 2023
To: WSDOT Olympic Region
From: SPMCS Consultant Team, Fehr & Peers
Subject: **Final Bicycle Level of Traffic Stress Methodology and Results Memo**

TC22-0040

An analysis of existing safety conditions within the study area of the South Pierce Multimodal Connectivity Study was performed, focusing on collision trends based on a variety of factors. On request from WSDOT, the project team supplemented this analysis with an analysis of bicycle Level of Traffic Stress (LTS) throughout the study area. This expanded the team's understanding of existing bicycle conditions and facilitated identification of active transportation countermeasures and mitigations.

This memorandum presents the methodology used to identify existing LTS for major corridors within the study area, the data requested from WSDOT to perform the analysis, and results of the analysis.

Bicycle Level of Traffic Stress Methodology

LTS is the current industry recognized practice for planning bicycle facilities and provides a framework for designing bicycle facilities that meet the needs of the intended users of the system. **Table 1** describes the four typical categories of bicyclists, each of which requires different levels of accommodation to feel comfortable using the system. Per **Table 1**, LTS categories range from level 1 representing conditions that are comfortable for people of all ages and all abilities, while level 4 represents conditions that are stressful for almost everyone.

An LTS network evaluation uses the typical variables that impact the comfort of a roadway for bicycling, which are posted speed limits, number of travel lanes, and vehicle volumes. Another factor can be bike lane presence, along with width/type of bike lane/facility. These variables help to determine an appropriate type of separation and crossing treatments. **Figure 1** defines how LTS could be measured on specific streets and can guide the identification of capital treatments to provide the desired LTS level on individual streets. Such treatments could include changes to

the roadway characteristics themselves (ex., posted speed and number of lanes) and/or mitigations through active transportation treatment choices that increase a bicyclist's separation from motorists along segments or at crossings (see **Figure 2** for protected LTS table). To perform the LTS analysis shown below, the initial data needed was speed limit (mph), traffic volume, number of lanes, and existing facilities. Fehr & Peers proposed to use this data and the LTS thresholds to develop a map of existing LTS conditions along major corridors within the study area. This allowed the project team to identify gaps in the active transportation network and potential areas for mitigation and capital improvement.

Table 1. Bicycle Level of Traffic Stress Categories

Characteristics	LTS 1	LTS 2	LTS 3	LTS 4
Stress	Minimal/none	Low	Moderate	High
Required attentiveness (to traffic)	Minimal/none	Low	Moderate	High
Unsupervised suitability	All ages and abilities	8 years and up	Adult	Adult
Accessibility	All ages and abilities	Possible limitations for wheeled mobility device	Likely limitations for wheeled mobility device	Presents barrier to wheeled mobility device use
Traffic Conditions	Low speeds and volumes if facilities are near traffic	Moderate speeds and volumes	Higher speeds and volumes	Highest speeds and volumes, typically multi-lane roadways

Source: WSDOT Active Transportation Plan

Bike Lanes are greater than or equal to 7 feet (allows for 5' plus 2' buffer)								
Lanes	AADT	<=20	25	30	35	40	45	50+
1 thru lane per direction (or 1 lane one-way street)	0-750	1	1	2	3	4	4	4
	751-1500	1	1	2	3	4	4	4
	1501-3000	1	1	2	3	4	4	4
	3000+	2	2	2	3	4	4	4
2 thru lanes per direction	0-7000	2	2	2	3	4	4	4
	>7000	2	2	3	3	4	4	4
3+ thru lanes per direction	Any ADT	3	3	3	4	4	4	4

Bike Lanes are less than 7 feet (must be 5' or greater to be within standard)								
Lanes	AADT	<=20	25	30	35	40	45	50+
1 thru lane per direction (or 1 lane one-way street)	0-750	1	2	2	4	4	4	4
	751-1500	1	2	2	4	4	4	4
	1501-3000	1	2	2	4	4	4	4
	3000+	2	2	2	4	4	4	4
2 thru lanes per direction	0-7000	2	2	3	4	4	4	4
	>7000	3	3	3	4	4	4	4
3+ thru lanes per direction	Any ADT	3	3	4	4	4	4	4

Source: WSDOT Active Transportation Plan

Figure 1. Bicyclist Linear-Facilities Look-Up Tables

Protected Bicycle Lane (parking or robust vertical barrier separation)								
Lanes	AADT	<=20	25	30	35	40	45	50+
1 thru lane per direction (or 1 lane one-way street)	0-750	1	1	1	2	2	2	2
	751-1500	1	1	1	2	2	2	2
	1501-3000	1	1	1	2	2	2	2
	3000+	2	2	2	2	2	2	2
2 thru lanes per direction	0-7000	2	2	2	2	2	2	2
	>7000	2	2	2	2	2	2	2
3+ thru lanes per direction	Any ADT	2	2	2	2	2	2	2

Vertically Delineated Bicycle Lane (Buffered bike lane with flexible delineator/candlestick)								
Lanes	AADT	<=20	25	30	35	40	45	50+
1 thru lane per direction (or 1 lane one-way street)	0-750	1	1	2	2	3	3	4
	751-1500	1	1	2	2	3	3	4
	1501-3000	1	1	2	2	3	3	4
	3000+	2	2	2	3	3	4	4
2 thru lanes per direction	0-7000	2	2	2	3	3	4	4
	>7000	2	2	3	3	3	4	4
3+ thru lanes per direction	Any ADT	2	2	3	3	3	4	4

Source: WSDOT Active Transportation Plan

Figure 2. Protected Bicyclist Linear-Facilities Look-up Tables

Data Requirements for Analysis

To calculate existing LTS throughout the study area, Fehr & Peers requested the following data. Much of the data had already been received as part of other aspects of the Existing Conditions analysis. Data in **bold** represents data that Fehr & Peers requested from WSDOT:

- **Existing Bicycle Facilities**
 - **Ideally including a break-down by facility type: buffered/protected bike lanes, and striped bike lanes**
- **Speed Limit (mph) For All Roadways**
 - **This data is included with other roadway/corridor data received from both WSDOT and Pierce County; however, it would be important to confirm that this represents the most recent speed limit data. Operational speed should also be considered as available.**
- Traffic Volume (AADT)
 - *We have already compiled this data from both WSDOT and Pierce County sources*
- Number of Lanes
 - **We will need to get this data from WSDOT and Pierce County.**
- *Crossing Data*
 - **We will need to get this data from WSDOT for crossing data such as midblock crossings and other available crossing infrastructure data.**

Existing Bike LTS Conditions

The study area has limited facilities for bikes. SR 7 and Canyon Road East have shoulder bike lanes that are LTS 4 facilities because the roads are multi-lane high-speed facilities. The only study area arterial facility with lower stress than LTS 4 is the Foothills Regional Trail. The shared-use trail is LTS 1, although roadway crossings and access to the trail likely have higher LTS. In general, LTS should be evaluated for corridors and crossings as part of any pre-design and preliminary engineering projects. It runs parallel to SR 162 which is LTS 4. **Figure 3** shows a map of existing bicycle LTS for the study area.

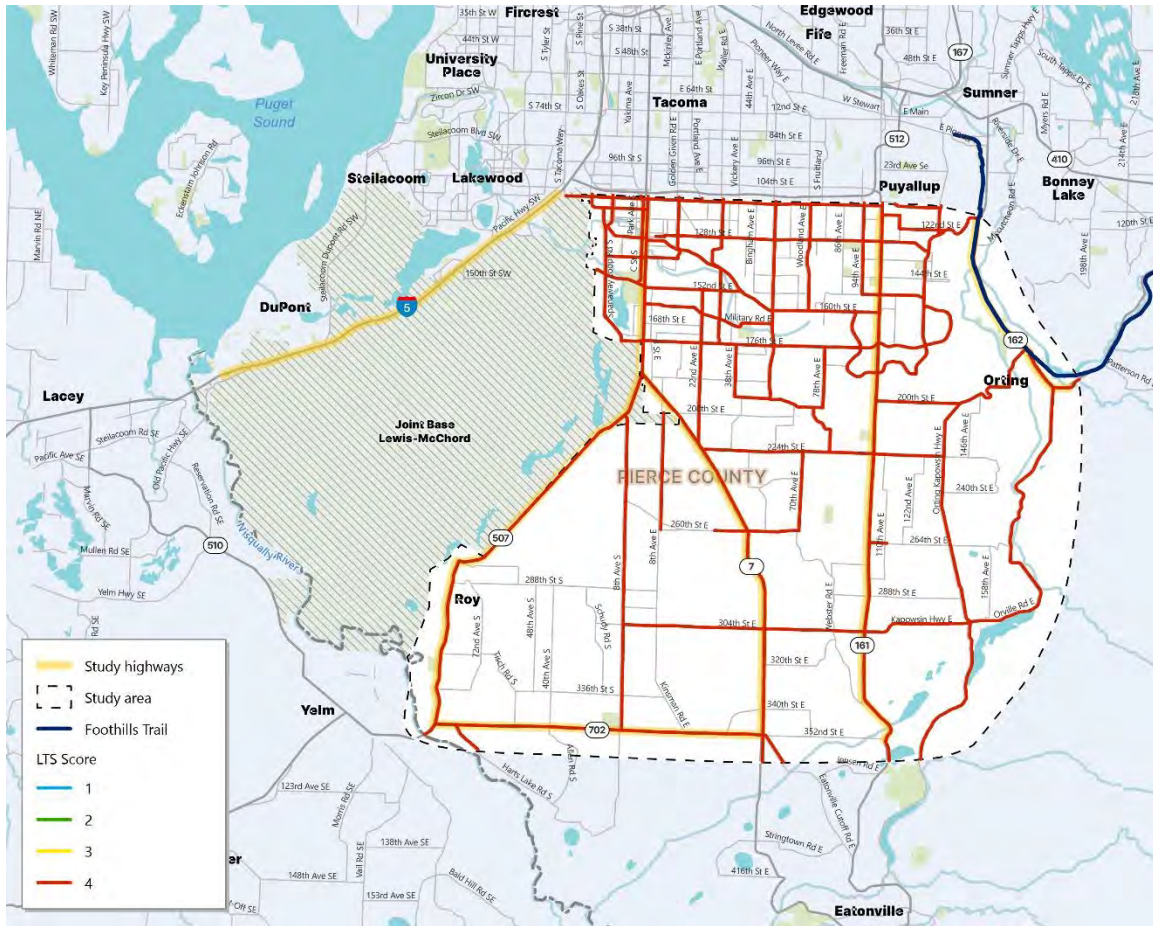


Figure 3. Bicycle LTS for the Study Area

Appendix C:

Crash Analysis Memo



Prepared by:
Fehr & Peers

In association with:
Stepherson & Associates
Parametrix

Memorandum

Date: August 2023

To: South Pierce Multimodal Connectivity Study Team

From: Michael Adamson, and Krista Runchey, Fehr & Peers

Subject: Final Crash Analysis Technical Memorandum

TC22-0040

Executive Summary

Based on the safety analysis, the project team identified the following areas with a high density of Killed or Serious Injury (KSI) crashes:

- SR 7 and SR 161 experienced a higher density of pedestrian and bicycle collisions near SR 512. These areas are also characterized by higher land use densities, travel volumes, and turning movements.
- SR 507 experienced its highest density of collisions at its intersections with SR 7 and SR 702 as it approaches McKenna.
- Canyon Road experienced a higher rate of sideswipe collisions along segments than any of the other corridors, including 2 that resulted in a KSI collision.

Key collision trends along SR 7, SR 161, SR 507 and/or Canyon Road were identified as follows:

Intersection-Related Trends

1. Failure to Yield to Pedestrians
2. Intersection Congestion and/or ROW Compliance

Segment-Related Trends

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3. Vehicle Compliance at Mid-Block Crossings
4. KSI Collisions in Evening Hours
5. Lack of Pedestrian Crossings
6. Congestion and Speed Compliance
7. Driveway Density
8. Sideswipe Collisions Along Segments

Introduction

The purpose of this memorandum is to summarize the results of the crash analysis performed as part of the South Pierce Multimodal Connectivity Study (SPMCS). On request from Washington State Department of Transportation (WSDOT) safety staff¹, the evaluation focused on identifying high collision locations throughout the study area. In safety analyses, high collision locations are those locations with a higher number of collisions. The high collision locations consisted of all collision types, including the subset of collisions that resulted in someone being killed or seriously injured (referred to as “KSI” collisions in this memorandum), as identified using data from WSDOT.

The safety evaluation included the following tasks:

- Spatial mapping of collisions within the study area, including high collision maps showing the concentration of all collisions, fatal or serious injury (KSI) collisions, and pedestrian/bicycle involved collisions.
- Assessment of collision trends along select major corridors within the study area, including identification of potentially applicable countermeasures.

¹ Meetings held on June 21, 2022 and December 21, 2022

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Study Area Collision Analysis

To effectively reduce future collisions, it is important to understand the history of collision patterns across the study area. The Consultant Project Team reviewed the complete WSDOT dataset from 2017 to 2021 for collisions along roadways within the study area to assess trends and locations with the highest collision frequency. The study area is shown in **Figure 1**.

Across the study area, there were a total of 12,261 collisions from 2017 to 2021. Of these collisions, 3,603 resulted in at least one minor injury (minor injury collision) while 386 resulted in at least one fatality or serious injury (KSI collision). For the purposes of this analysis, minor injury collisions also include any collision where at least one possible injury occurred. There were a total of 90 vehicle-to-bicycle collisions (with 11 KSI collisions) and 197 vehicle-to-pedestrian collisions (with 67 KSI collisions). A total of 85 fatalities occurred over the five-year period.

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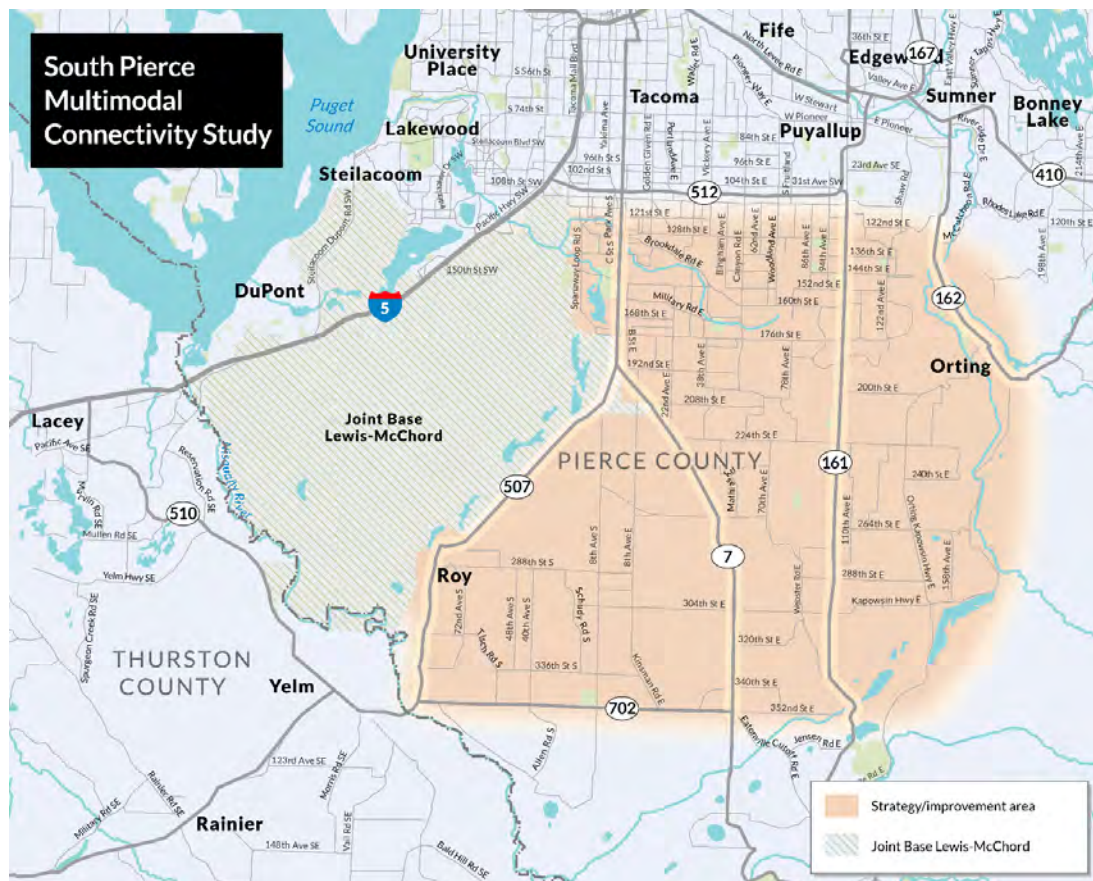


Figure 1. Study Area

Collision Heat Maps

Figure 2 shows a heat map of KSI collisions within the study area from 2017-2021, while **Figure 3** shows a heat map of pedestrian and bicycle KSI collisions within this same time frame. These heat maps represent the density of collisions throughout the subarea. Darker areas on the heat maps show higher collision densities². The KSI collisions map shows a higher density of collisions along SR 7, SR 161, Canyon Road, and SR 507. Pedestrian/bicycle KSI collisions are concentrated around SR 7 and SR 161, particularly on the northern end of these corridors near SR 512 where population densities are higher.

² These densities were defined using the Kernel Density tool in ArcGIS Pro. This tool calculates the density of features in a neighborhood around those features. By default the heat maps have exported in terms of collisions per square mile.

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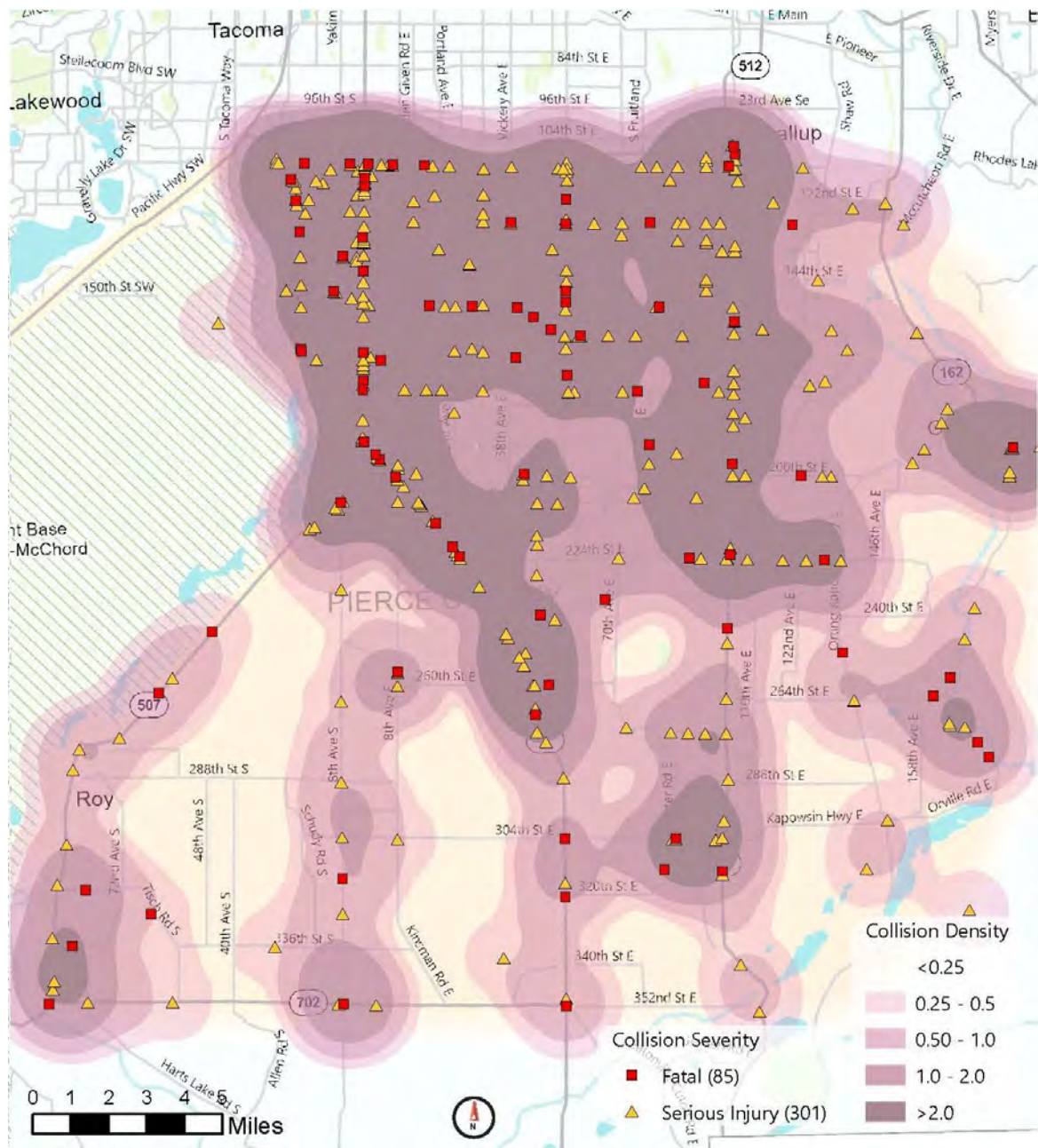


Figure 2. Heat Map of All KSI Collisions in the Study Area (2017-2021)

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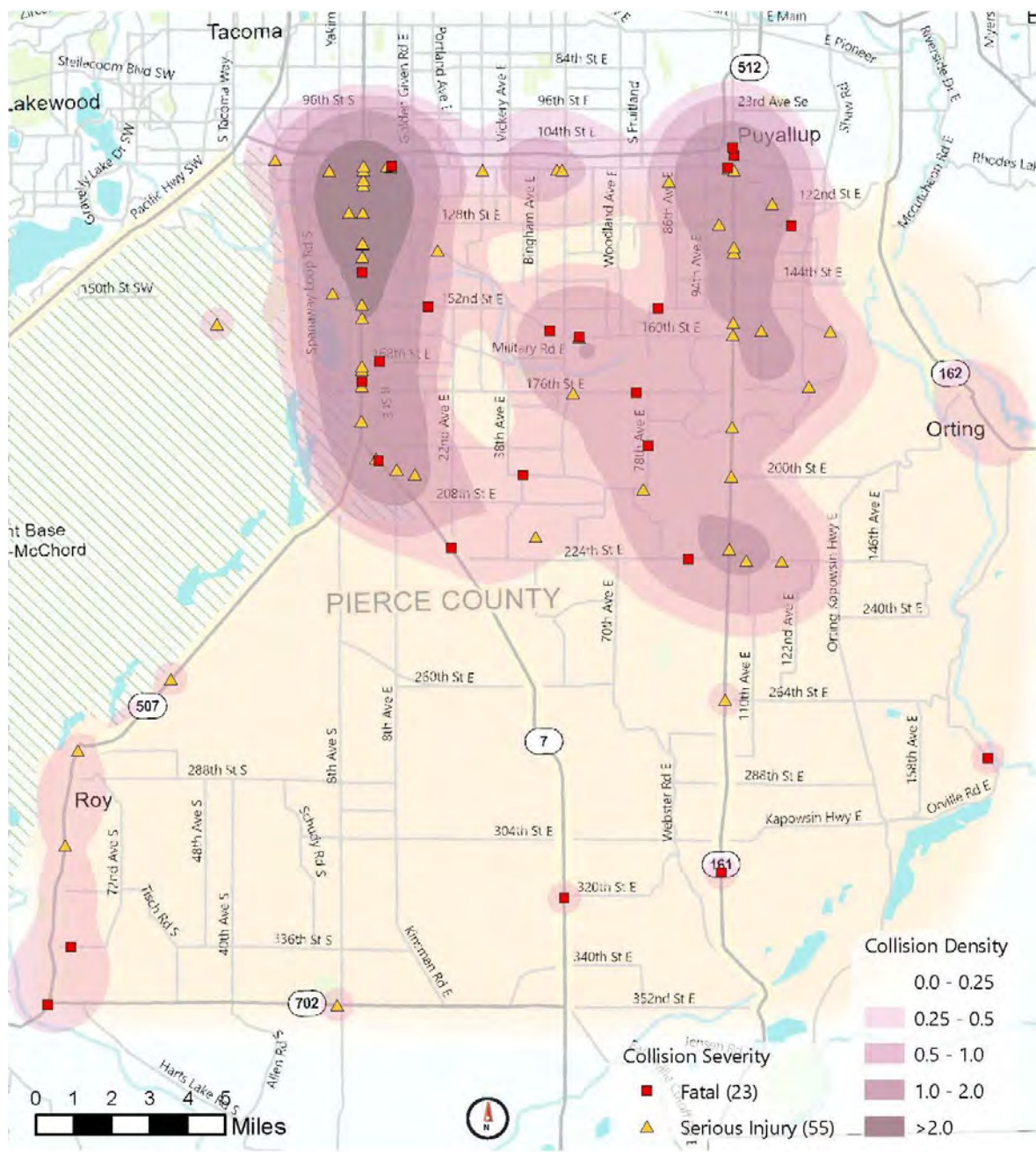


Figure 3. Heat Map of Pedestrian and Bicycle KSI Collisions in the Study Area (2017-2021)

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Area-Wide Trends

In addition to the trends already summarized in the heatmaps, the Consultant Project Team reviewed the contributing circumstances, collision types, weather, and other factors to identify trends specific to the study area. These trends are summarized in the following subsections.

General Trends for All Collisions

The Consultant Project Team reviewed trends for all collisions at both an intersection-level and segment-level. Failure to yield, speeding, and following too closely were key trends for all collisions both at an intersection and segment level, while higher percentages of collisions occurred at night. At an intersection level, 20% of all collisions were related to failure to yield, 15% of all collisions were related to driver inattention, and 7% of all collisions were related to speeding. At a segment level, there were still high numbers of vehicles failing to yield properly and operate at posted speed limits. However, at the segment level there is a larger percentage of vehicles following too closely (12%) and increased percentages in driver inattention (14%). The Consultant Project Team reviewed trends for active mode collisions at both an intersection-level and segment-level. Failure to yield and speeding were key trends for active mode collisions both at an intersection and segment level.

KSI Collision Trends

In reviewing KSI collision trends, it was found that while 30% of all vehicle collisions resulted in injury or fatality, 87% of vehicle-to-bicycle collisions and 93% of vehicle-to-pedestrian collisions resulted in injury or fatality. **Figure 4** shows a comparison of the proportions of property-damage-only (PDO), minor injury (including possible injuries), and KSI collisions for all three modes. These findings demonstrate the importance of protecting vulnerable road users such as bicyclists and pedestrians, who are more likely to sustain injuries. A higher percentage of KSI collisions involving a pedestrian occurred at night when compared to total pedestrian collisions. This is shown in **Figure 5**.

Summary of Trends:

- **Intersection-Related Trends:**
 - **Failure to Yield to Pedestrians/Bicyclists:** The majority of bicycle and pedestrian collisions resulted from the vehicle failing to yield (22% and 30% respectively). This was a relatively even split between vehicles going straight hitting pedestrians versus those turning.

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- **Intersection Right-of-Way Compliance:** 20% of all intersection-related collisions resulted from a failure to yield.
- **Segment-Related Trends:**
 - **Vehicle Compliance at Mid-Block Crossings:** 48% of all vehicle-to-pedestrian collisions occurred along roadway segments. Of these collisions, 25% were related to a pedestrian crossing the roadway somewhere other than a marked crosswalk. Of the remaining 75%, several relate to not granting right-of-way or inattention on the part of either the pedestrian or vehicle.
 - **Pedestrian KSI Collisions in Evening Hours:** While pedestrian collisions that occurred during evening or night-time hours make up 53% of the total pedestrian segment collisions, 63% of pedestrian segment KSI collisions occurred during these hours.

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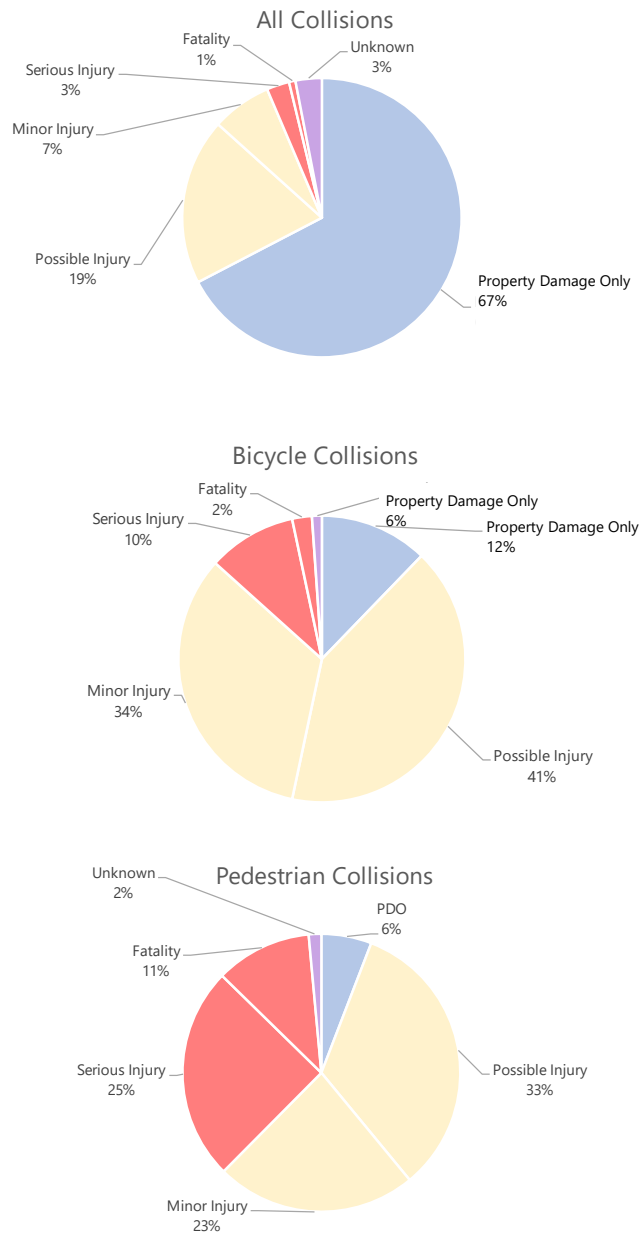


Figure 4. Proportion of Non-Injury, Minor Injury, and KSI Collisions for All Modes (2017-2021)

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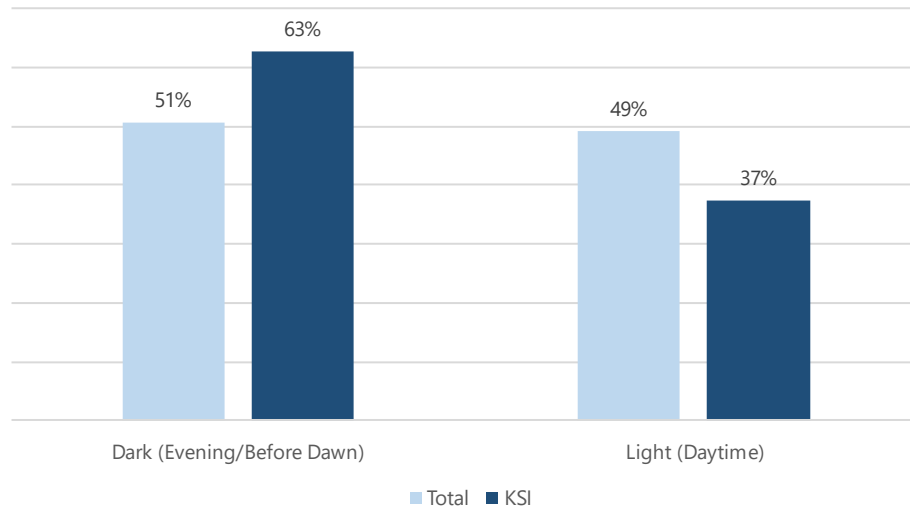


Figure 5. Total and KSI Pedestrian Collisions by Time Period (2017-2021)

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Corridor-Specific Trends

SR 7

From 2017 to 2021, 2,157 collisions occurred on SR 7. The severity of these collisions, broken out by mode, are summarized in **Table 1**. During this period, 18 fatalities occurred along the corridor, including one vehicle-to-bicycle fatality and four vehicle-to-pedestrian fatalities.

SR 7 serves as a principal north-south arterial within the study area, providing connections between SR 512 and communities in southern Pierce County and northeastern Thurston County. SR 7 experiences substantial congestion, particularly near SR 512. The collision trends along this corridor are related to congestion, such as rear-ends and sideswipes. The majority of total and KSI collisions on SR 7 were clustered on the northern portion of the corridor where the intersection with SR 512 is located. There was also a high density of KSI collisions at the intersection of SR 7 and SR 507. Pedestrian and bicycle collisions were clustered on SR 7 north of SR 507, with a higher density of pedestrian and bicycle KSI collisions closer to SR 512.

Specific Collision Trends

- **Intersection-Related Trends:**
 - **Failure to Yield to Pedestrians:** Of pedestrian collisions that occurred at intersections, the majority occurred at intersections without a marked crosswalk across SR 7.
 - **Crossing Visibility:** Many of the remaining pedestrian-related collisions at intersections dealt with vehicles turning and hitting pedestrians, either from minor approaches onto SR 7 or from SR 7 onto minor approaches.
- **Segment-Related Trends:**
 - **Congestion and Speed Compliance:** Of all collisions along segments, 51% were rear-end collisions, while 18% resulted from following too closely and 16% from speeding. The high proportion of rear-ends is consistent with the congestion and speeding issues along SR 7.
 - **Pedestrian Crossing Opportunities and Visibility:** Of pedestrian collisions that occurred on segments, the majority occurred in areas where there were limited crossing opportunities; most pedestrian crossings on SR 7 within the study area are at signalized intersections, with a few RRFB's also existing. The remainder of pedestrian collisions occurred at Rapid Repeating Flashing Beacon (RRFB) locations.

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- **Driveway Density:** Of all segment collisions, 22% occurred at driveways. There is a particularly high density of driveways on the northern portion of SR 7, as well as just south of SR 507, increasing the number of potential vehicle conflict points in these congested areas.

Table 1. Collisions by Mode and Severity – SR 7 Corridor

Severity	Collisions	Percentage
All Modes		
Property Damage Only	1,486	69%
Other Injuries	598	27%
KSI	73	4%
Total	2,157	-
Vehicle-to-Pedestrian		
Property Damage Only	1	2%
Other Injuries	25	57%
KSI	18	41%
Total	44	-
Vehicle-to-Bicycle		
Property Damage Only	0	0%
Other Injuries	13	81%
KSI	3	19%
Total	16	-

Source: WSDOT Collision Data 2017-2021, Analyzed by Fehr & Peers 2022

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SR 161

From 2017 to 2021, 2,140 collisions occurred on SR 161. The severity of these collisions, broken out by mode, are summarized in **Table 2**. The collisions included seven fatalities along the corridor, including three vehicle-to-pedestrian fatalities.

Similar to SR 7, SR 161 serves as a principal connection between SR 512/SR 167 and southern Pierce County communities, including South Hill and Graham. The South Hill Mall area has a high density of commercial accesses, in addition to being adjacent to multiple access points to SR 512. SR 161 experiences substantial congestion as it approaches South Hill and SR 512 from the south. This is reflected in the total collision trends on the corridor, with a higher density of collisions closer to SR 512. Additionally, a proportionally higher density of KSI collisions occurred around the South Hill Mall area of the corridor, compared to total collisions.

Specific Collision Trends

- **Intersection-Related Trends:**
 - **Intersection Congestion:** Of intersection collisions, 47% were rear-end collisions, with the majority of these along the northern portions of SR 161. This is consistent with the congestion issues in this area.
- **Segment-Related Trends:**
 - **Congestion and Speed Compliance:** Of all collisions along segments, 46% were rear-end collisions, while 17% resulted from following too closely, and 15% from speeding. The high proportion of rear-ends is consistent with the congestion and speeding issues along the northern and central portions of SR 161.
 - **Driveway Density:** Of all segment collisions, 28% occurred at driveways. There is a particularly high density of driveways on the northern and central portions of SR 161, increasing the number of potential vehicle conflict points in these congested areas.

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Table 2. Collisions by Mode and Severity – SR 161 Corridor

Severity	Collisions	Percentage
All Modes		
Property Damage Only	1,586	74%
Other Injuries	524	25%
KSI	30	1%
Total	2,140	-
Vehicle-to-Pedestrian		
Property Damage Only	0	0%
Other Injuries	9	47%
KSI	10	53%
Total	19	-
Vehicle-to-Bicycle		
Property Damage Only	3	21%
Other Injuries	10	71%
KSI	1	8%
Total	14	-

Source: WSDOT Collision Data 2017-2021, Analyzed by Fehr & Peers 2022

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SR 507

From 2017 to 2021, 344 collisions occurred on SR 507. The severity of these collisions, broken out by mode, are summarized in **Table 3**. The collisions included four fatalities along the corridor, with one vehicle-to-pedestrian fatality. Most collisions on SR 507 centered around the intersection of SR 7 and SR 507 or along SR 507 as the corridor enters McKenna from the north. In both areas, the project team has observed higher peak hour congestion and queueing.

Specific Collision Trends

- **Segment-Related Trends:**
 - **Congestion and Speed Compliance:** Of all collisions along segments, 35% were rear-end collisions while 12% resulted from following too closely and 22% from speeding. The high proportion of rear-ends is consistent with the congestion and speeding issues on SR 507 near SR 7 and as vehicles enter McKenna.
 - **KSI Collisions in Evening Hours:** While collisions that occurred during evening or night-time hours make up 45% of total segment collisions, 75% of segment KSI collisions occurred during these hours, including two pedestrian collisions and one bicycle collision.

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Table 3. Collisions by Mode and Severity – SR 507 Corridor

Severity	Collisions	Percentage
All Modes		
Property Damage Only	221	64%
Other Injuries	106	30%
KSI	17	6%
Total	344	-
Vehicle-to-Pedestrian		
Property Damage Only	1	20%
Other Injuries	1	20%
KSI	3	60%
Total	5	-
Vehicle-to-Bicycle		
Property Damage Only	0	0%
Other Injuries	1	50%
KSI	1	50%
Total	2	-

Source: WSDOT Collision Data 2017-2021, Analyzed by Fehr & Peers 2022

Canyon Road

From 2017 to 2021, 631 collisions occurred on Canyon Road. The severity of these collisions, broken out by mode, is summarized in **Table 4**. The collisions along the corridor included five fatalities during that period. Canyon Road serves as another principal north-south arterial connecting SR 512 with communities in southern Pierce County. This leads to substantial congestion along the corridor as it approaches SR 512 from the south, which is reflected in the collision densities. A proportionally higher density of KSI collisions centered around the intersection of Canyon Road and Brookdale Road/160th Street E, compared to total collisions.

Specific Collision Trends

- **Intersection-Related Trends:**
 - **Intersection Congestion:** Of intersection collisions, 48% were rear-end collisions, with these rear-end collisions spread across the major intersections on Canyon

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Road. This is consistent with the congestion experienced along much of Canyon Road.

- **Segment-Related Trends:**

- **Congestion and Speed Compliance:** Of all collisions along segments, 46% were rear-end collisions, while 17% resulted from following too closely and 15% from speeding. A high proportion of rear-ends generally indicates potential congestion or speeding issues, which is consistent with vehicle trends on SR 507 near SR 7 and as vehicles enter McKenna.
- **Sideswipe Collisions Along Segments:** 25% of segment collisions were sideswipe collisions, with all of these occurring in the north-south direction of Canyon Road. This is a larger proportion of collisions when compared to any other corridor in the study area.

Table 4. Collisions by Mode and Severity – Canyon Road Corridor

Severity	Collisions	Percentage
All Modes		
Property Damage Only	442	70%
Other Injuries	173	27%
KSI	16	3%
Total	631	-
Vehicle-to-Pedestrian		
Property Damage Only	0	0%
Other Injuries	5	100%
KSI	0	0%
Total	5	-
Vehicle-to-Bicycle		
Property Damage Only	0	0%
Other Injuries	1	100%
KSI	0	0%
Total	1	-

Source: WSDOT Collision Data 2017-2021, Analyzed by Fehr & Peers 2022

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Countermeasures

Countermeasures are actions that can be taken to potentially reduce the number and severity of fatal and serious injury collisions and bicycle/pedestrian collisions. These include a variety of roadway, lighting, and pedestrian facility changes, but also include programmatic actions such as education.

Countermeasure Identification

To identify potential countermeasures, the Project Team referenced material from WSDOT Target Zero³, from the recent Snohomish County Road Safety Plan⁴ and other recent Vision Zero studies in California cities including Sunnyvale, CA⁵ and Sacramento, CA⁶. Countermeasures included changes to signage, physical access and speed restrictions, modifications to lanes or roadway conditions, and upgrades to signals or intersections. The countermeasures were identified based on the trends in the study area and applicability to the corridors. **Table 5** shows the list of countermeasures considered, what trends they addressed and which corridors they could be applicable to.

³ Washington State Strategic Highway Safety Plan "Target Zero" (2016)

⁴ Snohomish County Road Safety Plan (2021)

⁵ Sunnyvale Vision Zero (2018)

⁶ Sacramento Vision Zero (2018)

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Table 5. Countermeasures Considered

Countermeasure Group	Candidate Engineering Countermeasure	Intersection- Level Trends (1-2) Segment-Level Trends (3-8)								Related Corridors
		Failure to Yield to Pedestrians	Intersection Congestion and/or ROW Compliance	Vehicle Compliance at Mid-Block Crossings	KSI Collisions in Evening Hours	Lack of Pedestrian Crossings	Congestion and Speed Compliance	Driveway Density	Sideswipe Collisions Along Segments	
Speed Maintenance	Speed indicator signs			X			X		X	SR 7, SR 161, SR 507, Canyon Road
	Prepare to Stop When Flashing (PTSWF) sign		X	X			X			SR 7, SR 161, SR 507, Canyon Road
	Speed humps, speed cushions, and speed tables			X			X			SR 7, SR 161, SR 507, Canyon Road
	Chicanes and narrowed intersections	X		X			X			SR 7, SR 161, SR 507, Canyon Road
Physical Access Restrictions	Median treatment							X	X	SR 7, SR 161, Canyon Road
	Implement Right-In Right-Out Access Control							X		SR 7, SR 161
	Consolidate driveways							X		SR 7, SR 161
Turning Movement Modifications	Right turn on red restriction		X							SR 161, Canyon Road
	Left turn restrictions		X							SR 161, Canyon Road

Under 23 U.S. Code 148 and 23 U.S. Code 407, safety data, reports, surveys, schedules, list 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 report, surveys, schedules, lists, or data.

Countermeasure Group	Candidate Engineering Countermeasure	Intersection- Level Trends (1-2) Segment-Level Trends (3-8)								Related Corridors
		Failure to Yield to Pedestrians	Intersection Congestion and/or ROW Compliance	Vehicle Compliance at Mid-Block Crossings	KSI Collisions in Evening Hours	Lack of Pedestrian Crossings	Congestion and Speed Compliance	Driveway Density	Sideswipe Collisions Along Segments	
Traffic Signal Upgrade (Minor Operational Change)	Leading bike interval	X								SR 7
	Leading pedestrian interval	X				X				SR 7
	Add additional pedestrian crossing time	X				X				SR 7
	Add back plates with retro-reflective borders to signals, and improve visibility of signals and signs at intersections	X	X		X					SR 7, SR 161, SR 507, Canyon Road
Traffic Signal Upgrade (Major Operational Change)	New traffic signal		X				X			SR 7, SR 161, SR 507, Canyon Road
	Signal timing improvements		X				X			SR 7, SR 161, SR 507, Canyon Road
Crosswalk Installation and/or Upgrade	Pedestrian Hybrid Beacon			X		X				SR 7
	High visibility crosswalks with advance stop or yield lines	X		X	X	X				SR 7, SR 507
	Intersection, street-scale lighting	X		X	X	X			X	SR 7, SR 507, Canyon Road
	Pedestrian refuge islands and medians and shortening crossing distance	X		X	X					SR 7, SR 507
	Bulb outs with low-cost materials	X		X	X					SR 7, SR 507

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"Rotary" Intersection Conversion	Roundabouts		X				X			SR 7, SR 161, SR 507, Canyon Road
Road and Striping Modification	Increase road surface skid resistance using high friction surface treatment								X	Canyon Road
	Implement Lane Marking Reflectors/ High-Visibility Lane Striping									Canyon Road
	Install or increase illumination at locations with nighttime collisions			X	X				X	SR 7, SR 507
	Redesign intersection approaches to improve sight distances and improve intersection visibility on approaches		X						X	SR 161, Canyon Road
	Two-way left-turn lane								X	Canyon Road
	Left turn lane at intersection		X							SR 161, Canyon Road
	Right turn lane at intersection		X							SR 161, Canyon Road

Under 23 U.S. Code 148 and 23 U.S. Code 407, safety data, reports, surveys, schedules, list 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 report, surveys, schedules, lists, or data.

2022 Safety Trends

At the time of our analysis, a limited subset of collision data was available for the first half of 2022 and all collisions may not be recorded as part of the data set. Because of this, 2022 data was not included in the overall safety analysis. However, it is important to highlight KSI trends that have occurred over the first part of 2022. Between January and August 2022, 76 KSI collisions have occurred across the study area. Of these, 17 resulted in fatalities, with two pedestrian fatalities and one bicyclist fatality.

Under 23 U.S. Code 148 and 23 U.S. Code 407, safety data, reports, surveys, schedules, list 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 report, surveys, schedules, lists, or data.

Insights and Next Steps

Based on the safety analysis, the project team identified the following areas with high collision density:

- SR 7 and SR 161 experienced a higher density of pedestrian and bicycle collisions near SR 512. These areas are also characterized by higher land use densities, travel volumes, and turning movements.
- SR 507 experienced its highest density of collisions at its intersections with SR 7 and SR 702 as it approaches McKenna.
- Canyon Road experienced a higher rate of sideswipe collisions along segments than any of the other corridors, including 2 that resulted in a KSI collision.

Key collision trends along SR 7, SR 161, SR 507 and/or Canyon Road were identified as follows:

Intersection-Related Trends

1. Failure to Yield to Pedestrians
2. Intersection Congestion and/or ROW Compliance

Segment-Related Trends

3. Vehicle Compliance at Mid-Block Crossings
4. KSI Collisions in Evening Hours
5. Lack of Pedestrian Crossings
6. Congestion and Speed Compliance
7. Driveway Density
8. Sideswipe Collisions Along Segments

Next steps for the safety analysis include:

- Identify priority locations for countermeasure application, to be identified in coordination with WSDOT.
- Analyze safety impacts of countermeasures at a select list of priority locations.

Under 23 U.S. Code 148 and 23 U.S. Code 407, safety data, reports, surveys, schedules, list 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 report, surveys, schedules, lists, or data.

Appendix D: Existing and Future Conditions Memo



Prepared by:
Fehr & Peers

In association with:
Stepherson & Associates
Parametrix

Memorandum

Date: August 2023

To: Washington State Department of Transportation

From: Fehr & Peers

Subject: South Pierce Multimodal Connectivity Study - Existing Conditions and Future Baseline Conditions

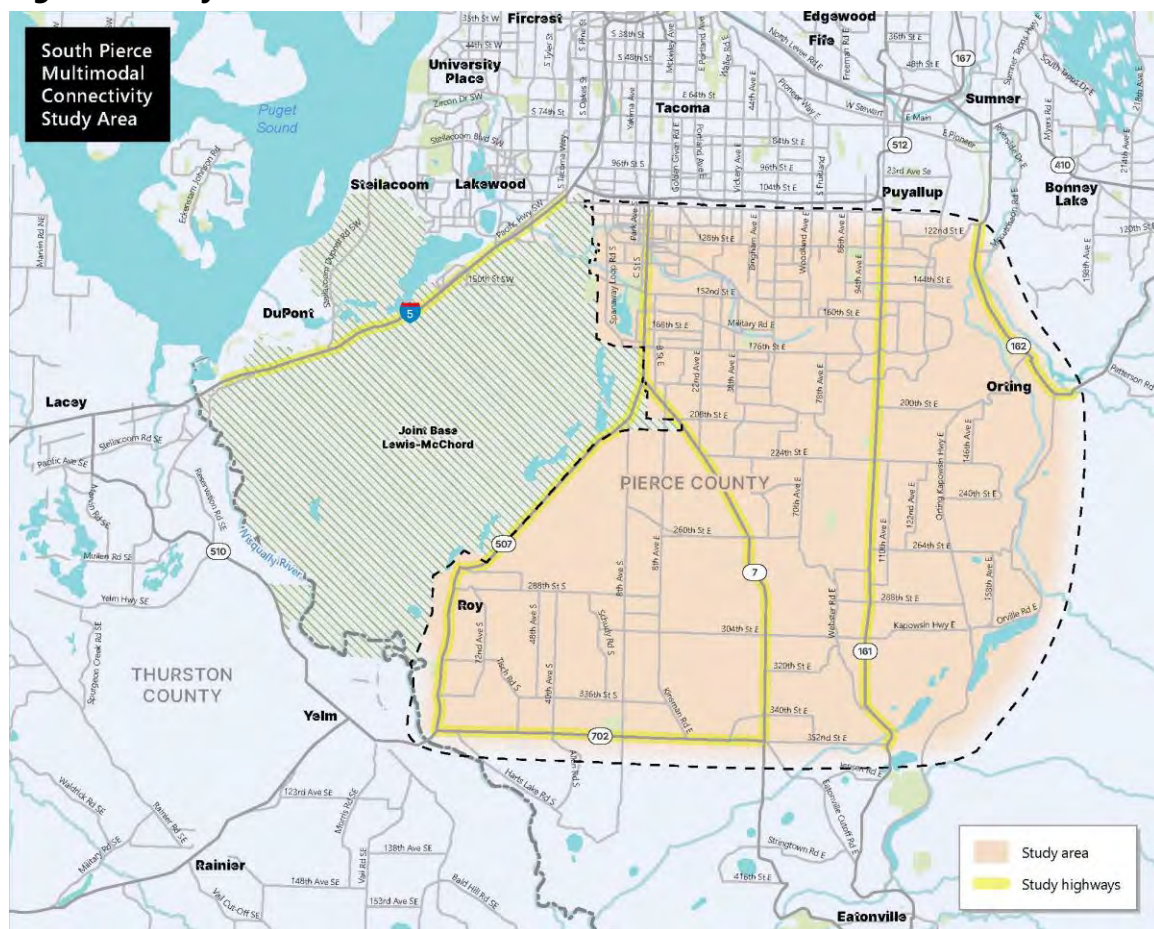
TC22-0040

This memorandum describes the current and future baseline transportation system in the study area, providing a foundation for the SPMCS and also provides an overview of transportation conditions related to equity, safety, active transportation, environmental constraints, and multimodal connectivity.

Introduction

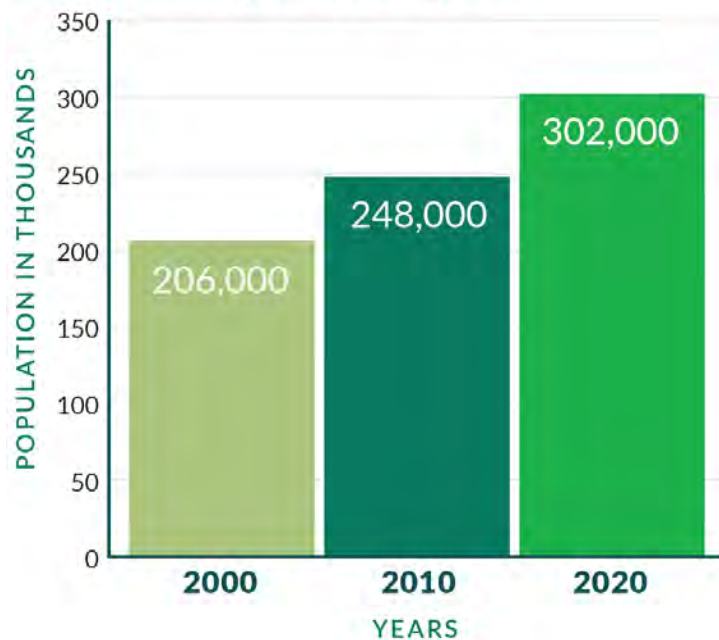
The Washington State Department of Transportation (WSDOT) is conducting the South Pierce Multimodal Connectivity Study (SPMCS) as a result of the Washington State Legislature allocating funding in the 2021 and 2022 legislative sessions for a planning study to look at the need for additional connectivity in the area between State Route (SR) 161, SR 7, SR 507 and Interstate (I)-5 in south Pierce County. The study will also look at the need for additional connectivity in the area between SR 162, south of Military Road East, and north of Orting and SR 161. The study will define transportation patterns and issues, including east-west travel needs, while advancing viable strategies. Multimodal strategies, such as Complete Streets, will be identified to help increase safety performance, connectivity, access, and mobility for all people.

The study area is located south of SR 512, east of SR 507 and Joint Base Lewis-McChord (JBLM), and north of SR 702. The highways SR 7, SR 161, and SR 702 run through the study area, and portions of I-5, SR 507, and SR 162 are also included in the study. WSDOT is also conducting a separate corridor study focused on SR 512. Communities within the study area include portions of Puyallup and Orting, all of Roy, and the unincorporated communities of Spanaway, Frederickson, Graham, Elk Plain, Parkland, and South Hill. **Figure 1** shows the study area and the highways that are included in the study.

Figure 1: Study Area

The study area has grown rapidly in recent decades, with population increasing by almost 50% between 2000 and 2020 and accounting for approximately 45% of the total population growth in Pierce County during that period. The study area includes two Puget Sound Regional Council (PSRC)-designated centers: the Puyallup South Hill Regional Growth Center, and the Frederickson Manufacturing Industrial Center.¹ Since 2011, overall employment in Pierce County has grown by 16%; past employment growth in the study area is not available. **Figure 2** shows the growth in population in the study area over the past twenty years.

¹ <https://www.psrc.org/media/2650>

Figure 2: Study Area Population Growth 2000-2020**Study Area Population Growth**

Sources: U.S. Census Bureau 2000, 2010, 2020 Census (Block Groups)

The area is primarily auto oriented, with few multimodal options for travel. North-south connections are provided by state and local roads, including State Routes 7, 161, 162, and 507, which have become congested as housing and commercial development have increased in south Pierce County. East-west routes are limited in the study area, with no direct connection to I-5 between SR 512 and SR 510 due to the presence of JBLM. SR 702 provides the only east-west highway route in the study area, with few other east-west route options, resulting in increased traffic and delays along the north-south routes.

Demographics and Land Use

This section summarizes demographic indicators (summarized in **Table 1**) for the study area and for Pierce County as a whole.

Table 1: Study Area Demographics Summary

Demographic	Study Area	Pierce County
¹ Total Population	302,769	921,130
² Youth Population (under 18)	27%	24%
² Senior Population (over 64)	11%	14%
¹ Minority Population	39%	38%
² Limited English Speaking Households	2%	3%
² Low-Income Households	20%	21%
² Population with a Disability	13%	13%
² Single-Parent Family Households	14%	24%

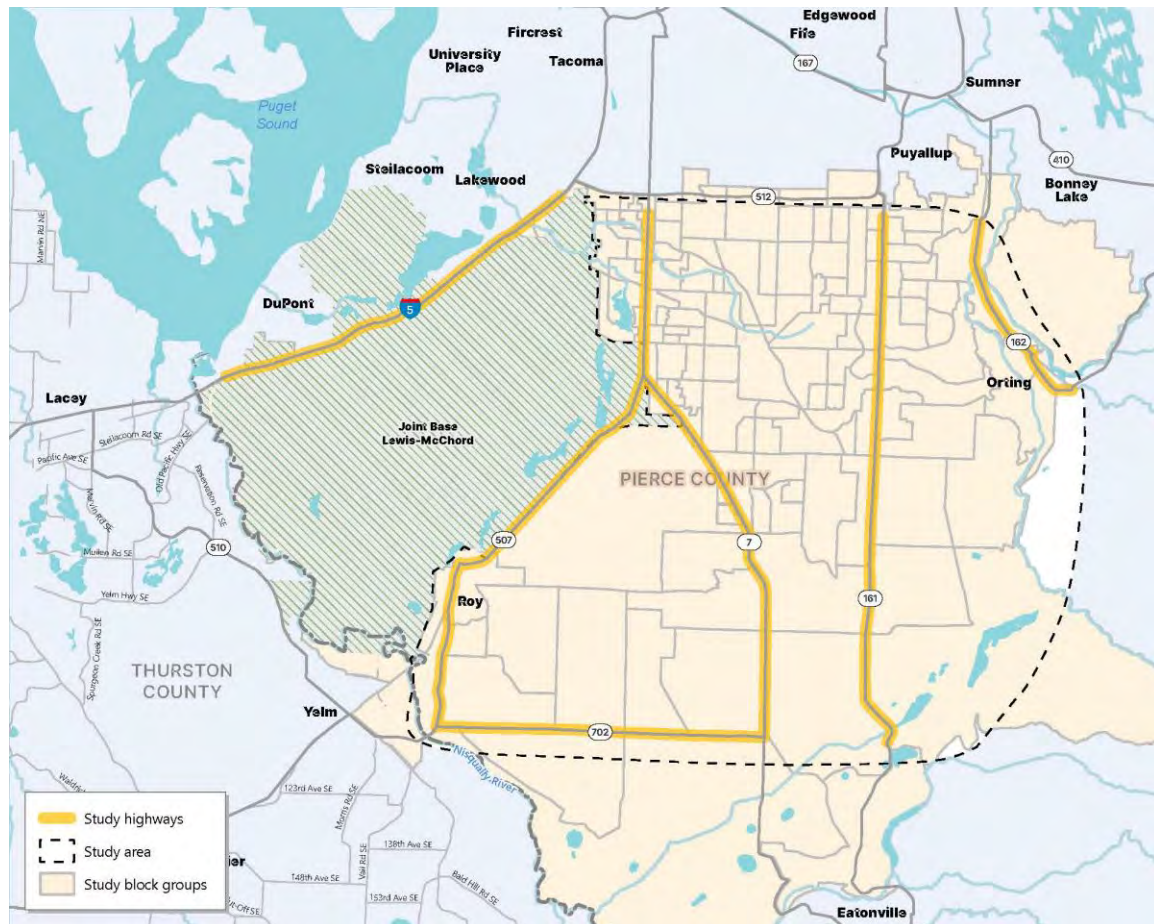
¹ Census 2020² ACS 2019 5-Year

Sources: U.S. Census Bureau 2019 American Community Survey (ACS) 5-Year Estimates (Block Groups), U.S. Census Bureau 2020 Census (Block Groups)

Community Profile Analysis Area

Census data block groups were aggregated to develop a community profile for demographic analysis that closely aligns with the overall study area. The demographic analysis area block groups and study area boundary are shown in **Figure 3**.

Figure 3: Study Area Census Data Block Groups



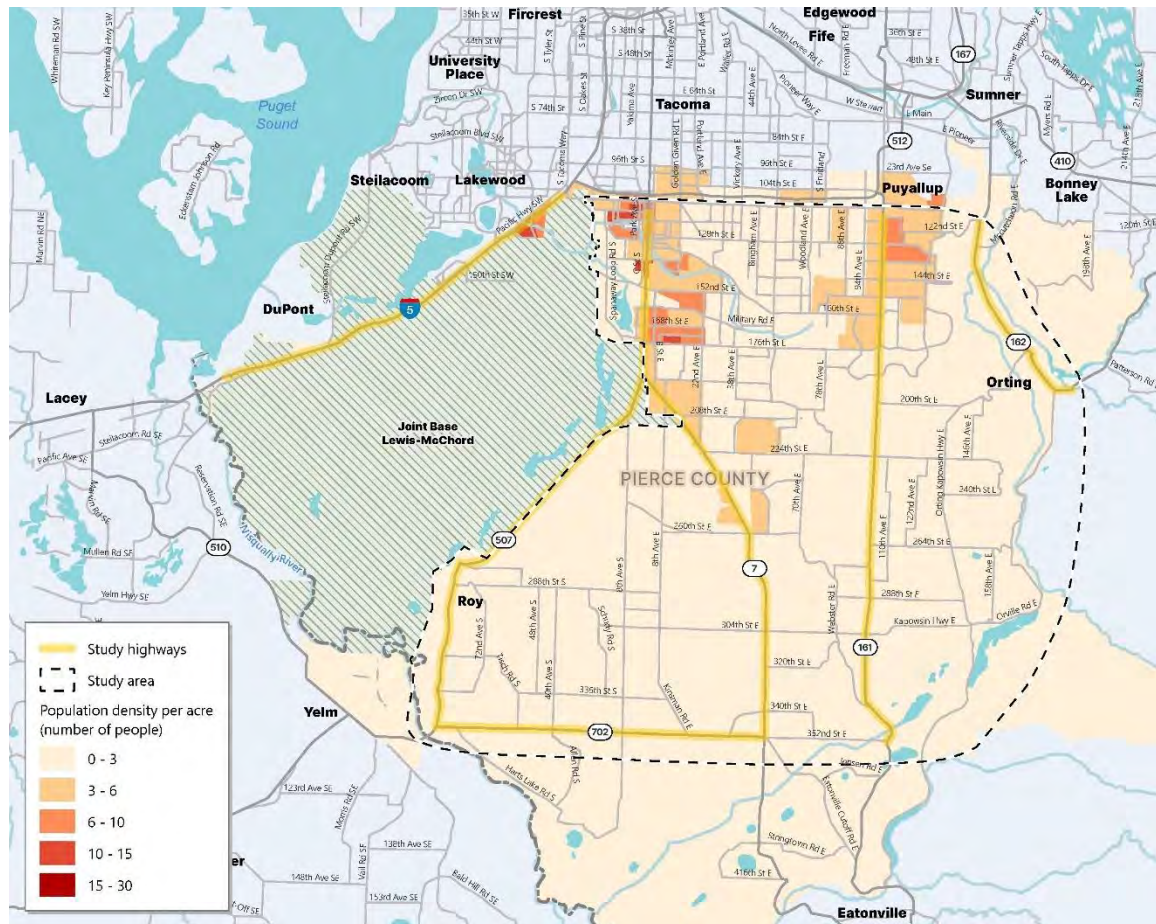
Source: U.S. Census Bureau 2019 American Community Survey (ACS) 5-Year Estimates (Block Groups)

Population Growth

Approximately 303,000 people live within the study area in south Pierce County, an area that has been growing rapidly in recent decades. The study area has grown from 207,000 residents in 2000 to 303,000 in 2020, a growth of almost 50% in 20 years. In 2000, few census block groups had high population densities, as shown in **Figure 4**. By 2010, the population had grown and expanded toward the south, although the growth remained predominantly in the northern half of the study area, as shown in **Figure 5**. By 2020, population densities had continued to increase in

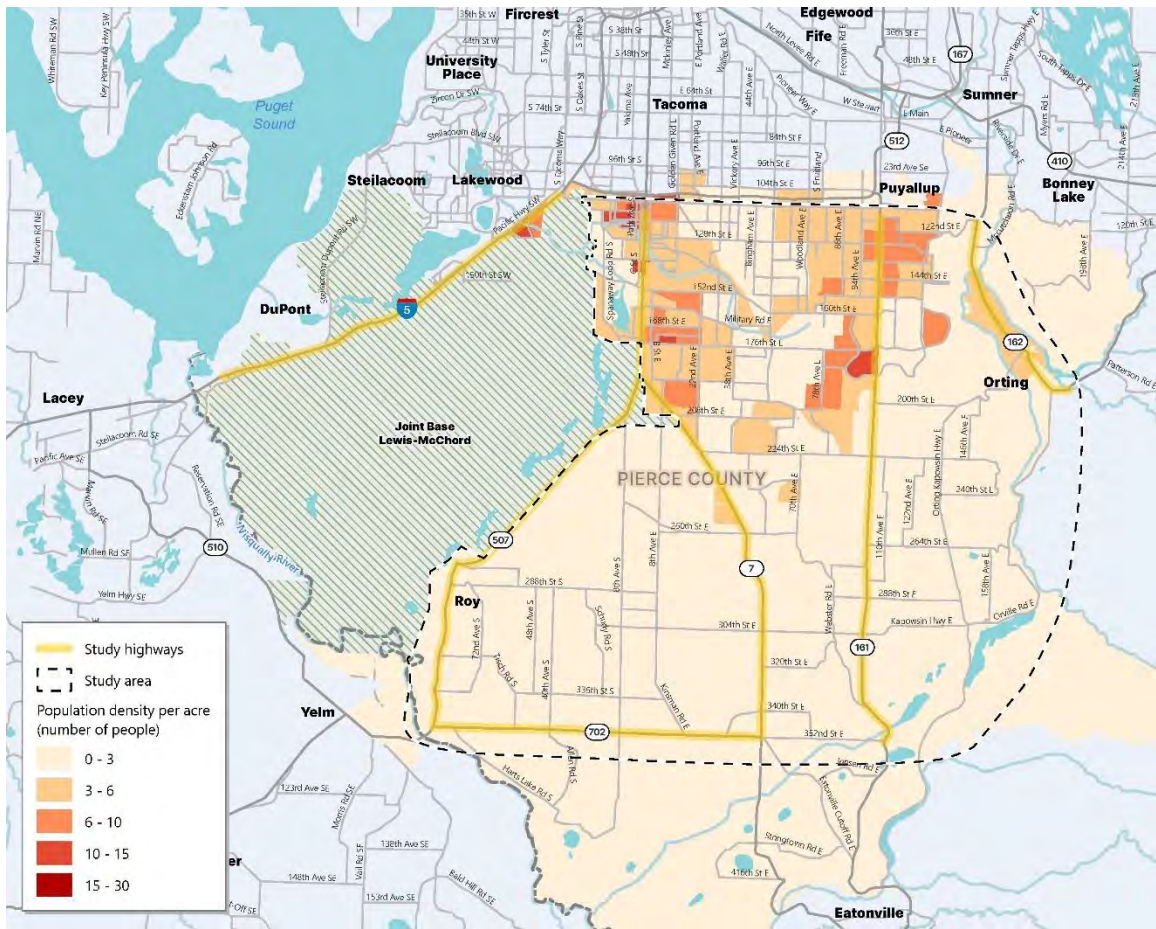
the northern half of the study area with growth concentrated around SR 7 and SR 161, as shown in **Figure 6**.

Figure 4: Population Density – 2000



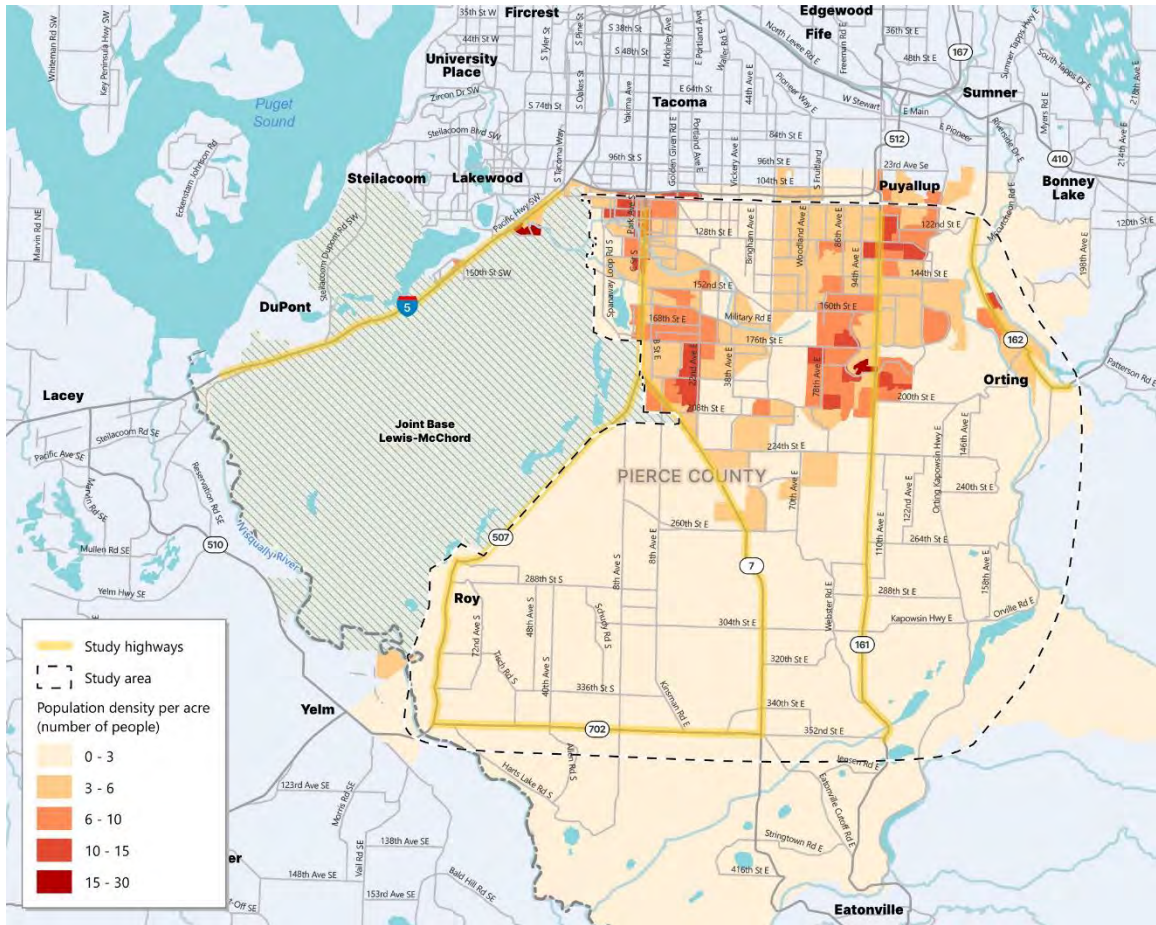
Source: U.S. Census Bureau 2000 Census (Block Groups)

Figure 5: Population Density – 2010



Source: U.S. Census Bureau 2010 Census (Block Groups)

Figure 6: Population Density – 2020

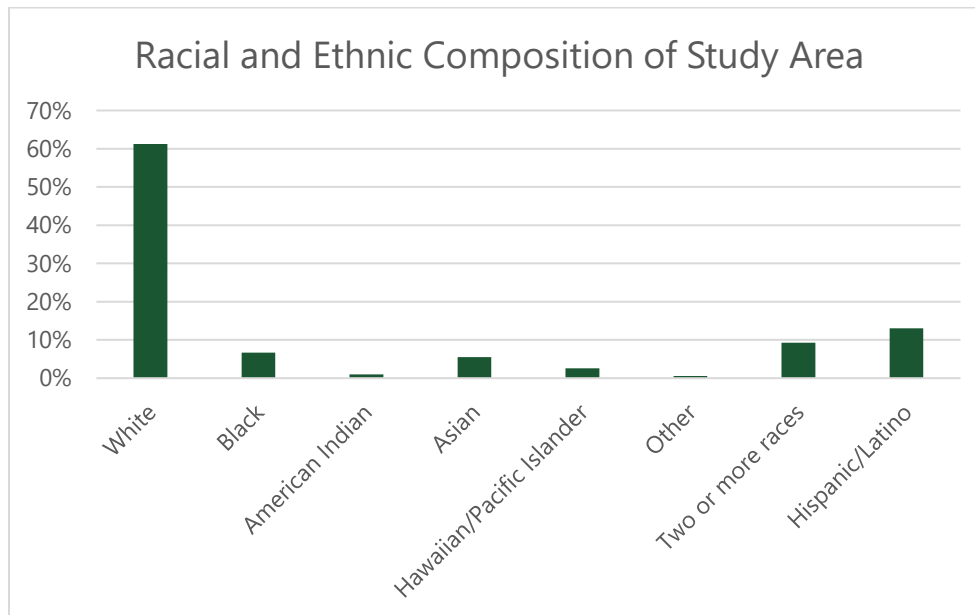


Source: U.S. Census Bureau 2020 Census (Block Groups)

Minority Populations

Minority populations account for 39% of the total population in the study area, as summarized in **Figure 7**. Hispanic/Latino is the largest minority (13%), followed by Black (7%), and Asian (6%). Minority populations are particularly concentrated in the urban areas to the north and west in the study area.

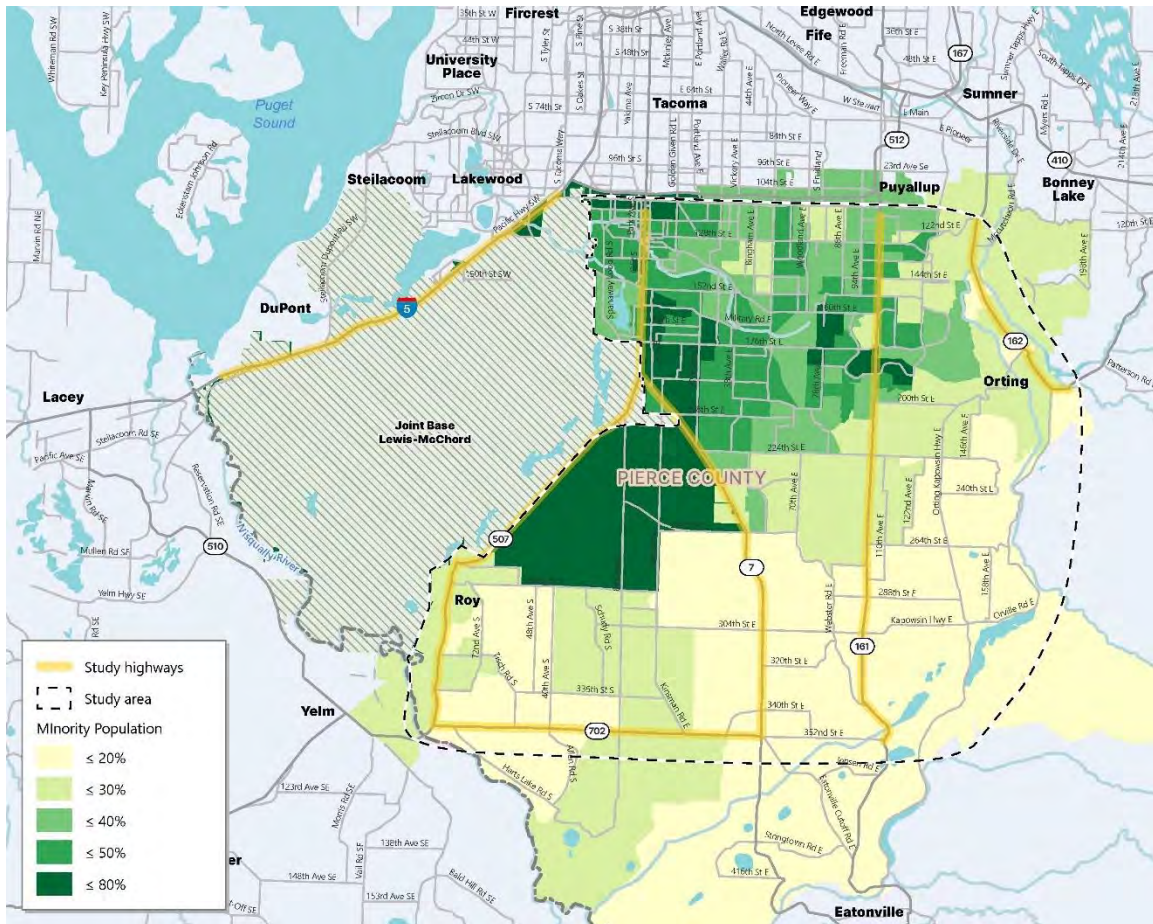
Figure 7: Racial and Ethnic Composition



Source: U.S. Census Bureau 2020 Census (Block Groups)

Figure 8 shows the percentage of minority population households in the study area. The large dark green block group on the western side of the study area represents JBLM land between SR 507 and SR 7 and includes data for the entirety of JBLM.

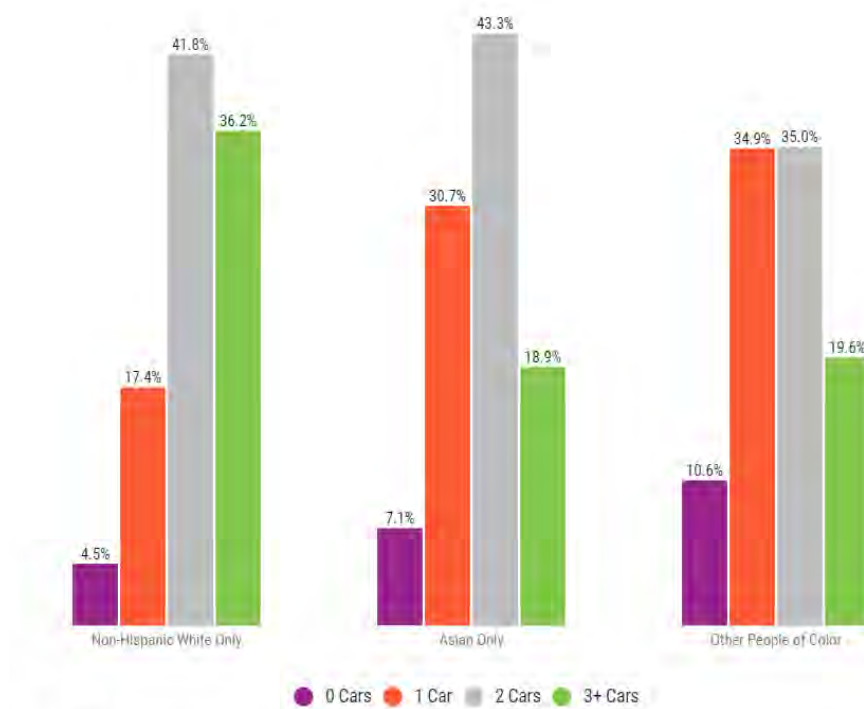
Figure 8: Minority Populations



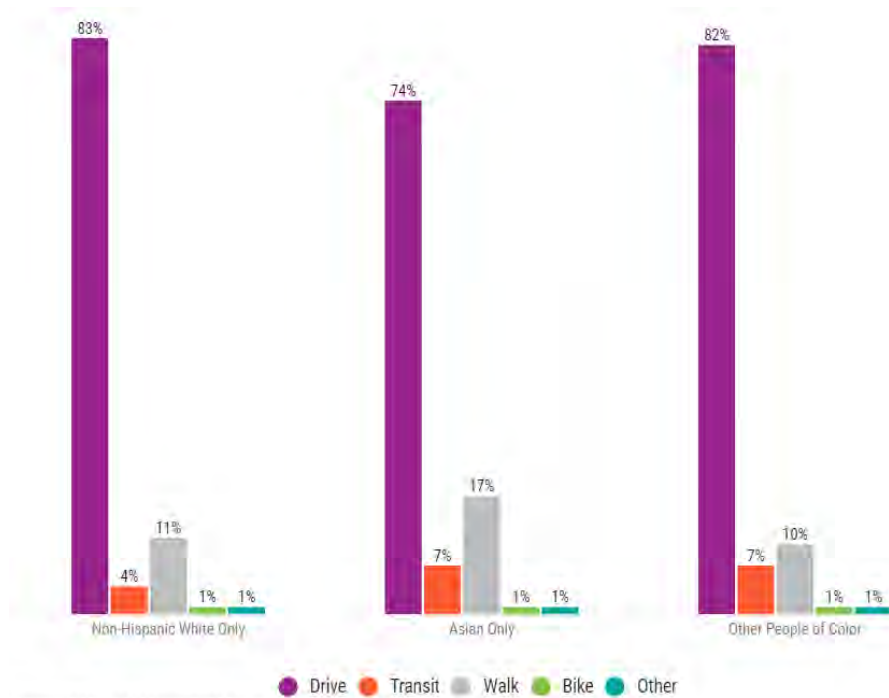
Source: U.S. Census Bureau 2020 Census (Block Groups)

In the Puget Sound Region, minority populations are more likely to live in a household without a vehicle and are also more likely to take transit (Puget Sound Regional Council, 2019), as shown in **Figure 9**.

Figure 9: Vehicle ownership and travel mode by race



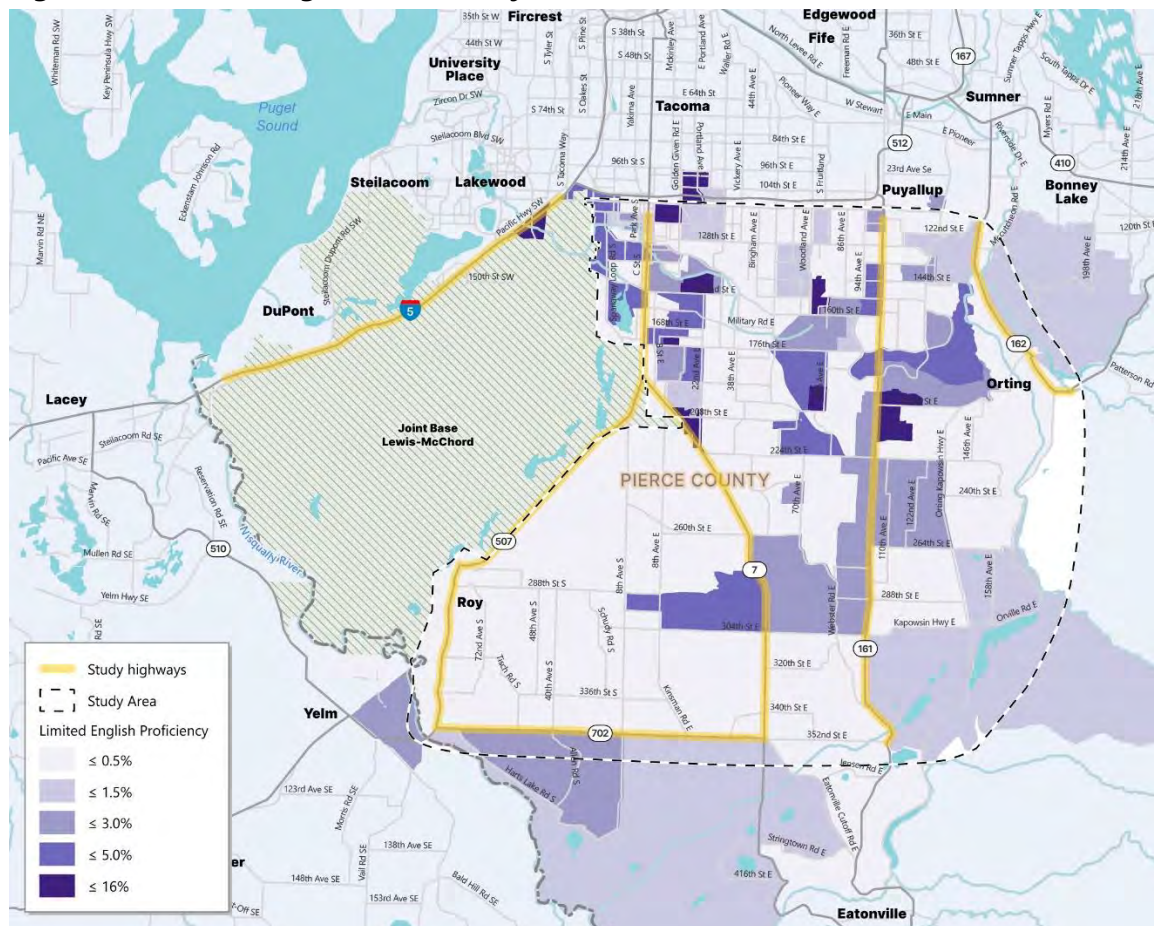
Source: PSRC, 2019 Household Travel Survey. [Download as XLS.](#)



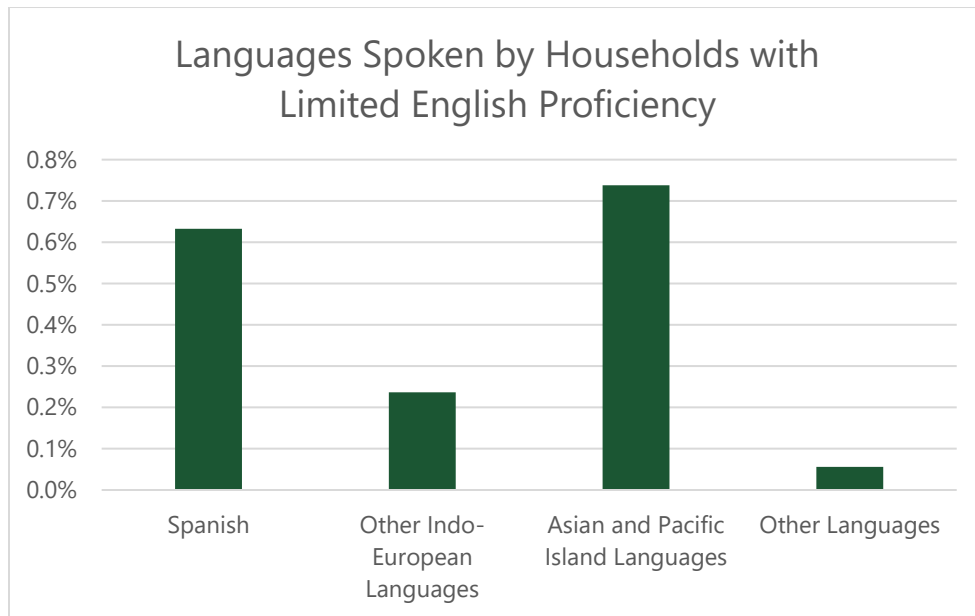
Source: PSRC, 2019 Household Travel Survey. [Download as XLS.](#)

Figure 10 shows the percentage of households in the study area that have limited English proficiency, 2% overall. People with limited English proficiency are concentrated in the more urban areas toward the north and west in the study area and near major roadways. Most of these households speak Spanish or Asian and Pacific Island languages, as shown in **Figure 11**. Households with limited English proficiency are likely to be underrepresented in community outreach efforts.

Figure 10: Limited English Proficiency Households



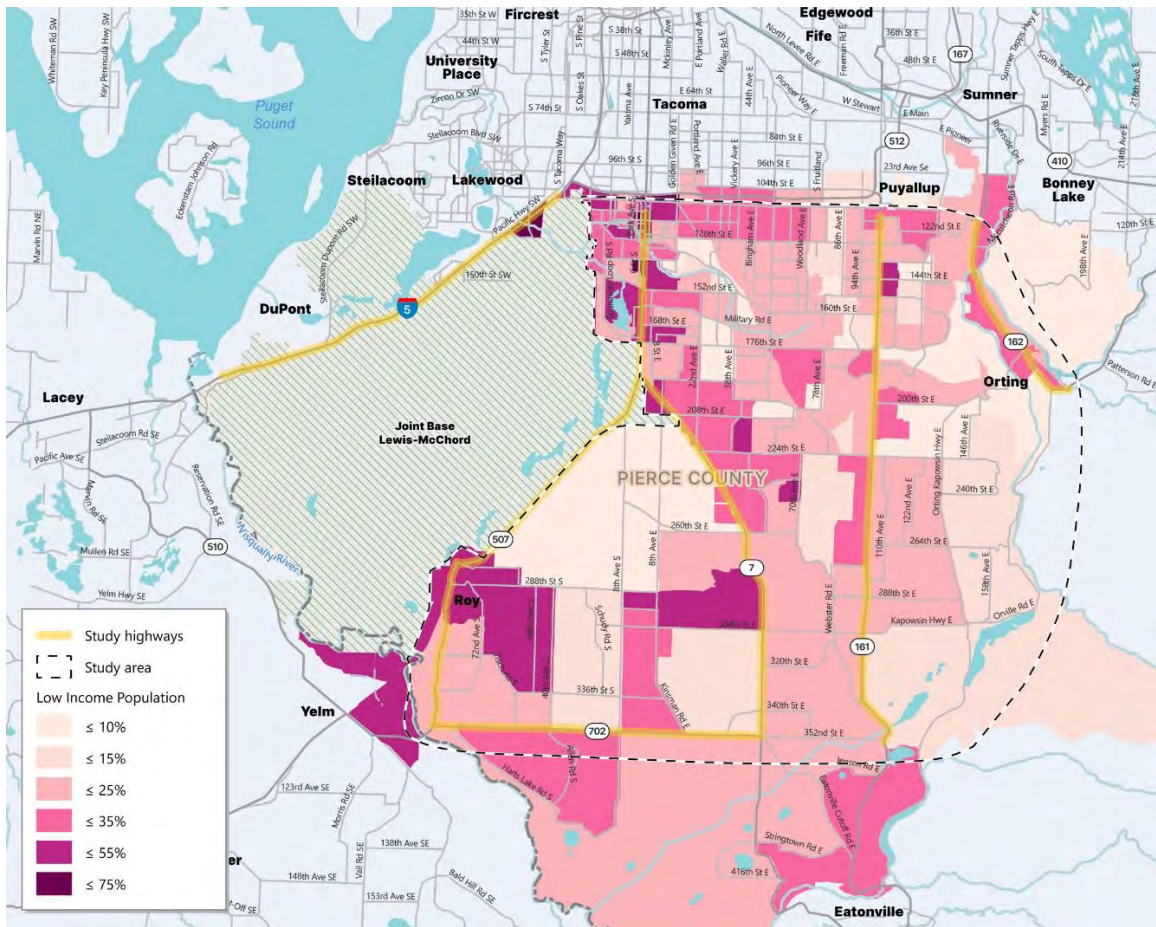
Source: U.S. Census Bureau 2019 American Community Survey (ACS) 5-Year Estimates (Block Groups)

Figure 11: Limited English Proficiency

Source: U.S. Census Bureau 2019 American Community Survey (ACS) 5-Year Estimates (Block Groups)

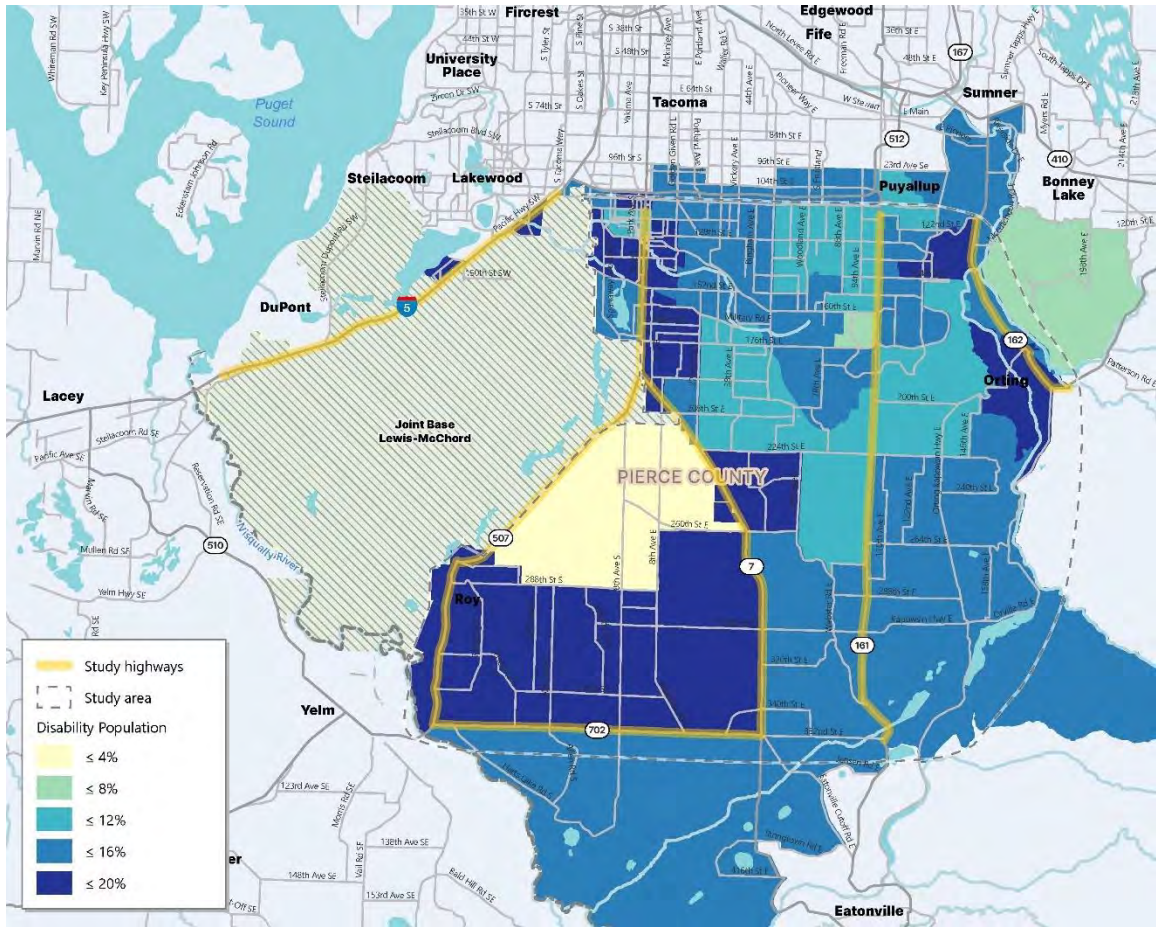
The median income for households in the study area is approximately \$86,000 per year, which is lower than the \$94,974 median for King County, but higher than the \$72,113 median for Pierce County. Within the study area, about 68% of housing units are owner occupied and about 14% of families are single parent families. Approximately 17% of the population is considered low income, defined by the Census as income under 50% of the area median income. For the Pierce County Metropolitan Division of the larger Seattle-Tacoma-Bellevue Metropolitan Statistical Area, the 2019 median household income was \$72,113, so these households have an income less than \$36,057 per year. A map showing the distribution of low-income households in the study area is shown in **Figure 12**. The percentage of population with a disability in the study area is shown in **Figure 13**, and **Figure 14** shows the percentage of single parent households. Single parent households and those with a disability have less flexibility in transportation options and may be more reliant on alternate forms of transportation.

Figure 12: Low Income Households



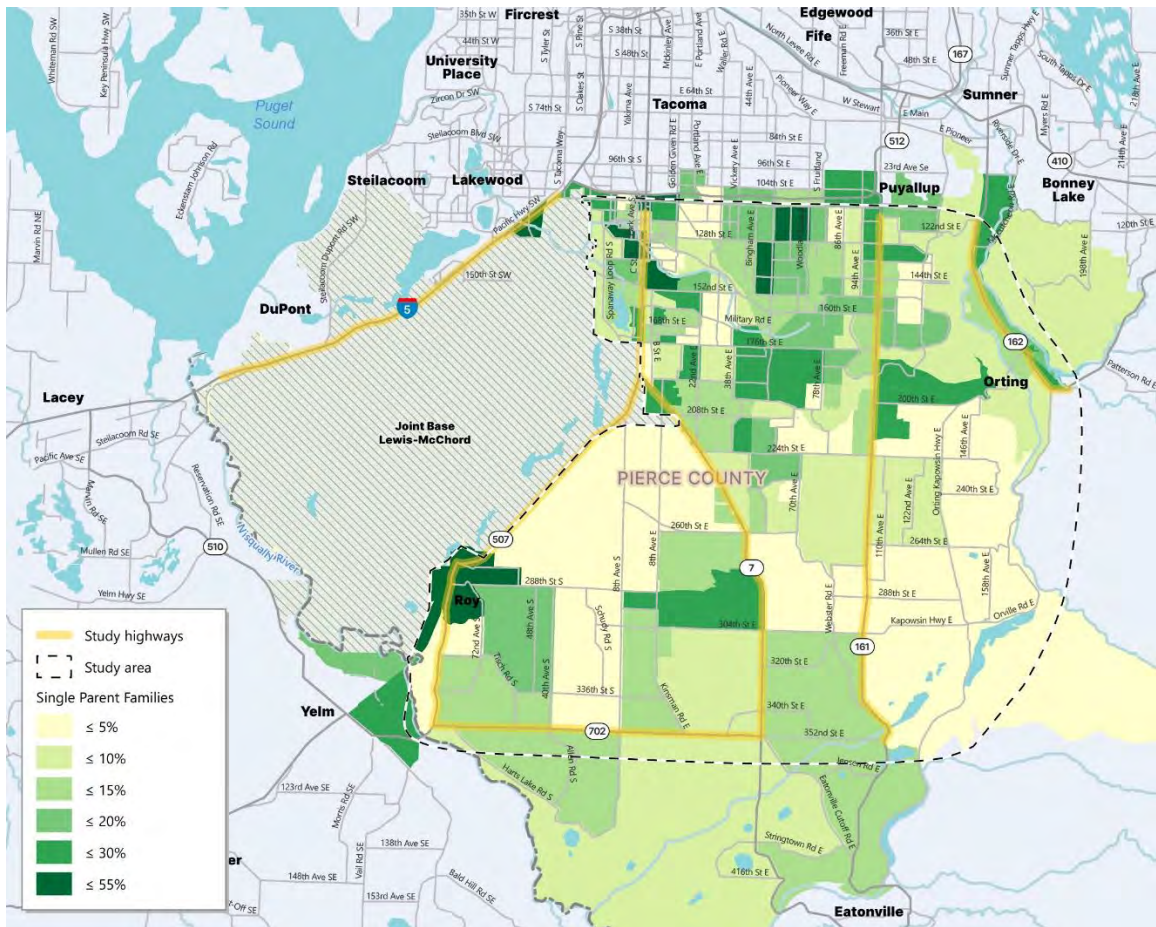
Source: U.S. Census Bureau 2019 American Community Survey (ACS) 5-Year Estimates (Block Groups)

Figure 13: Population with a Disability



Source U.S. Census Bureau 2019 American Community Survey (ACS) 5-Year Estimates (Tracts)

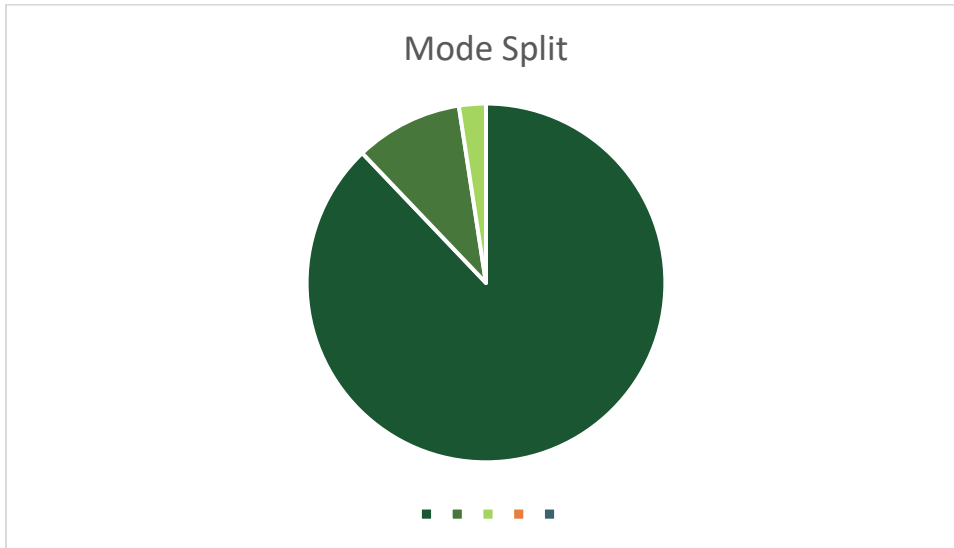
Figure 14: Single Parent Families



Source: U.S. Census Bureau 2019 American Community Survey (ACS) 5-Year Estimates (Block Groups)

According to the 5-year American Community Service (ACS) data, which surveyed how people commute to work, 80% of the population in the study area drove alone, 11% carpooled, 2% used transit, and 2% walked or biked. The high share of private vehicle use reflects a lack of multimodal transportation options in the study area. Most people only have the option of driving to get to work. The commute to work data are summarized in **Figure 15**.

Figure 15: Travel to Work

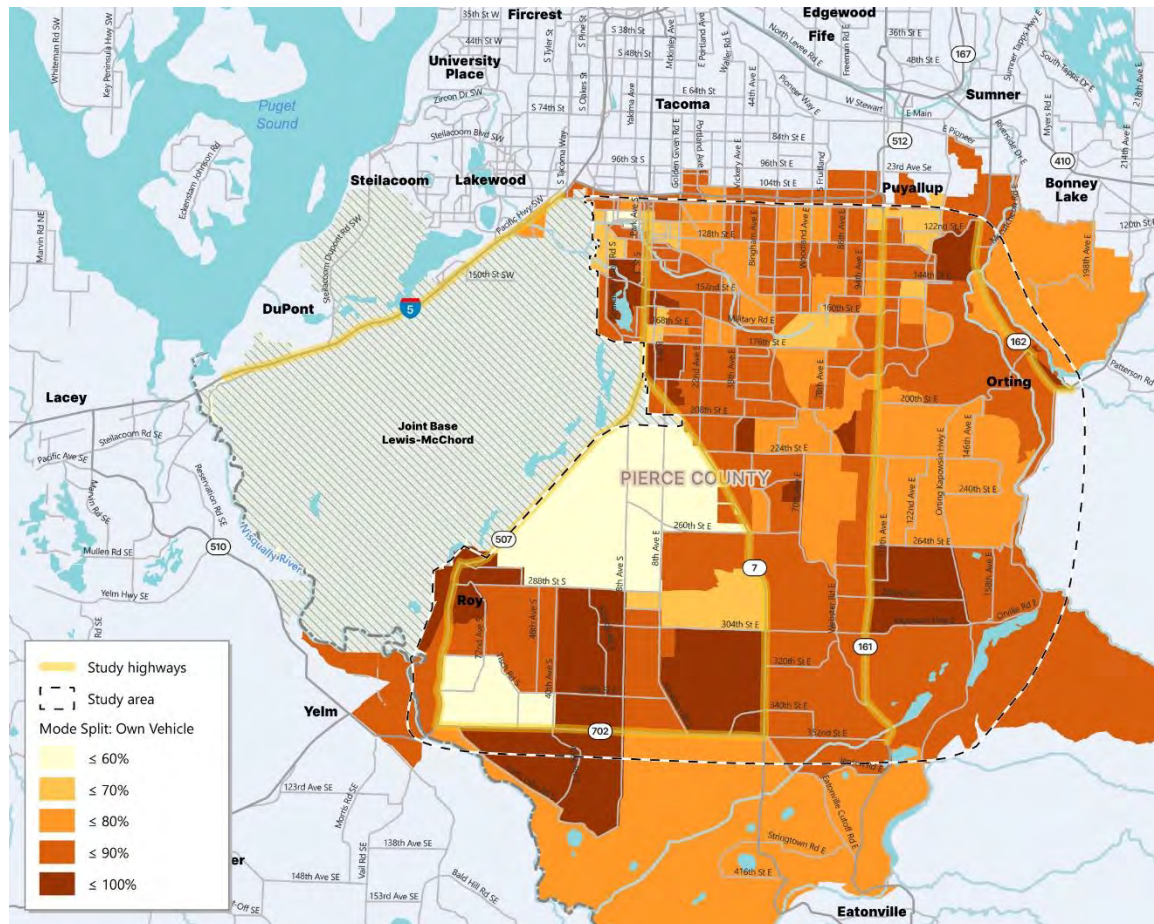


Source: U.S. Census Bureau 2019 American Community Survey (ACS) 5-Year Estimates (Block Groups)

The ACS surveys work commute trips only and does not reflect other trip types like recreation or shopping. The percentage of overall trips that are taken by modes other than driving alone are typically higher than indicated this data. The geographic distribution of mode split for commutes to work in the study area is shown in the following figures.

Figure 16 shows the percent of people traveling to work by driving alone. Across the study area, the majority of people drive alone to work, over 70% for most census block groups.

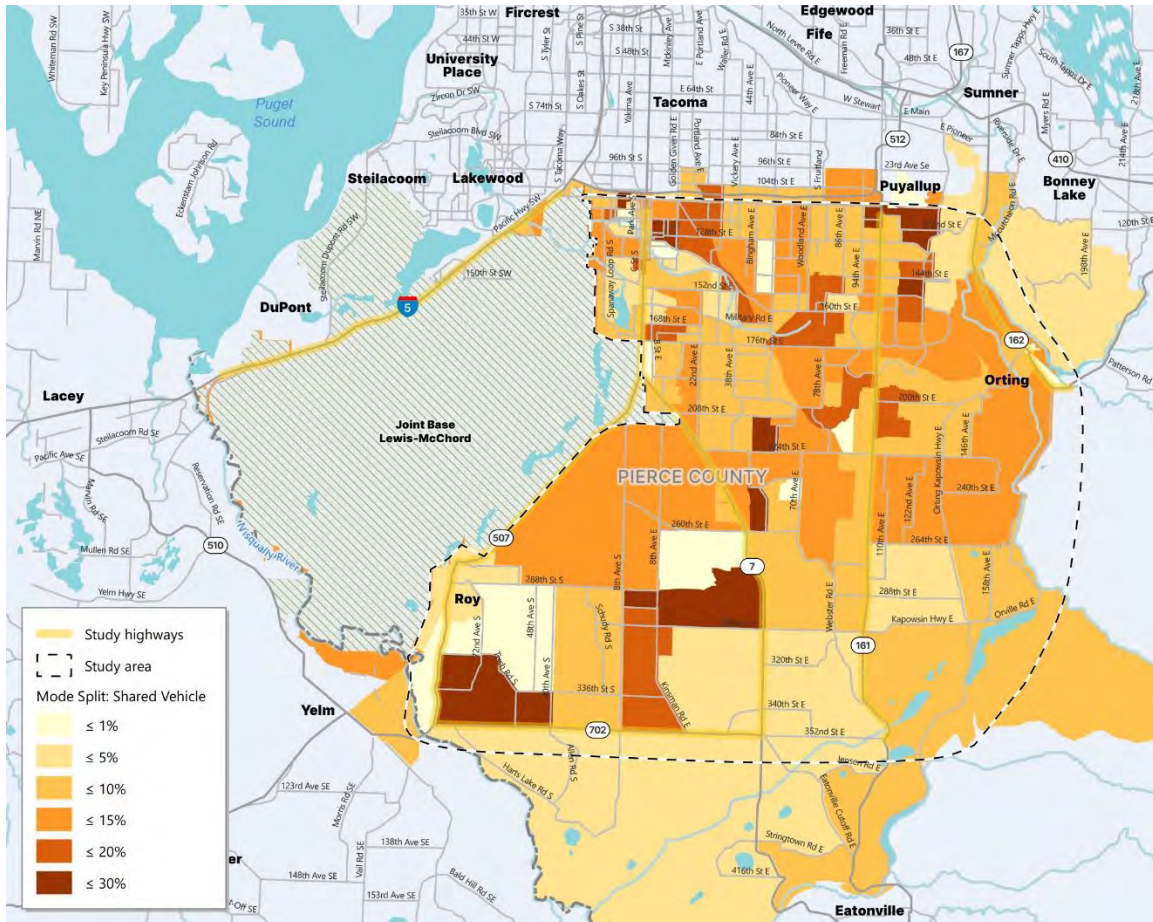
Figure 16: Travel to Work – Drive Alone



Source: U.S. Census Bureau 2019 American Community Survey (ACS) 5-Year Estimates (Block Groups)

Figure 17 shows the percent of people carpooling to and from work. In the study area, most locations show a carpool rate between 10-20%.

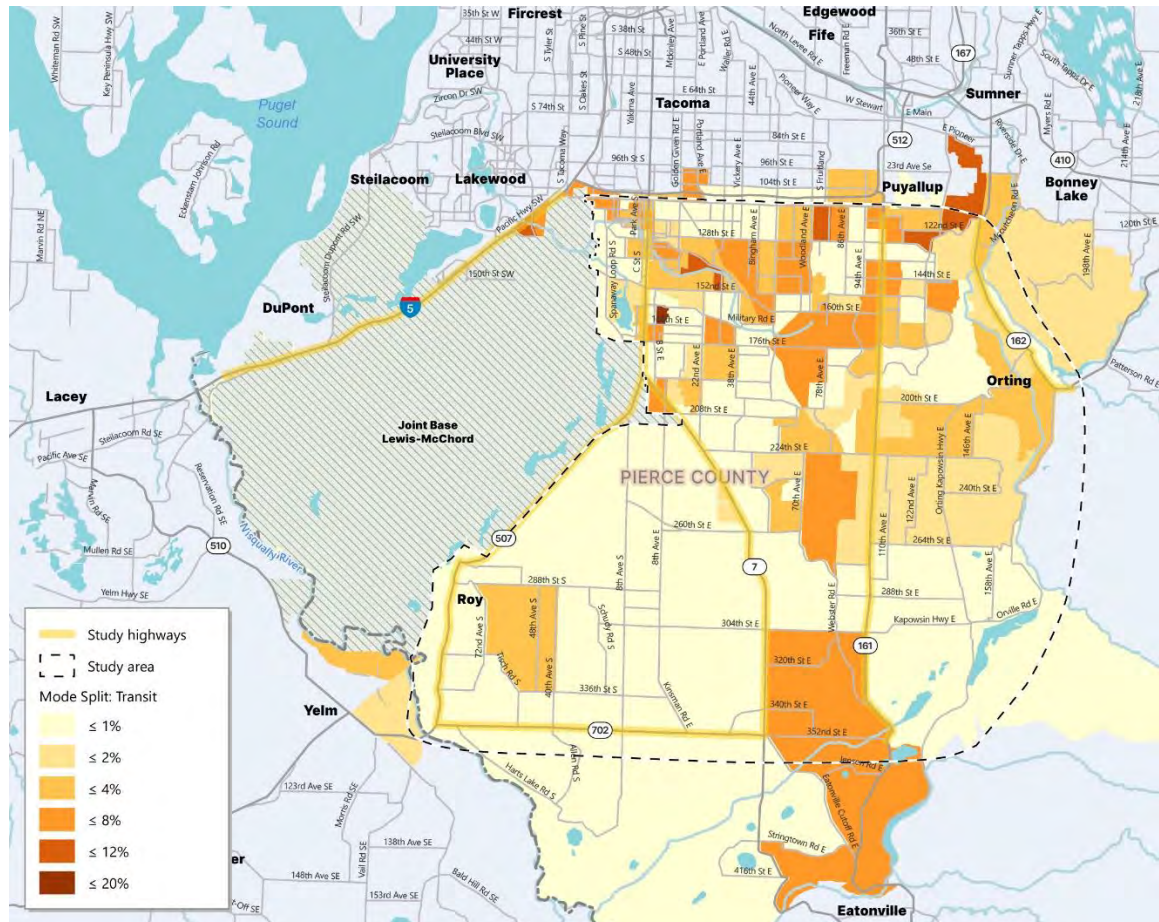
Figure 17: Travel to Work – Carpool



Source: U.S. Census Bureau 2019 American Community Survey (ACS) 5-Year Estimates (Block Groups)

Figure 18 shows the transit mode share for work commutes. Most of the area shows transit mode shares between 0 and 8%. A few locations further south in the study area show some higher amounts of transit mode share, despite the lack of transit service in these areas. This likely reflects those that drive to a park and ride or Sounder station and commute longer distance on the train or bus.

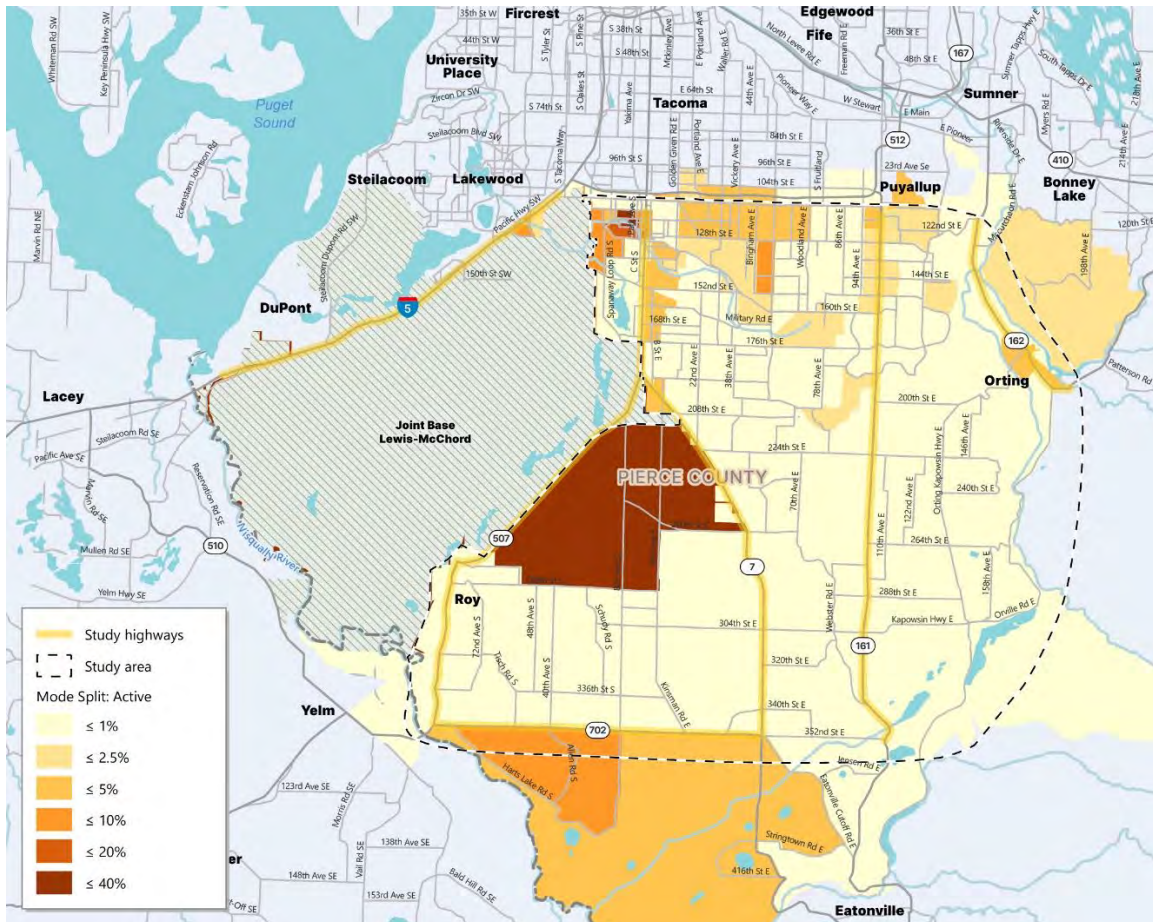
Figure 18: Travel to Work – Transit



Source: U.S. Census Bureau 2019 American Community Survey (ACS) 5-Year Estimates (Block Groups)

Figure 19 shows the percentage of people using active modes to commute. Only a few block groups show an active mode share greater than 5%. The block group between SR 507 and SR 7 is representative of all of JBLM and is less relevant for the study area.

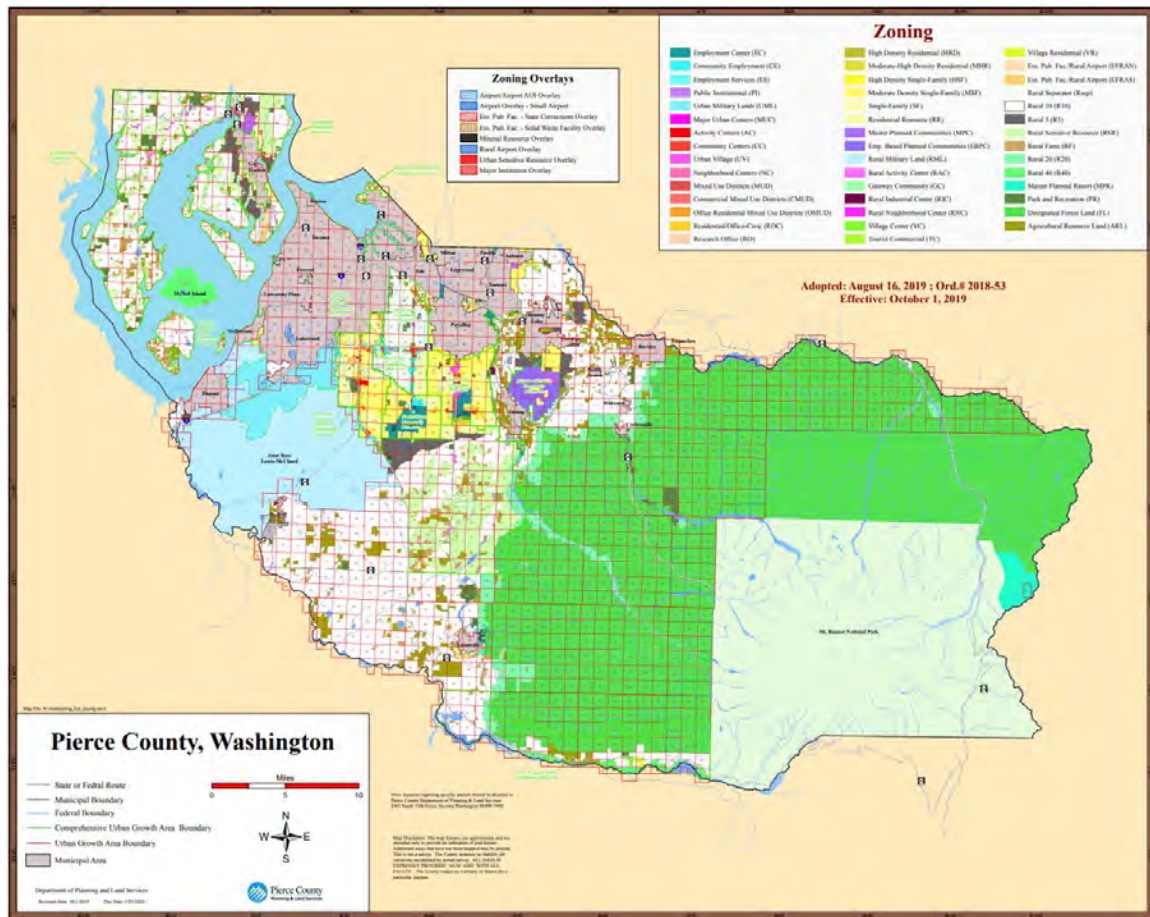
Figure 19: Travel to Work – Active Transportation



Source: U.S. Census Bureau 2019 American Community Survey (ACS) 5-Year Estimates (Block Groups)

Figure 20 shows the current zoning in Pierce County. The southern half of the study area is primarily zoned for rural uses, while the northern half of the study area is a mixture of many different designations, including single family, employment center, neighborhood corridor, rural separator, master planned community, and mixed-use centers.

Figure 20: Pierce County Zoning



Source: Pierce County Department of Planning and Land Services, 2019

Crash Data

Washington's Target Zero Plan seeks to reduce the number of traffic deaths and serious injuries on Washington's roadways to zero by the year 2030. Target Zero also serves as the state's Strategic Highway Safety Plan. The 2019 Target Zero Plan is the fifth edition of the safety road map and data shows that Washington's traffic fatality and serious injury trend is increasing (2015-2017). The trends Washington experiences mirrors the national increase of traffic fatalities.

Pierce County passed a resolution² in August 2022 to endorse Vision Zero with the goal of achieving zero traffic deaths and serious injuries on Pierce County Roadways by 2035.

According to WSDOT data, across the study area, on all local, county, and state roads, there were 387 fatal or serious injury crashes between 2017 and 2021. On state routes in the study area, there were 32 fatality and 102 serious injury crashes during this period.

This section summarizes a high-level crash analysis conducted by the study team for the SPMCS. Evaluation focused on identifying high crash locations throughout the study area, or those locations with a higher number of crashes. These locations also consisted of all crash types, including the subset of crashes that resulted in someone being killed or seriously injured (referred to as "KSI" crashes). The study area encompasses a very large area for which crash data from the 5-year period 2017 to 2021 was analyzed³. The data included crashes for all roadways, not just state routes. The focus of Target Zero is serious injuries and fatalities; over two-thirds of all crashes resulted in property damage only. **Table 2** summarizes the crash analysis.

Table 2: Crash Data Analysis for Study Area, 2017-2021

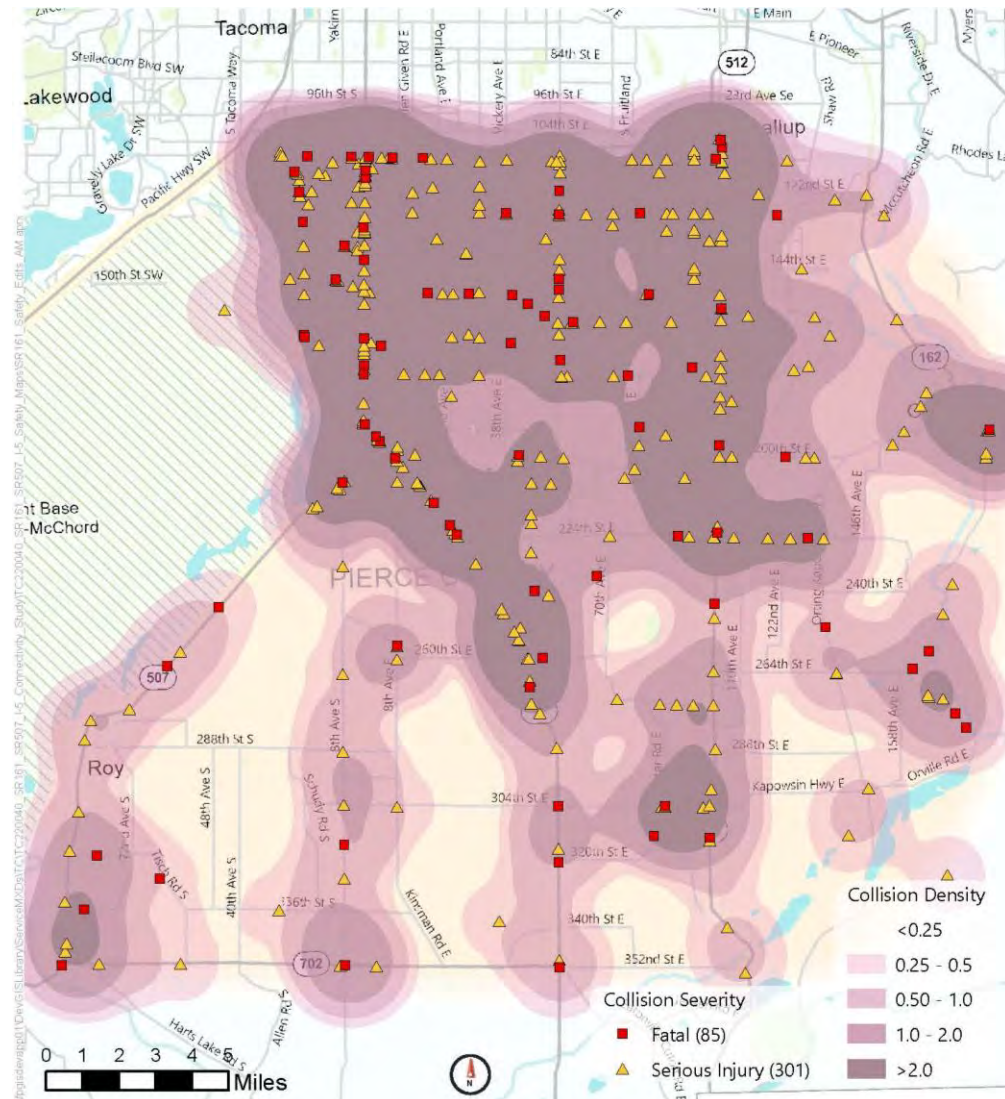
	Total	State Routes	All Other Roads
Minor Injury	3,603	1,408	2,195
Serious Injury	301	102	199
Fatality	85	32	53
Vehicle/Bike	90	35 (5 resulted in serious injury or death)	55 (5 resulted in serious injury or death)
Vehicle/Pedestrian	197	72 (31 resulted in serious injury or death)	125 (34 resulted in serious injury or death)

Figure 21 is a heat map of KSI crashes within the study area (top) and pedestrian and bicycle KSI crashes (bottom), respectively. Darker areas on the map show higher crash densities. These maps show crashes on all roadways and show that some areas have a higher concentration of fatal and serious injury crashes than others.

² [Pierce County Proposed Resolution No. R2022-118](#)

³ Note: Under 23 U.S. Code 148 and 23 U.S. Code 407, safety data, reports, surveys, schedules, list 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 report, surveys, schedules, lists, or data.

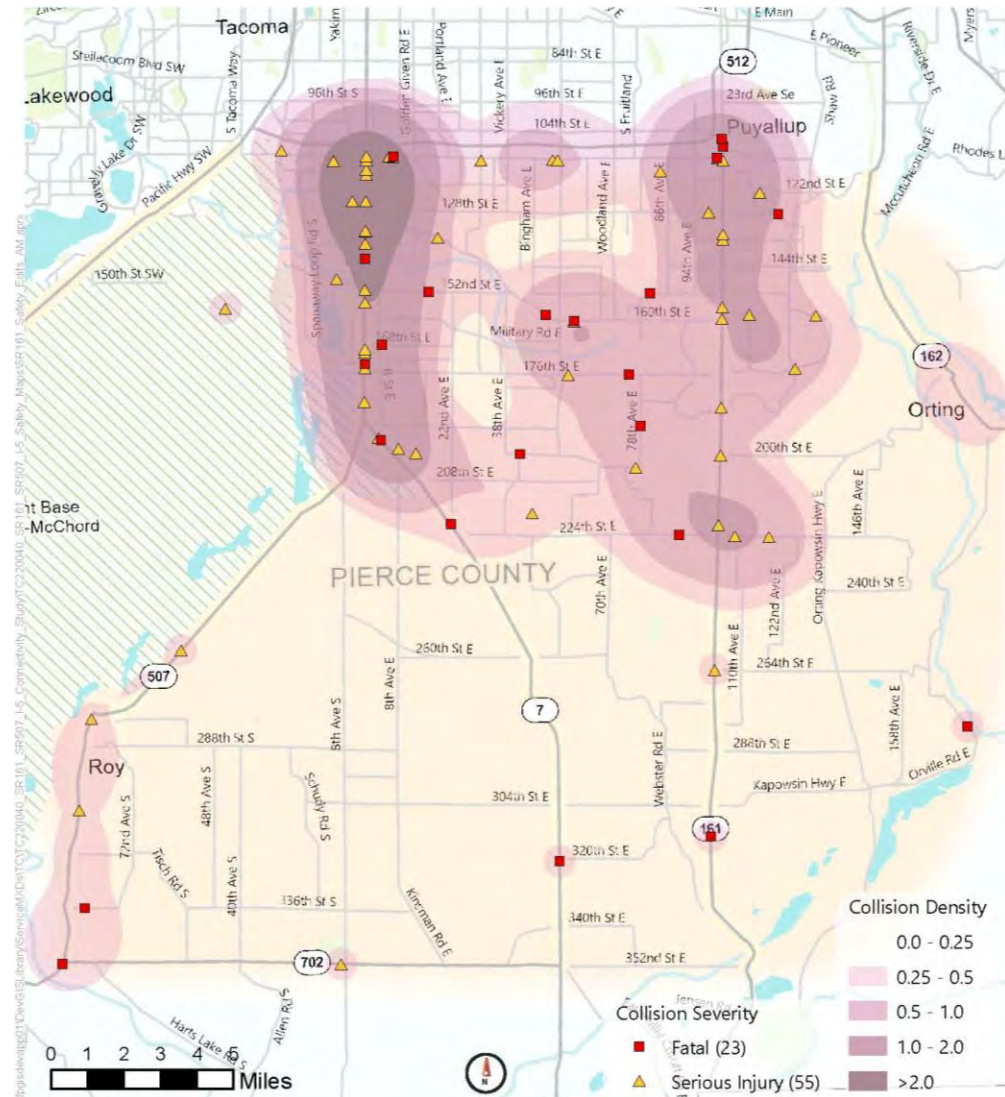
Figure 21: All Serious Injury and Fatal Crashes (Top) and Bike/Ped Serious Injury and Fatal Crashes (Bottom)



Note: Under 23 U.S. Code 148 and 23 U.S. Code 407, safety data, reports, surveys, schedules, list 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 report, surveys, schedules, lists, or data.

Source: WSDOT Crash Data, 2017-2021

SOUTH PIERCE MULTIMODAL CONNECTIVITY STUDY



Note: Under 23 U.S. Code 148 and 23 U.S. Code 407, safety data, reports, surveys, schedules, list 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 report, surveys, schedules, lists, or data.

Source: WSDOT Crash Data, 2017-2021

Both maps show high concentrations of these major crashes along busier roadways and higher population and employment densities. The active mode crashes are even more clustered in the north half of the study area where there are higher amounts of people traveling outside of a vehicle.

The higher equity marker areas are somewhat aligned with higher concentrations of all serious injury and fatal crashes and particularly pedestrian and bicycle serious injury and fatal crashes.

Figure 22 shows the percentage of total crashes (left) and fatal and serious crashes (right) by mode. Although pedestrians and bicyclists only represent a small percentage (about 2%) of total crashes, they are disproportionately represented in the fatal and serious injury crashes (about 17%). This mismatch highlights the vulnerable nature of pedestrian and bicyclists, who are not protected by vehicle safety systems that have been engineered to reduce injury.

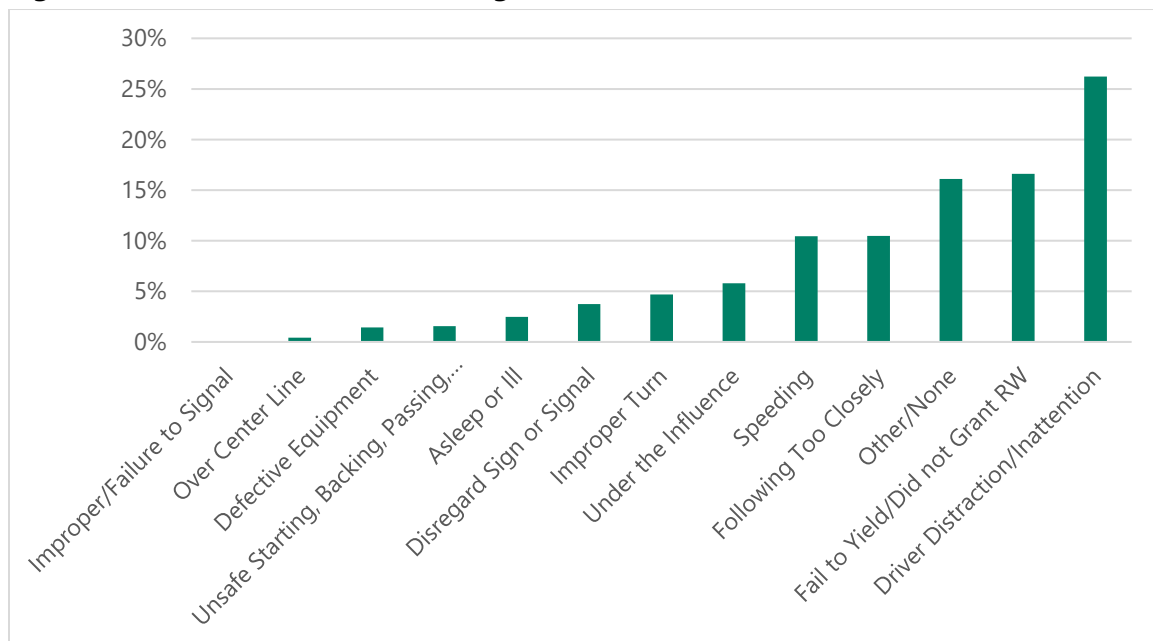
Figure 22: Severity of Crashes by Mode



Note: Under 23 U.S. Code 148 and 23 U.S. Code 407, safety data, reports, surveys, schedules, list 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 report, surveys, schedules, lists, or data.

Source: WSDOT Crash Data, 2017-2021

Crashes were often associated with contributing factors related to driver distraction and failure to yield: 26% were related to driver distraction/inattention, 17% were related to a failure to yield, and 10% each were related to following too closely and speeding. A summary of circumstances contributing to crashes is provided in **Figure 23**.

Figure 23: Crash Data – Contributing Circumstances

Note: Under 23 U.S. Code 148 and 23 U.S. Code 407, safety data, reports, surveys, schedules, list 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 report, surveys, schedules, lists, or data.

Source: WSDOT Crash Data Contributing Circumstances, 2017-2021

The crash analysis used data from 2017-2021. While 2022 was not included in the analysis, there was a limited subset of data available for the first half of 2022. This data showed that 76 KSI crashes have occurred in the study area, 17 resulting in fatalities.

Existing Conditions

The transportation network in the study area is primarily automobile oriented, with few multimodal options for travel. The network is characterized by lack of east-west connectivity and by north-south congestion. East-west connectivity is a study focus between SR 7/SR 507 and I-5 as well as between SR 161 and SR 162. No direct connection to Interstate 5 exists between SR 512 and SR 510 due to the presence of JBLM. SR 702 provides the only east-west highway route in the study area.

WSDOT has several projects ready for construction in the study area which are designed to improve safety and travel times, including:

- SR 702 roundabouts at 8th Avenue South, 40th Avenue South and Allen Road South, and Harts Lake Road South. All are scheduled for construction in 2023-2025.
- SR 507 roundabouts at Vail Road Southeast and 208th Street East. Both are scheduled for construction in 2025 and 2026.

Roadway Network

Travel Patterns

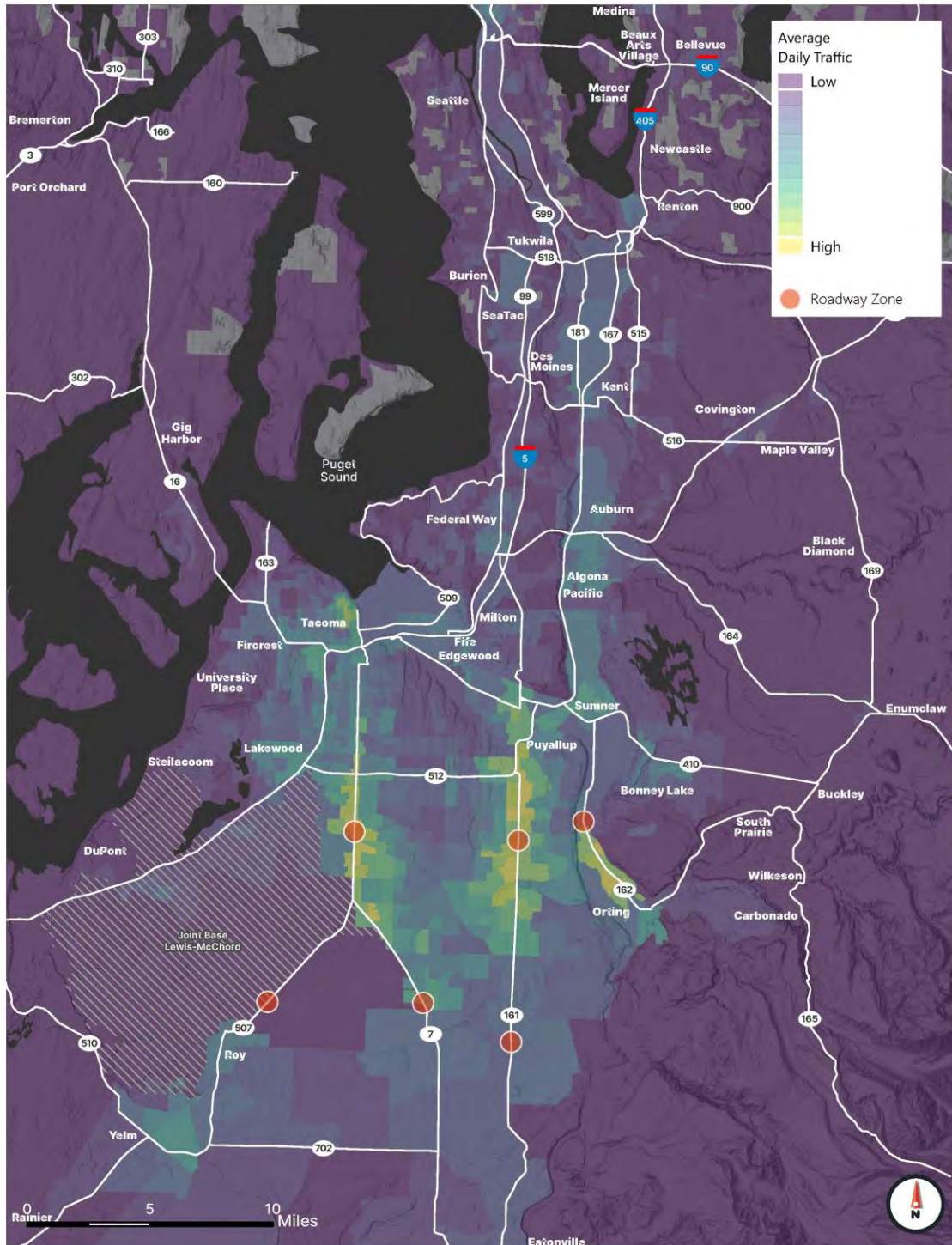
Anonymous cell phone location data was analyzed (See Appendix A – Streetlight Travel Patterns Memo for more detail on how and why this data was used) to better understand travel patterns within and to/from the study area. The data was aggregated across many travelers to provide a better understanding of where people are traveling on the existing network.

The first half of **Figure 24** shows the origins and destinations of traffic passing through each of the “roadway zone” circles on state roads within the study area. There is significant north-south travel, but much of the travel is relatively local within the study area.

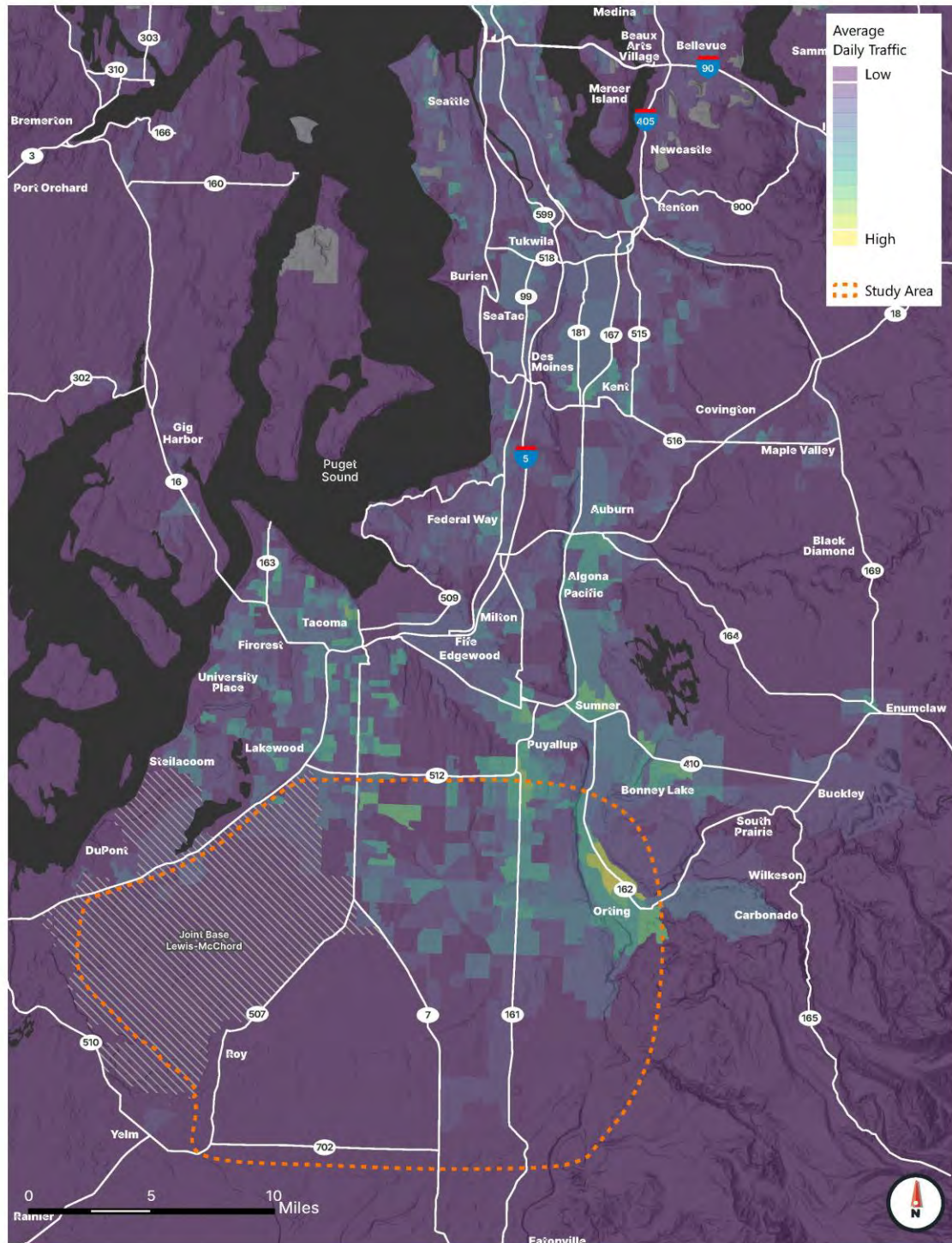
The second half of the figure shows the origins and destinations for all trips that start or end within the study area, regardless of which road they are using. About 70% of the trips that start or end in the study area remain within Pierce County, 25% are to and from King County, and 5% are to and from Thurston County. Many of the trips outside of the study area are headed to and from employment centers in the Green River Valley, Tacoma, and Seattle.

This data only reflects where people are traveling on the current network. There could be changes in these patterns over time if the network changes.

Figure 24: Travel Patterns to/from Study Area



SOUTH PIERCE MULTIMODAL CONNECTIVITY STUDY

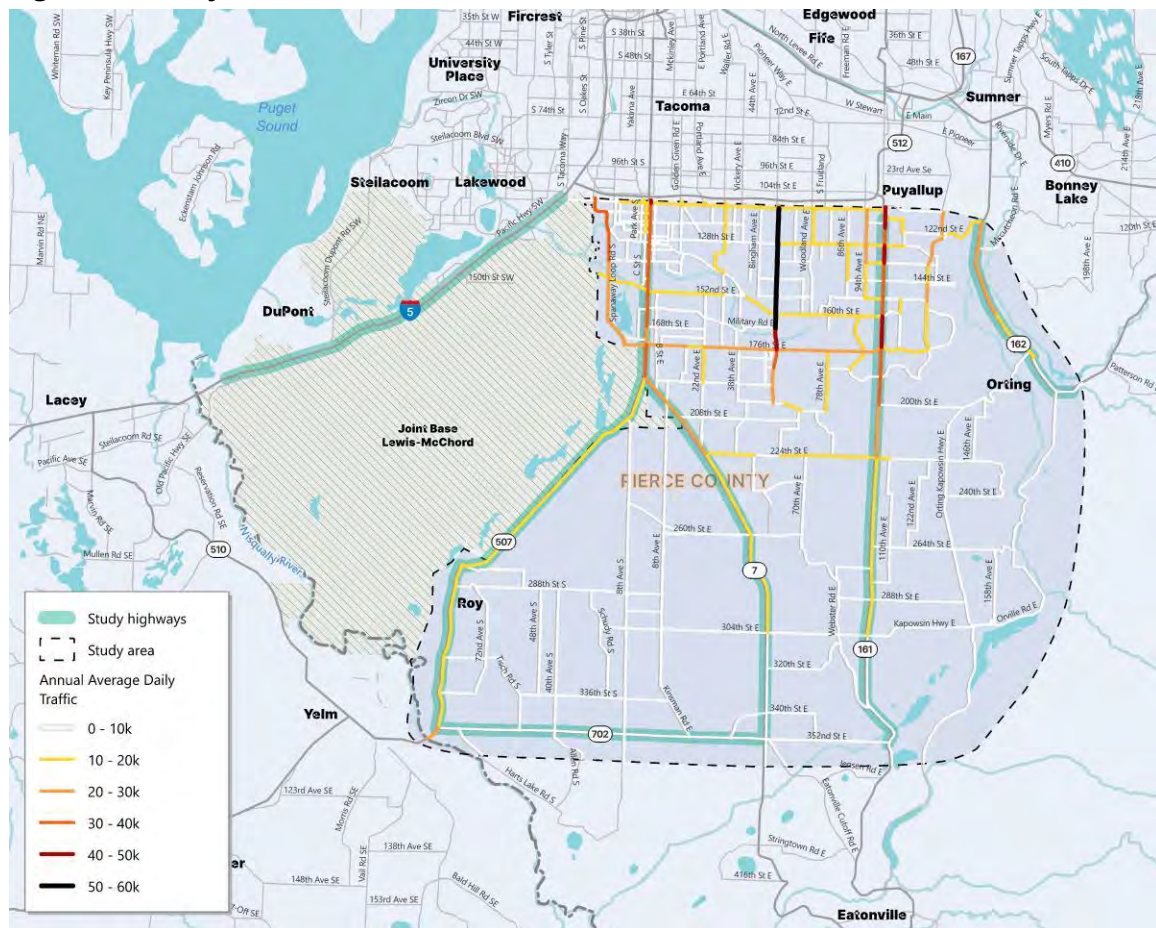


Source: Streetlight Data for Fall 2019

Traffic Operations and Volumes

The daily traffic volume map in **Figure 25** shows how vehicle traffic is distributed throughout the system. Canyon Road has the highest volumes in the study area with almost 60,000 vehicles per day, followed by SR 161 and SR 7 respectively. 176th Street E has the highest E-W volume in the study area, and facilities like 112th Street E and 160th Street E provide alternatives to SR 512 and 176th Street E when those are over capacity. Traffic is distributed across many different local roads where available due to existing congestion on the primary arterial roadways.

Figure 25: Daily Traffic Volumes



Source: WSDOT and Pierce County Volume Counts, 2022

Intersection Level of Service

The Level of Service (LOS) standard for an intersection in an unincorporated area is associated with the LOS standard for the corridor it is on. There are study intersections located on county-controlled arterials and WSDOT controlled highways.

County controlled corridors use a service threshold ratio to establish a service standard. The service standard for all county arterial road segments is set to 1.0. A service standard of 1.0 is similar to a level of service E in urban areas and D in rural areas. The City of Puyallup sets a LOS standard of D for all the intersections in the city.

The existing control delay and LOS for every study intersection for the AM and PM peak hours are summarized in **Table 3** below.

Table 3: Level of Service Results and Standard

Study Intersection	AM LOS/Control Delay	PM LOS/Control Delay	LOS Standard
Steele St S & 112 th St S	C/27.0	D/44.8	E
Spanaway Loop Rd S & Military Rd S	E/59.6	D/47.0	E
Canyon Rd E & 112 th St E	C/30.3	D/40.3	E
Canyon Rd E & 176 th St E	C/32.0	D/37.6	E
Meridian Ave E & 128 th St E	C/33.5	D/47.0	D
Meridian Ave E & 160 th St E	C/24.6	C/34.9	D
SR 507 & SR 702	B/13.1	B/14.8	C
39 th Ave SW & 94 th Ave E	B/19.2	D/37.1	D
Canyon Rd E & 160 th St E	C/31.2	D/53.3	E
SR 162 & Calistoga St W	B/14.9	B/16.8	D

Study Intersection	AM LOS/Control Delay	PM LOS/Control Delay	LOS Standard
SR 162 & Military Rd E	B/17.2**	C/24.5**	D
SR 7 & 112 th St S	C/27.4	D/50.9	D
SR 7 & 224 th St E	B/13.5	B/19.1	C
SR 7 & SR 704	C/24.7	D/45.7	D
Meridian Ave E & 176 th St E	C/24.5	C/34.3	D
Meridian Ave E & 224 th St E	D/38.3	C/29.8	D
Woodland Ave E & 112 th St E	B/12.2	C/22.9	E
SR 7 & Military Rd S	D/40.2	D/54.7	D
S Meridian & 39 th Ave SW	C/22.9	D/38.7	D

* Side-street stop intersection uses worst approach LOS and control delay

** Intersection analyzed with HCM 2000

There were no intersections in the study area that fail under existing conditions, but many just meet the LOS standard. With future growth, it is expected that there will be intersections that fail to meet the standards. Control Delay and LOS were worse during the PM peak hour period for every study intersection except for Spanaway Loop Road S & Military Road S and Meridian Avenue E & 224th Street E.

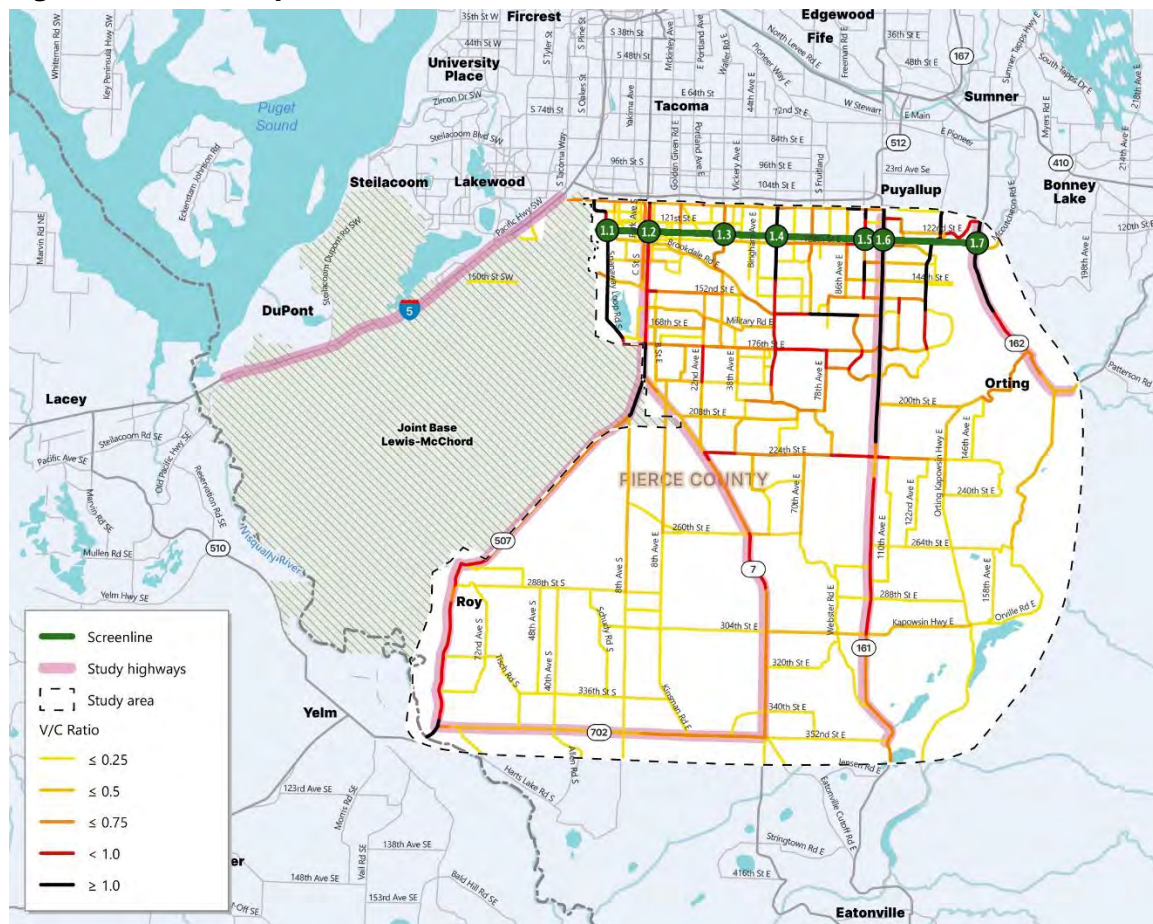
Volume and Capacity Screenlines

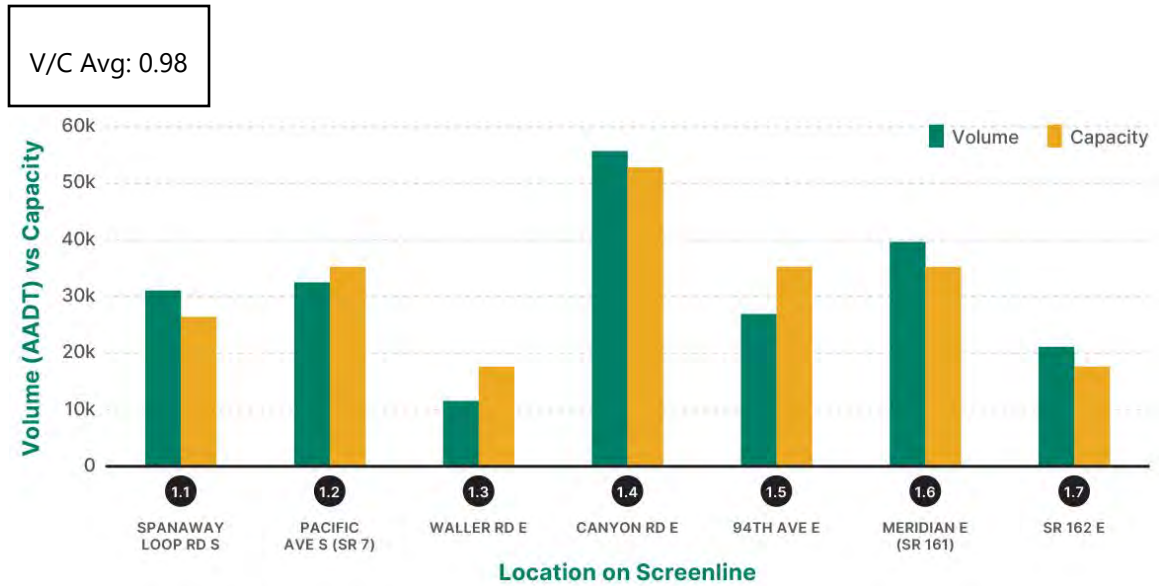
To better understand congestion, the study team developed 8 screenlines along the highest volume facilities across the study area. Screenlines look at the capacity of the entire system as well as across different routes. The screenlines for the study area provide a representative view of

existing volumes and capacities on major roadways that cross each screenline and help us understand the overall volume to capacity ratio of the entire network, not just one roadway at a time. The maps and bar charts below provide information on existing conditions across each screenline. On the bar charts, the daily volumes are shown in teal, while the theoretical capacity of the roadway is shown in gold. Roadways that are over capacity represent congestion. The higher the volume to the capacity ratio, the more congestion each road experiences.

Figure 26 shows the capacity of the north/south roadways north of 128th Street. This is the most congested area of the study area.

Figure 26: Traffic Operations

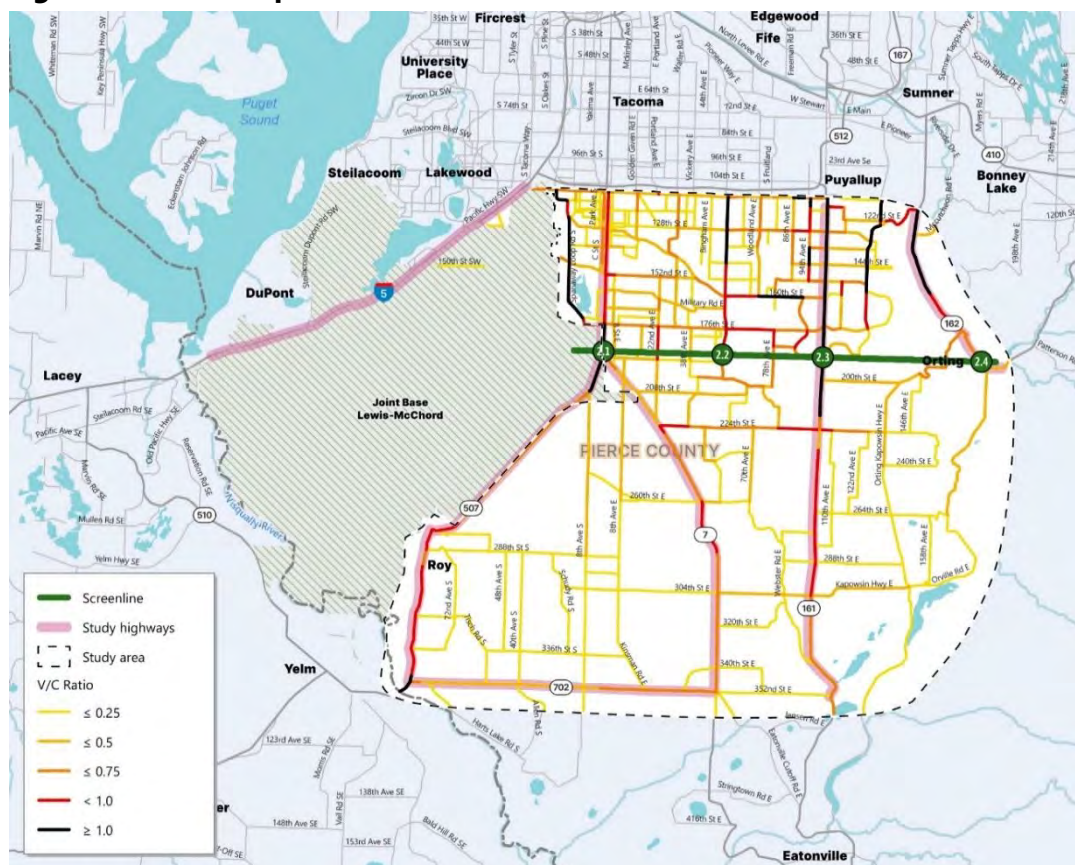




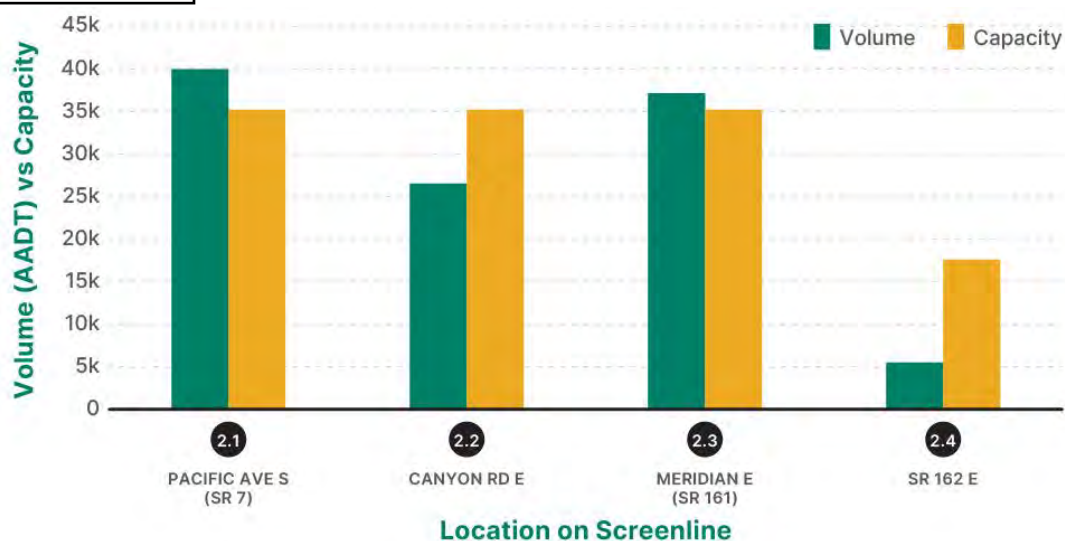
Source: WSDOT and Pierce County Volume Counts, Pierce County Roads, Pierce County Mobility Data, Pierce County 2018 TIF

Figure 27 shows the screenline south of 176th Street. Overall traffic volumes are lower, but fewer major roadways exist to distribute traffic.

Figure 27: Traffic Operations



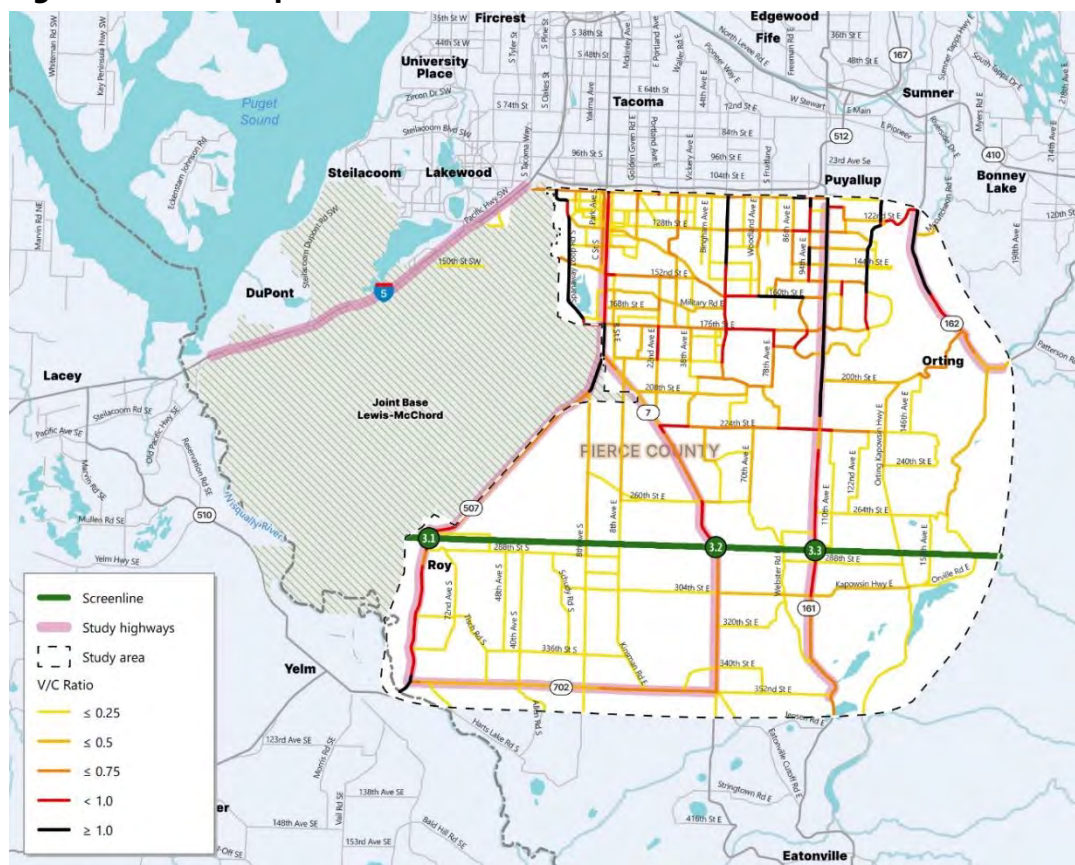
V/C Avg: 0.81



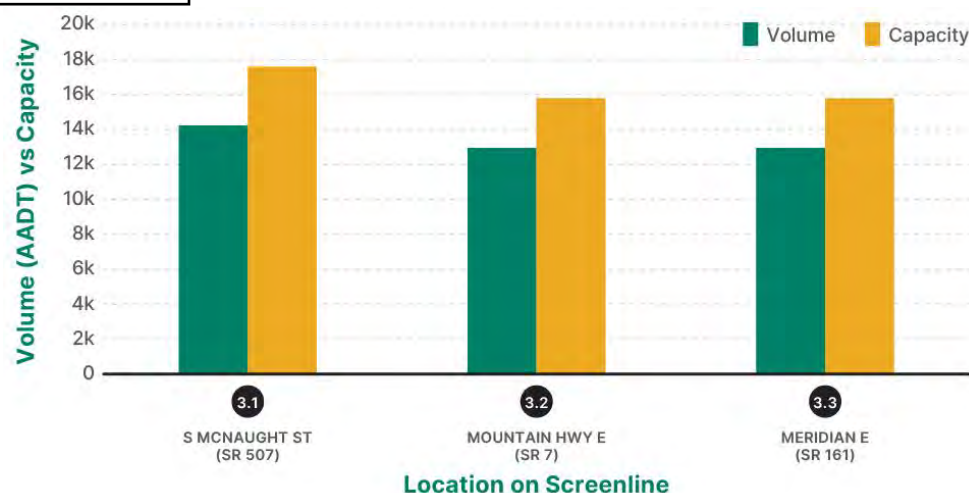
Source: WSDOT and Pierce County Volume Counts, Pierce County Roads, Pierce County Mobility Data, Pierce County 2018 TIF

Figure 28 shows the screenline north of 288th Street. Traffic volumes continue to decrease drastically as we continue further south.

Figure 28: Traffic Operations



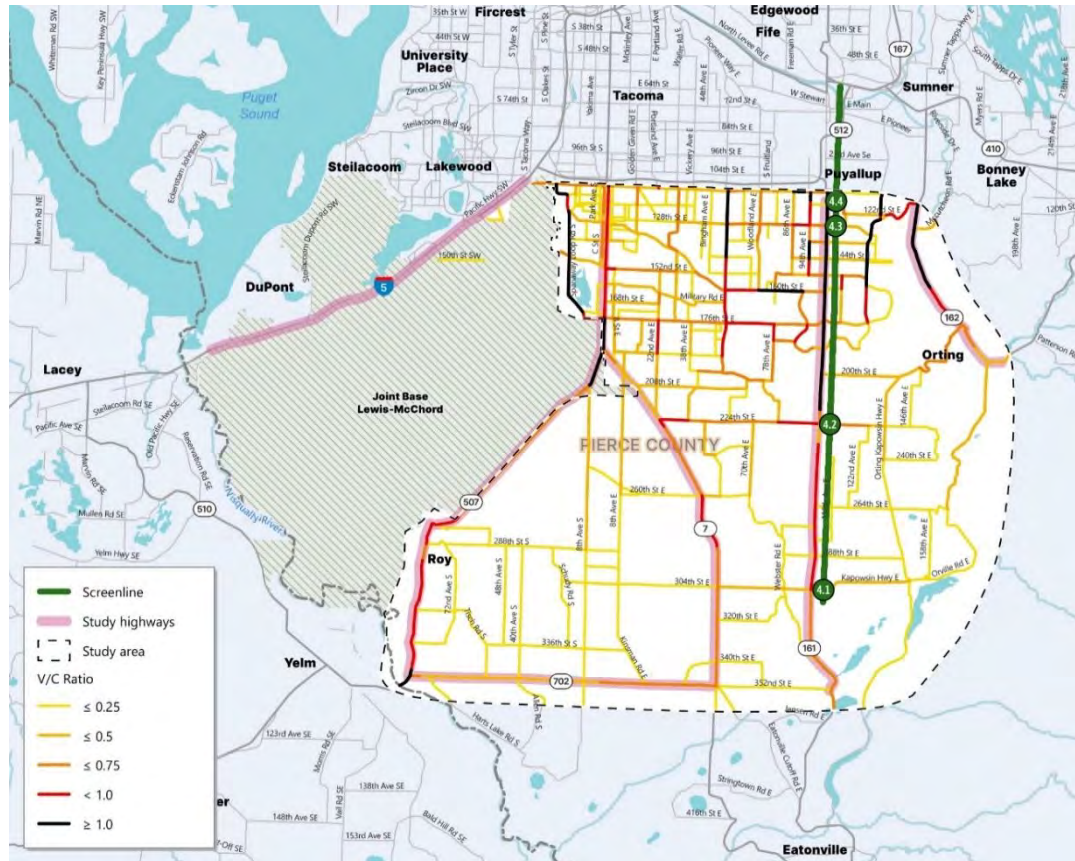
V/C Avg: 0.82



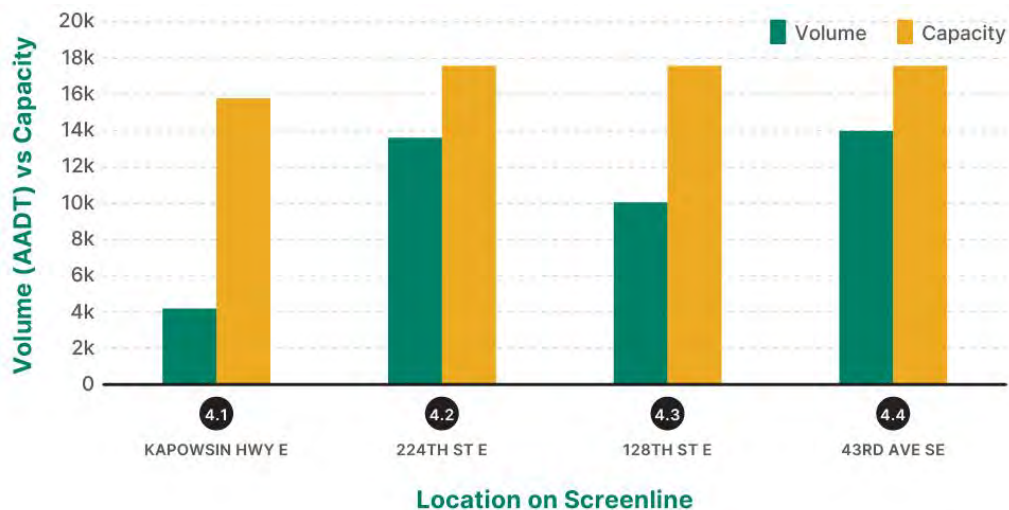
Source: WSDOT and Pierce County Volume Counts, Pierce County Roads, Pierce County Mobility Data, Pierce County 2018 TIF

Figure 29 shows the screenline east of SR 161. There are relatively lower traffic volumes and available capacity on these roadways.

Figure 29: Traffic Operations



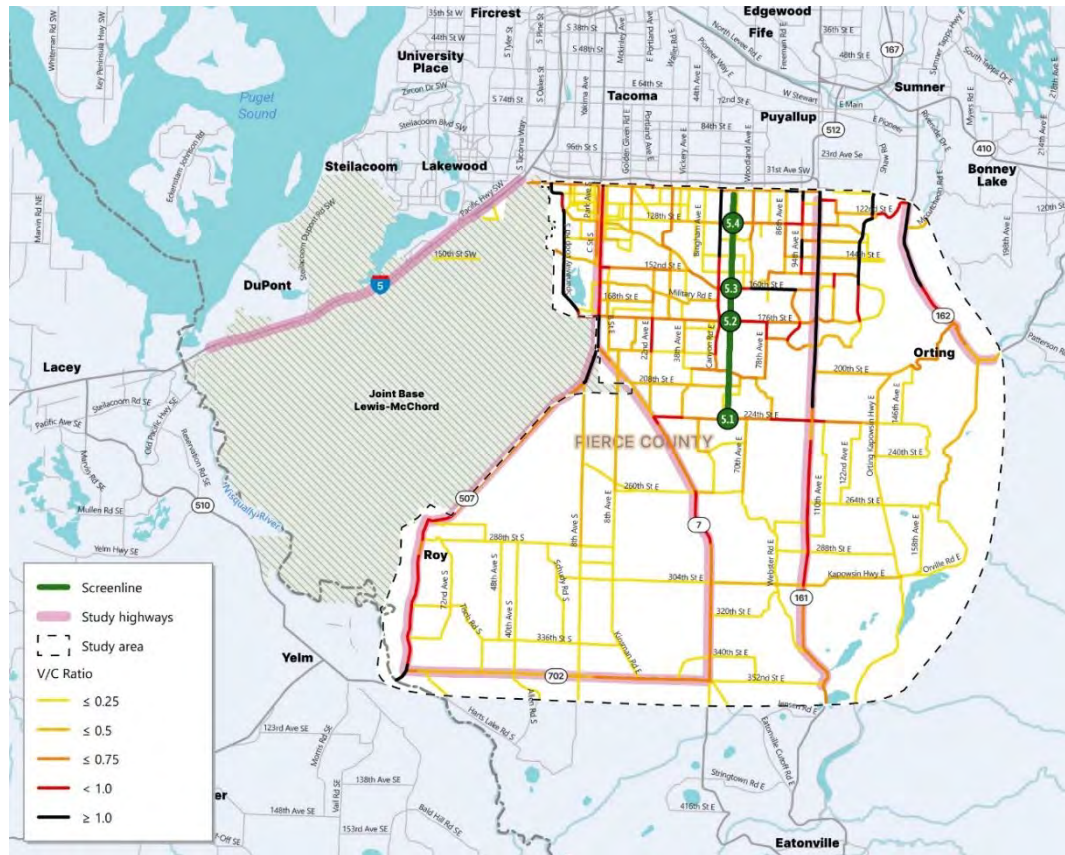
V/C Avg: 0.60



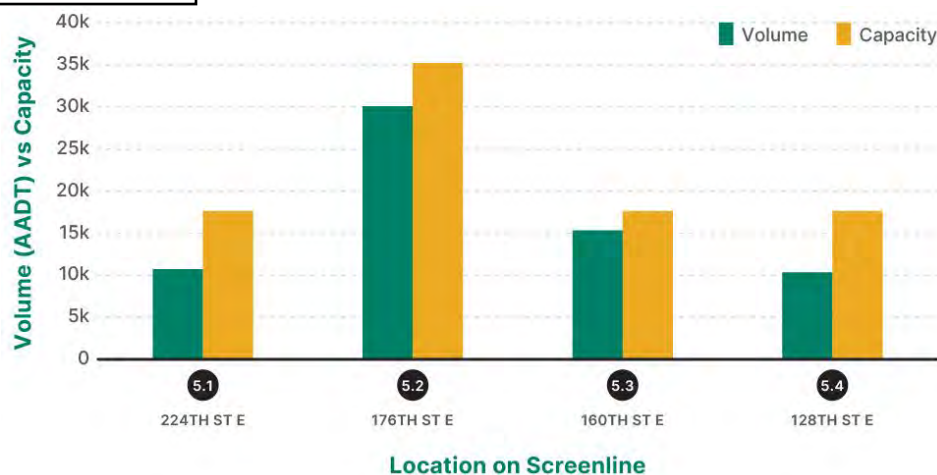
Source: WSDOT and Pierce County Volume Counts, Pierce County Roads, Pierce County Mobility Data, Pierce County 2018 TIF

Figure 30 shows the screenline, east of Canyon Road. As shown in the previous trip patterns, most of the demand is north/south, but these east/west routes are important for connections between parallel north/south roadways like Canyon Road and 94th Avenue.

Figure 30: Traffic Operations



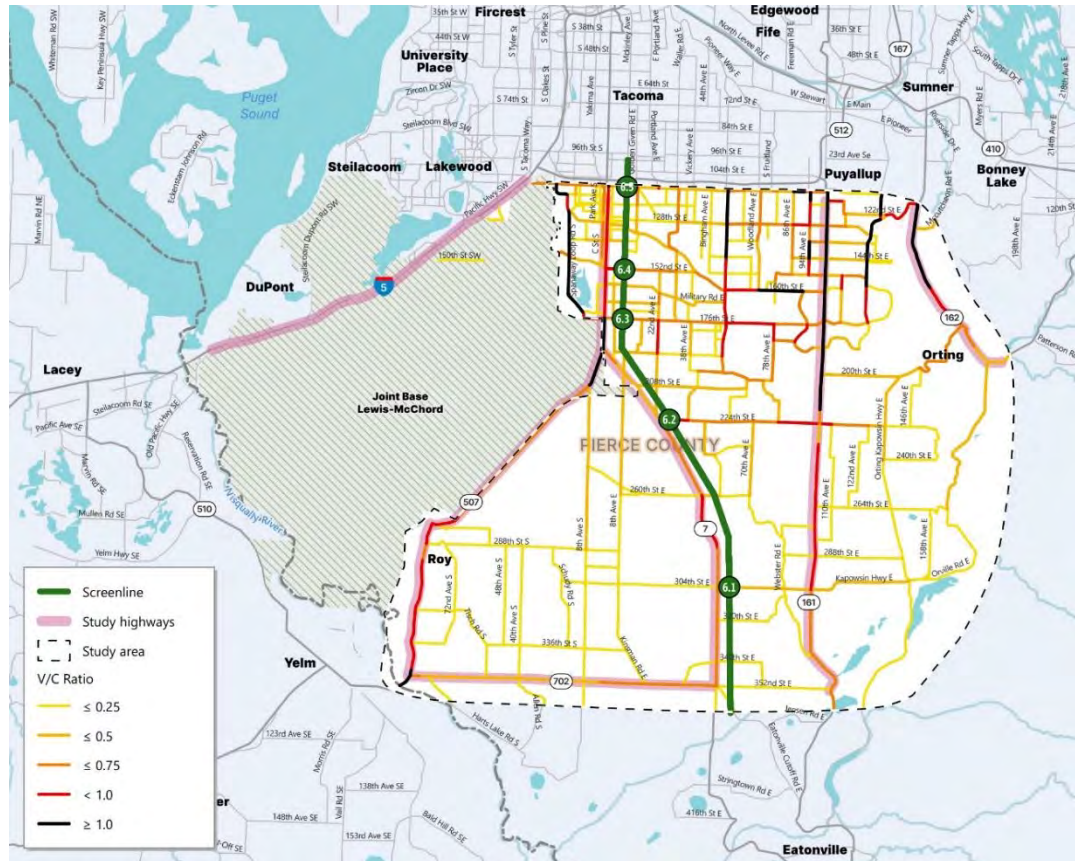
V/C Avg: 0.59



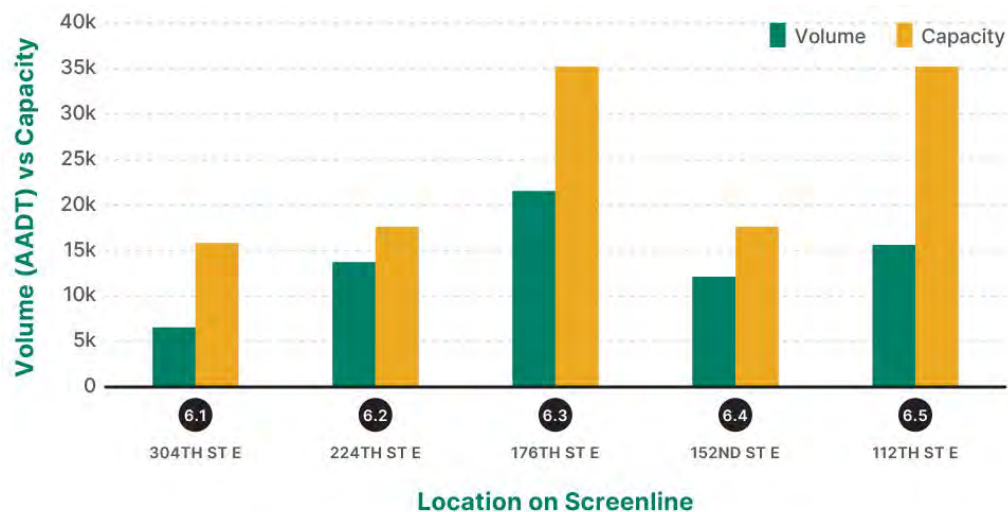
Source: WSDOT and Pierce County Volume Counts, Pierce County Roads, Pierce County Mobility Data, Pierce County 2018 TIF

Figure 31 shows the screenline, east of SR 7. There is a complete grid network in the north half of the study area to the east of SR 7, traffic distributes across multiple major and minor roadways.

Figure 31: Traffic Operations



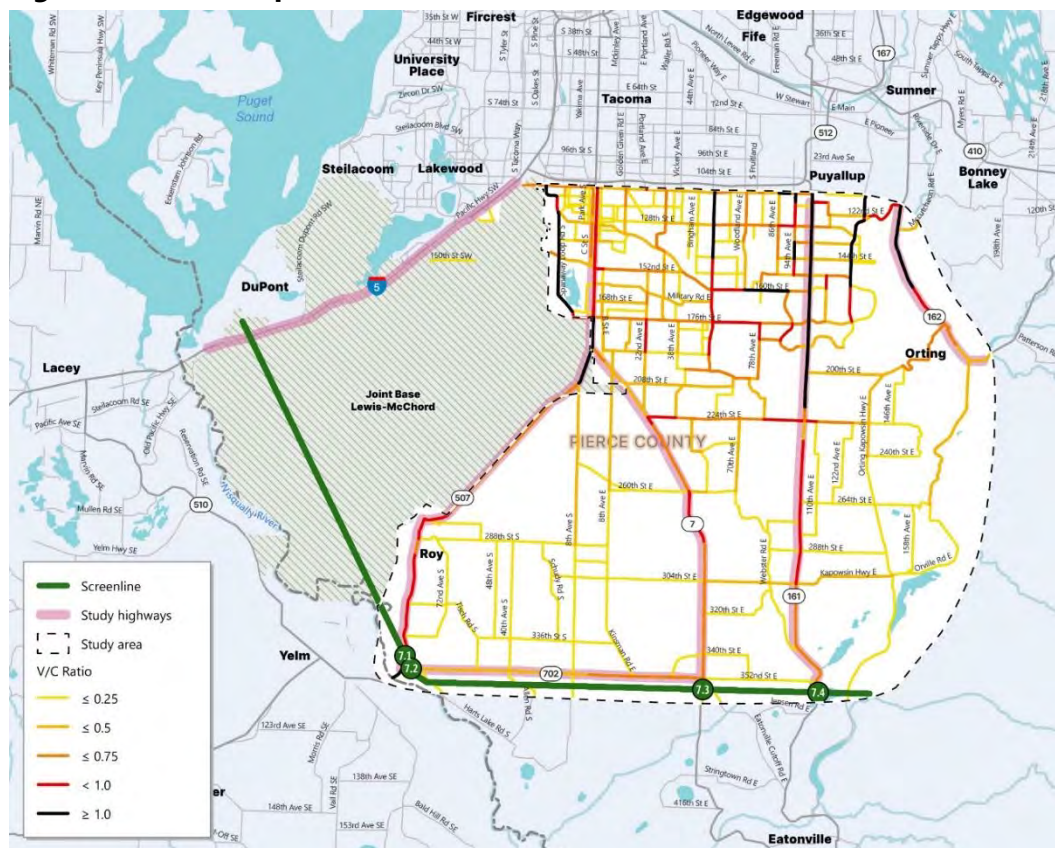
V/C Avg: 0.73



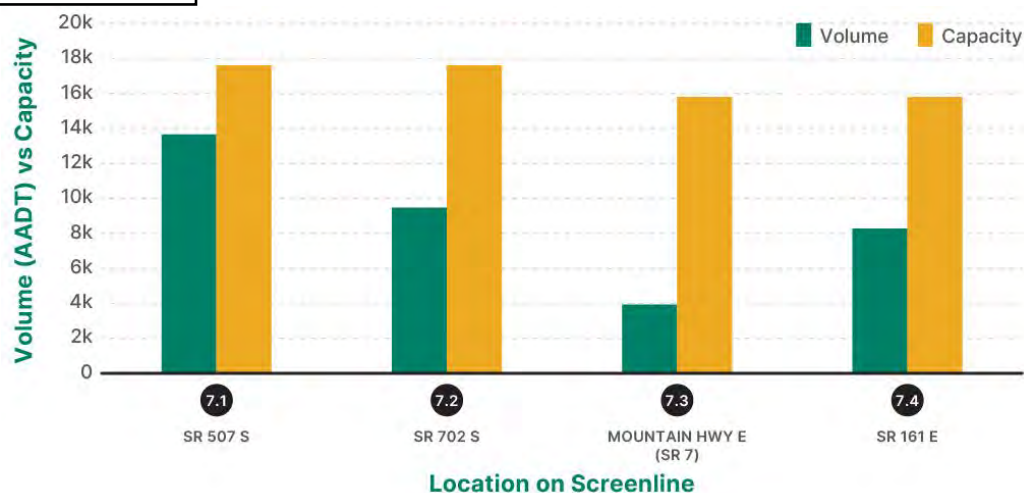
Source: WSDOT and Pierce County Volume Counts, Pierce County Roads, Pierce County Mobility Data, Pierce County 2018 TIF

Figure 32 shows the screenline, south of SR 702. Other than SR 507, traffic volumes are very low on weekdays on these roadways, although traffic increases when travelers are headed to and from recreational areas like Mt. Rainier.

Figure 32: Traffic Operations



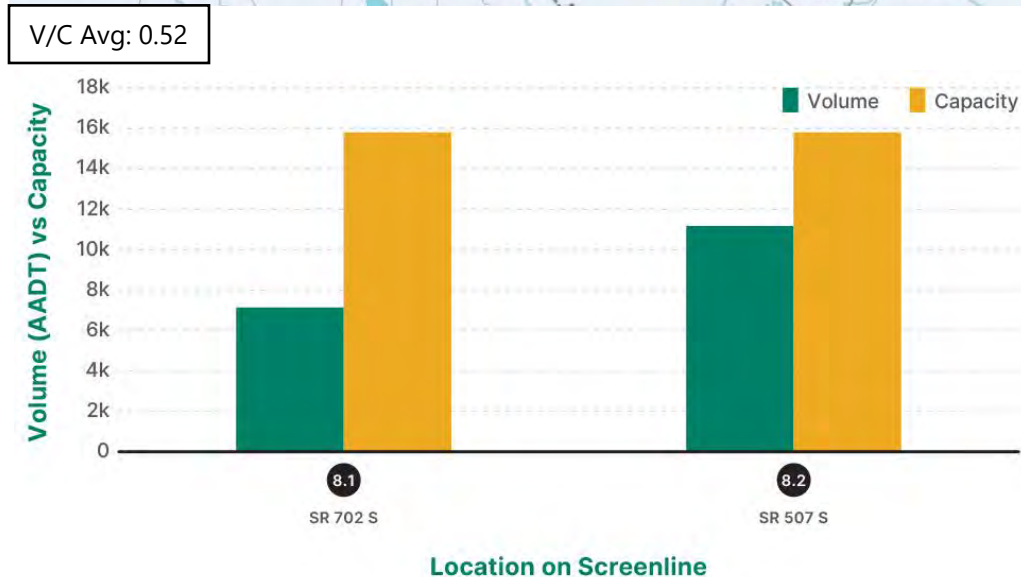
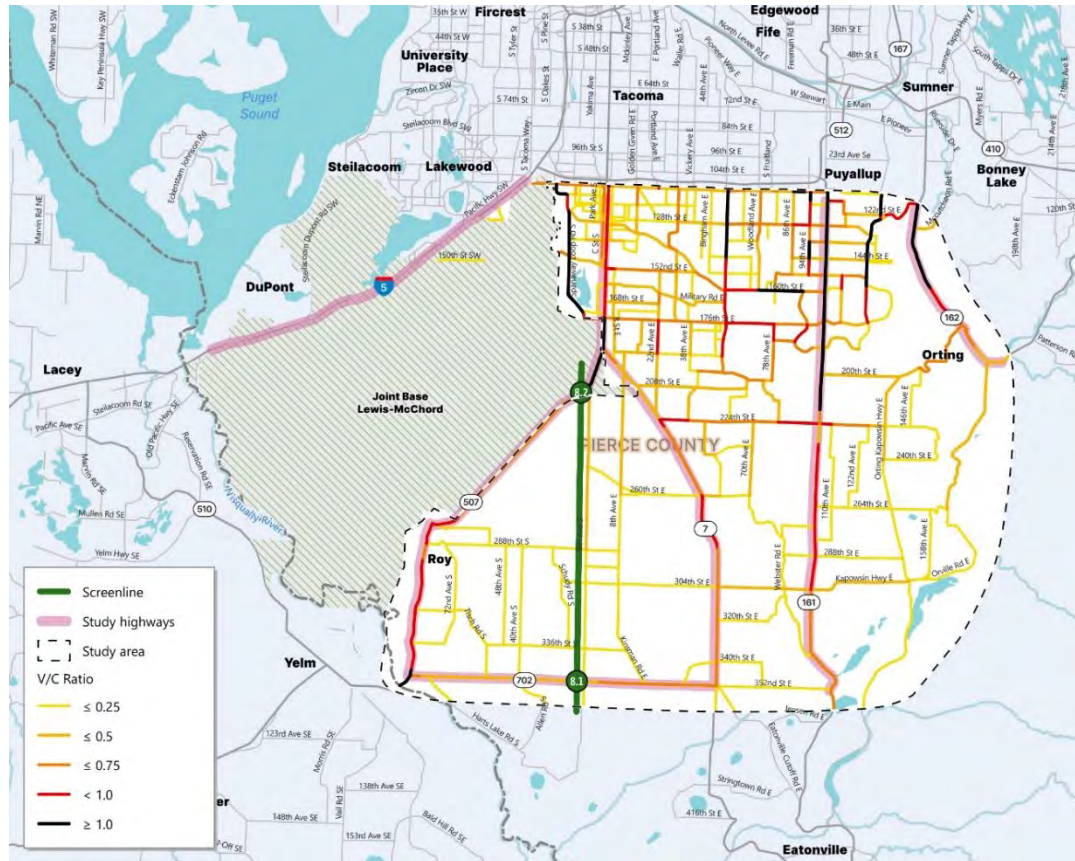
V/C Avg: 0.58



Source: WSDOT and Pierce County Volume Counts, Pierce County Roads, Pierce County Mobility Data, Pierce County 2018 TIF

Figure 33 shows the screenline, west of 8th Avenue. This area has much lower density than the northern half of the study area, and only has two major roadways.

Figure 33: Traffic Operations

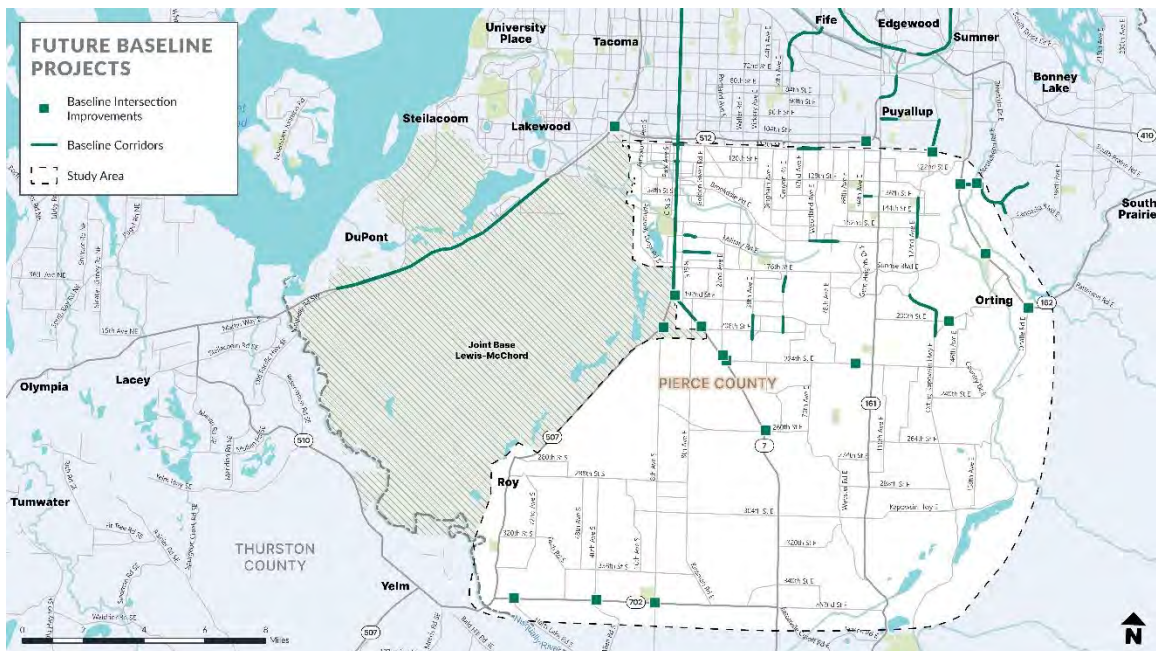


Source: WSDOT and Pierce County Volume Counts, Pierce County Roads, Pierce County Mobility Data, Pierce County 2018 TIF

Future Baseline Traffic Operations

Following the existing conditions assessment, the study team developed a travel demand model to forecast baseline conditions in 2050. The future baseline scenario included only those transportation improvements already funded or very likely to be implemented by 2050, as identified by agency staff (**Figure 34**). Future land use growth forecasts provided by PSRC and Pierce County were also included.

Figure 34: Future Baseline Projects



This assessment demonstrated that future transportation operations will be poor without additional management strategies and infrastructure investments beyond the baseline improvements. The implementation of the baseline projects and future land use patterns do result in a better jobs-to-housing balance, leading to an average trip length decrease of approximately 16 percent. However, total study area trips increase approximately 19 percent and the number of trips internal to the study area increases by 28 percent due to rapid housing and employment growth. The baseline assessment identified that limited transit service, active transportation infrastructure, and safety improvements are funded or very likely to be in place by 2050.

The 2050 Baseline traffic conditions are provided (on the same screenline as are shown for existing conditions) in **Figures 35-39**.

Figure 35: Future Baseline Traffic Operations

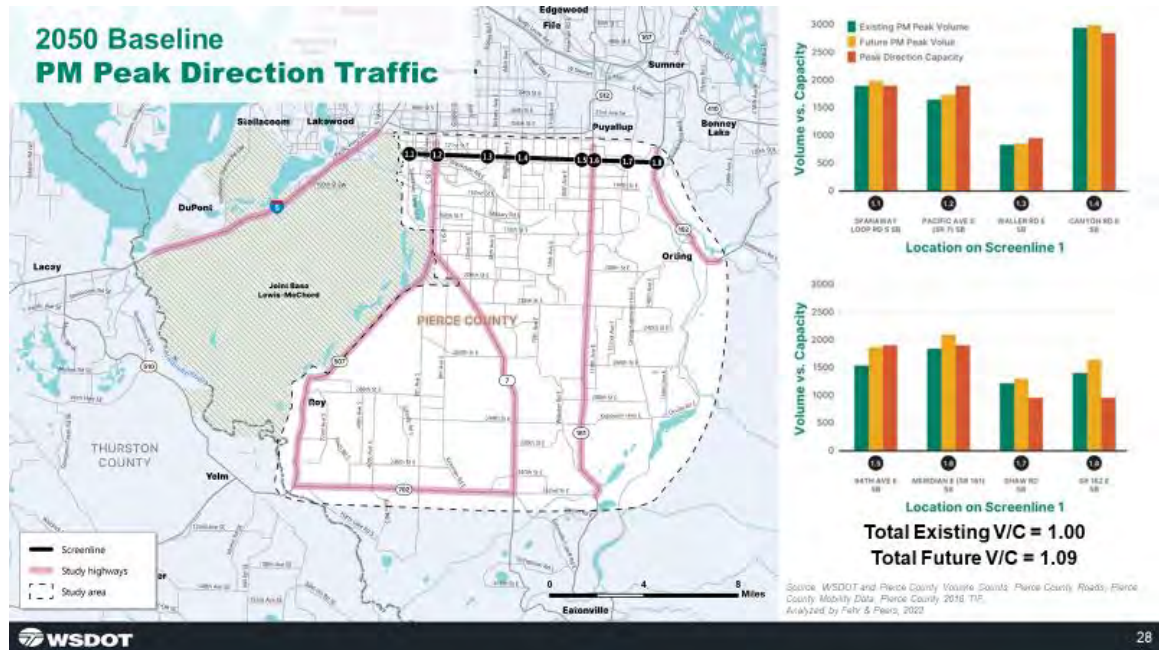


Figure 36: Future Baseline Traffic Operations

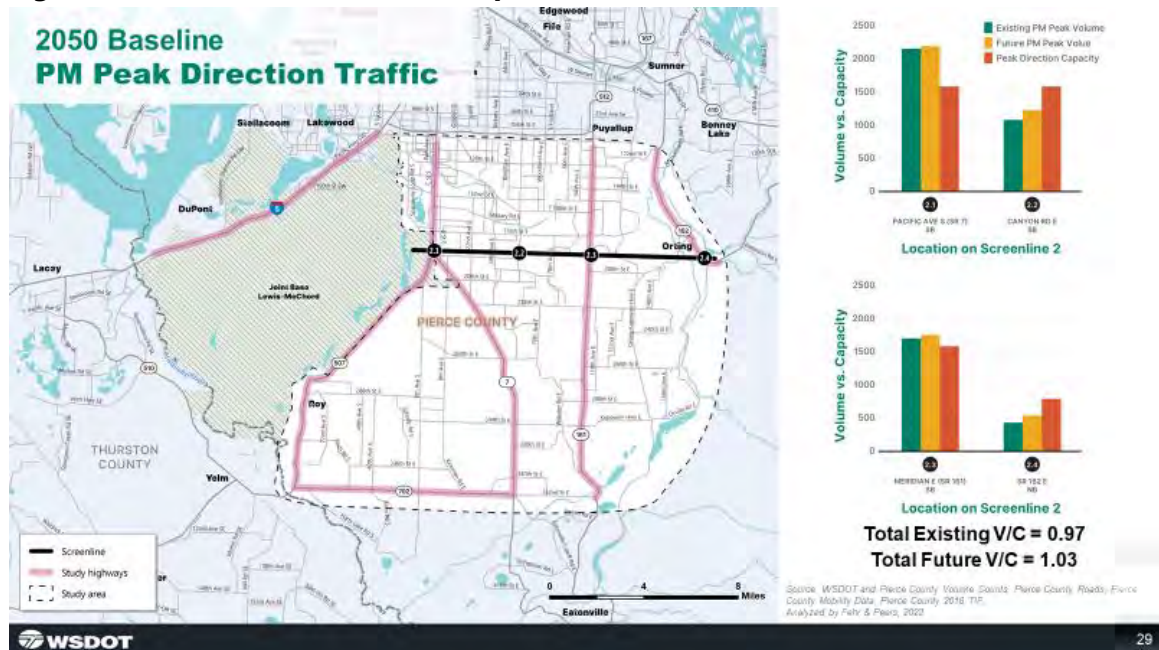


Figure 37: Future Baseline Traffic Operations

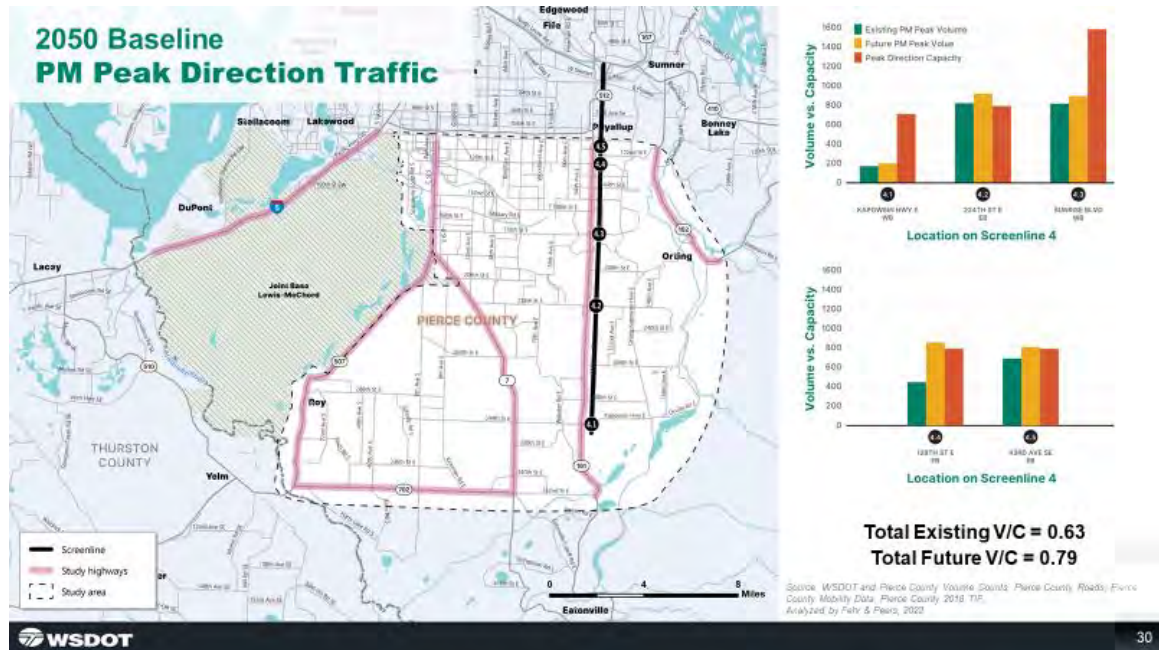


Figure 38: Future Baseline Traffic Operations

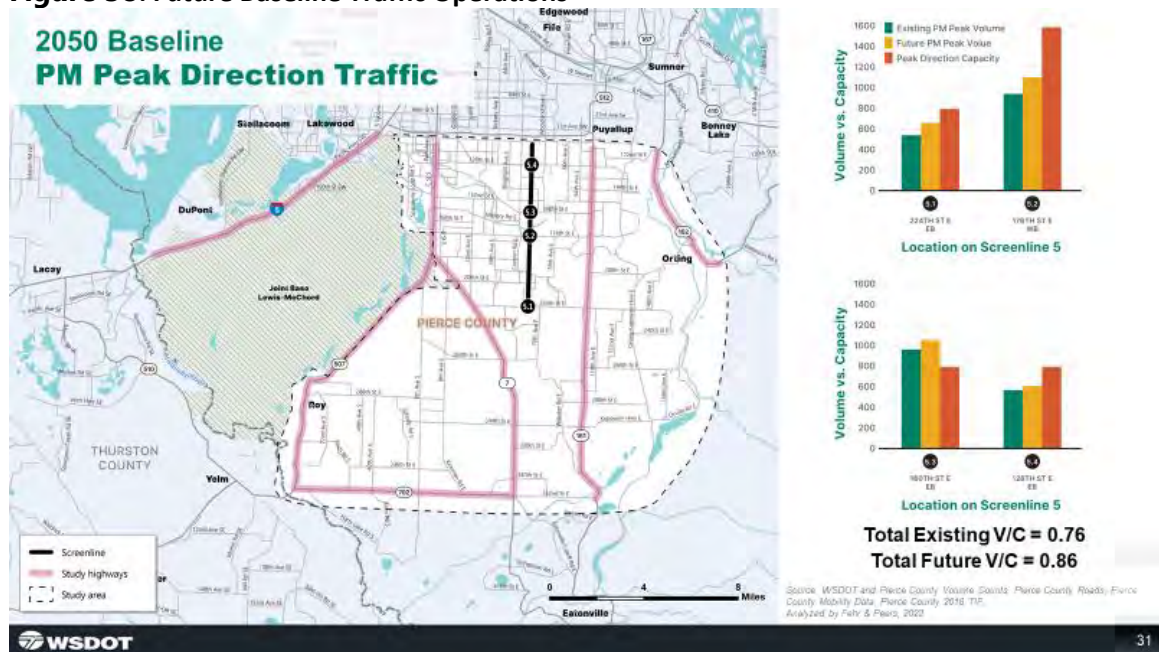
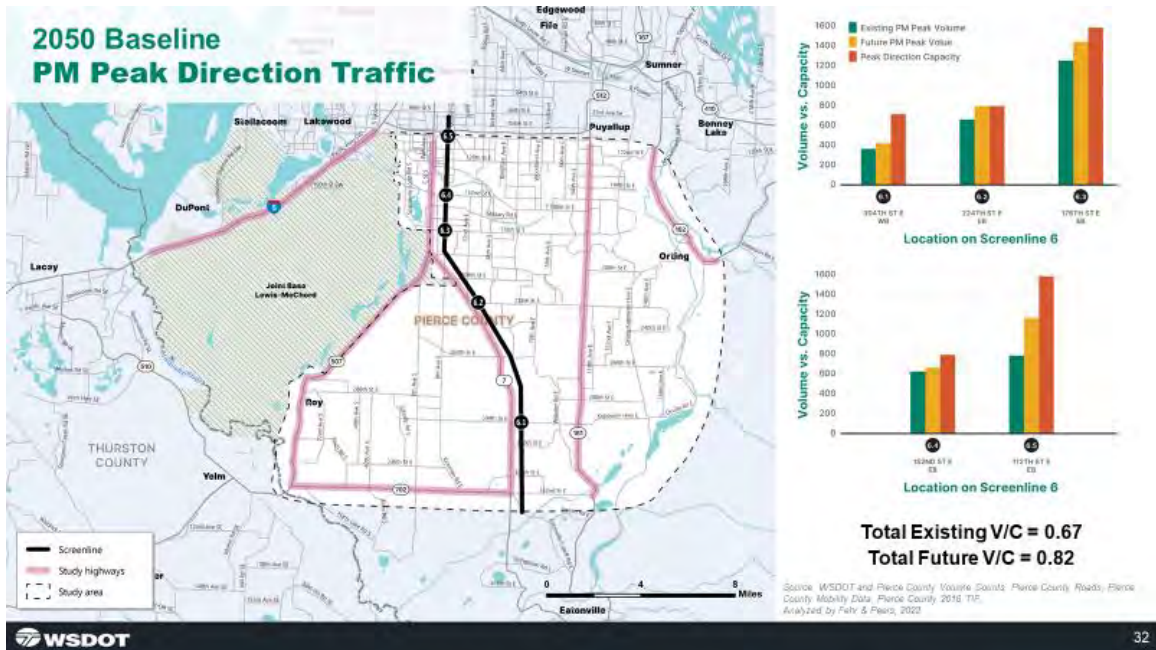


Figure 39: Future Baseline Traffic Operations



Roadways with volumes greater than capacity represent congestion. North of 128th Street, all study roadways have PM peak congestion in the southbound direction. This is the most congested screenline in the study area and is already at capacity under existing conditions. Canyon Road, SR 161, Shaw Road, and SR 162 are especially over capacity.

This screenline south of 176th Street shows overall traffic volumes are lower, but there are also fewer major roadways to spread traffic across. SR 7 has more volume at this cross section than the 128th Street screenline location where Spanaway Loop Rd serves as a parallel route. Canyon Road is not as busy south of 176th Street, while SR 161 is still over capacity.

The east-west screenlines in **Figures 37-39** don't have as defined of a peak direction flow as the north-south screenlines. 224th Street remains slightly over capacity as does 128th Street and 43rd Street.

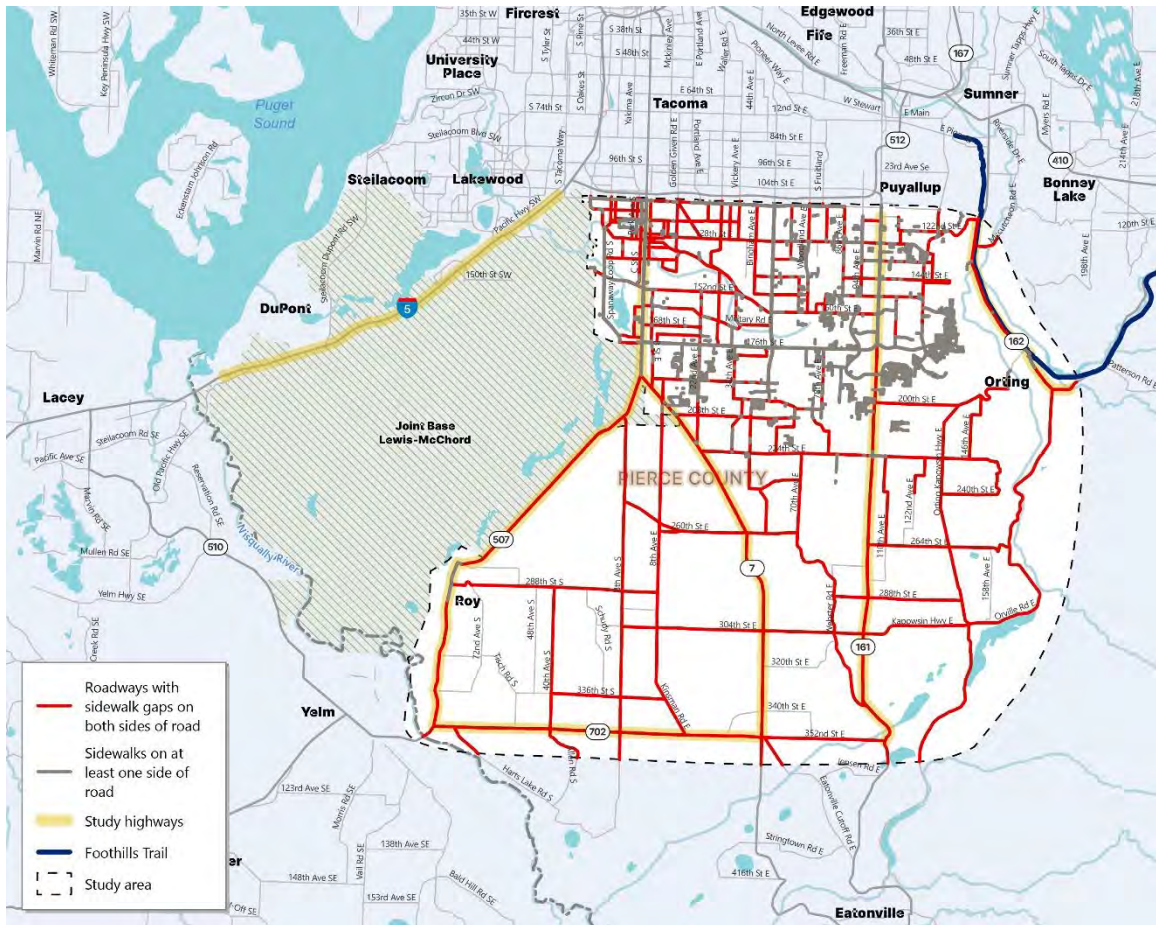
160th Street has the highest PM peak direction congestion in this central area and 224th Street is the only major road at capacity on the screenline east of SR 7 in the future.

Active Transportation

Sidewalk Gaps

Pedestrian facilities within the study area exist, but many roads have gaps in the sidewalk network on one or both sides of the road, and sidewalks are lacking particularly in the southern half of the study area. The locations of the existing sidewalks and gaps in the sidewalk network are shown in **Figure 40**, below.

Figure 40: Sidewalk Gaps



Source: WSDOT Sidewalks, Pierce County Sidewalks, Pierce County Mobility Data

The primary north-south corridors (SR 7, Canyon Road E, SR 161) have complete pedestrian facilities between 176th Street E and the northern extent of the study area. There are fewer complete pedestrian facilities on the east-west sections of road within the study area. A significant portion of pedestrian facilities on local and collector roads within the study area are developer frontage improvements. The frontage improvements create a patchwork of pedestrian facilities

between developed or redeveloped and undeveloped parcels. While this helps fill some gaps in the existing pedestrian network, many deficiencies remain.

Additionally, the roads with existing sidewalk infrastructure may not have complete and well-maintained sidewalks that meet current accessibility requirements. Sidewalk conditions vary throughout the study area, with some sidewalks needing maintenance and others that do not meet safety performance standards or are not accessible. Each agency should review the condition and accessibility of their sidewalks on a regular basis. The Bethel School District completed an analysis that found only 9% of the roadways in their district have sidewalks. District staff reported that many students live within walking distance of school but must take the bus due to the lack of a safe walking route.

Bicycle Level of Traffic Stress

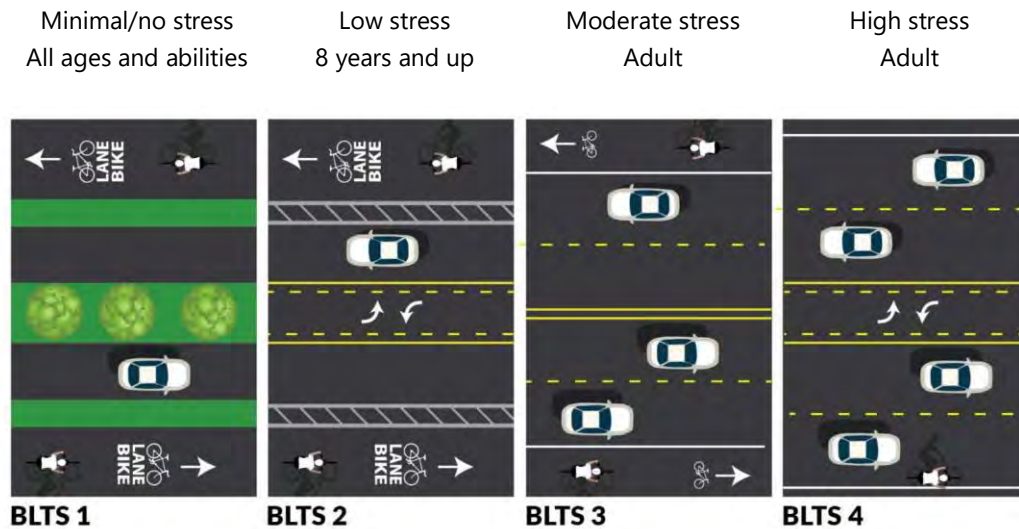
Table 4 describes Bicycle Level of Traffic Stress (LTS), a tool used to understand how comfortable different types of bikers may feel on a roadway. The first level, LTS 1, means that all ages and abilities might feel comfortable on a facility, while LTS 4 would only be seen as a viable route for very confident bikers.

Table 4: Bicycle Level of Traffic Stress

Characteristics	LTS 1	LTS 2	LTS 3	LTS 4
Stress	Minimal/none	Low	Moderate	High
Required attentiveness (to traffic)	Minimal/none	Low	Moderate	High
Unsupervised suitability	All ages and abilities	8 years and up	Adult	Adult
Accessibility	All ages and abilities	Possible limitations for wheeled mobility device	Likely limitations for wheeled mobility device	Presents barrier to wheeled mobility device use
Traffic Conditions	Low speeds and volumes if facilities are near traffic	Moderate speeds and volumes	Higher speeds and volumes	Highest speeds and volumes, typically multi-lane roadways

Source: Washington State Active Transportation Plan: 2020 and Beyond, 2021

There are many variables that go into determining the LTS of a given facility such as speed, vehicle volume, and facility characteristics. **Figure 41** shows examples of bicycle network design for each of the LTS levels. On the left side, fully separated bike facilities are on a lower volume and lower speed road. On the right side, a narrow or nonexistent bike facility is on a high volume and higher speed road. High volume and speed roads are almost always LTS 3 or worse, unless bike facilities are physically separated.

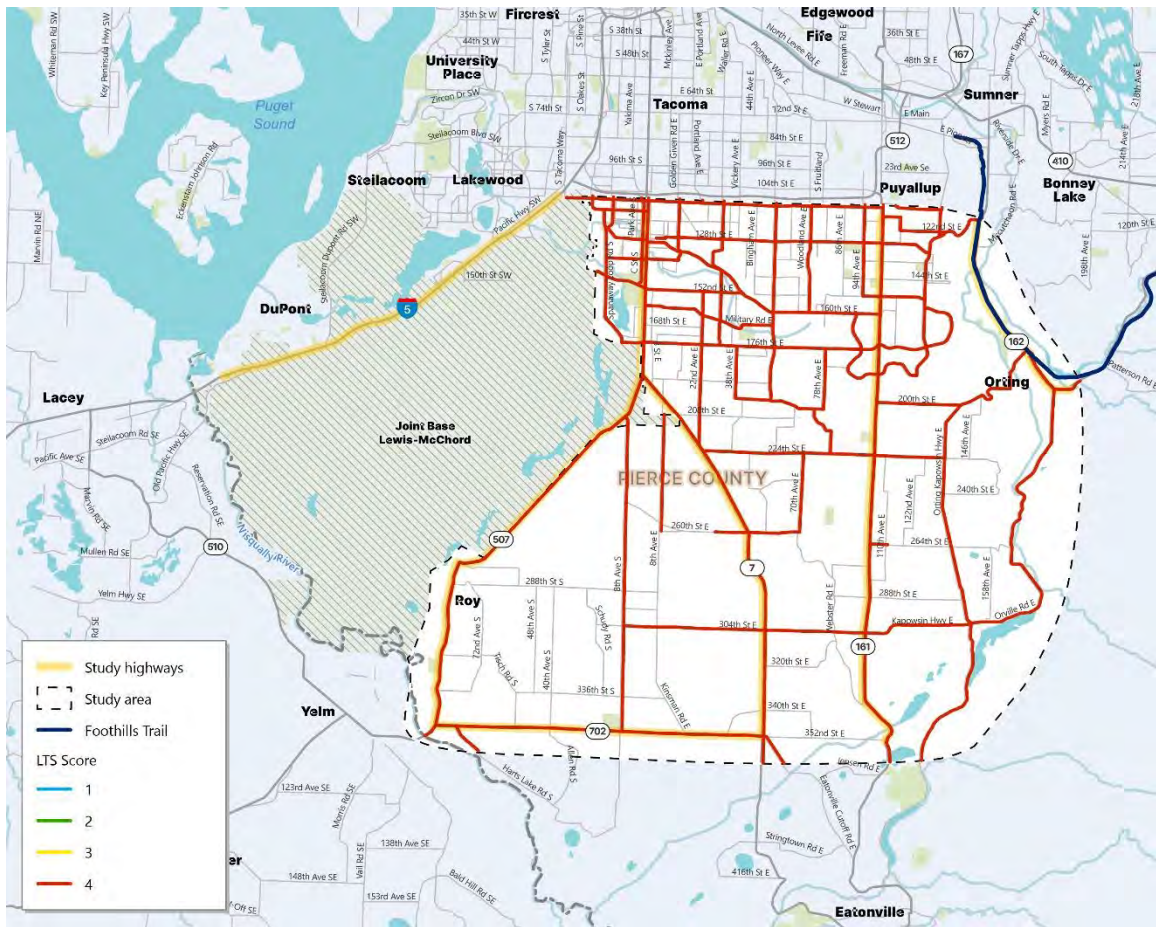
Figure 41: Bicycle Level of Traffic Stress

Source: WSDOT Active Transportation Plan 2020 and Beyond, 2021

Due to recent changes in state law, WSDOT must work to provide complete streets, with a goal of providing LTS 1 or 2 facilities. LTS 1 or 2 facilities will require major improvements on most roads. This mandate does not apply to local roads, and often low stress facilities are easier to accommodate on parallel facilities that have lower volumes and speeds.

Existing bike infrastructure is rare within the study area and is primarily limited to striped bike lanes or wide shoulders on arterial roadways that are characterized by high traffic volumes and speeds. There are small trails in the study area, while the Foothills Trail that parallels SR 162 is the only regional trail. **Figure 42** shows the Bicycle LTS for roadways in the study area. Roads in the study area are primarily LTS 4, which indicates a high stress bicycle environment. Most community members would not feel safe biking on roads in the study area, but they may feel somewhat safer on the limited sidewalk network.

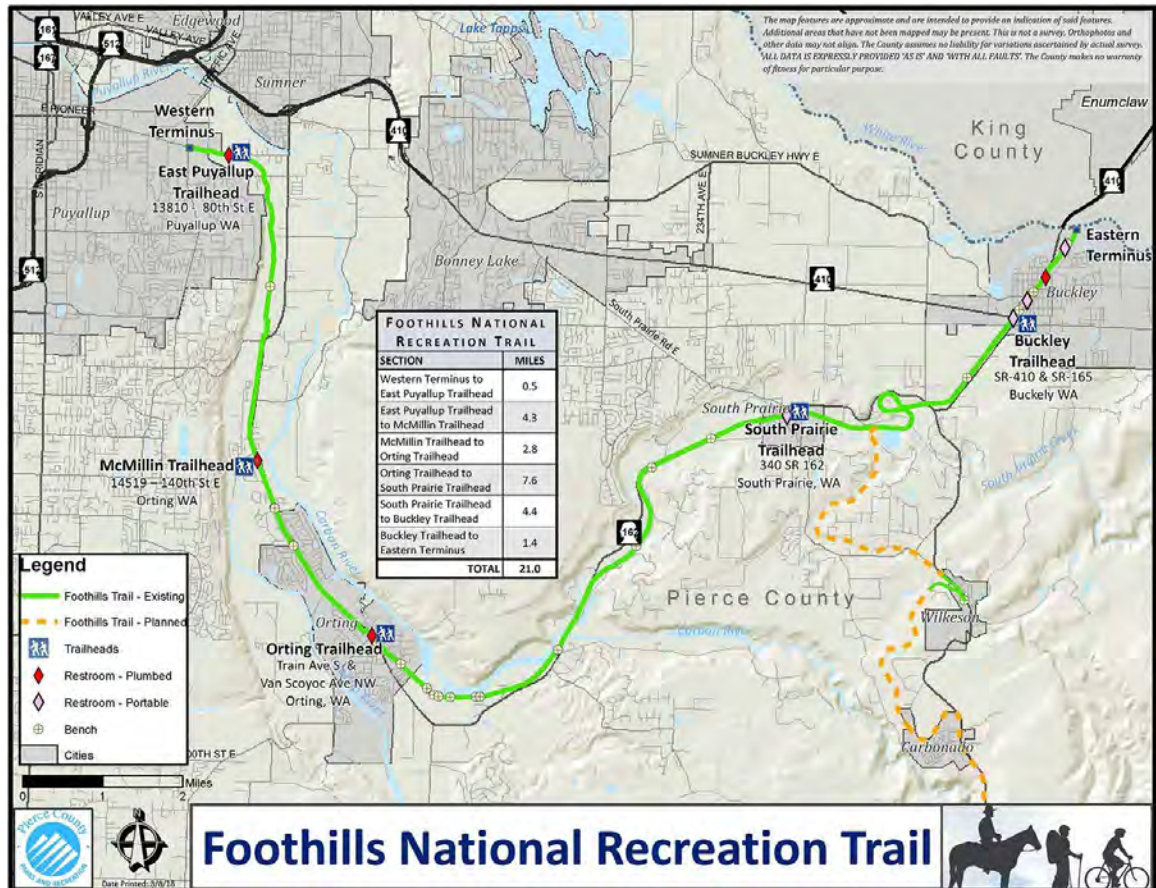
Figure 42: Bicycle LTS in Study Area



Source: WSDOT Active Transportation Data LTS, Pierce County Mobility Data

One exception to the LTS map is the Foothills Trail that parallels SR 162 through Orting, as shown in **Figure 43**. This trail provides a lower stress separated trail for all active transportation users.

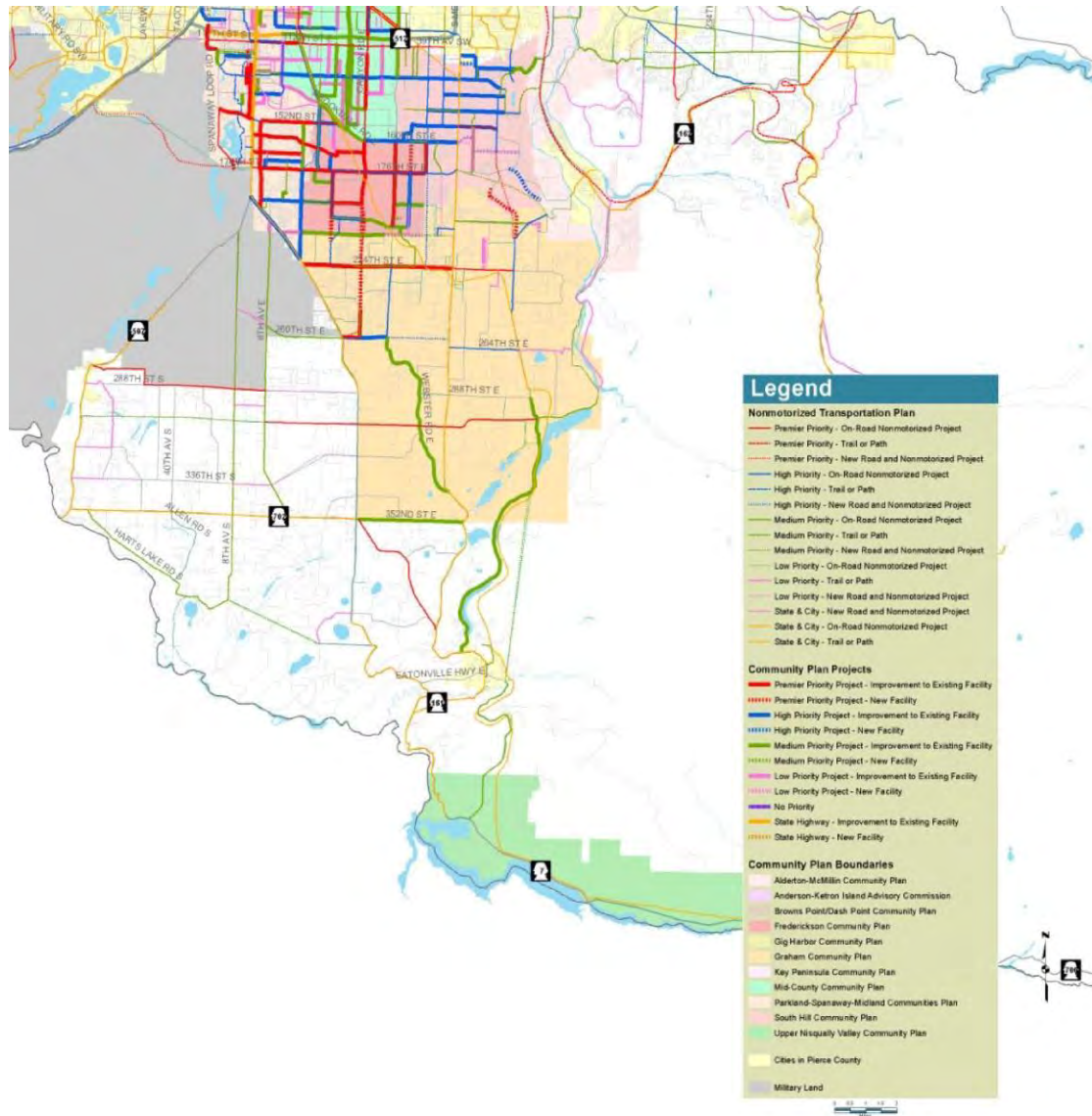
Figure 43: Foothills Trail



Source: Pierce County Trails Map, 2018

Figure 44 illustrates the location of Pierce County planned active transportation projects in the study area and **Table 5** shows the number of planned projects for each community plan in Pierce County.

Figure 44: Active Transportation Projects



Source: Pierce County Comprehensive Plan, 2021

Table 5: Community Plan Projects with Nonmotorized Elements**Table 12-5: Community Plan Projects that Contain Nonmotorized Elements**

Community Plan	Number of Projects by Priority				Total
	Premier	High	Medium	Low	
Alderton-McMillin	1	2	4	1	8
Anderson & Ketron Islands*					4
Browns Point & Dash Point*					5
Frederickson	10	7	12	3	32
Gig Harbor	8	9	8	4	29
Graham	43	18	10	16	87
Key Peninsula	5	6	12	8	31
Mid-County	9	8	18	18	53
Parkland-Spanaway-Midland	45	30	23	21	119
South Hill	9	9	1	3	22

*Anderson & Ketron Islands and Browns Point & Dash Point did not assign priorities.

Source: Pierce County Comprehensive Plan, 2021

Within the study area, Pierce County trail projects include expansion of the Foothills Trail to the north, extension of the Pipeline Trail to the Central and South Region, the Yelm Prairie Line Trail, and connector trails in Parkland and South Hill. For more information, refer to the Pierce County Regional Trails Plan.

Trails can serve as integral parts of an overall active mode network within the study area and connect to regional destinations outside the study area. Trails, sidewalks, bike facilities, and shared use paths can all work together to improve active mode connections to more destinations, and all active mode infrastructure should be developed with interconnectivity in mind.

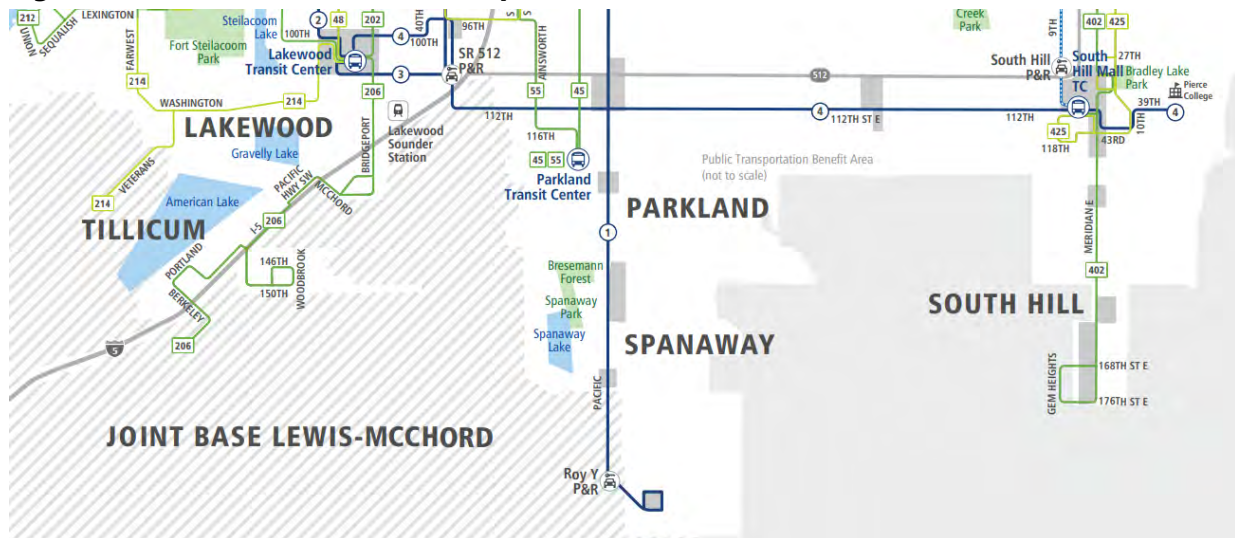
Transit

Pierce Transit is the main transit agency operating in the study area, with 7 routes currently in service. Some Pierce Transit routes also provide connections to regional transit centers. Puyallup and South Hill along SR 161 are served by Pierce Transit bus routes. Pierce Transit operates a Park and Ride in Spanaway as well as Transit Centers in Parkland next to SR 7 and at the South Hill Mall. The principal routes operating in the study area are Routes 1, 4, and 402. Other routes serve the Parkland Transit Center and South Hill Transit Center at the north end of the study area. See **Table 6** and **Figure 45** for Pierce Transit's existing bus routes in the study area.

Table 6: Pierce Transit Study Area Service

Route	Name	Major Road	Frequency (min)	Start	End
1	6 th Ave-Pacific Ave	Pacific Ave (SR 7)	30	Spanaway Walmart	TCC TC
4	Lakewood-South Hill	112 th St E	30	Lakewood TC	Pierce College
45	Yakima	Park Ave S	30	Parkland TC	Commerce TC
55	Tacoma Mall	Steele St S	30	Parkland TC	Tacoma Mall TC
400	Puyallup-Downtown Tacoma	River Rd E	30-60	South Hill TC	Commerce TC
402	Meridian	Meridian (SR 161)	30-60	171 st St Ct E	Federal Way TC
425	Puyallup Connector	-	60	South Hill TC	Puyallup Station

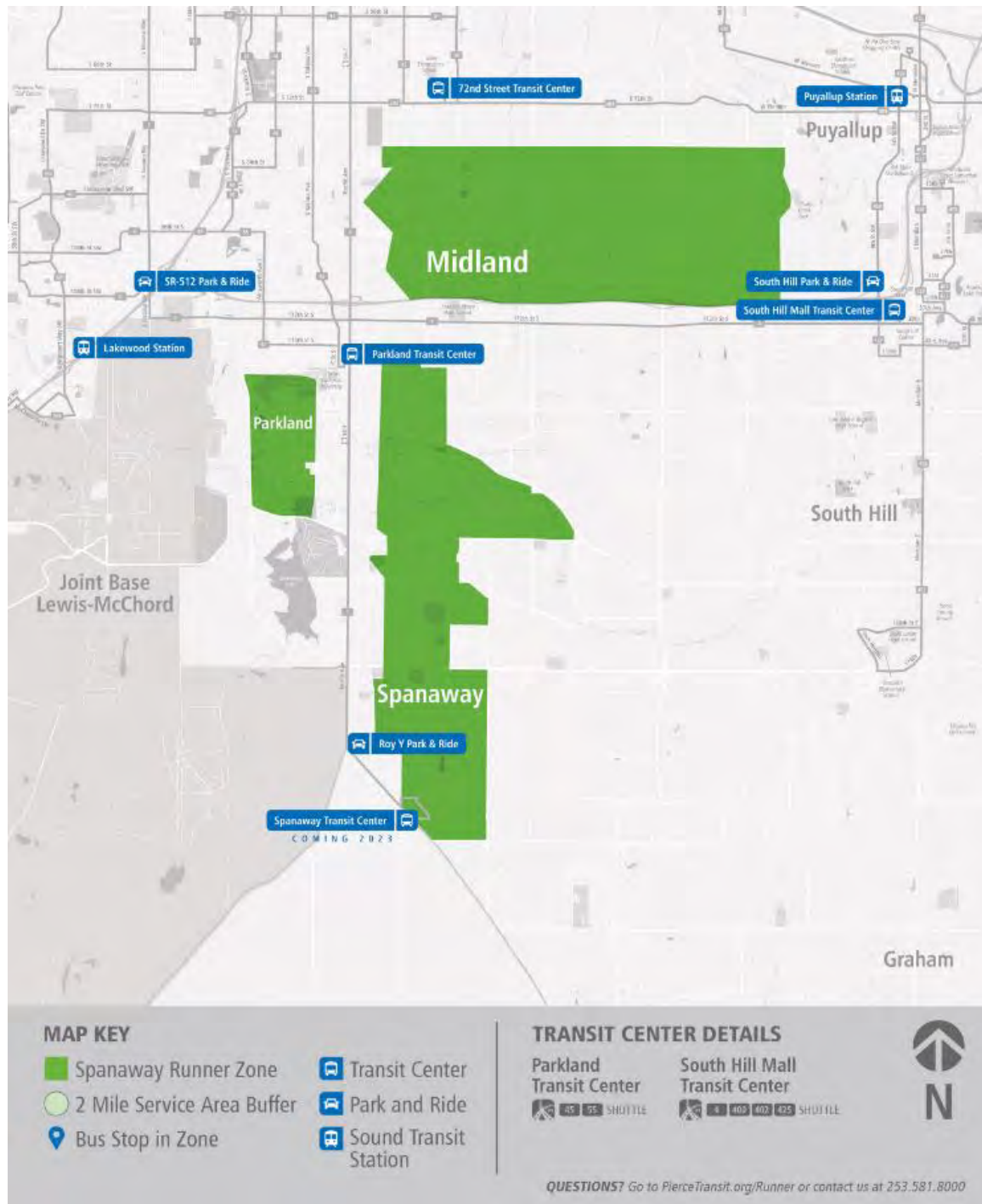
Source: <https://www.piercetransit.org/pierce-transit-routes/>

Figure 45: Pierce Transit Service Map

Source: Pierce Transit System Map, 2022

Pierce Transit recently added a microtransit service called Runner within the study area, as shown in **Figure 46**. Runner uses smaller vehicles to provide on-demand rides within and to and from the green zones. A user can request a ride with an app to and from any location within the zone or up to two miles outside of the zone. Fares are the same as bus fares and can be paid using the ORCA card or via an app.

Figure 46: Pierce Transit Runner Service for Spanaway

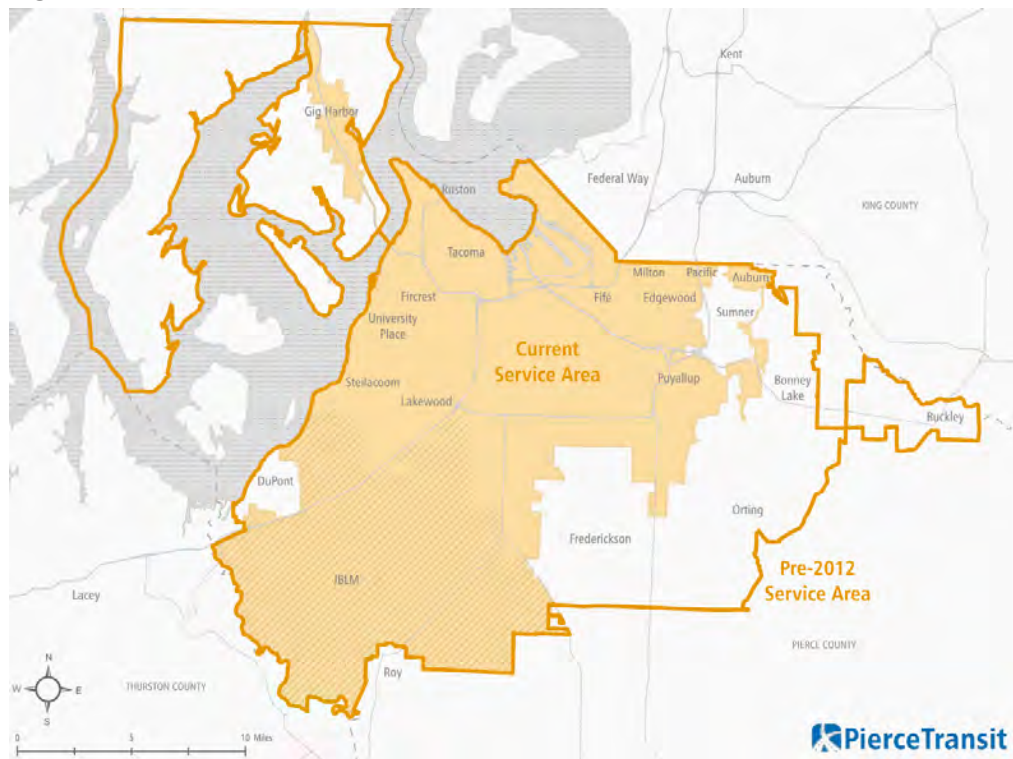


Source: Pierce Transit Spanaway Parkland Midland Runner, 2022

Additionally, Pierce Transit operates a vanpool program. The vanpool program provides passenger vans to groups of three to 15 people who share a commute that starts or ends within Pierce County.

Pierce Transit's service area was larger prior to 2012 and served areas like Frederickson and Orting. The Pierce Transit Service Area/benefit district boundary was reduced in 2012, resulting in about half of the study area being outside of the current boundaries. Many requests have been made for more for transit in this area and to reinstate the pre-2012 service. Additional service would need to be voted on by the communities. The shaded orange area in **Figure 47** shows the current transit service area, while the orange outline shows the previous service area.

Figure 47: Pierce Transit Service Area 2012 vs. Present



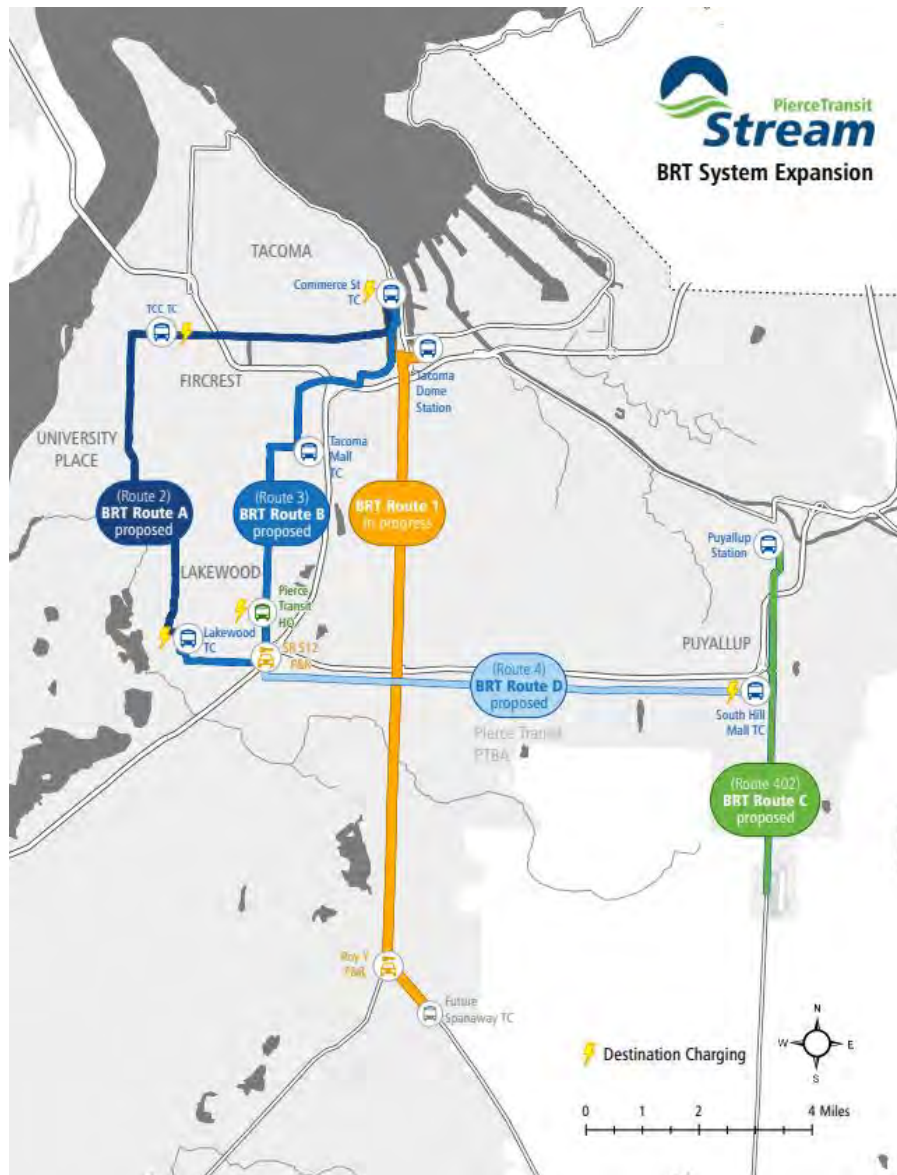
Source: Pierce Transit 2040 Long Range Plan Update, 2020

In Pierce Transit's 2040 Long Range Plan Update, the agency is focused on increasing service hours in the reduced area to improve reliability and will evaluate expanding the system to other areas. Pierce Transit is hoping to increase the sales tax by 0.3% to 0.9% which is the maximum allowed by Pierce County. The increase in tax would fund the improvements in the 2040 plan under Scenario A, including increased service frequency, increased span service during the day, creation of new routes, and added first-last mile connection zones.

Future Pierce Transit proposed improvements within the study area include an increased frequency and span of the existing routes, extension of Route 54 to Parkland, and multiple new Bus Rapid Transit (BRT) routes as part of the Stream BRT System Expansion.

Bus Route 1 is currently being upgraded to BRT service for the SR 7 corridor and is scheduled to open service in 2028 as BRT Route 1. Pierce Transit is planning for additional BRT expansions, but these are likely to be longer term improvements. Route 402 is proposed to become BRT Route C and Route 4 to become BRT Route D. Route 402 is the only route on the SR 161 (Meridian) corridor. **Figure 48** shows Pierce Transit's planned BRT lines.

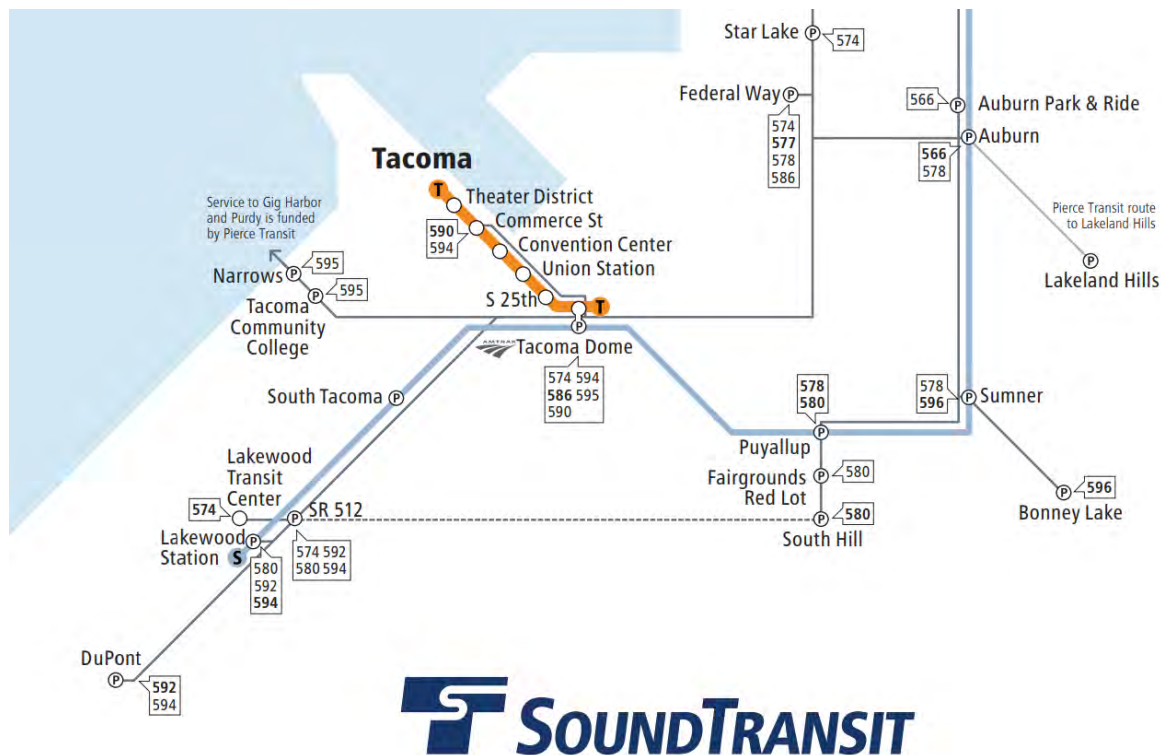
Figure 48: Pierce Transit Future BRT



Source: Pierce Transit BRT Expansion Study, 2022

Sound Transit provides additional regional bus and rail service outside the study area. Sound Transit Bus Route 580 serves the South Hill Park and Ride. Sounder commuter rail has stops west of I-5 in Lakewood, South Tacoma, and at Tacoma Dome, and north of the study area in Puyallup and Sumner. **Figure 49** shows Sound Transit's current service map.

Figure 49: Sound Transit Service



Source: Sound Transit Current Service Map, 2022

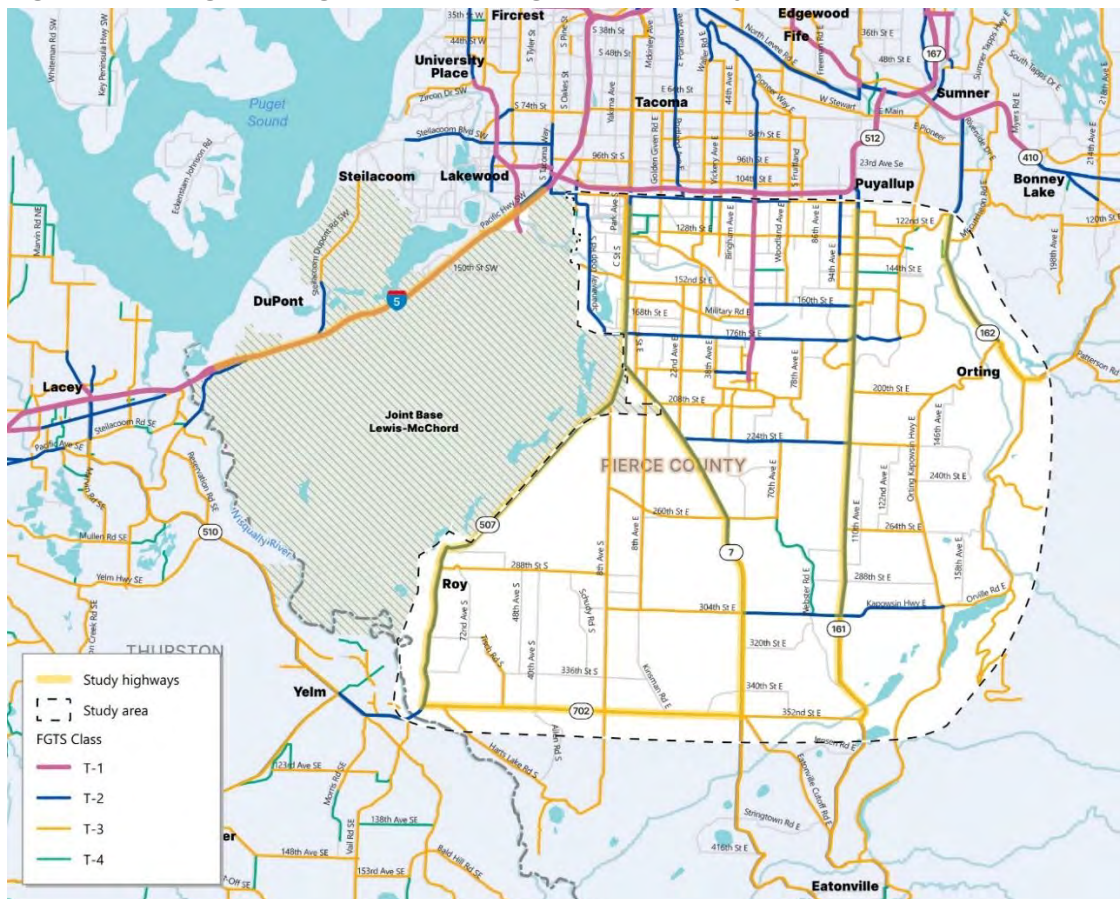
Sound Transit also has multiple projects planned outside the study area as part of the ST3 plan. Link light rail is scheduled to extend from Angle Lake to the Tacoma Dome Station. Sounder commuter rail service will add stations at DuPont and Tillicum near JBLM and increase capacity and frequency. Sound Transit also has plans to study commuter rail between Orting and the Sumner Sounder Station. Pierce Transit is coordinating with Sound Transit to integrate bus services with the new regional rail facilities per the System Expansion Transit Integration Agreement.

Freight Network

Freight within the study area travels primarily to and from the Frederickson Industrial Center. An analysis of trip origins and destinations showed that most freight travels along Canyon Road to SR 512. From SR 512, trips head eastbound to SR 167 to go north, or westbound to I-5 where they go north to Tacoma or south to Olympia. Due to a lack of east-west connectivity in the study area, travel is funneled north-south to SR 512 before accessing I-5 or SR 167. Some freight travels from Frederickson along 176th St E and Spanaway Loop Rd to SR 512 closer to I-5.

Figure 50 shows the Washington State Freight and Goods Transportation System (FGTS) designations for the regional freight network. The designations are based on the annual gross truck tonnage, with T-1 in pink representing more than 10 million tons per year, while T-2 in blue represents between 4 and 10 million tons. Regional freeways like I-5 and SR 512 are T-1 routes. Canyon Rd from SR 512 to Frederickson is the only T-1 route in the study area. It is the primary route to the Frederickson Industrial Center. T-2 routes in the study area include state routes and major county roads.

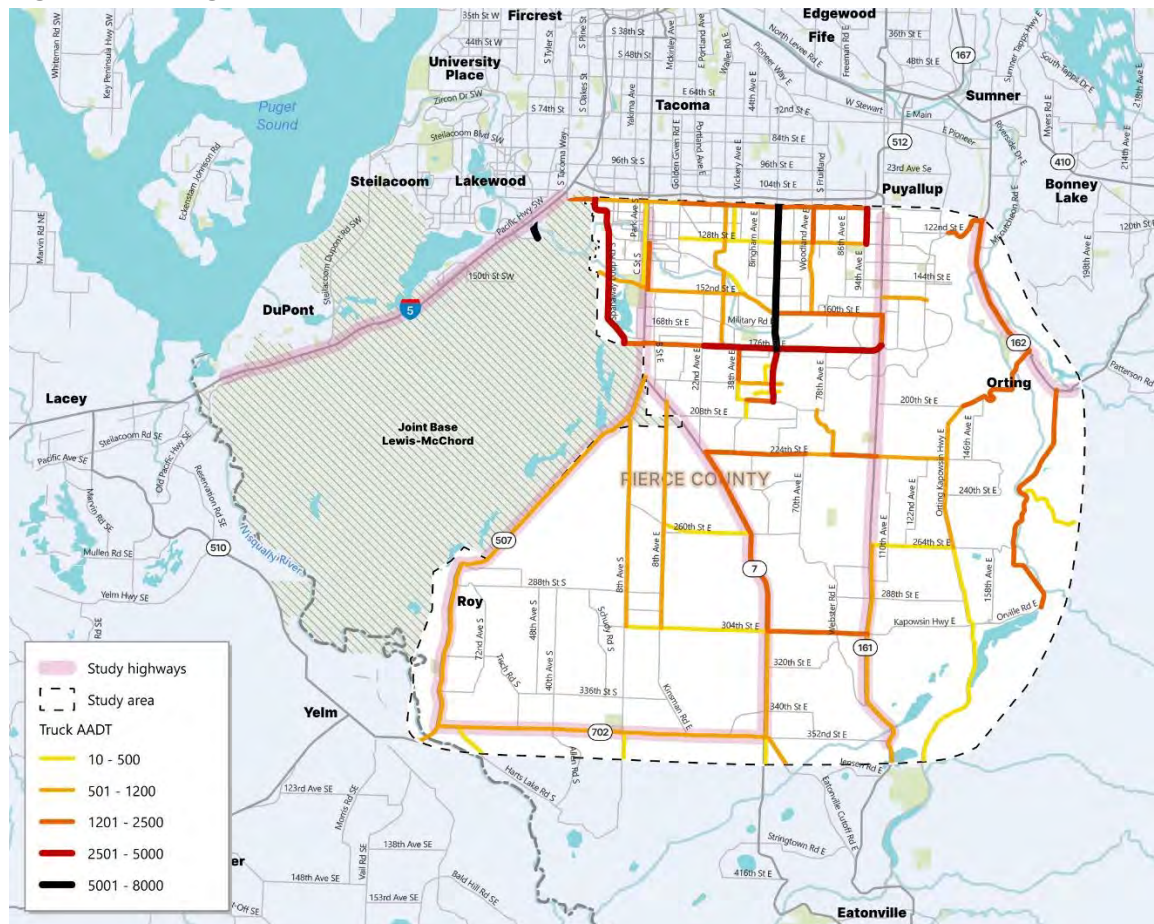
Figure 50: Freight Designations for Regional Roadways



Source: WSDOT 2021 Freight Data FGTS

Figure 51 provides a summary of freight volumes on the study area network based on Pierce County and WSDOT data. Truck volumes are highest on Canyon Road at about 7,500 trucks per day, followed by about 3,000 on Spanaway Loop Road near SR 512, 2,500 on 176th Street E, 1,900 on SR 7, 1,700 on SR 161, and 1,500 on 112th Street E. The data suggests many trucks may be using Spanaway Loop Road as an alternate route to SR 7.

Figure 51: Freight Volumes



Source: WSDOT 2021 Freight Data FGTS, Pierce County Traffic Count Data, Pierce County Mobility Data

Growth Projections

The study area is mostly unincorporated, but includes portions of Puyallup, Roy, and Orting.

Table 8 summarizes the projected land use for the study area. Unincorporated High Capacity Transit (HCT) represents the mid county region, encompassing most of the study area including Parkland, Spanaway, Midland, and South Hill.

Over the next twenty years, the study area is expected to add 40,000 people. Much of this growth is expected near SR 7 and SR 161. Demand for north-south travel to access regional highways is expected to increase as this growth occurs.

Employment is projected to increase by approximately 10,000 jobs in the next twenty years. The Frederickson Manufacturing Industrial Growth Center is expected to experience much of that growth. Freight demand is expected to increase along major corridors and especially on Canyon Road.

Table 8: Land Use Growth Projections

	2020	2020	Percent Growth (2020 - 2044)	Percent Growth (2020 - 2044)
Jurisdiction	Population	Jobs	Population	Jobs
Puyallup	43,000	30,600	43%	48%
Orting	9,000	1,500	7%	13%
Roy	800	200	38%	50%
Unincorporated HCT ⁴	157,500	31,500	25%	33%
Unincorporated Urban	79,500	25,900	40%	34%
Unincorporated Rural	169,300	24,200	5%	12%
Pierce County Total	921,100	346,300	30%	41%

Source: Pierce County GMA Targets 2022

Summary

The SPMCS Study Area has experienced rapid growth over the last twenty years and is projected to experience significant more growth over the next twenty. This study will address key priorities identified by the State Legislature, TAC and PAC, community, and the study team's existing conditions analysis and the multimodal deficiencies projected for the future baseline condition.

⁴ Pierce County designation for area that includes Mid-County, Parkland-Spanaway-Midland, and South Hill Community Plan boundaries

Appendix E:

Unresolved Issues List



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Ongoing and future planning efforts

1. **Pierce County Comprehensive Plan Update** – The Pierce County Comprehensive Plan is a 20-year policy document that addresses growth in the unincorporated areas of Pierce County. The Comprehensive Plan’s periodic review must be completed by December 31, 2024. It is also the foundation for several community plans and capital facilities planning, which must be consistent with the Comprehensive Plan’s policy framework. Currently, three growth alternatives are being considered; No Action, Centers and Corridors Implementation, and High-Capacity Transit Focus. As part of this plan, the County will analyze a better jobs-housing match, which may reduce the distance people travel to work. Each alternative will be studied for its impact on natural resources, air quality and greenhouse gases, land use, housing, transportation, public facilities and services, and consistency with plans and policies. Each alternative would result in different land use and growth patterns which may not be consistent with the land use assumptions used for the SPMCS analysis given different timelines for each.
2. **Pierce County Active Transportation Plan** – This plan was paused to allow completion of the Comprehensive Plan Update but is expected to resume. A Pierce County Active Transportation Plan will develop more specific recommendations and prioritization for active mode improvements, including context sensitive options to address different active mode demand between urban and rural locations within the SPMCS study area.
3. **Pierce County Trails Plan** – Pierce County is planning to update the trails plan and integrate regional trail connections into the County’s Transportation Improvement Plan.
4. **Incorporation Feasibility Efforts for Spanaway, Parkland, and Fredrickson** – All of these communities are located within the SPMCS study area. The Washington State Department of Commerce is performing an incorporation study for these growing unincorporated communities. Land use, zoning, and infrastructure are elements of these studies. The timing for completion of these studies is mid-2023. If decisions are made to incorporate, this could result in land use densities and zoning which may not be consistent with the land use assumptions used for the SPMCS analysis and additional agencies with jurisdiction over strategies included in the SPMCS study recommendations. Additionally, an incorporation study for South Hill is forthcoming from Pierce County.
5. **Sound Transit High-Capacity Transit (HCT) Study to Orting** – The alignment of this HCT study would traverse the SPMCS study area. Sound Transit is planning to conduct an HCT Planning Study: Sumner to Orting Commuter Rail. This study examines a future commuter rail connection from Orting to the Sumner Sounder Station. The timing of this study is not known by the SPMCS project team. Additional transit options within the study area are strongly supported by the SPMCS project team and could impact travel patterns on SR 162.
6. **SR 167 Master Plan** – As part of the SR 167 Master Plan effort, WSDOT is analyzing existing and future conditions, incorporating information from public and stakeholder engagement, to identify near, medium, and long-term multimodal transportation needs and strategies along the SR 167 corridor. While SR 167 is north of the SPMCS study area, any improvements made in the corridor are expected to have an impact on regional travel. This study will be completed in 2023.
7. **SR 512 Corridor Study** – SR 512 forms the northern boundary of the SPMCS study area. WSDOT is conducting this study of State Route 512 between Lakewood and Puyallup in Pierce County. The study will develop near-, mid- and long-term alternatives to improve



operations, safety, and mobility for all users. This highway provides a vital connection between Interstate 5 and SR 167 for residents, businesses, and visitors. The study will identify potential roadway improvements and focus on safety, access and improving travel times using the Practical Solutions approach. Recommendations published in the study report will be used to pursue future funding for highway design and construction improvements. Some preliminary recommendations included in the Draft SR 512 Corridor Study report are corridor-wide managed lanes, arterial and ramp terminal intersection connection upgrades, transit improvement options, and active transportation investments. Implementation of these recommendations will result in better facilitation of multimodal travel in the north part of the SPMCS study area but could also deliver more peak period traffic to SPMCS roadways. This study will be completed in 2023.

8. **I-5 Master Plan** – In Spring 2022, the Legislature initiated the Move Ahead Washington funding package that included funding for WSDOT to conduct statewide (border-to-border) planning for I-5. This work will ultimately create a master plan that addresses seismic vulnerability and resiliency, managed lanes, and develops a framework, coordination of corridor needs, core evaluation criteria and a prioritization process, as well as the identification of early action priority projects that address safety and resiliency along the corridor. The SPMCS trip distribution analysis for portions of the study area shows that there are significant levels of travel (especially for freight) funneling to SR 512 to travel east or west to connect to regional freeways such as I-5 and SR 167. Improvements to I-5 could result in changes in travel patterns within the SPMCS study area.
9. **Ultra-High Speed Ground Transportation** – WSDOT continues to analyze how ultra-high-speed ground transportation (UHS GT) might provide a high-capacity corridor for the Pacific Northwest. A stronger, better connected economic megaregion – stretching from Vancouver, British Columbia to Seattle, Washington to Portland, Oregon metropolitan areas – could continue to thrive in the global marketplace. A key component of that vision is a fast, frequent, reliable, and environmentally responsible transportation system that unites this Cascadia megaregion and positions it for global competitiveness and future prosperity. Continued analysis as directed by the legislature is reported as “in-progress.” Any significant high-speed rail investment could impact travel patterns in the SPMCS study area.
10. **I-5 Marvin Road to Mounts Road Planning and Environmental Linkage Study** - This project will begin with a federal Planning and Environmental Linkages (PEL) study focused on I-5 from Marvin Road to Mounts Road. Funding is provided to accelerate work along I-5 through the Nisqually River Delta for preliminary engineering, design and right of way acquisition to address flood risk, improve mobility through the corridor between Mounts and Marvin Roads, and enhance the ecosystem at the I-5 Nisqually Delta crossing. Funding is also provided to construct three roundabouts on SR 507 as the only viable alternative to I-5. The alternatives being studied include a 4.7-mile shared use path for active mode users.

Each of these ongoing or future studies could impact travel patterns within the SPMCS study area. We recommend that the outcomes of these studies be tracked by WSDOT and Pierce County for impacts to the SPMCS recommendations.



Transportation system funding shortfalls have affected both the preservation and maintenance of the existing system and the ability of agencies to deliver planned projects. Transportation projects assumed to be completed by 2050 (and therefore not included in this study's Strategic Vision Package) are at risk of not being implemented if funding falls through or continued cost increases make these improvements too expensive. The state legislature has partially funded major projects in and around the study area (see the In-Process Mega Projects unresolved issue) but additional funding sources will be needed to implement the assumed and recommended strategies identified in this study.

Existing and approved low density development

1. **Sunrise** – Sunrise is a Master Planned Community in the unincorporated South Hill area south of Puyallup. As of late 2021, over 75% of the planned 4,728 housing units are completed. The Sunrise Community does not contain any commercial uses, meaning that all residents must leave the community for retail and employment destinations.
2. **Tehaleh** – Tehaleh is a large mixed-use area under development and is located in the unincorporated Pierce County UGA northeast of the City of Orting and south of the City of Bonney Lake. The primary routes serving the site include SR 162 to the west via the existing Rhodes Lake Road East and SR 410 via 198th Avenue East to the east. Tehaleh is entitled to include approximately 9,700 housing units and approximately 5,000-6,000 jobs at full buildout. 2050 modeling assumptions provided by Pierce County Public Works and Planning staff indicate that the plateau area may have approximately 11,000 housing units and about 3,400 jobs. The modeling assumption that fewer jobs may develop by on the Plateau may result in different trip-making compared to the Tehaleh EIS, and modeling results demonstrated that longer trips that could impact more county and state roadways if Plateau residents are traveling elsewhere for jobs. As Tehaleh continues to develop, Pierce County should ensure that the capacity of the transportation system matches the traffic demand (concurrency) as required by the Washington State Growth Management Act (GMA) or that funding is in place to complete the necessary improvements within six years.



Past development patterns and approved low density housing within unincorporated Pierce County (such as those identified above) drive demand for peak period high-cost auto network improvements. In contrast, recent upzoning along 176th Street and SR 7 may result in several thousand new multifamily homes in a denser development pattern that is more supportive of multimodal transportation options.

Low density development patterns within the study area are beginning to change as the County focuses more growth on key urban arterials. WSDOT supports more compact development patterns within UGAs.

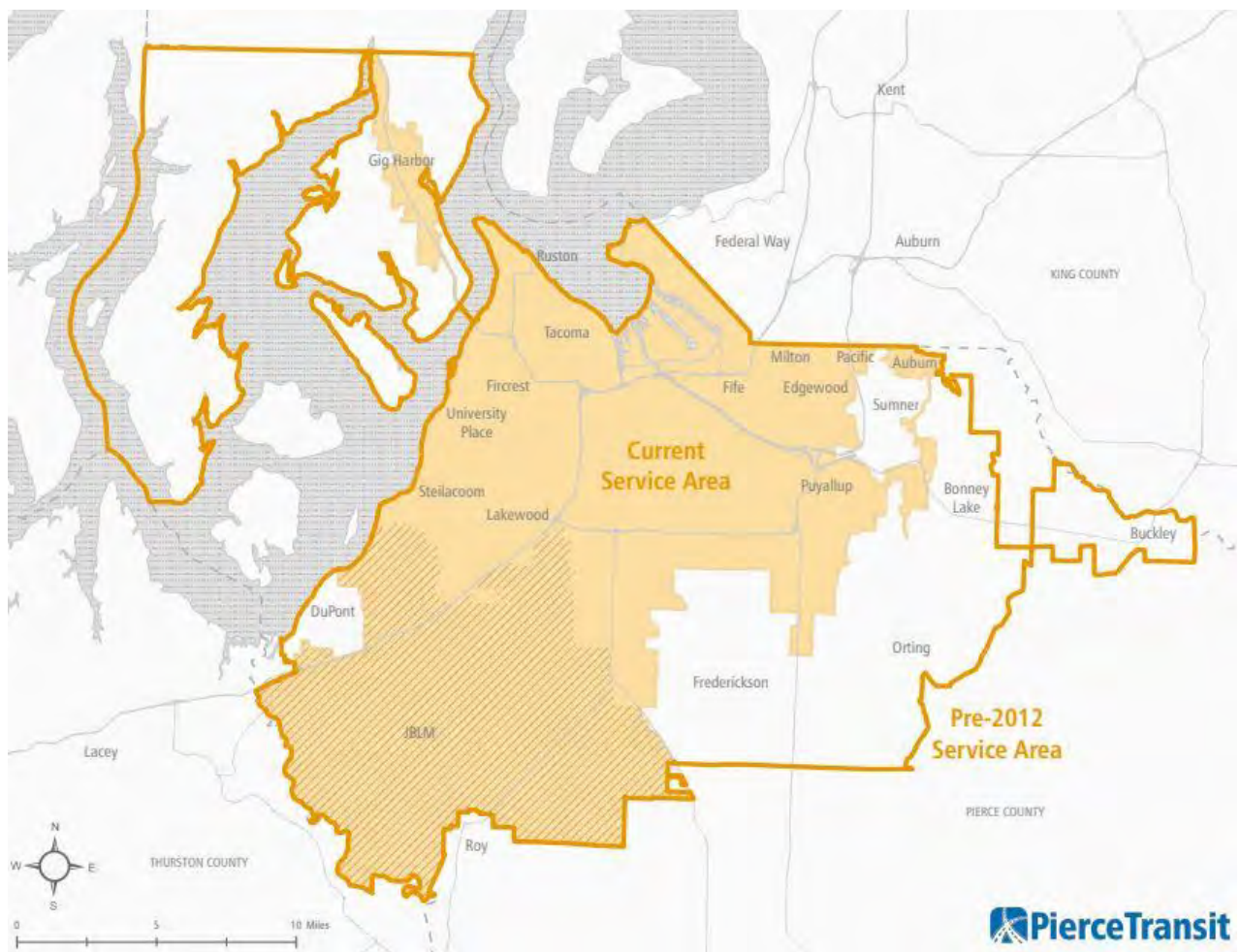
Pierce Transit Service Area

In 2012, Pierce Transit cut service by 53% due to a revenue shortfall and a failed ballot measure. Also in 2012, a large portion of the SPMCS study area withdrew from the boundaries of Pierce Transit's service (see below). The elimination of transit service for areas within and adjacent to the UGA limits the transportation options for residents and lowers the density of development that can be supported in the study area as most residents will need to drive and store private vehicles.

Numerous SPMCS stakeholders have expressed an interest in exploring re-instating the discontinued service area. This is a policy decision that will require further study and either a popular or elected official vote to rejoin the benefit district. The Pierce County Council stated that rejoining the study area is a very complicated process.

WSDOT supports expanding the transit service area to provide transit options to this growing area. Alternatively, other agencies or organizations could provide transit service to this area.

Figure 1. Pierce Transit Service Area



Source: Pierce Transit

Natural disaster resiliency and evacuation capacity



Study stakeholders inquired about on-going, existing, and adopted plans for transportation system disruptions caused by climate change, natural disasters, and emergency evacuations. The SPMCS study team researched the extent of existing evacuation plans to determine if they contain quantitative information on evacuation capacity of the existing system. There are currently no adopted plans or studies that provide this information. It is beyond the scope of this study to address evacuation capacity.

WSDOT recommends that Pierce County or other emergency planning agencies study this topic further and provide a quantitative analysis

In-process mega projects

1. **Canyon Road Regional Connection Project** – This Pierce County project will extend Canyon Road East from Pioneer Way East to 70th Avenue East in Fife, connecting communities on both sides of the Puyallup River and making it easier and faster for people and goods to travel through the area. This project will complete a long-planned connection between the Frederickson Industrial Area and the Port of Tacoma, offering travel time benefits for drivers, safety and connectivity improvements for cyclists and pedestrians, and better mobility for freight haulers in this growing area. Pierce County Resolution No. R2022-141 dated October 25, 2022, requires additional analysis of funding priorities and capacity needs. Pierce County forecasts a ten-year transportation funding shortfall of \$220M, which does not include the approximately \$300M cost of the Canyon Road Regional Connection Project. In addition, the completion of SR-167 (see project description below) is anticipated to occur in 2028. The Council seeks to better understand the benefits of the Canyon Road Regional Connection Project with the completion of SR-167. The full completion of this project was assumed for the future baseline transportation analysis in the SPMCS.
2. **SR 167 Completion Project** –The 167 Completion Project will create a new connection between the Port of Tacoma, I-5, and the existing terminus of SR 167 in Puyallup. The project constructs 6 new miles of tolled highway between Puyallup and the Port of Tacoma and builds sidewalks and shared-use paths for non-motorized travelers. Completing this unfinished highway will greatly benefit the movement of freight, improve safety, and reduce congestion on local roads and highways in the surrounding area. The first stage of construction (Stage 1a) in and around Fife, WA is complete. The second stage of construction (Stage 1b) is in progress. This stage provides a new 2-mile highway that will link I-5 to SR 509 near the Port of Tacoma. The third and final stage of construction (Stage 2) is planned for 2026-2028 and will build a new four-lane highway between Puyallup and I-5, completing SR 167 from I-5 to SR 161, along with several new interchanges. The Washington State Legislature continues to fund this project. The full completion of this project was assumed for the future transportation analysis in the SPMCS.
3. **I-5 Mounts Road to Steilacoom-DuPont Road Corridor Improvements** – This project is planned to relieve chronic traffic congestion and improve mobility along I-5 in the vicinity of Joint Base Lewis-McChord, WSDOT will rebuild the interchange of Steilacoom-DuPont Road (Exit 119) and adding HOV lanes to I-5. This will support congestion relief on I-5 during peak traffic periods while maintaining access to neighboring communities and JBLM. The new interchange includes grade separation of the roadway over the railroad. The project is in pre-construction and the planned completion date is 2025. The SPMCS trip distribution analysis for portions of the study area shows that there are significant levels of travel (especially for freight) funneling to SR 512 to the west to connect to I-5. The SPMCS study team supports these continued improvements to this important regional facility.



Each of the mega projects listed above could affect travel patterns within the SPMCS study area. We recommend monitoring the status of each project and determining if changes to the Strategic Vision Package improvements need to be made upon project opening or a change in project viability status.

JBLM considerations



1. **JBLM Growth** - When Fort Lewis Army Base and McChord Air Force Base combined into Joint Base Lewis-McChord (JBLM) on January 31, 2010, the base became the largest military installation in the western United States. Assigned military strength at JBLM continues to expand. Over the period of fiscal years 2003 to 2020, JBLM added approximately 10,596 full-time military personnel, which represents a 54 percent expansion. Today, JBLM supports a population both on-base and in neighboring communities of more than 125,000 people, including military personnel, families, civilian and contract employees, and retirees and their families. Continued growth will present multiple opportunities and challenges to JBLM and the surrounding communities. While the Washington State Growth Management Act (GMA) recognizes the vital nature of military installations to the state's economy and encourages the protection of land surrounding military installations from incompatible development, the unique needs and impacts of military installation growth are not well-accounted for in local and regional community planning processes.
2. **SR 704 Cross-Base Highway Project** – SR 704 (Cross-Base Highway) is a planned state highway intended to provide access between I-5 and SR 7 by passing through a portion of JBLM. A portion of the designated route is a completed, a 0.6-mile section between SR 7 and Spanaway Loop Road in Spanaway. The fully planned 6-mile highway remains unfunded and is on hold due to funding constraints and changes in project priorities. JBLM remains a barrier between the SPMCS study area and I-5. Traffic from the SPMCS study area mostly uses north-south routes to SR 512 to access I-5.

WSDOT recommends that growth of JBLM be monitored for impacts to the SPMCS study area. No further action is recommended on the SR 704 Cross-Base Highway Project given a lack of funding for further development of this alignment.

Active mode improvements and multimodal level of service (MMLOS) standard considerations



There are limited and discontinuous sidewalks, trails, and bike facilities within the SPMCS study area. Multimodal Level of Service (MMLOS) standards currently do not exist for Pierce County. Pierce County is in the process of updating its Comprehensive Plan Transportation Element and is considering a robust active transportation plan as well as developing MMLOS standards. MMLOS standards will likely consider both urban and rural areas in the SPMCS study area. Conventional vehicle-based Level of Service (LOS) standards neglect all other travel modes. MMLOS standards define an acceptable level of service for each mode and ensure that transportation system users have a variety of transportation options. MMLOS standards are required by the state and help agencies apply for multimodal improvement funding.

WSDOT recommends that Pierce County implement robust MMLOS standards and that agencies work together to fund and implement active mode improvements throughout the study area.

Pierce County Equity Analysis



A Pierce County Equity Analysis indicates that portions of the SPMCS study area (such as Parkland and Spanaway) have high concentrations of equity priority populations. Areas of the County have historically had less access to many County resources, resulting in minimal investment in transportation facilities, particularly for active modes.

WSDOT recommends further equity analysis be completed and that transportation improvements be prioritized for disadvantaged areas. Active transportation improvements should be prioritized near school facilities.

Appendix F:

SPMCS Engagement Report



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South Pierce Multimodal Connectivity Study

Community Engagement Summary

Overview

The Washington State Legislature directed WSDOT to perform a planning study that looks at the need for additional connectivity in the area between SR 161, SR 7, SR 507 and I-5 in south Pierce County. Called the South Pierce Multimodal Connectivity Study (SPMCS), this study also looked at the need for more connectivity in the area between SR 162, south of Military Road East, and north of Orting.

Throughout the duration of the study process, the project team gathered information and feedback from agencies, elected officials, and community members. The SPMCS has resulted in a report that identifies short-, medium-, and long-term potential multimodal improvements to enhance mobility and safety for all users and prioritizes strategies and solutions for implementation and future targeted funding. This document summarizes the engagement activities conducted during the study between July 2022 and August 2023.

Study Engagement

Community engagement took place in two phases in the study process to help inform the analysis. In the first phase, during fall 2022 and winter 2023, the study team gathered input that advanced the project team's understanding of existing conditions and challenges. Later in spring 2023, the study team worked with agencies and advisory committees to propose strategies and improvements. In spring 2023, the study team also shared with the public feedback from the online open house, an update on study strategies development and information on the initial study results. In July and August 2023, the study team shared the draft strategic vision with the public and advisory committees.

Study engagement goals

- Identify community issues, concerns and priorities that advance the development of the study and its recommendations by involving the public and key stakeholders in all phases of the study process.
- Inform the public about the study's need and purpose in order to promote awareness, encourage involvement in the process and build support for future actions.

Equity and social justice

WSDOT committed to conducting an inclusive planning process that aims to break down barriers to involvement for all members of the community, from long-time participants in transportation and urban planning to new voices who represent the increasingly diverse communities in the study area. WSDOT worked with communities at each step of the process to



make sure the study team was on the right track and ensure those who may be most impacted by the study's findings were able to voice their concerns.

With respect to language access, the study team offered translations in Spanish, as well as in Korean and Khmer, which are languages spoken by a small amount of the population within the study area, but among whom English is spoken "less than very well," increasing the importance of language access measures.

When promoting engagement opportunities, WSDOT provided Americans with Disabilities Act Information and Title VI notice to the public. Additionally, the study team approached community engagement based upon the following practices:

Project Planning

- Met with key stakeholder groups to understand concerns, community interests and best ways to reach audiences. This was achieved largely through interviews with agencies and community-based organizations.

Project Materials

- Used simple, easy-to-understand language when communicating study information. Used visuals and graphics where possible.
- Ensured printed materials were available at nearby community centers and libraries, among other important community gathering places, to help maximize reach to those without online access or who might not have received them otherwise.
- Translated project materials and other essential project information in Spanish, Korean, and Khmer.
- Used alt text to describe or summarize visual elements, as is WSDOT standard.

Engagement Activities

The study team conducted a public engagement process that identified community issues, concerns and priorities through four distinct efforts:

1. Agency and community-based organization interviews
2. Online open house and questionnaire
3. Presentations and briefings
4. Advisory committees

Agency and community-based organization interviews

Agency interviews

In summer and fall 2022, the study team met with a number of agency partners and organizations to learn about their perspectives on transportation issues and priorities for the study area. These conversations were held virtually. Information from these conversations aided the study's process, sparked further collaboration and informed decision-making.



Stakeholders included representatives from the following organizations:

Organization	Representative(s)	Date
Pierce County Planning and Public Works	Jesse Hamashima, Brian Churchill and Rory Grindley	June 9, 2022
Pierce Transit	Tina Lee	June 27, 2022
City of Puyallup	Hans Hunger, Ken Davies and Jeff Wilson	June 27, 2022
Freight Mobility Strategic Investment Board (FMSIB)	Brian Ziegler	July 6, 2022
Pierce County Planning and Public Works,	Jen Tetatzin	July 12, 2022
South Sound Military and Communities Partnership (SSMCP)	Bill Adamson	July 26, 2022
Port of Tacoma	Christine Wolf, Zack Thomas and Steve Balaski	July 28, 2022,
City of Roy	William Starks	August 11, 2022
City of Orting	Scott Larson	August 25, 2022
Bethel School District	Tom Seigel and Paul Marquardt	September 29, 2022
Orting School District	Ed Hatzenbeler and Megan Gintili	September 29, 2022
Pierce County Parks & Recreation and ForeverGreen Trails	Roxanne Miles and Larry Leveen	January 31, 2023

Key takeaways from agency interviews

- Nearly all of the interviewees referenced a lack of east/west connectivity, causing SR 512 to surpass its capacity.
- Many of the east/west connectivity comments specifically mentioned the lack of high-capacity roadways between SR 161 and SR 162.
- Several comments noted that there are few higher capacity state routes in the study area, with only SR 512 and SR 702 east/west and not many north/south state routes.
- Several stakeholders mentioned the large amount of growth in south Pierce County and the need to ensure that transportation infrastructure improvements help accommodate that growth.
- Freight traffic is prevalent throughout the study area, but most highly concentrated and visible in the Frederickson area. Canyon Road East carries very large truck volumes. The need to accommodate freight was mentioned by several stakeholders.
- Multiple stakeholders suggested I-5 improvements.
- The lack of transit and multimodal connections were identified by the stakeholders.
- There are many concerns about funding sources for existing and new projects identified as part of this study.
- Numerous stakeholders referenced safety concerns.



Community-based organizations interviews

The study team interviewed representatives from community-based organizations (CBOs) in fall 2022 and early 2023. The purpose of these interviews was to engage in more personal conversations with CBOs, understand their key priorities and concerns about the study area and learn from them the best ways to engage with their respective communities and constituencies.

The conversations also provided the opportunity to ask for referrals or suggestions of additional individuals or groups with whom to engage.

Proposed organizations

The project team conducted four CBO interviews. **Table 1** lists the organizations we contacted, and **Table 2** lists the organizations we interviewed. The study team prioritized CBOs located in or serving people in the study area, including the following:

- people from underrepresented or historically excluded communities (i.e., racialized communities, immigrants, refugees and people with limited English proficiency)
- people with disabilities
- people living with low incomes
- farmers/farm workers

Table 1: Organizations contacted for interviews

Name
Center for Independence
King-Pierce Farm Bureau
Korean Women's Association (KWA)
Latinx Unidos of South Sound
Myanmar Hope
Quixote Communities (Orting Village)
Nourish Food Bank Pierce County
Walk and Roll Pierce County Coalition

The study team did not receive a response from several of the organizations.

Table 2: Organizations interviewed

Organization	Date
Center for Independence	Nov. 17
Tacoma Washington Bicycle Club	Nov. 22
Walk and Roll Coalition of Pierce County	Feb. 27
Blue Zones	March 10



Key takeaways from CBO interviews

During these conversations the study team learned about:

- Challenges the disabled community faces when traveling around south Pierce County.
- Concerns about vehicle speeds and the desire for Complete Streets elements that incorporate safe ways to get around walking, rolling and biking.
- Barriers and opportunities that impact regional trail expansion and improved connections for people biking.

Briefings and Presentations

The study team identified and contacted community groups and organizations to see if they were interested in learning more about the study through a briefing or presentation. The goals of the briefings and presentations effort was to promote awareness of the study, increase participation and engagement, involve organizations that serve overburdened communities, and provide opportunities for a more tailored conversation and direct dialogue with the WSDOT study team.

The project team carried out a total of 12 such presentations during the study period.

Proposed organizations

Organizations that were offered a presentation or briefing are shown in **Table 3**. The study team prioritized outreach to community groups, racialized populations and community-based organizations.

Table 3: Organizations offered presentations and briefings

Name
Around the Sound
Bethel School District
Frederickson Clover Creek Community Council
Graham Business Association
King-Pierce Farm Bureau
Korean Women's Association (KWA)
Northwest Immigrant Rights Project
Safe Streets
Pierce County Fire & Rescue (Central, South and Graham)
South Puget Intertribal Planning Agency
Orting Chamber of Commerce
Walk and Roll Pierce County Coalition



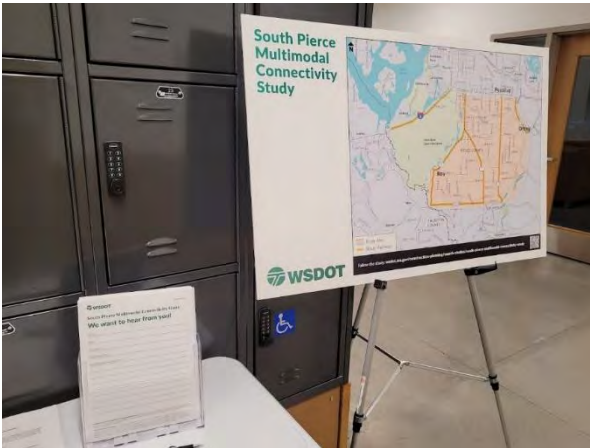
The study team did not hear back from several of the organizations. However, as the study progressed, the study team attended and presented to a number of groups, shown in **Table 4**.

Table 4: Briefings and presentations conducted

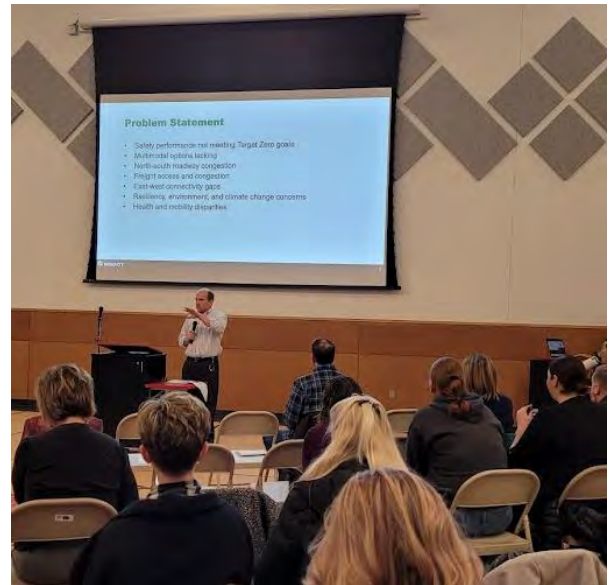
Organization	Date
Bethel School District Faith Leaders	Sept. 29
ForeverGreen Trails	Sept. 29
Pierce County Regional Commission TAC	Oct. 27
Mid-County Leadership Team	Jan. 4
Graham Business Association	Jan. 18
Bethel School Board of Education	Jan. 24
Bethel School District Faith Leaders (included an information table)	Jan. 26
South Hill Advisory Commission	Feb. 6
SR 162 Community Group	Feb. 16
Walk and Roll Pierce County	Feb. 21
Tideflats Strategic Transportation Planning Roundtable	March 28
SR 162 Community Group and Sunrise Terrace Architectural Control Committee	April 20
South Hill Advisory Commission (canceled by SHAC day of event)	May 1
Frederickson Business Team	May 16
Mid-County Leadership Team	May 31

Some key takeaways from briefings and presentations:

- Attendees have noted there is a lack of county resources for much of the study area and a desire to provide public services closer to where people live.
- Request for explicit consideration of lahar evacuation planning.
- Attendees emphasized one or more connections are needed between SR 161 and SR 162 to address SR 162 capacity.
- The region is expected to grow significantly in the coming decades. Planning for this is important.
- Attendees noted that the nature of new business and jobs along Canyon Drive are quite different than in past years.



Display board at a community event for the Bethel School District



WSDOT's George Mazur discusses the study's problem statement with an audience.



Advisory Committees

WSDOT established a Technical Advisory Committee (TAC) and a Policy Advisory Committee (PAC) to provide input on study direction, share useful information and data and help build consensus and support for strategies and solutions.

While the TAC was primarily focused on detailed technical issues and consisted of technical agency staff, the PAC focused on policy issues and included elected officials from local jurisdictions and leadership from other public agencies.

Policy Advisory Committee

The Policy Advisory Committee (PAC) consisted of tribal, government, and other agency representatives within the study area and met five times in 2022 and 2023.

- Federal Highway Administration
- Joint Base Lewis—McChord
- Washington State Department of Transportation
- Muckleshoot Indian Tribe
- Nisqually Indian Tribe
- Puyallup Tribe of Indians
- Yakama Nation
- Pierce County Council
- Pierce County Executive Office
- Pierce County Planning and Public Works
- Pierce Transit
- Bethel School District
- Orting School District
- City of Bonney Lake
- City of Orting
- City of Puyallup
- City of Sumner

Meeting 1 – September 14, 2022



Word cloud generated from PAC meeting 1.

Topics covered at the meeting:

- Study overview



- Expectations
- PAC roles and responsibilities
- Draft problem statement

Input received from the PAC included:

- What words come to mind when thinking about getting around south Pierce County?
(See word cloud at right)
- PAC members' Top two expectations for the study
- Ranking of draft problem statement elements and why
- Feedback on what is missing from draft problem statement

Meeting 2 – November 16, 2022

Topics covered at the meeting:

- Existing conditions and future growth for the study area
- How the study team will evaluate strategies
- Early strategy identification

Input received from the PAC included:

- Questions, comments and reactions to existing conditions data
- Feedback on near-term strategies the study should consider

Meeting 3 – April 19, 2023

Topics covered at the meeting:

- Overall policy guidance and safe system design
- Study process and initial results
- Online open house and questionnaire recap
- Study subareas and future conditions
- Level 1 screening of strategies
- Level 2 evaluation methods and draft results
- SR 161/162 connections

Input received from the PAC included:

- Reactions to initial results and strategy packages
- Feedback and questions about Level 1 screening

Meeting 4 – May 31, 2023

Topics covered at the meeting:

- Unresolved issues
- Presentation of draft strategic vision package
- SR 161 to 162 connection alternatives update



- Implementation considerations

Input received from the PAC included:

- Feedback and reactions to draft strategic vision
- Clarifying information on specific proposed strategies
- Reactions to implementation considerations

Meeting 5 – June 29, 2023

Topics covered at the meeting:

- SR 161 to 162 connection alternatives cost estimate update
- Presentation of final strategic vision, including implementation considerations, recap and changes since last meeting, and funding resources
- Next steps for unresolved issues
- Draft report including the structure of the document and reviewing the comment timeline and process

Input received from the PAC included:

- Clarifying information on updated State Route 161 to State Route 162 connection cost estimates
- Comments on unresolved issues in the study area
- Reactions to final strategic vision package

Technical Advisory Committee (TAC)

WSDOT convened a Technical Advisory Committee (TAC) made up of tribal, government, community, and other agency representatives within the study area that met six times in 2022 and 2023.

- | | |
|---|--|
| • Federal Highway Administration | • Pierce County Parks and Recreation |
| • Joint Base Lewis-McChord | • Pierce County Planning and Public Works |
| • Washington State Patrol | • Pierce County Transportation Advisory Commission |
| • Washington State Department of Transportation | • Pierce County Parkland - Spanaway – Midland Land Use Advisory Commission |
| • Nisqually Indian Tribe | • Bethel School District |
| • Muckleshoot Indian Tribe | • Port of Tacoma |
| • Squaxin Island Tribe | • City of Bonney Lake |
| • Yakama Nation | • City of Puyallup |
| • Puyallup Tribe of Indians | • City of Orting |
| • Puget Sound Regional Council | • City of Roy |
| • Sound Transit | |
| • Pierce County Sheriff's Department | |
| • Pierce Transit | |



- City of Tacoma
- Puyallup Sumner Chamber of Commerce
- Tacoma Pierce County Chamber
- SR 162 Community Group
- Korean Women's Association
- Washington Trucking Association
- Forever Green Trails
- South Sound Military & Communities Partnership
- Sunrise Developer (Corliss Resources), South Hill

Meeting 1 - July 11, 2022

Topics covered at the meeting:

- Study overview
- TAC roles and responsibilities
- Community engagement strategy
- Gather feedback on draft outlines of the problem statement, vision, and goals

Input received from the TAC included:

- Reactions to elements of the draft problem statement
- Responses to the question “what is one thing you hope to get out of this study?”
- Questions about the scope of the study
- Suggestions for additional TAC members

Meeting 2 - October 31, 2022

Topics covered at the meeting:

- Update on study progress
- Review and receive feedback on:
 - Existing conditions
 - Future growth
 - Alternatives evaluation criteria and performance measures
 - Potential near-term improvement strategies

Input received from the TAC included:

- Reactions to existing conditions data and feedback on data that might be missing
- Responses to if the TAC agrees with the PAC’s ranking of the problem statement from the September 14 meeting
- Suggestions on near-term strategies the study team should consider

Meeting 2.5 - January 23, 2023 (additional meeting)

Topics covered at the meeting:

- Study progress update and schedule
- Online open house and questionnaire recap
- Future baseline conditions



- Strategy evaluation process
- Travel pattern impacts of potential SR 161/162 connection

Input received from the TAC included:

- Questions and reactions to the online open house and questionnaire results
- Suggestions and comments about the future conditions data
- Reactions to the direction of three strategy package themes (responding to the question: “how do you feel about the three packages as they are today?”)
- Requests for more details on SR 162/161 connections

Meeting 3: April 10, 2023

Topics covered at the meeting:

- Overall policy guidance and safe system design
- Study progress and initial results
- Level 1 screening of strategies
- Packaging strategies
- Level 2 evaluation methods and draft results
- SR 161/162 connections

Input received from the TAC included:

- Reactions to three package themes
- Questions and comments about the Level 2 evaluation and results
- Questions and opinions about the three early design concepts for SR 161/162 connections

Meeting 4: May 22, 2023

Topics covered at the meeting:

- Unresolved issues
- Presentation of draft strategic vision package
- SR 161 to 162 connection alternatives update
- Implementation considerations

Input received from the TAC included:

- Reactions to draft strategic vision package, including emphasizing priorities and future considerations
- Feedback on implementation considerations (e.g., which strategies should come first)

Meeting 5: June 26, 2023

Topics covered at the meeting:

- SR 161 to 162 connection alternatives cost estimate update
- Presentation of final strategic vision, including implementation considerations, recap and changes since last meeting, and funding resources



- Next steps for unresolved issues
- Draft report including the structure of the document and reviewing the comment timeline and process

Input received from the TAC included:

- Feedback and questions on updated State Route 161 to State Route 162 connection cost estimates
- Reactions to updated unresolved issues in the study area
- Feedback and questions on final strategic vision package



Online Open House and Questionnaire

WSDOT hosted an online open house and community questionnaire from Dec. 1 – 16, 2022 to inform the public about the study and collect their input to inform near-, mid-, and long-term strategies to address the multimodal transportation gaps that exist within the study area.

The online open house and questionnaire were provided in Khmer, Korean, Spanish and English. The questionnaire consisted of 21 questions and optional demographic questions.

Participation

Between Dec. 1 and 16, 5,356 individuals visited the online open house. The website received more than 14,900 total pageviews (the total number of times all pages were viewed). The website received 80 pageviews in Khmer, 52 pageviews in Spanish and 44 pageviews in Korean.

Some 1,574 people completed the questionnaire. Nearly all responses were in English, with one response each in Korean and Spanish.

Audiences

The top three zip codes the study team heard from were from Graham (98338), Spanaway/Elk Plain (98387) and Orting (98360).

Most participants identified as Caucasian (71%), followed by Asian (4%), American Indian/Alaska Native (3%), Black or African American (2%), Other (2%), and Native Hawaiian/Pacific Islander (1%). Seventeen percent of respondents chose not to disclose their racial identity.

About five percent of respondents identified their ethnicity as Hispanic or Latino and around four percent of respondents reported speaking Spanish at home.

The top three languages spoken at home by respondents included: English only (89%), Spanish (4%), and Other (3%).

Sixty percent of respondents reported being 35 years old or older: 35-44 (24%), 45-54 (20%), and 55-64 (16%).

Most respondents identified as not having a disability (75%), while 11% identified as having a disability.



WSDOT

Comparta sus comentarios

Estudio de conectividad multimodal de Pierce Sur

El Washington State Department of Transportation está dirigiendo un estudio de conectividad multimodal en el sur del condado de Pierce.

¡QUEREMOS CONOCER SU OPINIÓN!
Visite engage.wsdot.wa.gov y seleccione **Estudio de conectividad multimodal de Pierce Sur**.
Vea la jornada de puertas abiertas en línea y comparta sus comentarios del 1 al 16 de diciembre de 2022.




PARA OBTENER MÁS INFORMACIÓN
Nazmul Alam, equipo de estudio del WSDOT | 360-357-2706 | nazmul.alam@wsdot.wa.gov
wsdot.wa.gov/construction-planning/search-studies/south-pierce-multimodal-connectivity-study



Promotions

The study team shared information about the online open house and questionnaire through a number of channels to varied audiences and communities.

Outreach method	Promotion details
Flyer	Study team distributed printed flyers to 22 community sites throughout the study area (available in English, Korean, Khmer and Spanish). Sites included community centers, libraries, social service centers and ethnic grocery stores.
Schools	WSDOT shared information through PeachJar, an online service that partners with local schools. The flyer was made available to parents and guardians of students in the Bethel, Puyallup, Franklin Pierce and Orting school districts. WSDOT staff also sent the flyer via email to the Chief Leschi School District communications office.
Social media	WSDOT shared the online open house and questionnaire on its social media accounts on Dec. 1, 5, 9 and 14. Twitter posts received 12,000 impressions and more than 300 engagements. Facebook posts received more than 220 comments and 305 likes. The TikTok post received 230 likes and 29 comments.
Media release	WSDOT sent a media release via GovDelivery to 5,851 subscribers on Dec. 1.
Tacoma News Tribune interview	Tacoma News Tribune published an article about the study on Dec. 9. This article was sent to Tacoma News Tribune online subscribers and printed in their newspaper.



Pierce County Council District 6 email	Pierce County Councilmember Jani Hitchen's office shared study information via an e-newsletter to the communities of Parkland, DuPont, Lakewood, Steilacoom, Joint Base Lewis McChord, Anderson and Ketron Islands.
Emails to community-based organizations	The study team emailed a list of more than 100 community-based organizations and interest groups sharing information about the online open house and questionnaire on Dec. 1 and Dec. 14.

Key themes and findings

The format of the questionnaire included both multiple choice questions and options for writing in answers. This questionnaire is not considered a scientific or statistically significant poll. The robust input demonstrated a number of themes, in terms of priorities, challenges and possible solutions.



The leading challenges for respondents included north-south roadway congestion on state routes, few east-west highways to connect to other routes, and lack of connectivity options when I-5 or other state highways are closed or at capacity.



The top three suggestions to improve travel for people biking, walking, and rolling included adding missing sidewalks, improving lighting and providing more separation between vehicles and those biking, walking, and rolling.



The top three suggestions to improve travel for people taking bus transit were more or new transit routes, separate transit lanes and more frequent transit service on existing routes.



When asked about top strategies to improve vehicle travel, respondents were nearly evenly split among these responses: matching population growth with transportation improvements, roadway widening, improved intersection operations and new roadway connections.

Additional Themes

A variety of themes emerged in the responses, including from those with multiple-choice 'other' (write-in) and open-response questions.

Build capacity: Responses included suggestions to add travel lanes, turn lanes and/or shoulders. SR 162 was most frequently mentioned as a location that would benefit from capacity improvements. SR 161 and SR 7 were also mentioned for capacity improvements.

Addressing mobility: Many respondents suggested implementing intersection signal timing and synchronization to address congestion.



Multimodal options: Across multiple questions, respondents expressed a strong desire for multimodal options, especially for people walking, rolling and taking transit. There were also some responses in opposition to these improvements. Safety concerns for people walking, rolling and taking transit were frequently mentioned. Generally, the safety concerns were focused on safe routes to school for children, lighting, and crosswalks. There was also concern about safety and security for those taking transit and at Park and Ride locations.

Modal separation: Some respondents expressed a desire for bike lanes or bike separation, keeping those walking and biking off the roads, and/or transit only lanes.

No change: Some respondents commented that they did not see any issues to fix, want to keep their community rural and/or prefer less development. These types of responses came up across multiple write-in questions.

Growth-minded infrastructure: Many comments expressed concern about recent, ongoing or planned housing development. Some respondents wanted to see the pace of development slowed until sufficient infrastructure improvements can be incorporated. A desire for planning around future growth was expressed.

Expand transit service: Some respondents preferred to expand transit service to areas not currently served. A number of respondents highlighted Orting and 224th Street East as areas where they would like to see service expanded, as well as along the state routes. Others said they wanted more frequent and reliable service on existing routes.

Safety on transit and at facilities: Some respondents expressed a desire for safety improvements on transit and transit facilities. These included safety improvements on buses and at Park and Ride locations and bus stations. Several respondents noted that they would like to see improved lighting and separation from vehicles at bus stations.

New roadway connections: Some respondents suggested connecting roadways to improve mobility. Specifically, respondents suggested extending Canyon Road to 224th Street, creating more east-west connections and creating easier ways to access I-5.

Road maintenance: Respondents expressed a desire for improved road maintenance in the study area. This included fixing potholes, restriping lanes and adding reflectors.

Study Communications

As the study progressed, audiences and stakeholders became more engaged and sent written statements by email detailing their positions on the study data and initial results. Written input was provided by:

- Port of Tacoma/Northwest Seaport Alliance – November 2022
- SR 162 Community Group – April 2023
- Bethel School District – September 2022, April, and June 2023
- Sunrise Terrace Architectural Control Committee – April 2023

Appendix G:

Online Open House Report



Prepared by:
Fehr & Peers

In association with:
Stepherson & Associates
Parametrix



South Pierce Multimodal Connectivity Study

Online Open House and Questionnaire Summary

Dec. 1-16, 2022



Highway Wayfinding Signage near the Junction of SR 7 and SR 507 in Spanaway, Washington

Executive Summary

Overview

The Washington State Legislature directed the Washington State Department of Transportation to perform a planning study that looks at the need for additional connectivity in the area between State Routes 161, 7, 507 and Interstate 5 in south Pierce County. Called the South Pierce Multimodal Connectivity Study, this study will also look at the need for more connectivity in the area between SR 162, south of Military Road East, and north of Orting.

Study community engagement

As part of the study, WSDOT hosted an online open house and community questionnaire to inform the public about the study and collect their input to inform near-, mid- and long-term strategies to address the multimodal transportation gaps that exist within the study area.

Between Dec. 1 and 16, 2022, 5,356 individuals visited the online open house and 1,574 people completed the questionnaire.

Key takeaways

The questionnaire included both multiple choice and open-ended questions. Several priorities, challenges and possible solutions emerged from community responses. Key takeaways include:



The leading challenges for respondents included north-south roadway congestion on state routes, few east-west highways to connect to other routes, and lack of connectivity options when I-5 or other state highways are closed or at capacity.



The top three suggestions to improve travel for people biking, walking, and rolling included adding missing sidewalks, improving lighting and providing more separation between vehicles and those biking, walking, and rolling.



The top three suggestions to improve travel for people taking bus transit were more or new transit routes, separate transit lanes and more frequent transit service on existing routes.



When asked about top strategies to improve vehicle travel, respondents were nearly evenly split among these responses: matching population growth with transportation improvements, roadway widening, improved intersection operations and new roadway connections.

Introduction

Overview

People who live, work, or travel in south Pierce County use state and local north-south roads, such as State Routes 7, 161, 162 and 507. People traveling in the area experience delays throughout the day. Additionally, people driving in south Pierce County have no direct connection to Interstate 5 between SR 512 and SR 510, and very few east-west highway connections other than SR 702. The area also has limited options for people walking, rolling, biking, or taking transit.

The Washington State Legislature directed WSDOT to perform a study that looks at the need for additional connectivity in the area between SR 161, SR 7, SR 507 and I-5 in south Pierce County. Called the South Pierce Multimodal Connectivity Study, this study will also look at the need for more connectivity in the area between SR 162, south of Military Road East, and north of Orting.

This study will address key priorities of reducing potential for crashes, enhancing multimodal travel options, and improving east-west connectivity.

Study community engagement

As part of the study, WSDOT hosted an online open house and community questionnaire between Dec.1 and 16, 2022. The online open house was designed to inform the public about the study and collect community input which will inform near-, mid- and long-term strategies to address the transportation gaps that exist within the study area.

When visiting the online open house, participants could:

- Learn about why WSDOT is conducting the study
- Review study area maps
- Review data about existing transportation conditions
- Provide input on the issues that they experience while traveling and their priorities for the study area

WSDOT provided the online open house and questionnaire in English, Khmer, Korean and Spanish. A copy of the online open house and questionnaire can be found in **Attachment A** of this document.

Goals of online open house

The following goals guided the study's online open house engagement:

- Promote awareness about the study, the study process, and its purpose and need.
- Collect community input to identify issues, concerns and priorities that will inform the development of the study and its strategies.

Community context

In September 2022, a few months prior to when WSDOT made this online open house and questionnaire available to the community, the Commercial Aviation Coordinating Commission proposed three greenfield sites as possible locations for a new commercial airport. Two proposed sites are located in the study area, roughly in south Graham and Eatonville (overlapping SR 161) and south of Elk Plain (overlapping SR 7 and SR 702). The announcement of these potential airport sites spurred many comments from the community in the questionnaire and is reflected in write-in responses.

Online open house promotions

WSDOT is committed to conducting an inclusive planning process that aims to break down barriers to involvement for all members of the community. The study team shared information about the online open house and questionnaire through a number of channels to varied audiences and communities.

Outreach method	Promotion details
Flyer	Study team distributed printed flyers to 22 community sites across the corridor (available in English, Korean, Khmer, and Spanish). Community sites included community centers, libraries, social service centers and ethnic grocery stores.
Schools	WSDOT shared information through PeachJar, an online service that partners with local schools. The flyer was made available to parents and guardians of students attending the Bethel, Puyallup, Franklin Pierce and Orting school districts. WSDOT staff also sent the flyer via email to the Chief Leschi School District communications office.
Social media	WSDOT shared the online open house on its social media accounts on Dec. 1, 5, 9 and 14. Twitter posts received 12,000 impressions and over 300 engagements. Facebook posts received over 220 comments and 305 likes. The TikTok post received 230 likes and 29 comments.
Media release	WSDOT sent a media release via GovDelivery to 5,851 subscribers on Dec. 1.
Tacoma News Tribune interview	Tacoma News Tribune published an article on Dec. 9 about the study. This article was sent to the Tacoma News Tribune online subscribers and printed in their newspaper.
Pierce County Council District 6 email	Pierce County Councilmember Jani Hitchen's office shared study information via an e-newsletter to the communities of Parkland, DuPont, Lakewood, Steilacoom, Joint Base Lewis McChord, Anderson and Ketron Islands.
Emails to community-based organizations	The study team emailed a list of more than 100 community-based organizations and interest groups information about the online open house and questionnaire on Dec. 1 and Dec. 14.



Photo 1: Flier in Spanish used to promote online open house.



Photo 2 & 3: WSDOT Facebook and Twitter posts promoting the online open house.

Participation

The online open house, hosted on the engage.wsdot.wa.gov platform, was live from Dec. 1 – 16. It consisted of 21 questions and optional demographic questions. The online open house was offered in Khmer, Korean, Spanish, and English. **Attachment A** of the report includes the entirety of the online open house content and full list of questions on the questionnaire.

Activity

Between Dec. 1 and 16, 5,356 individuals visited the online open house. The website received more than 14,900 total pageviews (the total number of times all pages were viewed). The website received 80 pageviews in Khmer, 52 pageviews in Spanish, and 44 pageviews in Korean.

1,574 people completed the questionnaire. The majority of questionnaire responses were in English, with one response each in Korean and Spanish.

Audiences

The top three zip codes we heard from were from Graham (98338), Spanaway/Elk Plain (98387) and Orting (98360).

A majority of participants identify as Caucasian (71%), followed by Asian (4%), American Indian/Alaska Native (3%), Black or African American (2%), Other (2%), and Native Hawaiian/Pacific Islander (1%). Seventeen percent of respondents chose not to disclose their racial identity. About five percent of respondents identified their ethnicity as Hispanic or Latino.

The top three languages spoken at home by questionnaire participants include: English only (89%), Spanish (4%), and 'Other' (3%).

The top age ranges of participants were 35-44 (24%), 45-54 (20%), and 55-64 (16%).

A majority of participants identified as not having a disability (75%), while 11% identified as having a disability.

Key themes

The format of the questionnaire included both multiple choice questions and options for writing in answers. This questionnaire is not considered a scientific or statistically significant poll. The robust input provided by the community leads to a number of themes, both in terms of priorities and challenges, and possible solutions.

Priorities and Challenges

The questionnaire included several multiple-choice questions. Several priorities, challenges and possible solutions emerged from community responses.



The leading challenges for respondents included north-south roadway congestion on state routes, few east-west highways to connect to other routes, and lack of connectivity options when I-5 or other state highways are closed or at capacity.



The top three suggestions to improve travel for people biking, walking, and rolling included adding missing sidewalks, improving lighting and providing more separation between vehicles and those biking, walking, and rolling.



The top three suggestions to improve travel for people taking bus transit were more or new transit routes, separate transit lanes and more frequent transit service on existing routes.



When asked about top strategies to improve vehicle travel, respondents were nearly evenly split among these responses: matching population growth with transportation improvements, roadway widening, improved intersection operations and new roadway connections.

Additional Themes

A variety of themes emerged in the responses, including those with multiple-choice 'other' (write-in) and open-response questions:

Build capacity: Responses included suggestions to add travel lanes, turn lanes, and/or shoulders. State Route 162 was most frequently mentioned as a location that would benefit from capacity improvements. SR 161 and SR 7 were also mentioned for capacity improvements.

Addressing mobility: Many respondents suggested implementing intersection signal timing and synchronization to address congestion in the write-in comments.

Multimodal options: Across multiple questions, respondents expressed a strong desire for multimodal options, especially for people walking and rolling and taking transit. There were also some responses in opposition to these improvements. Safety concerns for people walking and rolling and taking transit were frequently mentioned. Generally, the safety concerns were focused on safe routes to school for children, lighting, and crosswalks. There was also concern about safety and security for those taking transit and at Park n Ride locations.

Modal separation: Some respondents expressed a desire for bike lanes or bike separation, keeping those walking and biking off the roads, and/or transit only lanes.

No change: Some respondents commented that they did not see any issues to fix, they want to keep their community rural, and/or prefer less development. These types of responses came up across multiple write-in questions.

Growth-minded infrastructure: Many comments expressed concern about recent, ongoing, or planned housing development. Some respondents wanted to see the pace of development slowed until sufficient infrastructure improvements can be incorporated. A desire for planning around future growth was expressed.

Expand transit service: Some respondents preferred to expand transit service to areas not currently served. A number of respondents highlighted Orting and 224th Street East as areas they would like to see service expanded, as well as the state routes. Others said they wanted more frequent service and reliable service on existing routes.

Safety on transit and at facilities: Some respondents expressed a desire for safety improvements on transit and transit facilities. These included safety improvements on buses, at Park & Ride locations, and bus stations. Several respondents noted that they would like to see improved lighting and separation from vehicles at bus stations.

New roadway connections: Some respondents suggested connecting roadways to improve mobility. Specifically, respondents suggested extending Canyon Road to 224th Street, creating more east-west connections, and creating easier ways to access I-5.

Road maintenance: Respondents expressed a desire for improved road maintenance in the study area. This included improvements such as fixing potholes, restriping lanes and adding reflectors.

Attachment B of the report includes an analysis of responses broken out by the four geographic subareas. To several questions, responses from people in the South subarea differed from those of people in the other subareas. Examples that illustrate this include:

- When asked “how likely would you take transit regularly if offered in your area?”, the majority of respondents who live in the South subarea said, “Not likely”. The majority of the Central, SR 7 and 161/162 subarea residents selected “Likely”.
- When asked “if you had the option to travel by train, would you?”, only respondents from the South subarea responded with a majority “No”.
- When asked about suggested improvements for people walking, biking and rolling, a majority of respondents from the other subareas indicated adding missing sidewalks as a top priority. However, for the South Subarea, a majority of respondents indicated improving lighting as their top priority.

Additional notable highlights from this analysis include:

- When asked about suggested improvements for people traveling around by car, rideshare, vanpool or other vehicles:
 - Most of the respondents from the SR 7 and SR 161/162 subareas selected “matching growth with transportation improvements”.
 - The majority of the South subarea respondents selected “roadway widening”.

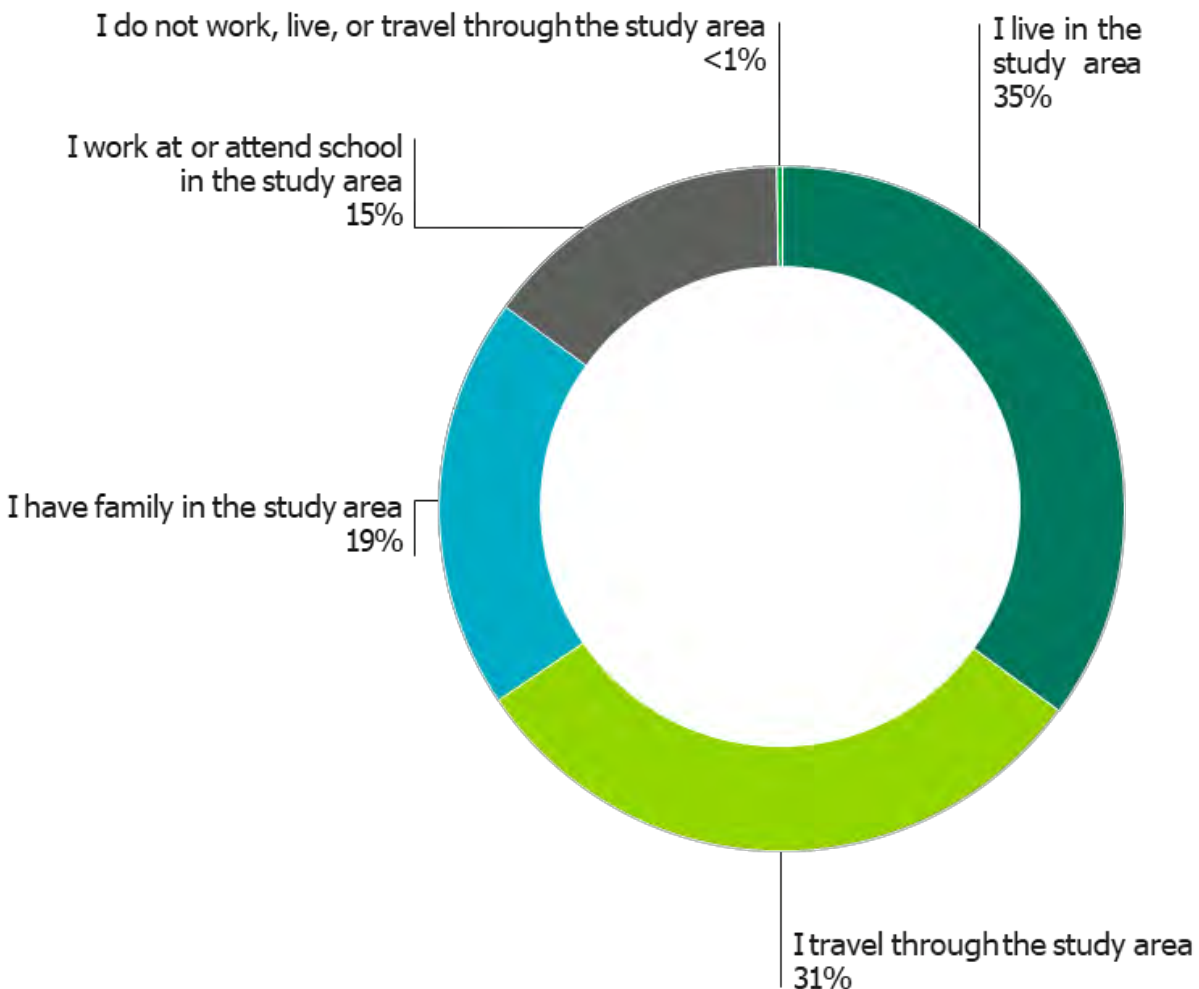
- The majority of Central subarea respondents selected “new roadway connections”.
- When asked to rank challenges for traveling around the study area, all four subareas ranked the challenges in the same order.

Please see **Attachment B** for details.

Questionnaire results

This questionnaire represents community input to inform the South Pierce Multimodal Connectivity Study. It is not considered a scientific, statistically significant survey.

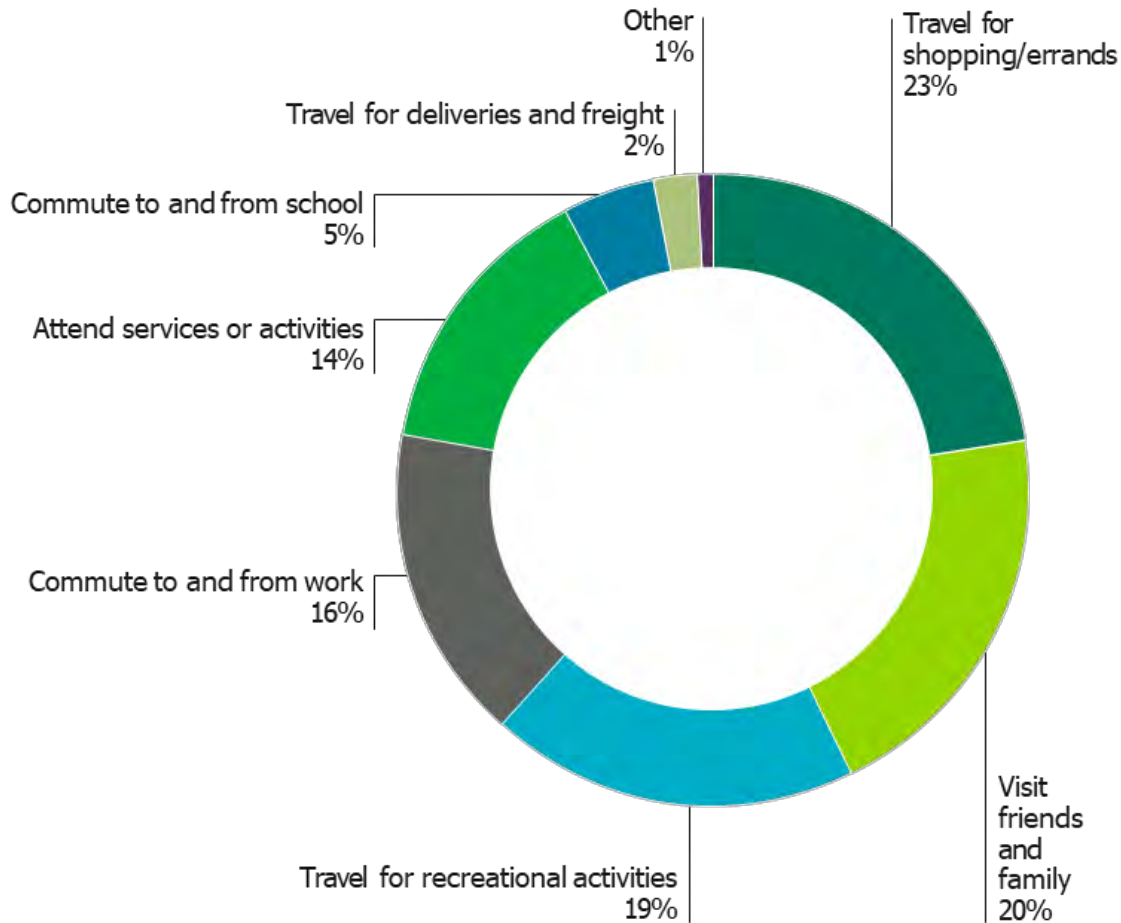
Question 1 | What best describes you? Select all that apply:



Answer	Tally	Percent
I live in the study area	1238	35%

I travel through the study area	1077	31%
I have family in the study area	685	19%
I work at or attend school in the study area	518	15%
I do not work, live or travel through the study area	8	<1%

Question 2 | What types of trips do you take in the study area? Select all that apply:

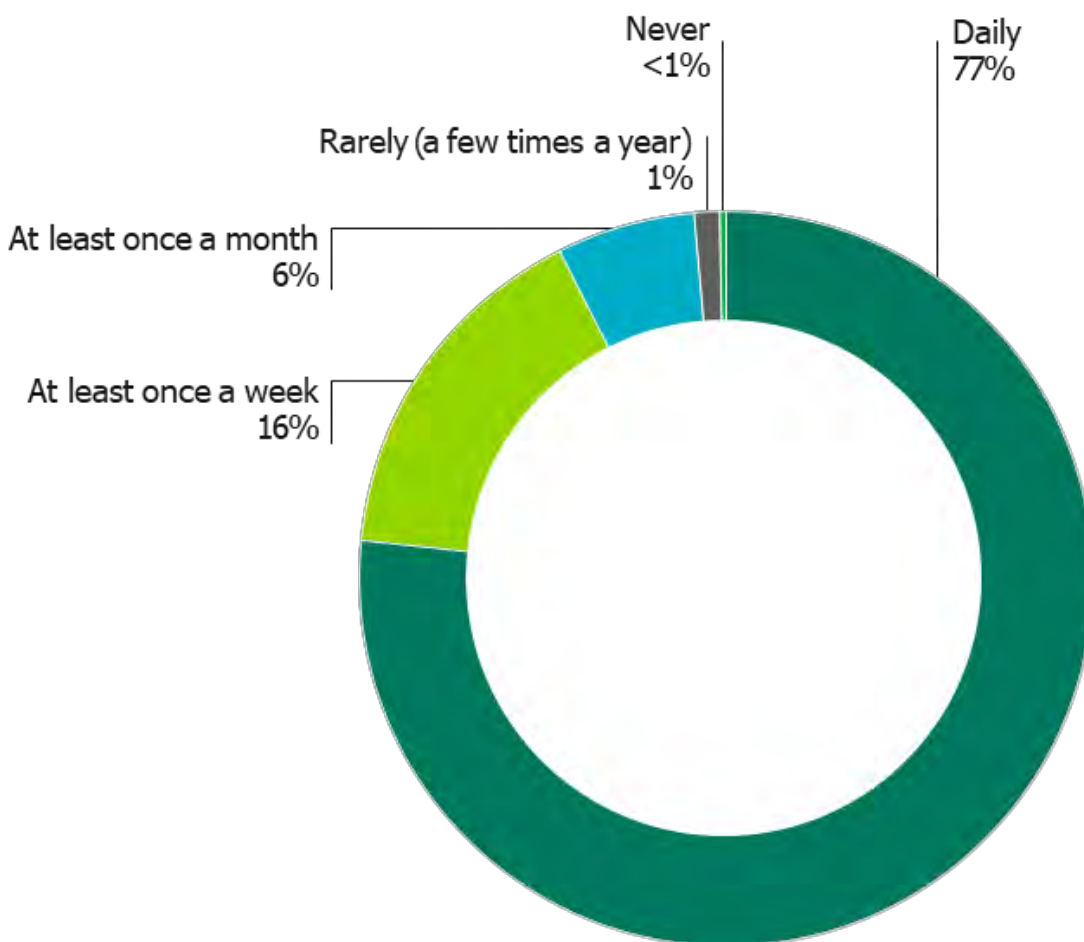


Answer	Tally	Percent
Travel for shopping/errands	1394	23%
Visit friends and family	1247	20%
Travel for recreational activities	1170	19%
Commute to and from work	999	16%
Attend services or activities	887	14%
Commute to and from school	286	5%
Travel for deliveries and freight	130	2%
Other	50	1%

The top three types of trips that respondents took in the area were: travel for shopping or errands, visiting friends and family, and travel for recreational activities.

Of the 1 percent of respondents who chose 'Other,' many specified that they took trips for work-related activities other than commuting to and from work. Several respondents also noted that they traveled in the area to medical appointments and to take care of family members.

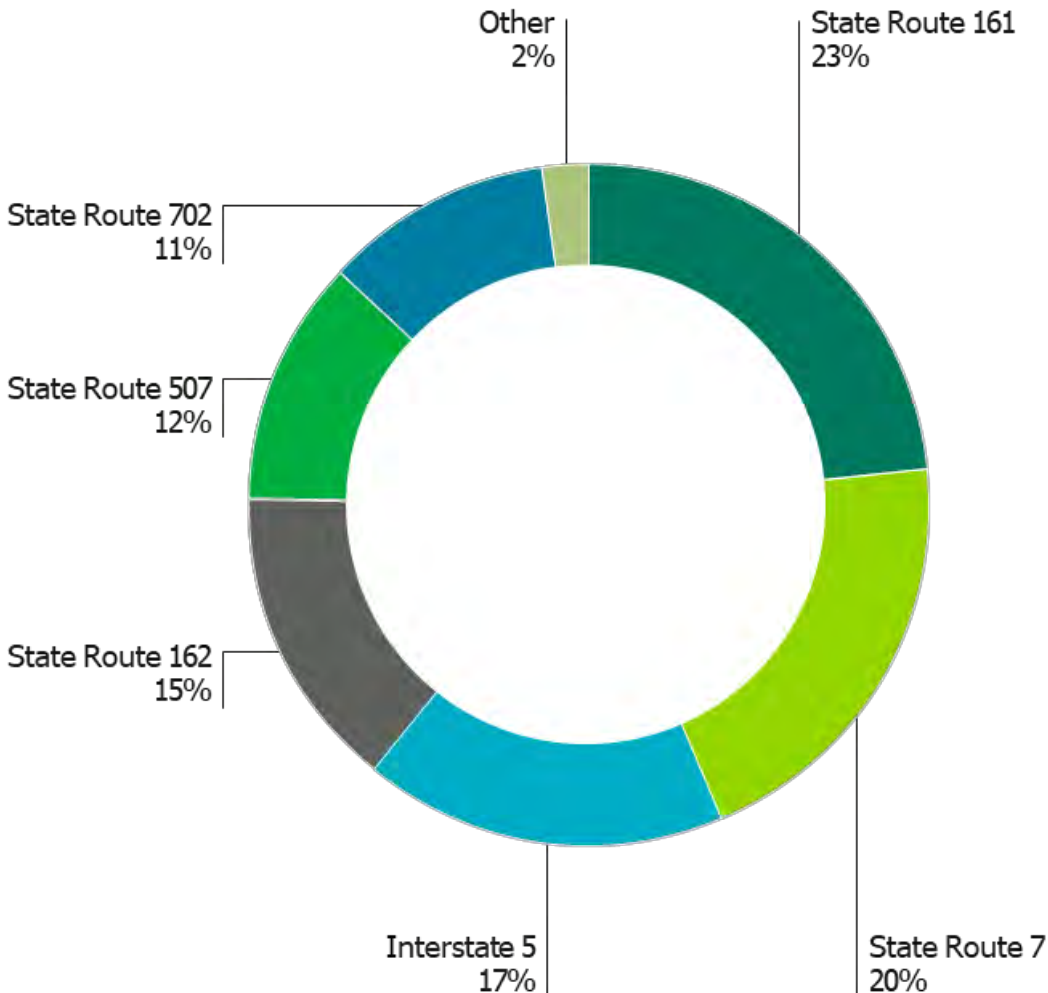
Question 3 | How often do you travel around or through the study area? Select one:



Answer	Tally	Percent
Daily	1202	77%
At least once a week	248	16%
At least once a month	92	6%
Rarely (a few times a year)	20	1%
Never	1	<1%
Total	1563	100%

A majority of respondents indicate they travel around or through the study area daily. Less than 1 percent indicated they never travel through the area.

Question 4 | Which study area state route(s) do you travel on regularly? Select all that apply:

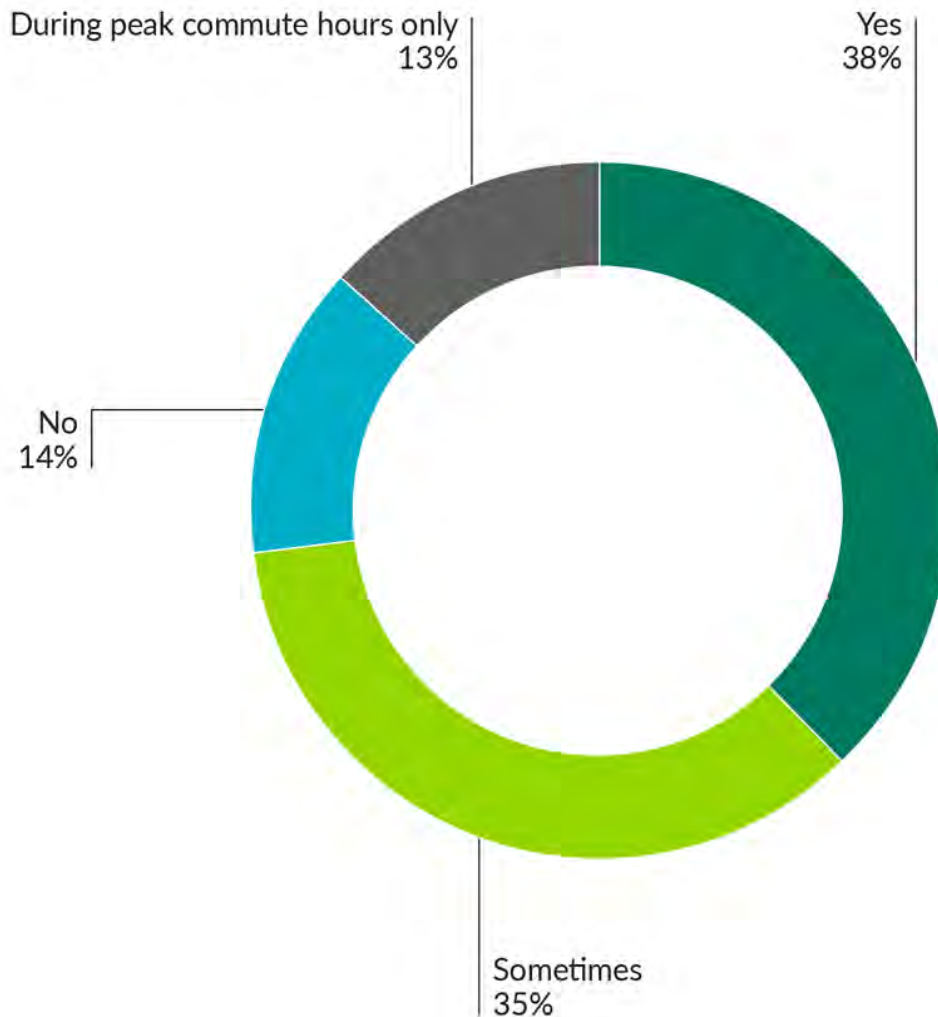


Answer	Tally	Percent
State Route 161	1160	23%
State Route 7	1003	20%
Interstate 5	843	17%
State Route 162	725	15%
State Route 507	570	12%
State Route 702	534	11%
Other	105	2%

The top three routes that respondents reported traveling on regularly were: State Route 161, State Route 7, and Interstate 5.

About two percent of respondents selected 'Other' and had the ability to write something. They most frequently shared that they regularly traveled on Canyon Road East, State Route 167, and State Route 512.

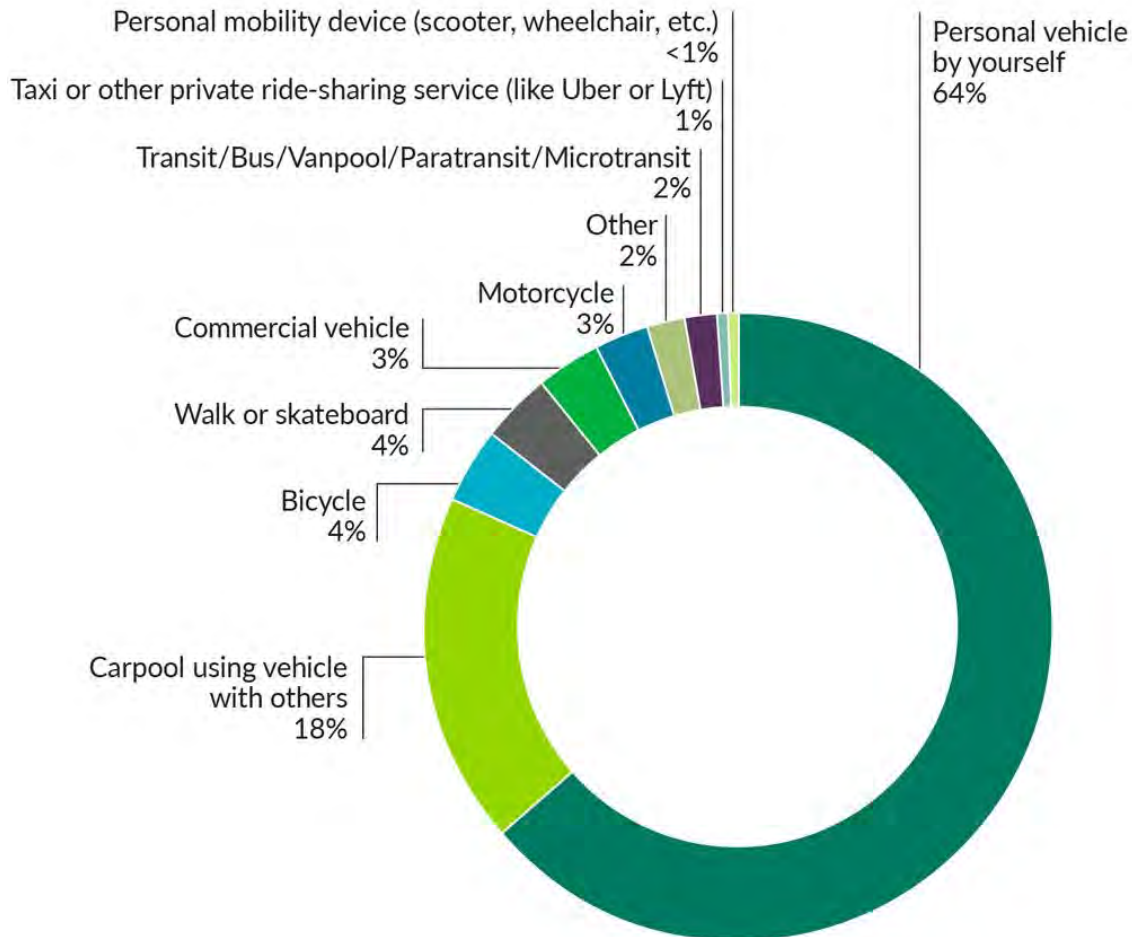
Question 5 | Do you take an alternate route to avoid traveling on any of the state highways listed above? Select one:



Answer	Tally	Percent
Yes	591	38%
Sometimes	549	35%
No	214	14%
During peak commute hours only	204	13%
Total	1558	100%

A majority of respondents indicated that they take alternate routes to avoid state highways most of the time or sometimes.

Question 6 | What are the main ways you get around the study area? Select all that apply:



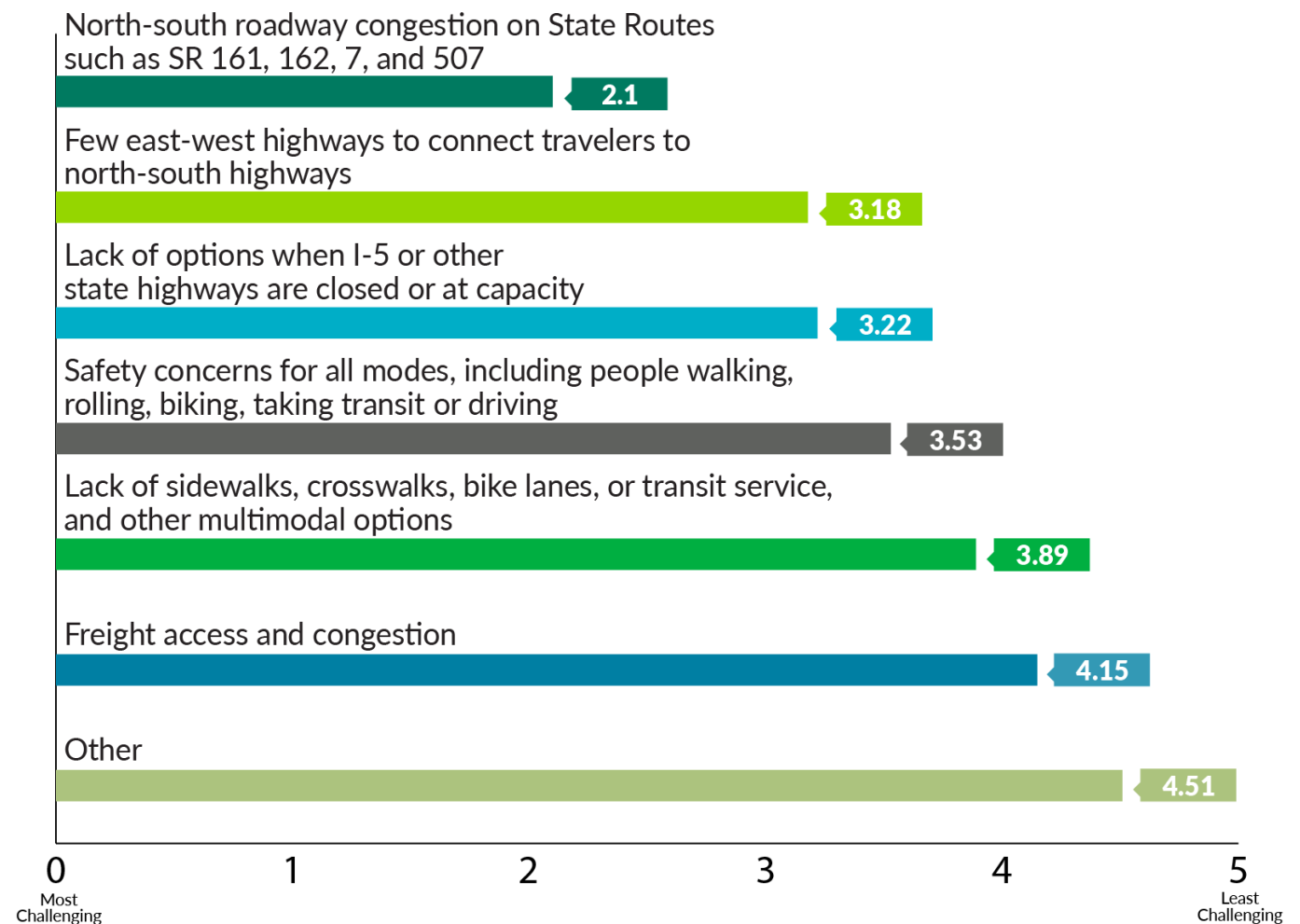
Answer	Tally	Percent
Personal vehicle by yourself	1492	64%
Carpool using vehicle with others	425	18%
Bicycle	88	4%
Walk or skateboard	85	4%
Commercial vehicle	79	3%
Motorcycle	68	3%
Other	42	2%
Transit/Bus/Vanpool/Paratransit/Microtransit	39	2%
Taxi or other private ride-sharing service (like Uber or Lyft)	15	1%
Personal mobility device (scooter, wheelchair, etc.)	9	<1%

A majority of respondents said they drive a personal vehicle by themselves or carpool in a vehicle with others.

Question 7 | What are the biggest challenges for you when you travel around south Pierce County? Rank 1 being your biggest challenge and 7 being the least challenging.

Note: For every individual that answered this question, they provided a ranking from 1 to 7. As you'd expect, the responses vary from person to person. Looking at the population of respondents overall, we've taken the average of each option to help us understand where it falls relative to the set of options. Those answers with the lowest average ranking reflect the biggest challenges.

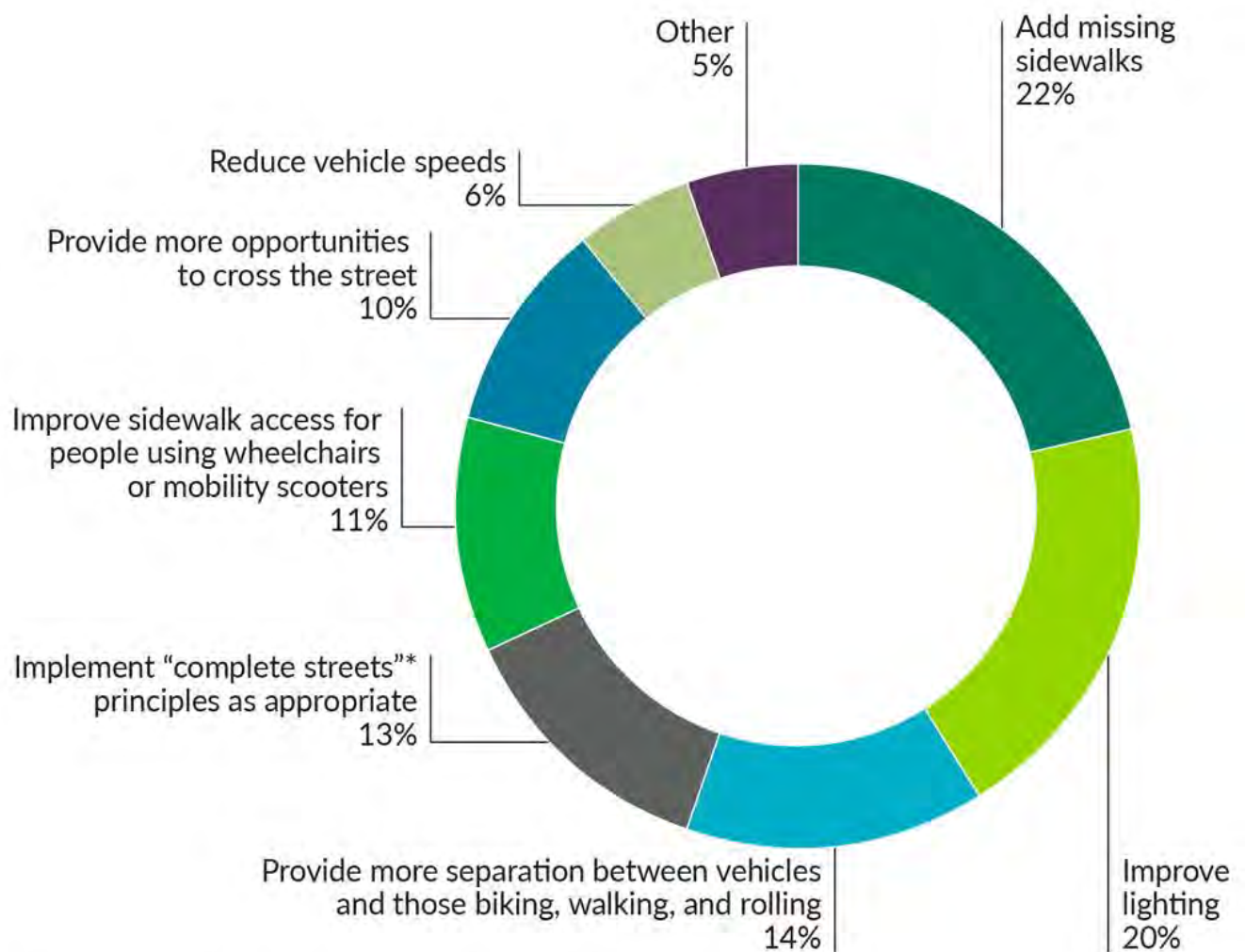
AVERAGE RANKING



Answer	Tally	Relative ranking	Average Ranking	Standard Deviation	Most challenging → Least Challenging
North-south roadway congestion on State Routes such as SR 161, 162, 7, and 507	3279	1	2.1	1.73	
Few east-west highways to connect travelers to north-south highways	4989	2	3.18	1.86	
Lack of options when I-5 or other state highways are closed or at capacity	5040	3	3.22	2.00	
Safety concerns for all modes, including people walking, rolling, biking, taking transit or driving	5520	4	3.53	2.13	
Lack of sidewalks, crosswalks, bike lanes, or transit service, and other multimodal options	6100	5	3.89	2.13	
Freight access and congestion	6486	6	4.15	2.07	
Other	6928	7	4.51	2.81	

North-south roadway congestion on state routes, few east-west highways to connect to other routes, and lack of options when I-5 or other state highways are closed or at capacity are the leading challenges for respondents.

Question 8 | What can be done to improve travel for people biking, walking and rolling? Select all that apply.



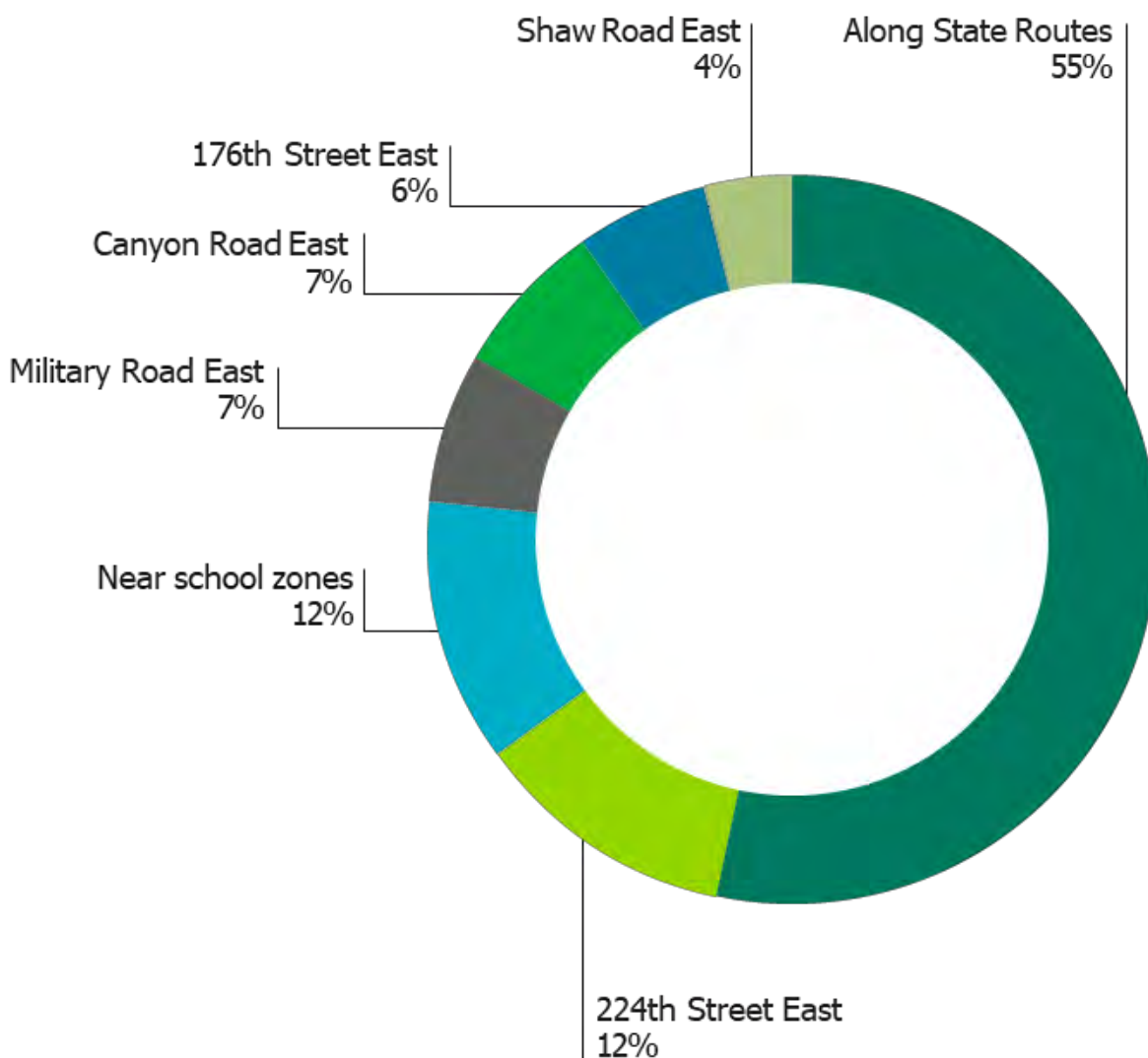
**Complete streets is defined as: a complete street is safe and feels safe for everyone using the street, for all users regardless of their age and ability.*

Answer	Tally	Percent
Add missing sidewalks	943	22%
Improve lighting	866	20%
Provide more separation between vehicles and those biking, walking, and rolling	617	14%
Implement “complete streets” principles as appropriate (complete streets is defined as: a complete street is safe and feels safe for everyone using the street, for all users regardless of their age and ability).	560	13%
Improve sidewalk access for people using wheelchairs or mobility scooters	491	11%
Provide more opportunities to cross the street	438	10%
Reduce vehicle speeds	241	6%
Other	223	5%

The top three strategies to improve travel for people biking, walking and rolling included adding missing sidewalks, improving lighting and providing more separation between vehicles and those biking, walking, and rolling.

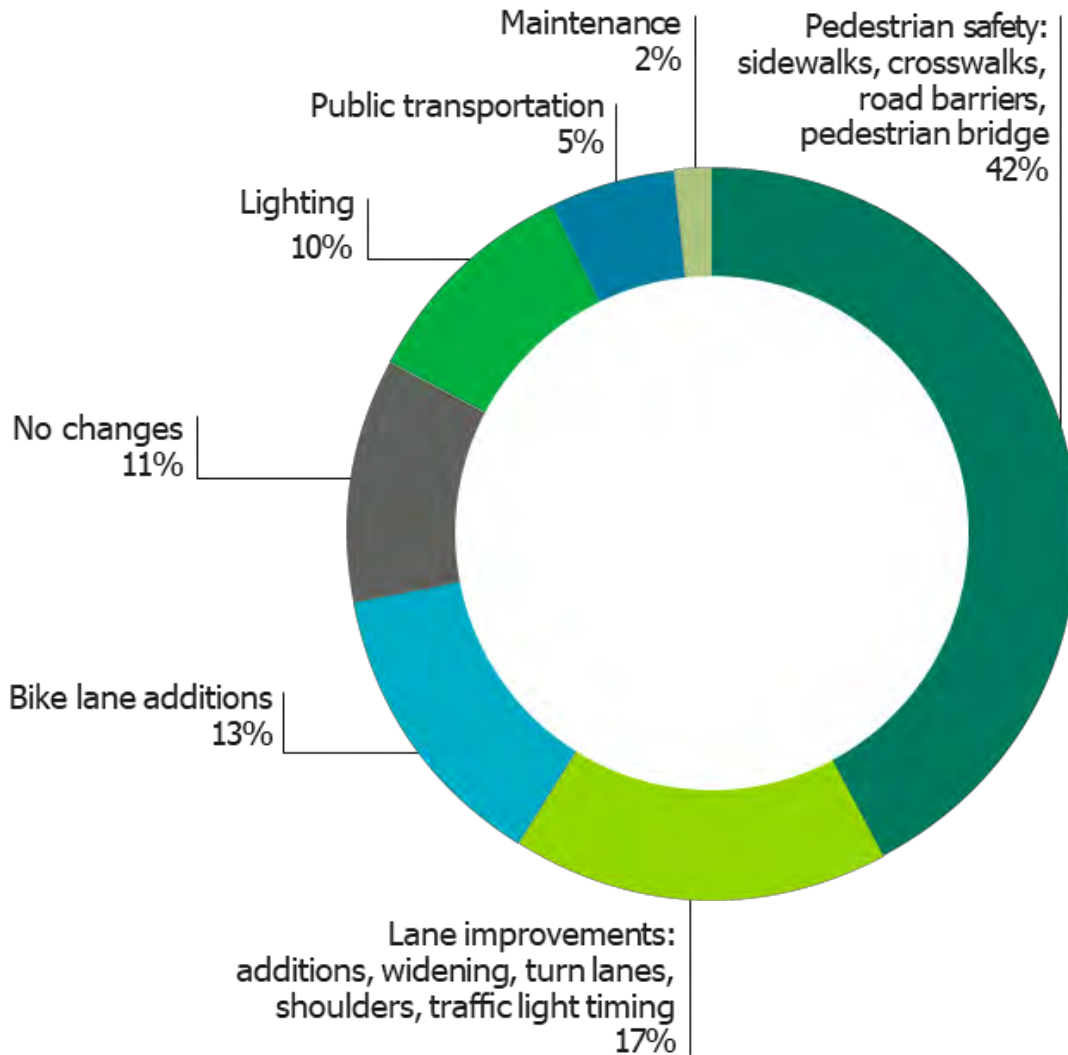
About five percent of respondents selected ‘Other’, with the ability to explain. Of those that selected ‘Other,’ suggestions on how to improve travel for people biking, walking, and rolling varied widely. Many expressed a desire to not change anything in the area, while others suggested pedestrian improvements, road widening or adding lanes, and separated bike lanes.

Question 9 | Are there specific roadway or sidewalk locations or places you'd suggest we look at to make improvements for people biking, walking, and rolling? (write-in question)



Respondents reported state routes to be a significant area of improvement for those biking, walking, and rolling. Other top responses included near school zones and along 224th Street East.

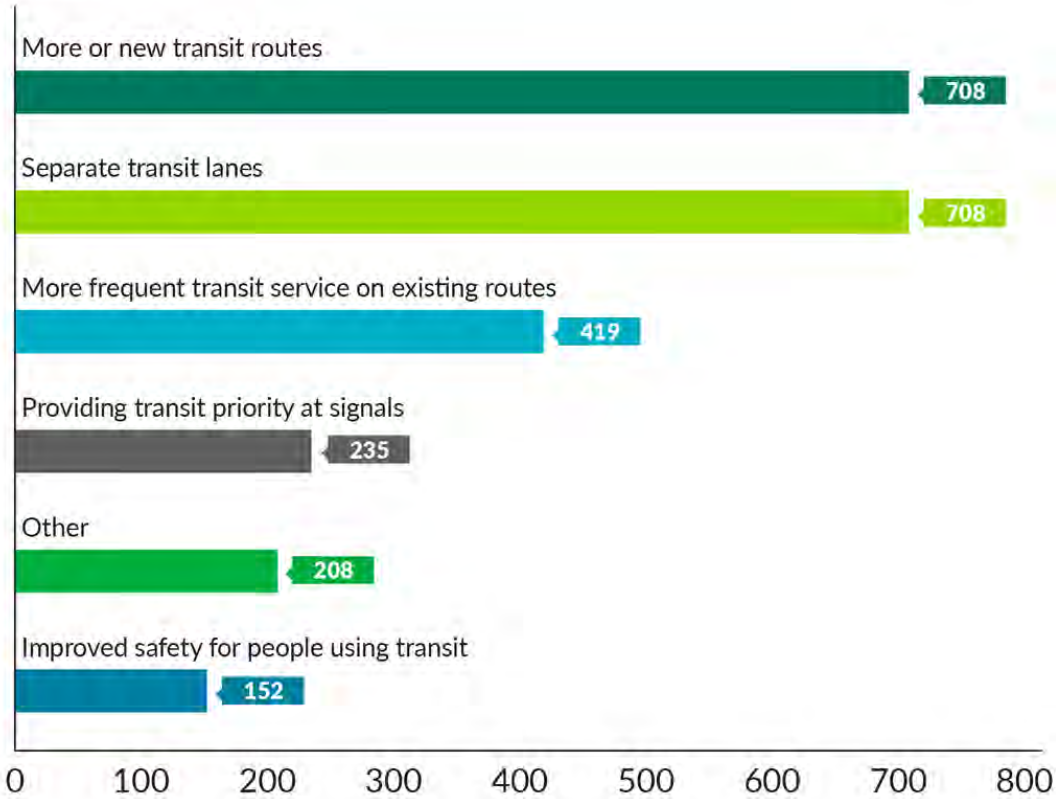
What improvements would you recommend at those locations? (write-in question)



The top three types of improvements respondents had noted were pedestrian safety (such as sidewalks, crosswalks, mode separation, and pedestrian bridges), lane improvements (such as adding lanes, widening, turn lanes, shoulders, or signal control), and bike lane additions.

Sample comments include:

- 224th St between the Bethel High School campus and the shopping center has frequent multimodal use, often by minors going to work or shop at Bethel Station. This stretch of roadway has narrow shoulders and no sidewalks, leading to hazardous conditions for those walking, biking, etc. along this route.
- Shaw Rd-Military-122nd has become an alternative for Meridian travel for many people. There has been significant housing growth and many more new communities planned but no infrastructure improvement. This stretch of road(s) needs more lanes, sidewalks and lighting to continue to help as a way to aid congestion on Hwy 161.
- A bike path with adequate separation from vehicles.

Question 10 | What can be done to improve travel for people taking bus transit?**TALLY**

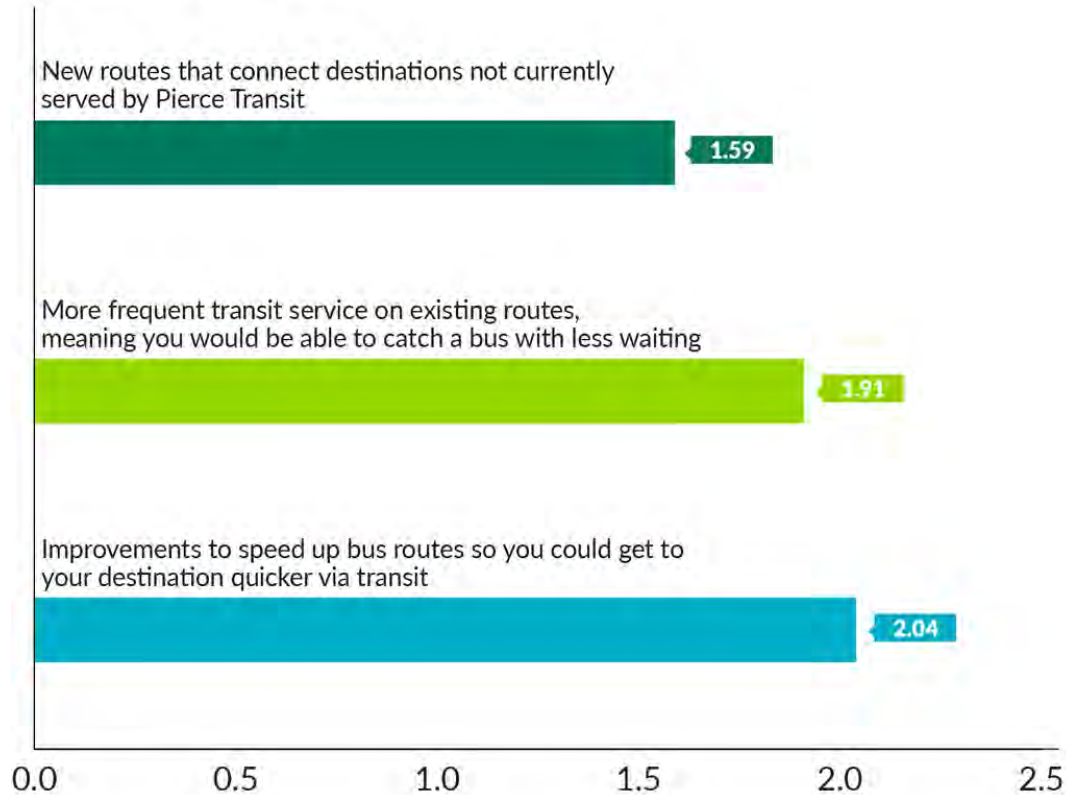
Answer	Tally	Percent
More or new transit routes	708	29%
Separate transit lanes	708	29%
More frequent transit service on existing routes	419	17%
Providing transit priority at signals	235	10%
Other	208	9%
Improved safety for people using transit	152	6%

The top three strategies to improve travel for people taking bus transit were more or new transit routes, separate transit lanes and more frequent transit service on existing routes.

About nine percent of respondents selected 'Other' and had the ability to explain (write-in field). Of those that selected 'Other,' suggestions on how to improve travel for people taking bus transit were wide-ranging. Many expressed a desire to not change anything in the area. A significant number of 'other' responses also expressed a desire to expand bus service, especially to Orting, and to improve safety on transit and at Park & Rides. Other suggestions included extending bus service hours and adding more Park & Ride locations.

Question 11 | If more funding was available for bus transit service, either within the current Pierce Transit service area or an expansion, how would you prioritize the following transit improvements? Please rank the following 1 – 3, with 1 being your highest priority.

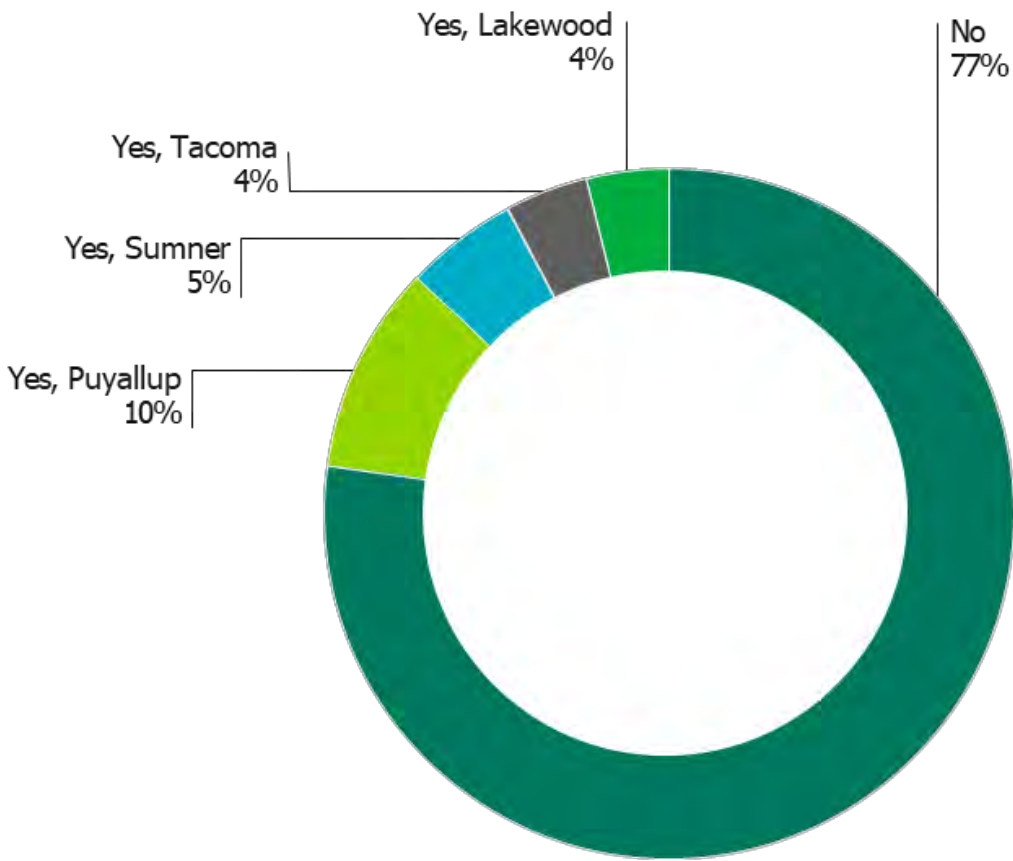
AVERAGE RANKING



Answer	Average Rank	Tally	Relative ranking
New routes that connect destinations not currently served by Pierce Transit	1.59	2502	1
More frequent transit service on existing routes, meaning you would be able to catch a bus with less waiting	1.91	3003	2
Improvements to speed up bus routes so you could get to your destination quicker via transit	2.04	3211	3

Respondents indicated that new routes that connect destinations not currently served by transit was their highest priority.

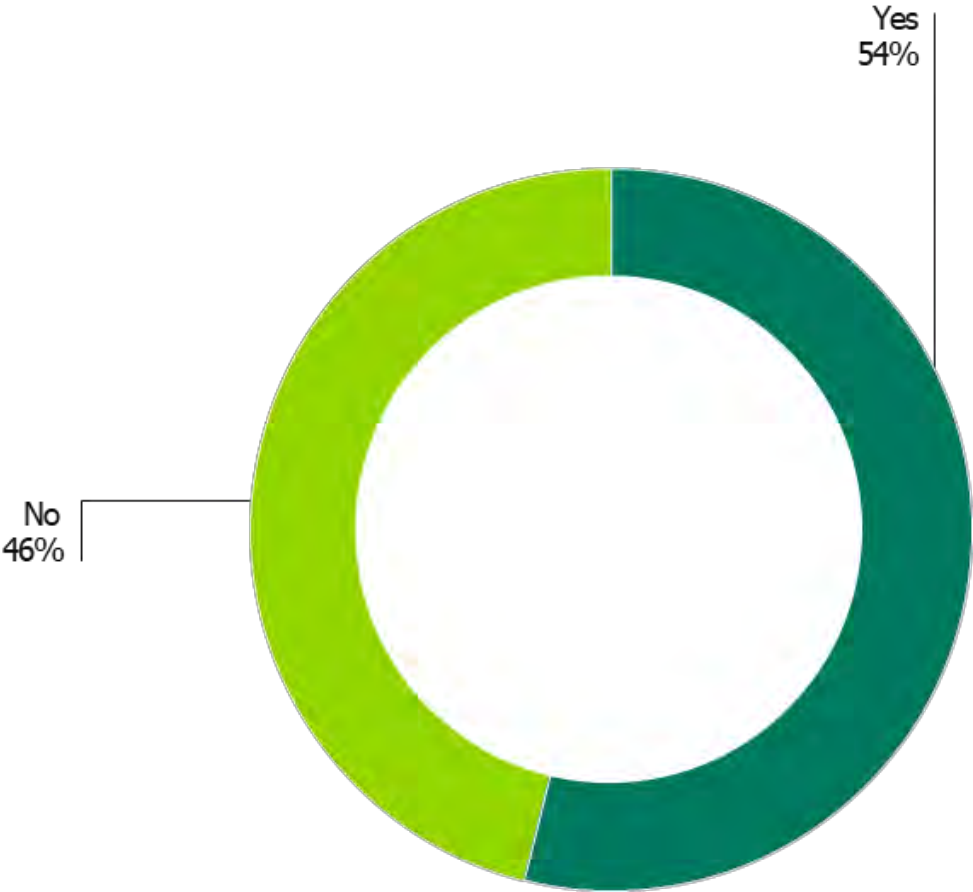
Question 12 | Do you or your family members use Sound Transit's Sounder Train from Lakewood, Tacoma, Puyallup or Sumner to travel to work, school or recreation?



Answer	Tally	Percent
No	1200	77%
Yes, Puyallup	152	10%
Yes, Sumner	79	5%
Yes, Tacoma	61	4%
Yes, Lakewood	59	4%
Total	1551	100%

A majority of respondents do not use Sound Transit's Sounder Train. Of those that do, traveling to/from Puyallup was the most common.

Question 13 | If you had the option of traveling by train, would you use it?



Answer	Tally	Percent
Yes	834	54%
No	704	46%
Total	1538	100%

A slight majority, 54%, of respondents indicated that they would travel by train if given the option.

Question 14 | If more funding was available for train transit, within the current Sound Transit service area or future expansion, how would you prioritize the following improvements? Please rank 1-2, with 1 being your highest priority.

AVERAGE RANKING

More frequent train service on existing routes including weekend service to and from Seattle

1.46

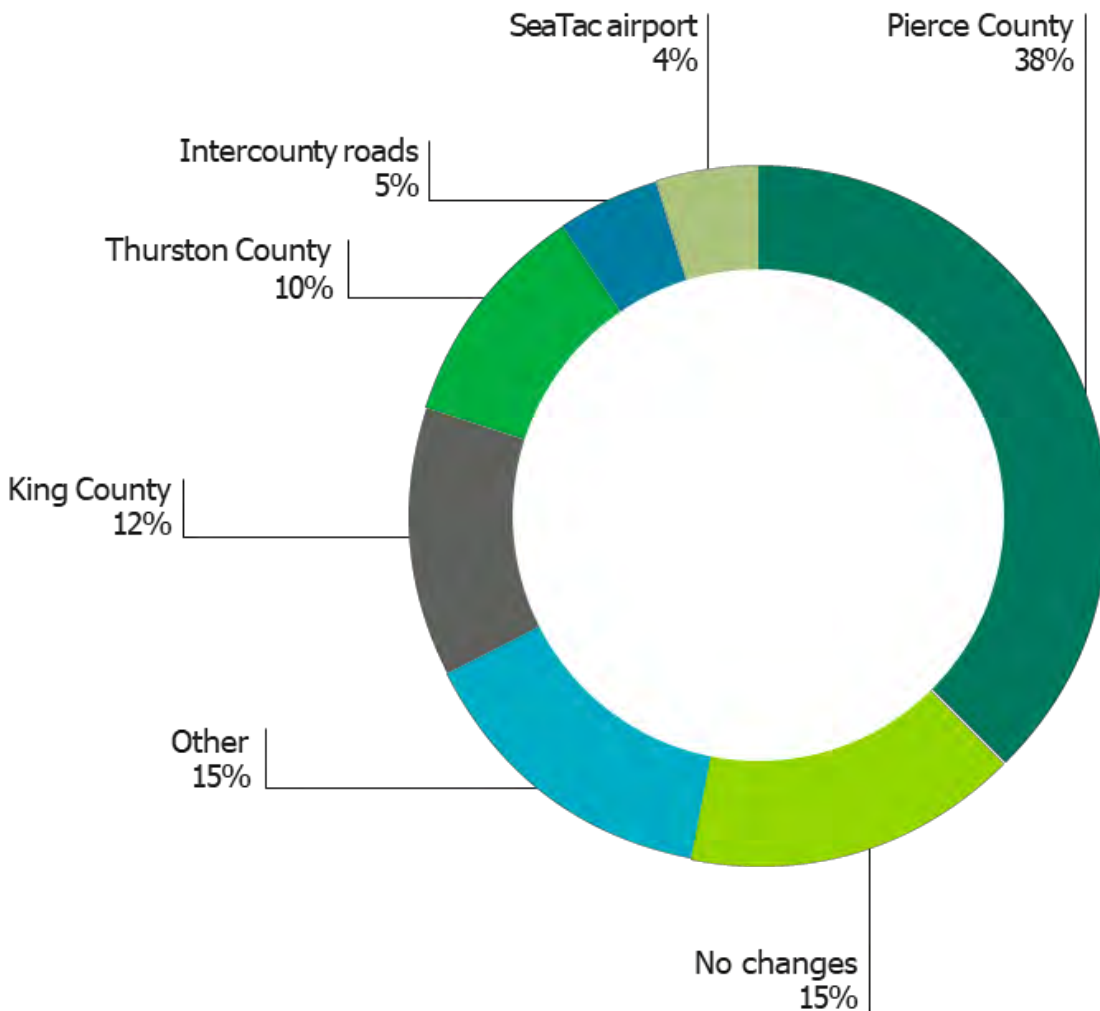
New routes that connect destinations not currently served by Sound Transit Sounder Train

1.40

Answer	Tally	Average Ranking	Relative Ranking
New routes that connect destinations not currently served by Sound Transit Sounder Train	2208	1.40	1
More frequent train service on existing routes including weekend service to and from Seattle	2292	1.46	2

Respondents indicated that new routes that connect destinations not currently served by Sound Transit Sound Train would be their priority if more funding was available for train transit.

Question 15 | What are some destinations that you would like to be able to access via bus or train transit? (write-in question)

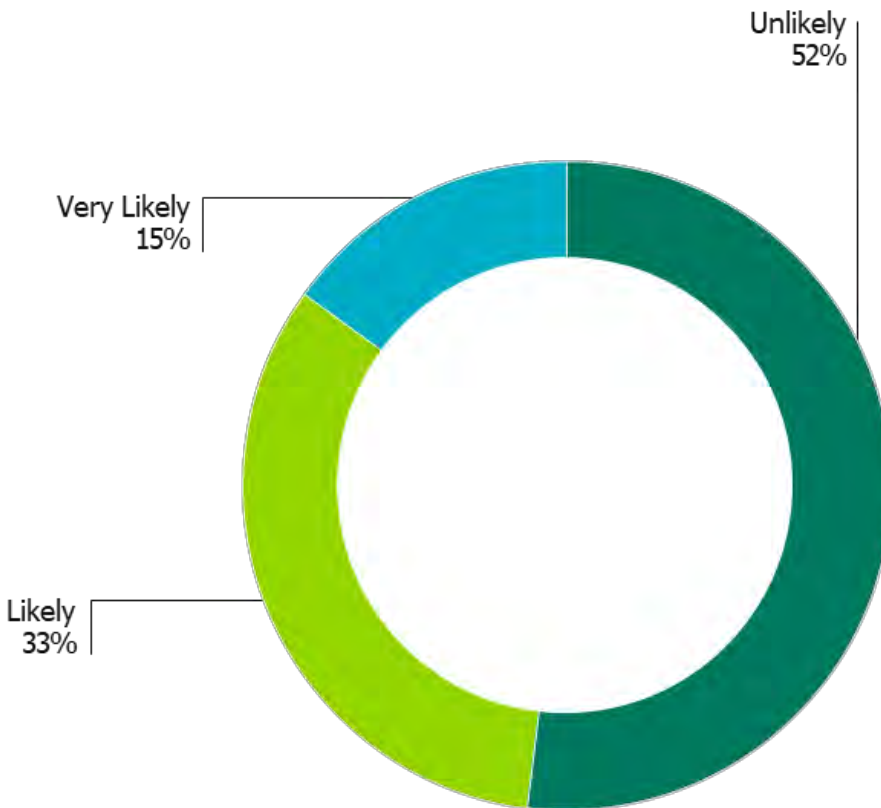


Responses reflected the desire for transit options available to connect people to different cities or communities within Pierce County boundaries. Fifteen percent of respondents advocated for no changes, for reasons such as feeling unsafe taking transit or wanting to keep the area rural. There were a significant number of other responses, some focused on the lack of safety on transit and a strong disinterest in building an airport.

Sample comments include:

- It would be awesome to see a train running from Tacoma to the Frederickson/Graham area. It would help reduce a lot of people's commutes and alleviate traffic on the north/south corridors.
- High population rural areas like Graham town center and Eatonville for buses. Need better parking options/ safety for me to want to utilize rail or link systems.
- None, I do not take the bus. Public transit is unsafe.

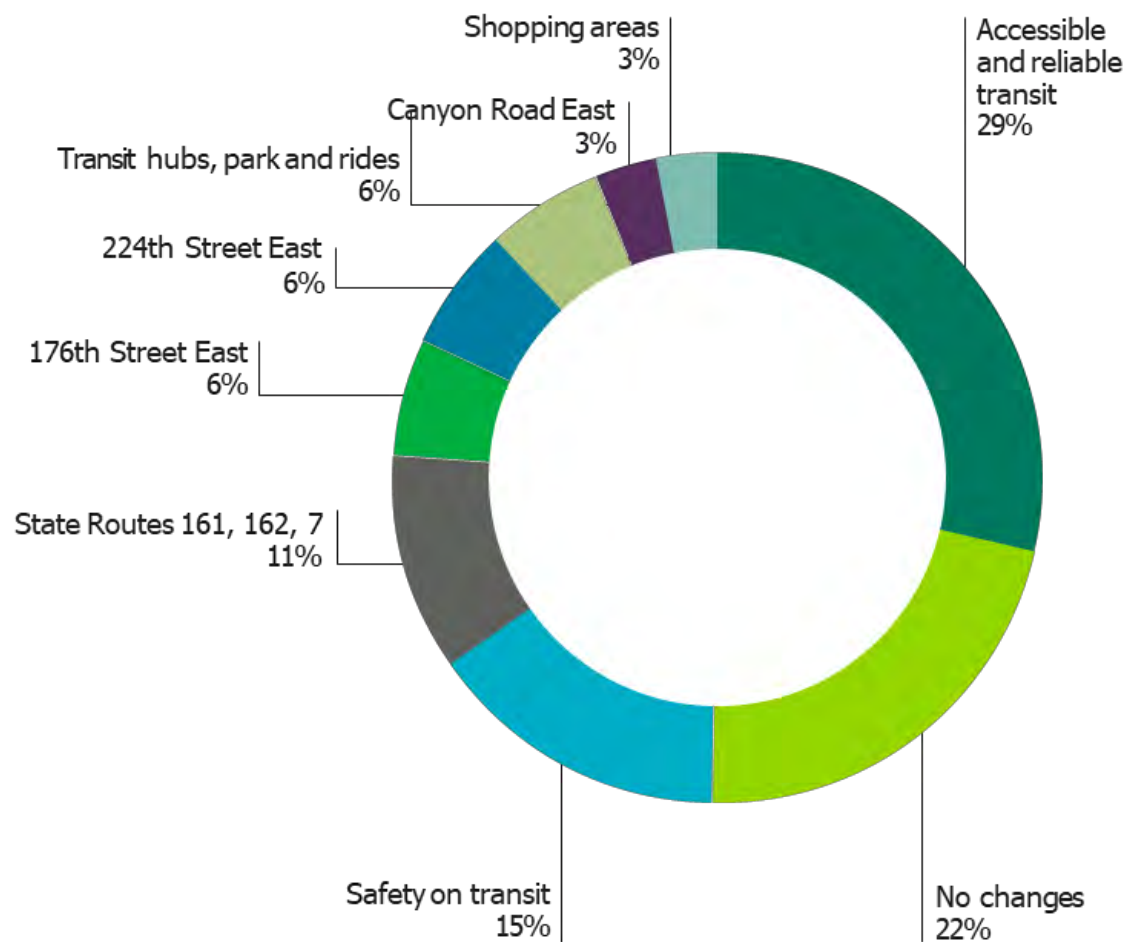
Question 16 | How likely would you be to take transit on a regular basis if it was offered in your area? Select one:



Answer	Tally	Percent
Unlikely	790	52%
Likely	506	33%
Very Likely	230	15%
Total	1526	100%

Respondents were about evenly split over how likely they would be to take transit on a regular basis if it was offered in their area. Fifty-two percent of respondents said it would be unlikely that they would take transit on a regular basis if offered. Combined, 48 percent said they would be likely or very likely to take transit if offered.

Question 17 | Are there specific locations or places you would like to see improvements for people taking transit? (write-in)



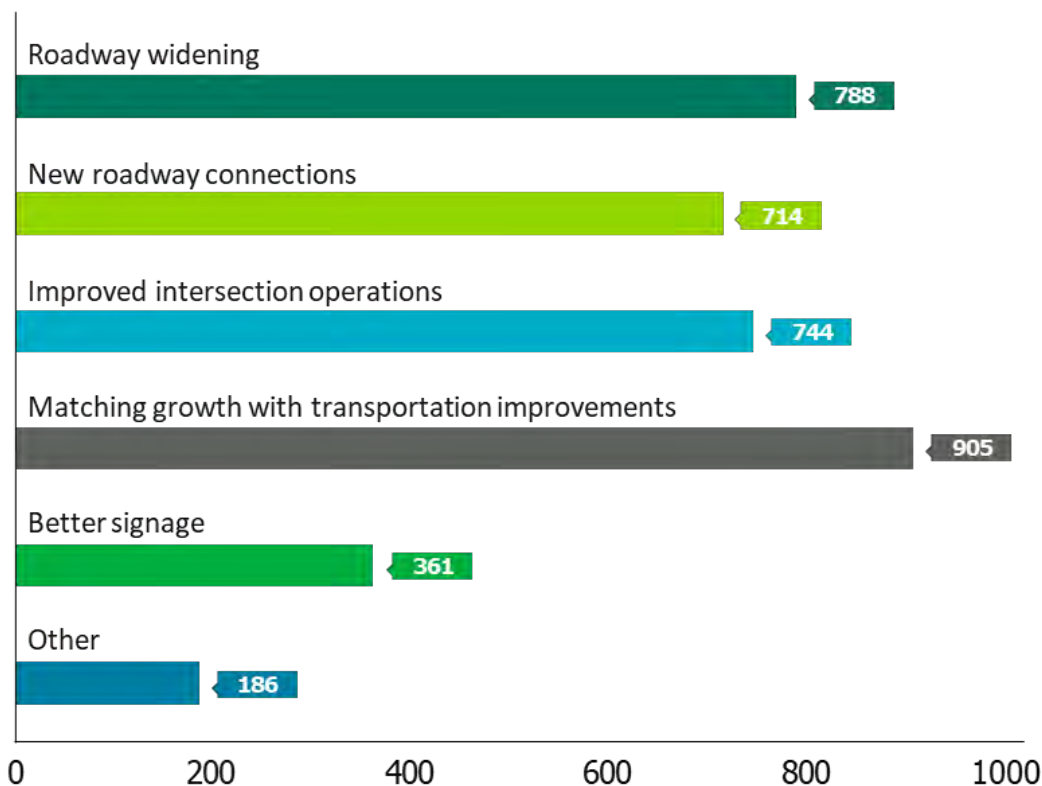
The top responses did not list specific locations, but rather focused on providing reliable and accessible transit options, feeling safe while taking transit, along with a sentiment to keep south Pierce County rural (no need for transit).

Sample comments include:

- There needs to be more connections to the residential areas near the Pierce Transit 402 line. Also, smaller capacity, more frequent service would be preferred, especially going to and from downtown Puyallup in the mornings and evenings.
- It is not needed! People live in the country for a reason and have the resources to do so.

Question 18 | What can be done to improve travel for vehicles (including rideshare, vanpools, carpools, and other vehicles)? Select all that apply:

TALLY



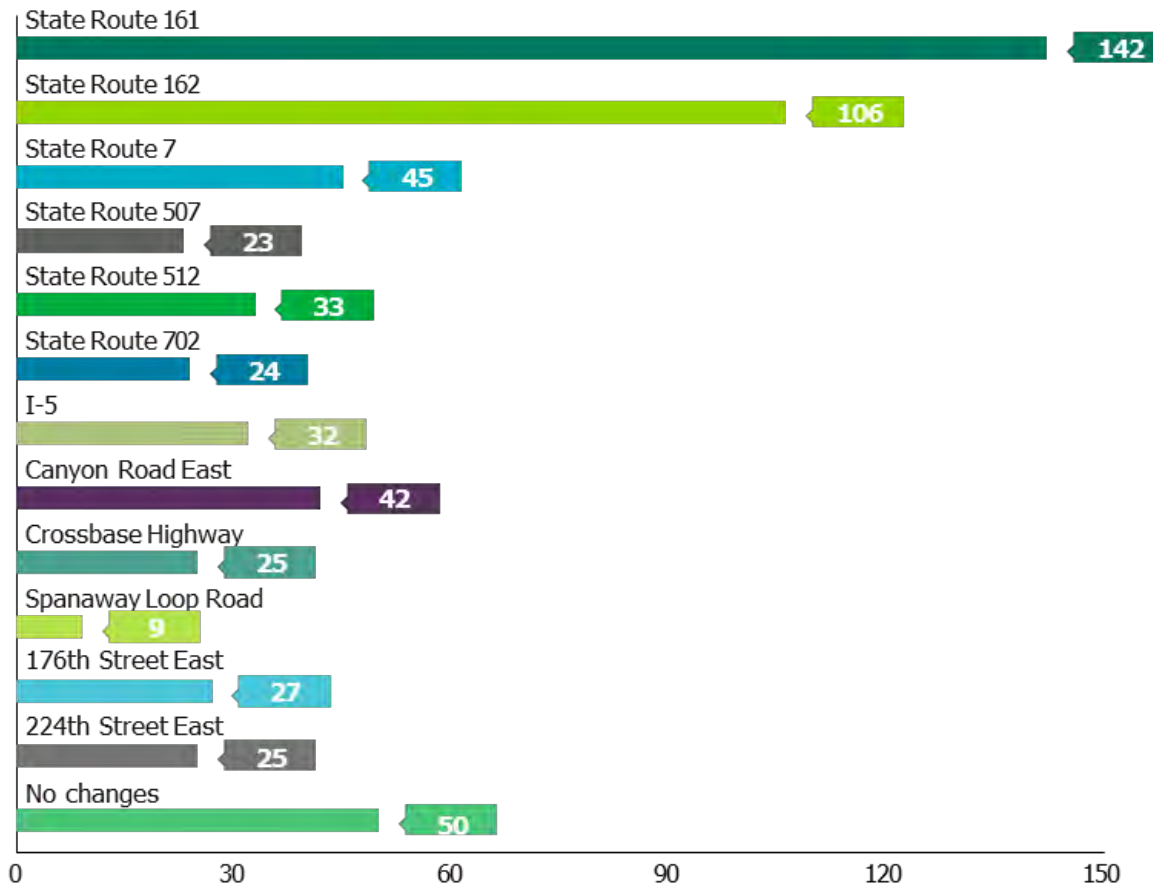
Answer	Tally	Percent
Matching growth with transportation improvements	905	24%
Roadway widening	788	21%
Improved intersection operations	744	20%
New roadway connections	714	19%
Better signage	361	10%
Other	186	5%

About 80 percent of respondents nearly evenly identified with these top four improvements: matching growth with transportation improvements, roadway widening, improved intersection operations, and new roadway connections.

About five percent of respondents selected 'Other' and shared clarifying comments. Of those who selected 'Other,' the most frequent suggestion was implementing synchronized signals in the study area, followed by a desire to not change anything. Other suggestions included improving lighting and signage, adding turn lanes, and improving road maintenance (e.g., filling potholes and repainting travel lanes).

Question 19 | Are there specific locations or places you would like to see improvements for people traveling in rideshare, carpool, or driving personal vehicles? Write-in.

TALLY

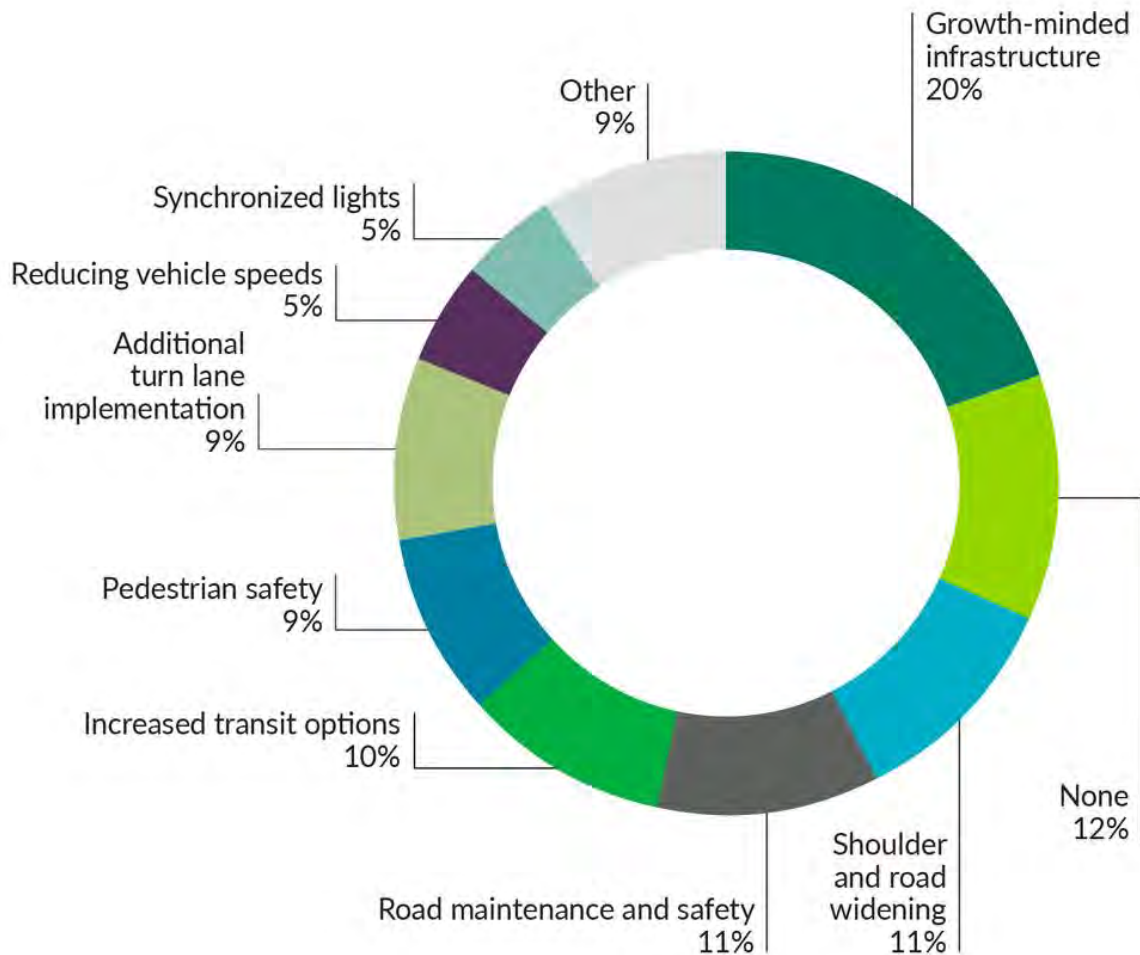


The majority of responses were centered around rideshare, carpool, and personal vehicle improvements along state routes, specifically SR 161 and SR 162. Other top responses include focusing on SR 7 and Canyon Road East, increased east-west connections and the completion of Cross-base Highway frequently being mentioned. Fifty respondents however did not feel the need for improvements, noting the desire for no changes in south Pierce County.

Sample comments include:

- SR 162. I drive my daughter to school and myself to work on SR 162, and there is significant congestion 90+ percent of the time. AM and PM peak delays add 15-30 minutes to travel times to/ from Sumner or Puyallup.
- SR 161 from 31st AVE SE to 160th ST E needs its intersection light timings adjusted; the stretch of road is the most bogged down. The road is plenty wide enough to accommodate volume, it's the intersection lights that cause the back up.
- Spanaway Loop Road - widened to 2 lanes. SR 161 - widened to 3 lanes. Complete the cross-base highway - that would make the biggest East-West impact over anything else!

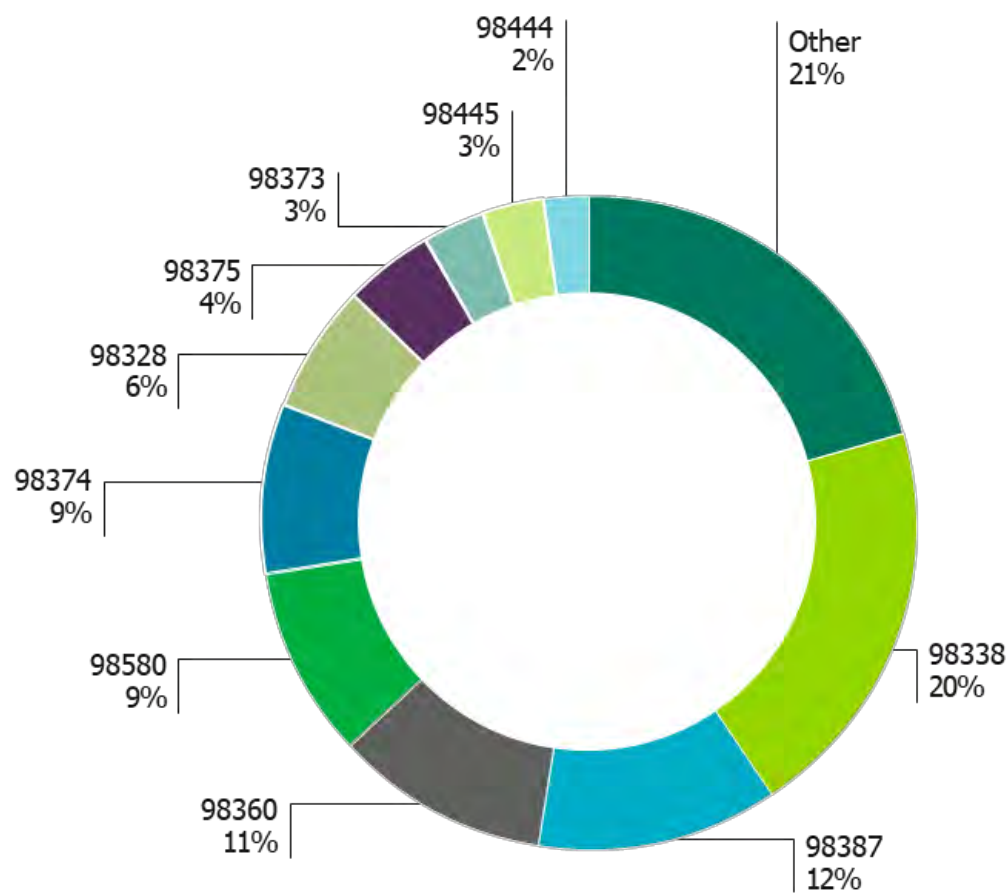
Question 20 | When thinking about how you travel through the study area, what improvements would you like to see in the future? Please describe it in one sentence.



Respondents mentioned a variety of improvements they would like to see implemented in south Pierce County. Growth-minded infrastructure, followed by no changes, shoulder and road widening, and road maintenance and safety were the top common themes.

Sample comments:

- Build new highway infrastructure to meet future growth projections and focus on east/west routes to better connect existing north/south routes already in place.
- A system that allows for improvements based on potential population growth rather than waiting for it to grow, become a problem then fixing it.
- No improvements, especially if it is to substantiate a new airport.

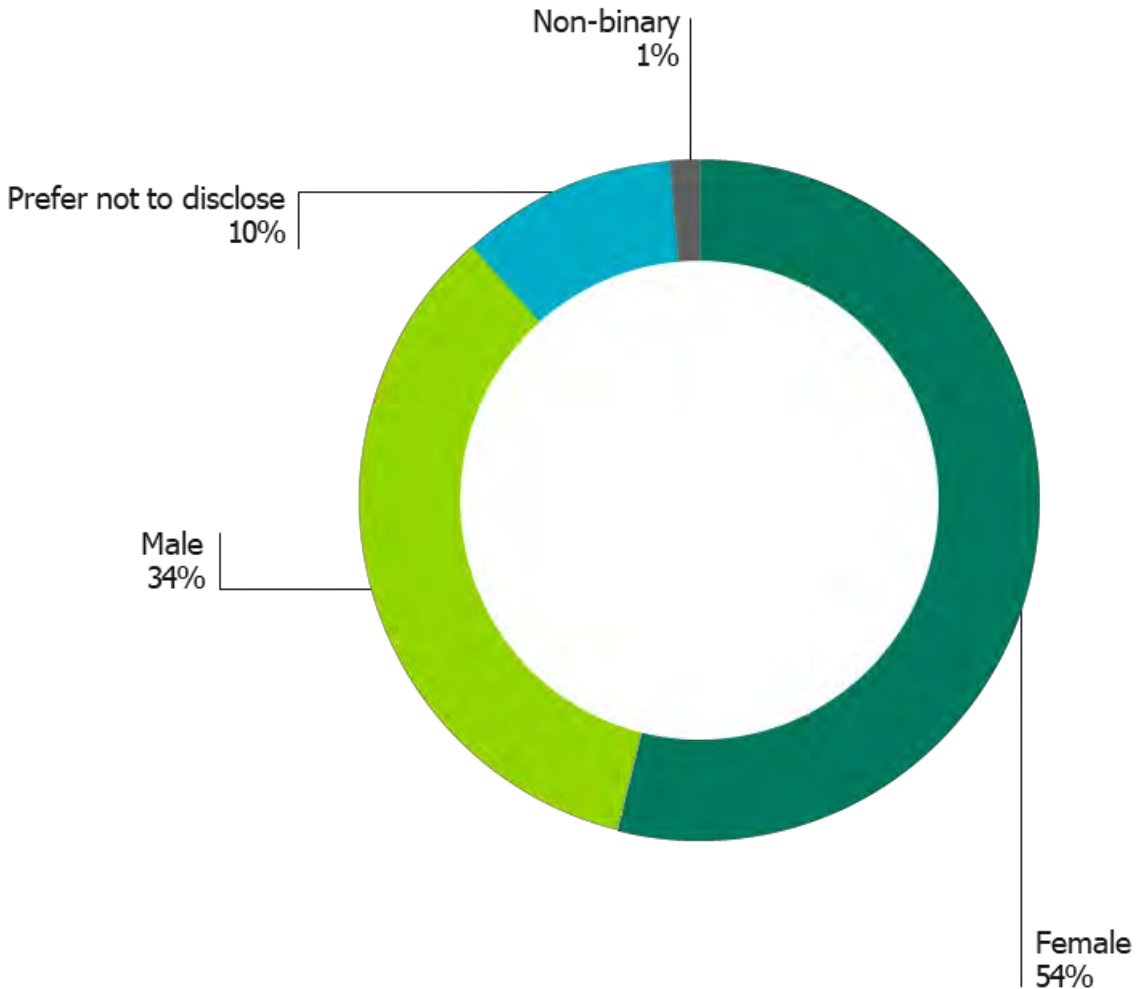
Question 21 | What is your zip code?

Answer	Tally	Percent
Other	316	21%
98338	308	20%
98387	181	12%
98360	162	11%
98580	142	9%
98374	131	9%
98328	94	6%
98375	68	4%
98373	47	3%
98445	47	3%
98444	33	2%
Total	1529	100%

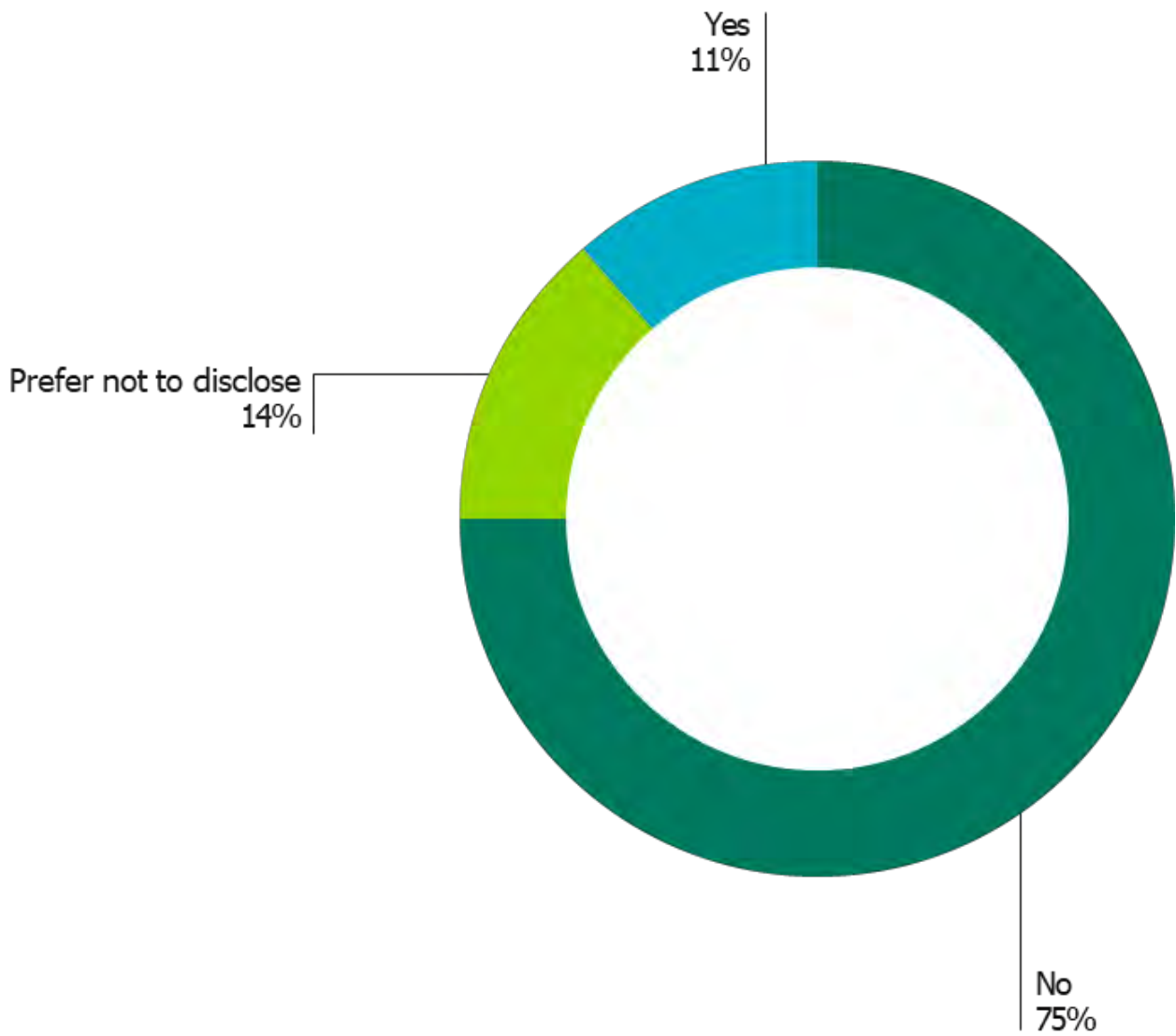
Demographics

Title VI of the Civil Rights Act of 1964 requires the Washington State Department of Transportation to be sure that everyone in the affected project areas has a chance to be heard and to respond to transportation programs and activities that may affect their community. To help with that, we asked that participants voluntarily provide us information about race, ethnicity, gender and/or other demographics. Responses to these questions were not required.

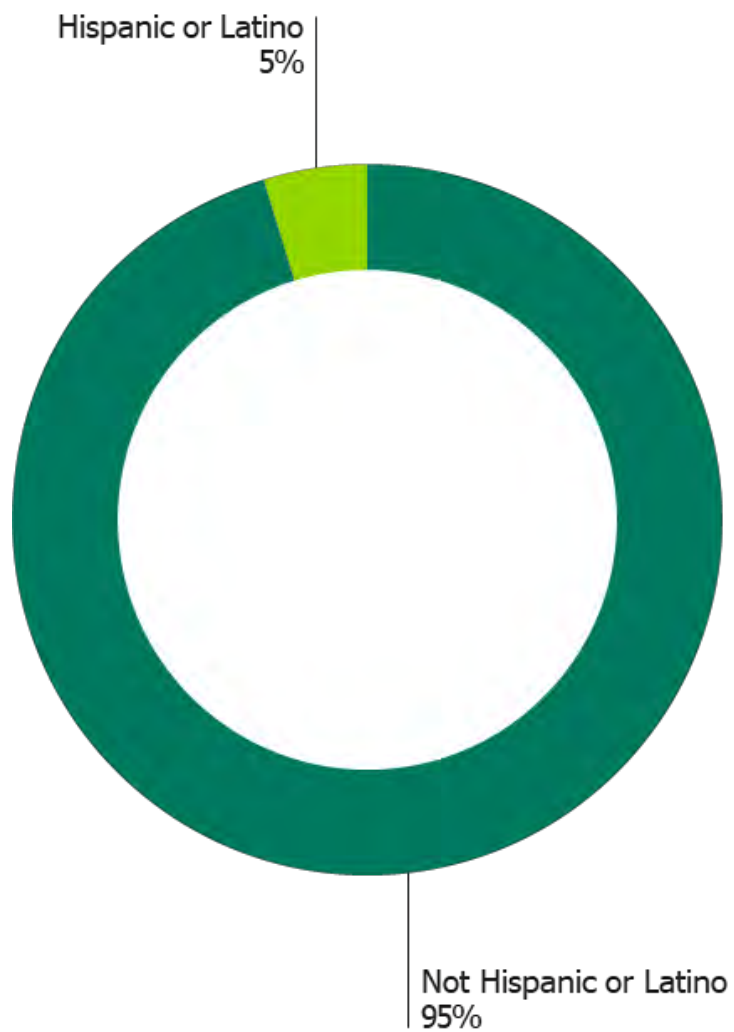
Question 1 | Gender



Question 2 | Disability

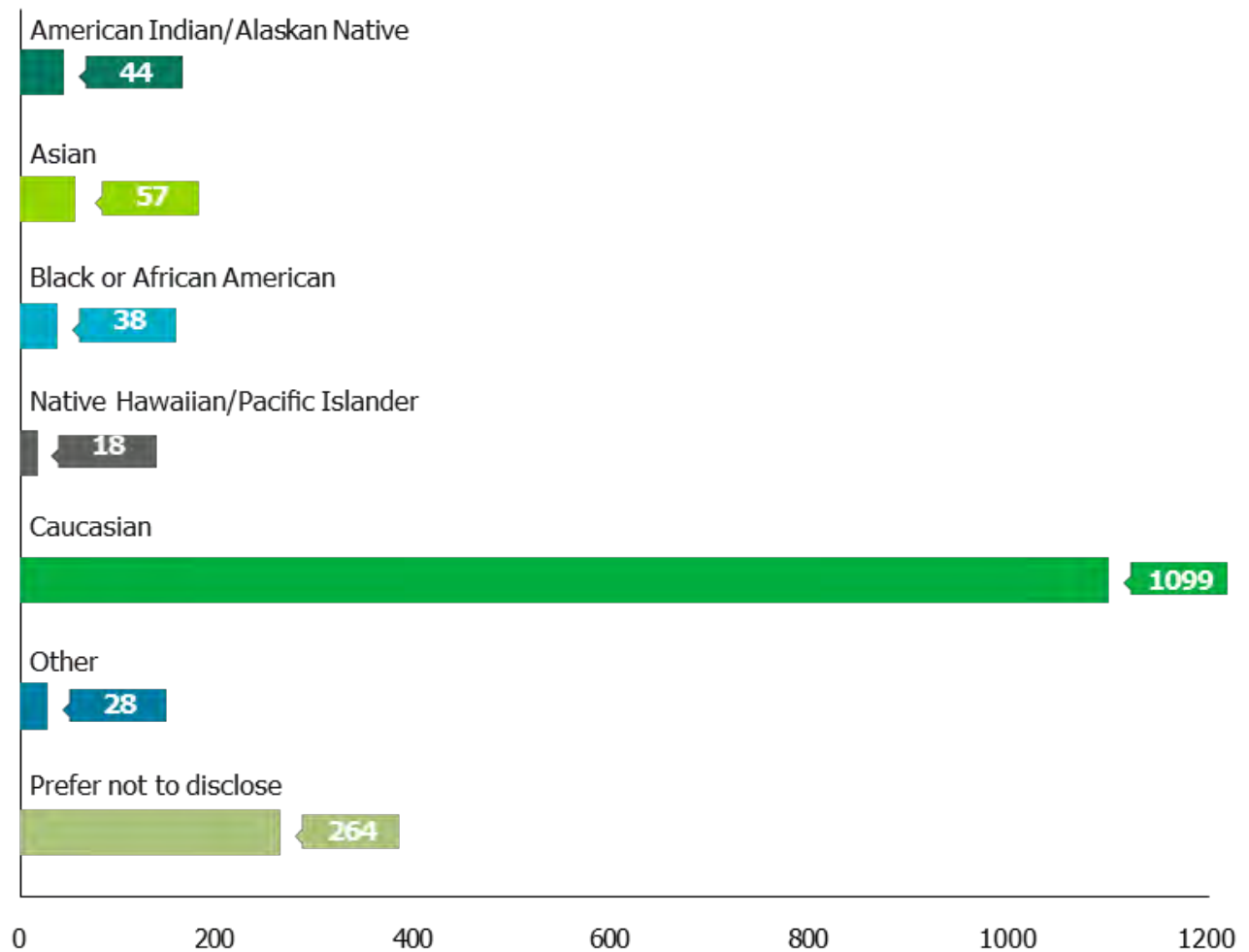


Question 3 | Ethnicity



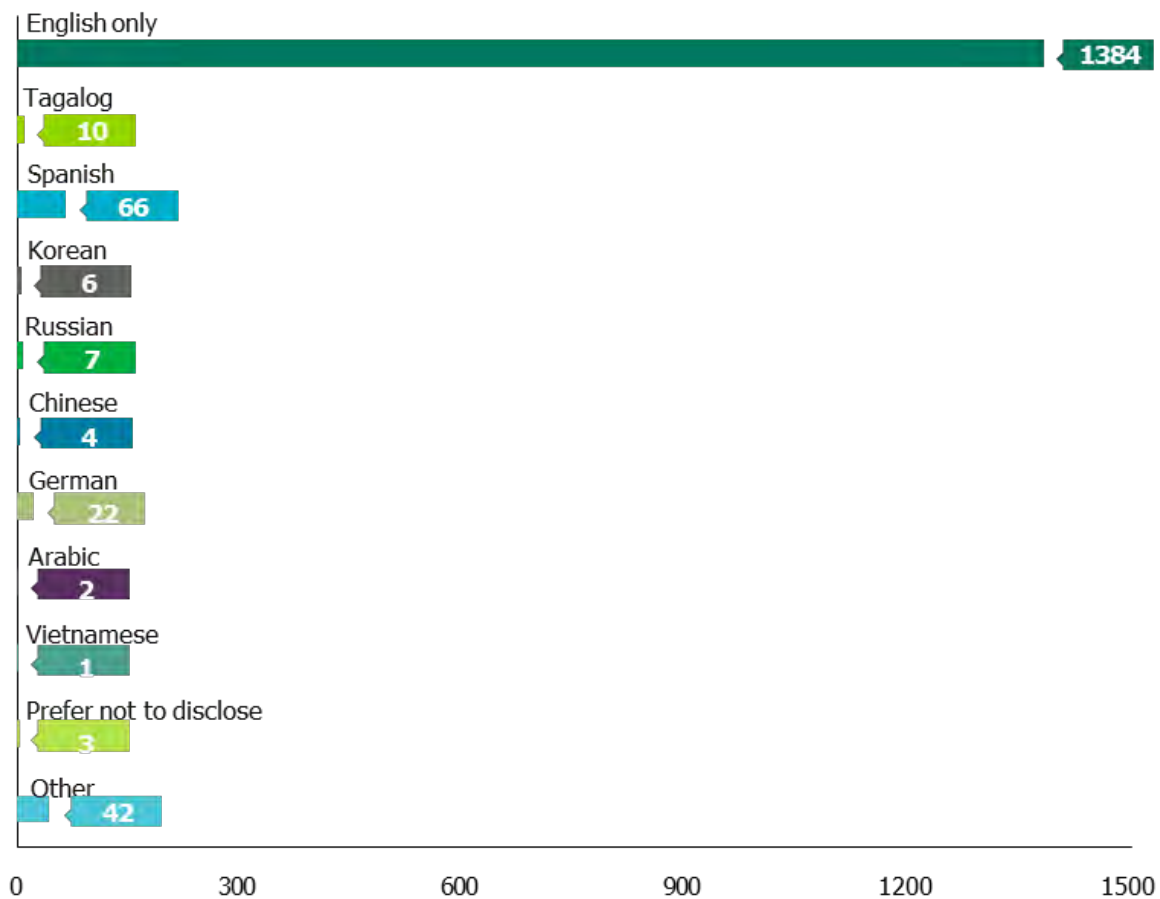
Question 4 | Race

TALLY

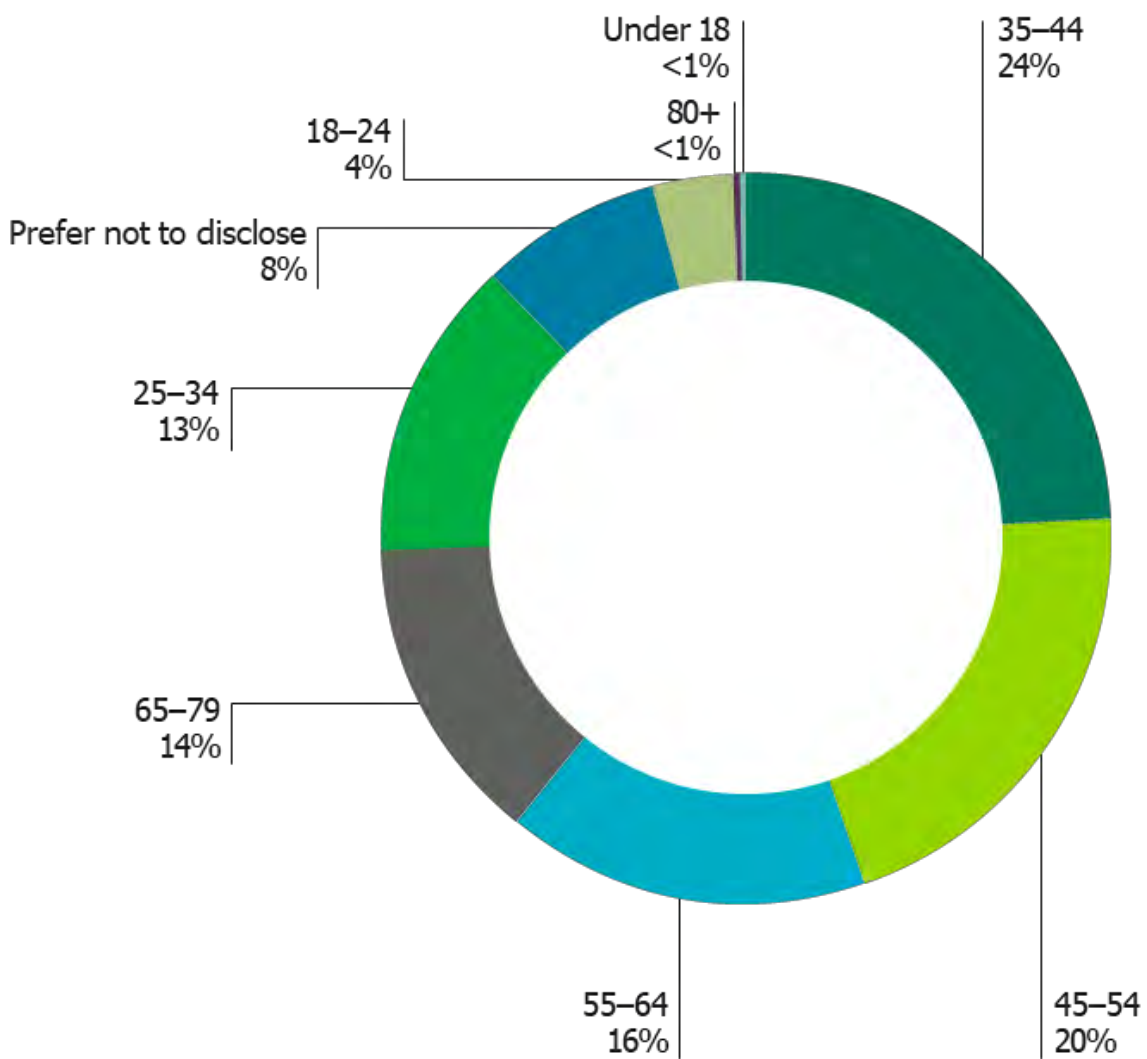


Question 5 | Language

TALLY



Question 6 | Age



Attachment A

South Pierce Multimodal Connectivity Study

Welcome to our online open house!

The Washington State Department of Transportation is conducting a study that focuses on reducing potential for crashes, enhancing multimodal travel options, and improving east-west connectivity for people who use state highways in south Pierce County. The highways included in the study are State Routes 7, 161, 507, 702, a section of SR 162 and I-5.

This online open house will provide information about:

- Why we are doing this study
- How you can share input

Your feedback will help us develop proposed near-, mid- and long-term strategies to address the transportation gaps that exist within south Pierce County.

The online open house is available Dec. 1-16. Once you have reviewed the information, please visit the Feedback section of this open house. There you will find a series of questions and opportunities to provide feedback. If you submit a question through the questionnaire, we will address it in a summary after the online open house closes.



This map shows the study area for the South Pierce Multimodal Connectivity Study.

Title VI Notice to Public

WSDOT ensures full compliance with Title VI of the Civil Rights Act of 1964 by prohibiting discrimination against any person on the basis of race, color, national origin or sex in the provision of benefits and services resulting from its federally assisted programs and activities. For additional information regarding WSDOT's Title VI Program, contact the Department's Title VI Coordinator at 360-705-7098.

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.

Study overview

Why are we doing this?

People who live, work, or travel in south Pierce County use state and local north-south roads, such as State Routes 7, 161, 162 and 507. People traveling in the area experience delays throughout the day. People driving in south Pierce County have no direct connection to Interstate 5 between SR 512 and SR 510, and very few east-west highway connections other than SR 702. The area also has limited options for people walking, rolling, biking, or taking transit.

The Washington State Legislature allocated \$1.5 Million for WSDOT to perform a planning study that looks at the need for additional connectivity in the area between SR 161, SR 7, SR 507 and I-5 in south Pierce County. The study will also look at the need for more connectivity in the area between SR 162, south of Military Road East, and north of Orting.

This study will address key priorities of reducing potential for crashes, enhancing multimodal travel options, and improving east-west connectivity.

There is no funding identified at this time for design and construction. The study will identify potential funding sources for identified improvement strategies.

Schedule

In early 2023, WSDOT will combine the feedback and data gathered from this online open house to refine strategies and conduct further analysis.

A second opportunity for community input will be available in Spring 2023 on the potential strategies.

The end result

Based on your feedback, input from our stakeholders, and transportation data, WSDOT will develop near-, mid- and long-term strategies to address the transportation gaps that exist within the study area. WSDOT will complete the study in mid-2023.

Study area

About the study area

The study area includes the following:

- SR 161
- SR 7
- SR 507
- SR 162, south of Military Road and north of Orting
- Interstate 5 from the Pierce/Thurston County line to just south of SR 512
- SR 702

Municipalities within the study area include portions of Puyallup, Orting and Roy. Pierce County communities of Spanaway, Frederickson, Graham, Elk Plain, Parkland and South Hill are also included.



Study area map

The study area consists of several north-south state routes but has few east-west arterial corridors and only one east-west state highway, SR 702. With more people living and working in the area, people traveling experience delays throughout the day.

SR 512 is located just north of the study area. WSDOT is conducting a separate corridor study focused on SR 512.

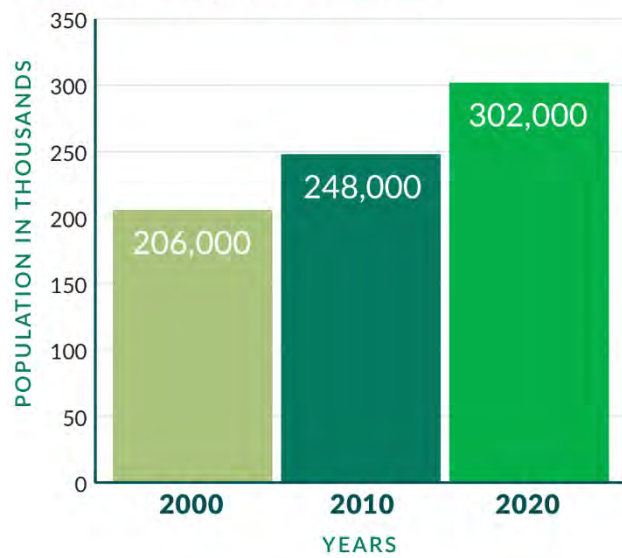


Road sign near the junction of SR 7 and SR 507.

Population growth and mobility

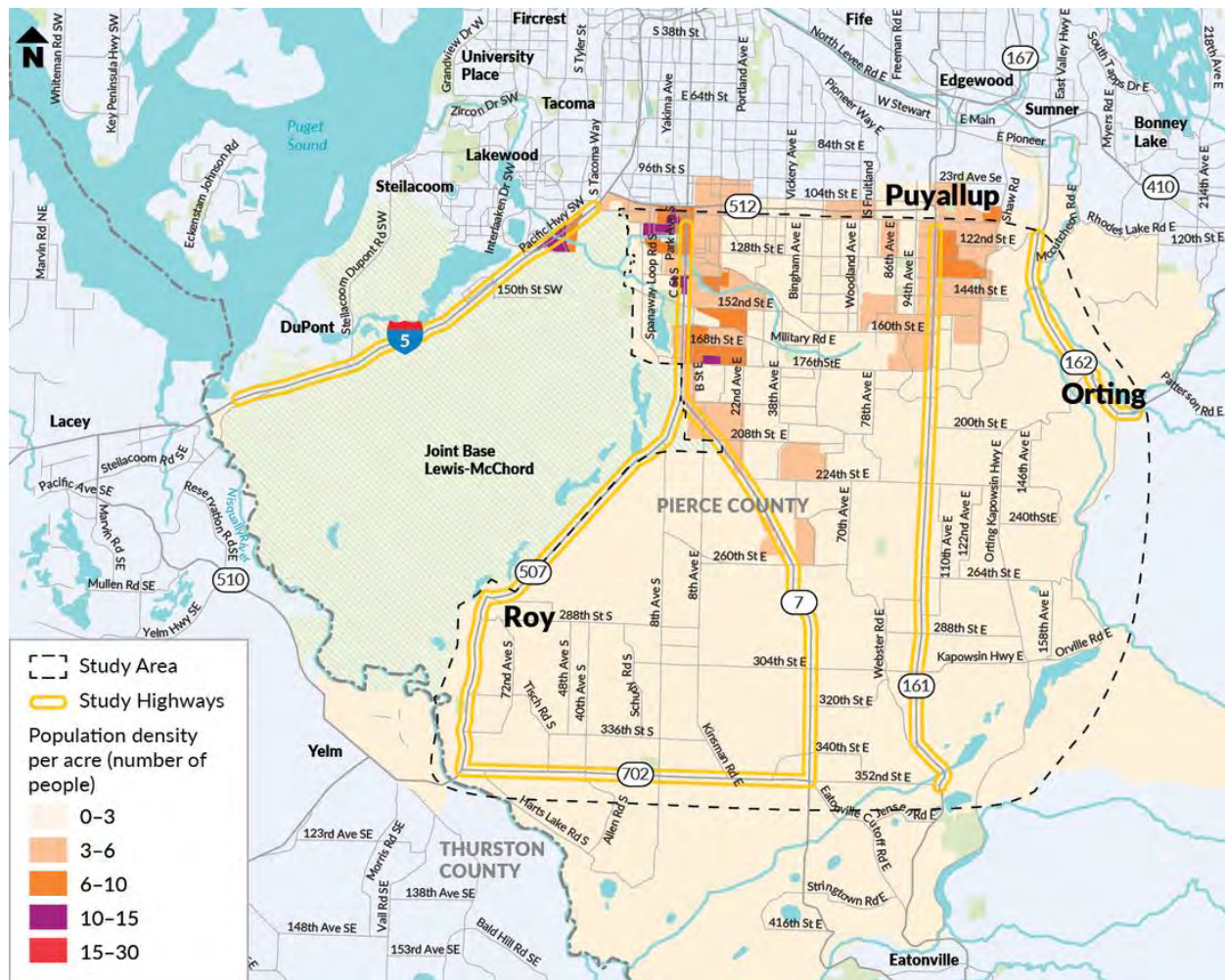
South Pierce County, within the study area, has experienced population growth and development, increasing from about 206,000 to 302,000 people between 2000 and 2020. This is a growth of almost fifty percent over twenty years. In comparison, Pierce County grew by thirty percent during that same period.

Study Area Population Growth

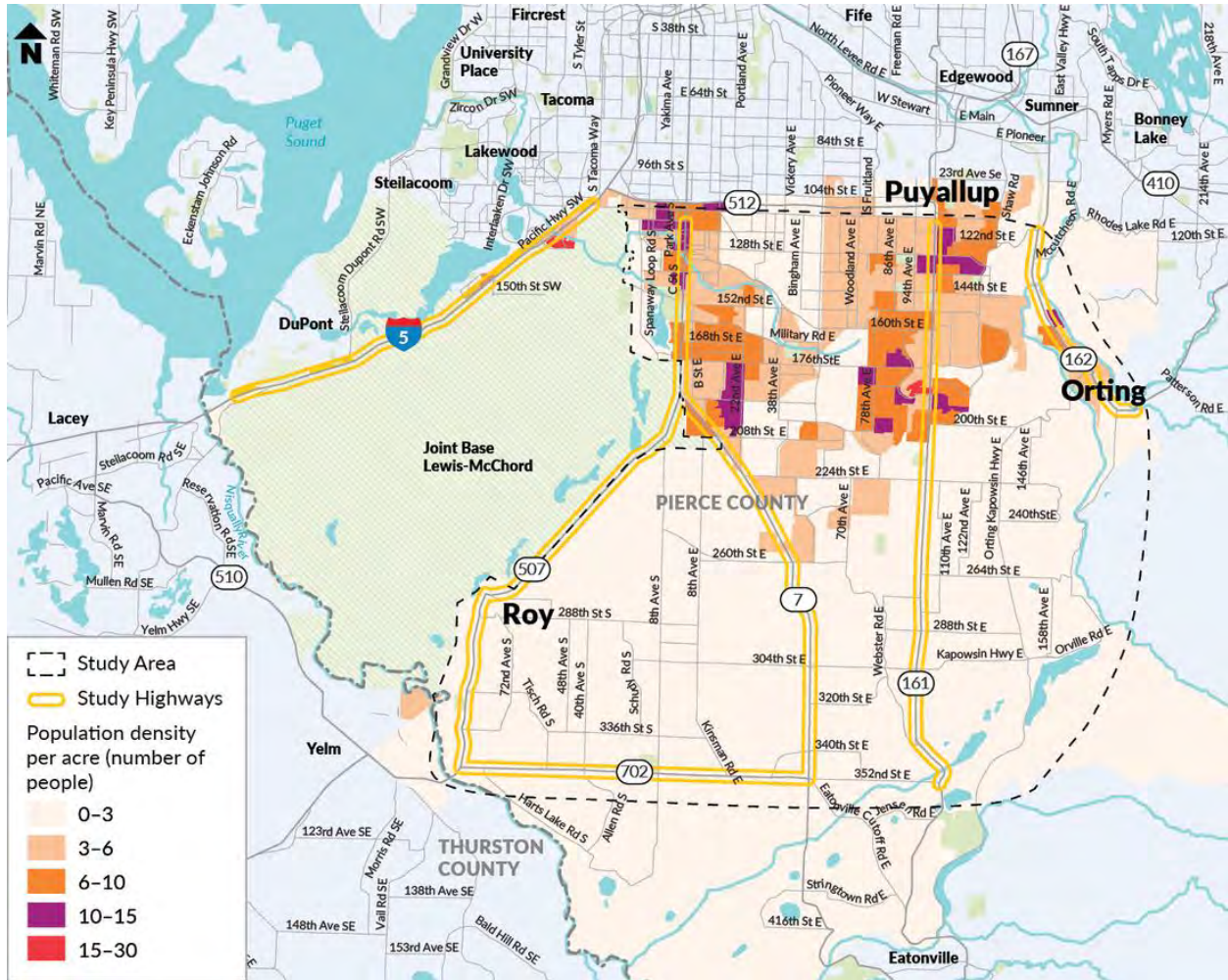


Study area population growth between 2000 and 2020 (US Census Data)

SOUTH PIERCE MULTIMODAL CONNECTIVITY STUDY



2000 Population density (Source: American Community Survey)



2020 Population density (Source: American Community Survey)

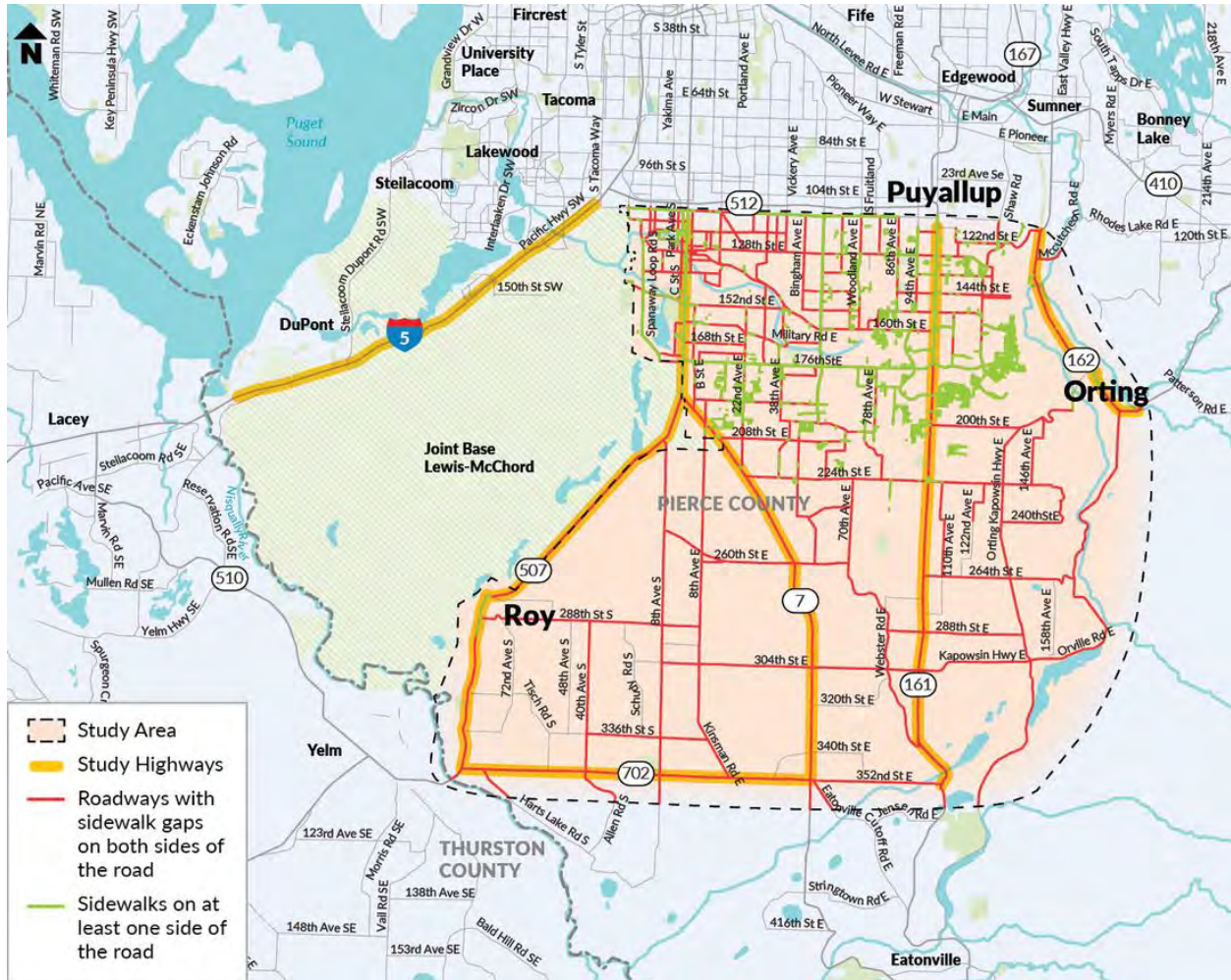
Transportation modes

People use multiple travel modes to move throughout the study area:

Biking, walking, and rolling: There is limited infrastructure for people biking, walking or rolling, which creates safety concerns for people using these modes of travel.

Many of the primary roadways in the study area do not have infrastructure for people biking, or the roadways may have a striped bike lane or wide shoulder but are paired with high traffic volumes and speeds from motor vehicles.

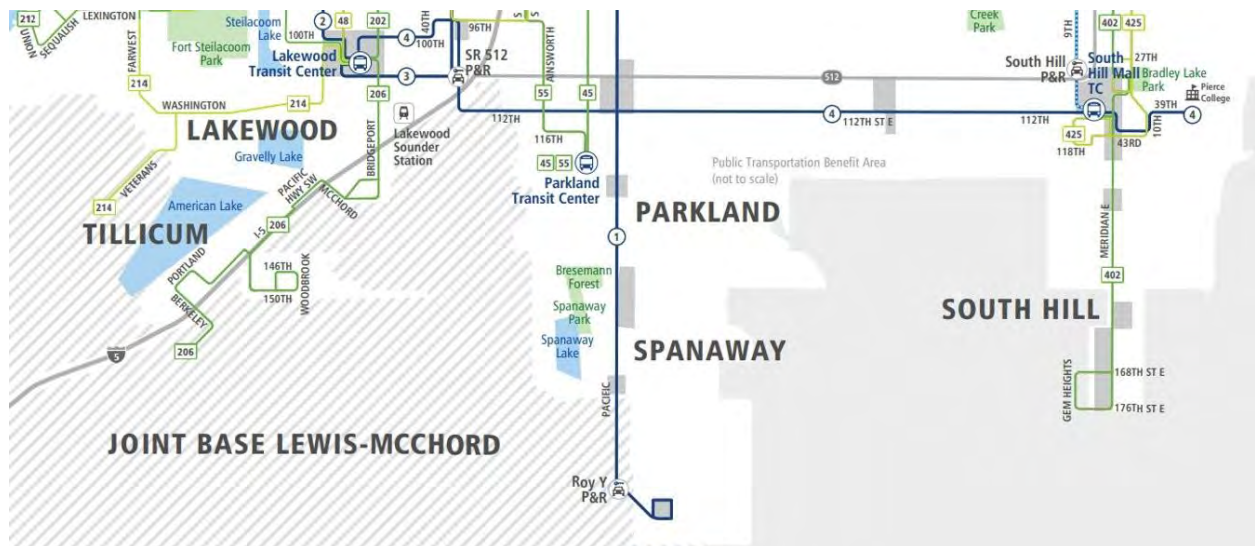
A [Bethel School District](#) analysis showed that only nine percent of streets in their district have sidewalks. The southern half of the study area, in particular, lacks sidewalks.



Roadways with sidewalk gaps in study area (source: WSDOT and Pierce County data for existing sidewalks, analyzed by Fehr & Peers, 2022)

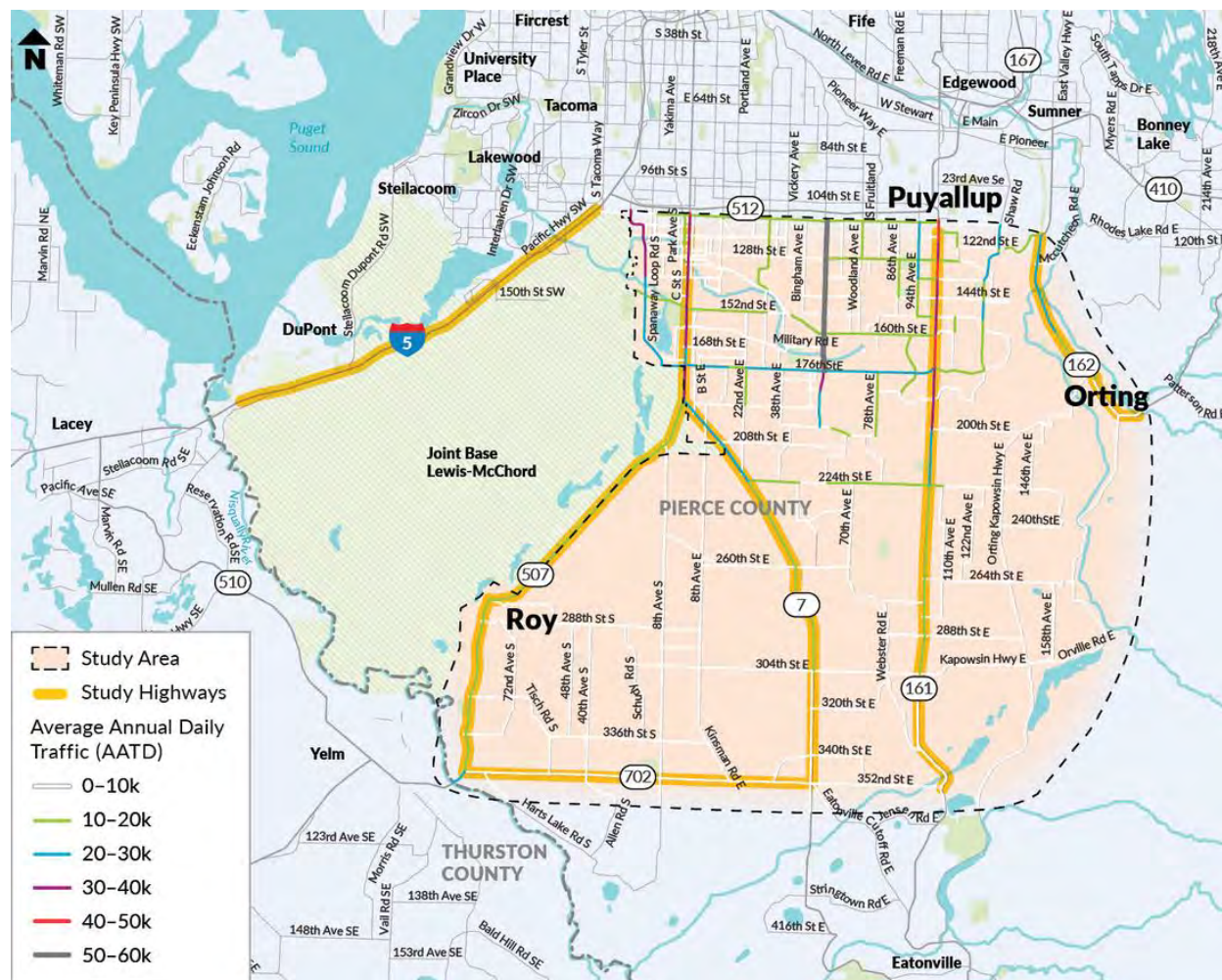
Taking transit: Pierce Transit operates routes 1, 4, 45, 55, 400, 402 and 425 in the study area. Pierce Transit is currently working to convert Route 1 to a [bus rapid transit](#) route, which is scheduled to begin in 2027.

Sound Transit operates the South Sounder line in the study area. In 2016, voters approved the [Sounder South Capacity Expansion program](#) with the goal of expanding Sounder train capacity and improving rider experience. Platform extensions are expected to be completed by 2036 and potential new trips added by 2046.



Transit routes in the study area (Source: Pierce Transit System Map, 2022)

Driving vehicles: People traveling in motor vehicles (including rideshares and carpools) have few east-west arterial options, which creates delays along the north-south state routes.

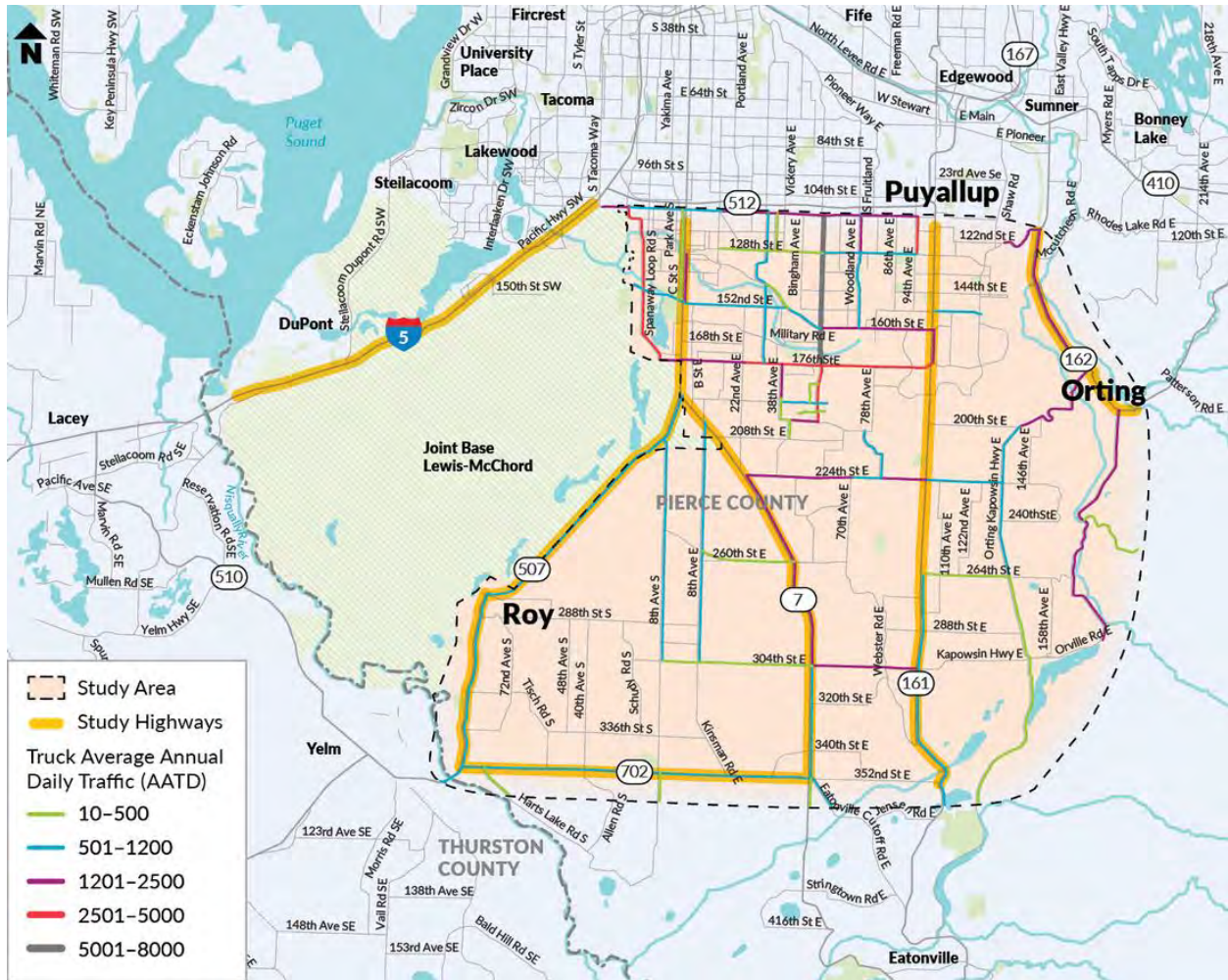


Annual average daily vehicle volumes (source: WSDOT and Pierce County Data)

This daily traffic volume map shows how vehicle traffic is distributed throughout the study area. The dark gray color shows the highest traffic volumes between 50-60,000 vehicles per day; and the lightest white color indicates volumes below 10,000 vehicles per day. Canyon Road East, which is a county road located in the north-central portion of the study area, has the highest volumes, followed closely by SR 7 and SR 161.

Corridor	Vehicles per day
Canyon Road East (between 176th Street East and SR 512)	50,000 – 60,000
SR 161 (north of 200th Street East)	40,000 – 50,000
SR 7 (north of SR 507)	30,000 - 40,000
SR 162 (north of Orting and south of Military Road East)	20,000 – 30,000
SR 507 (between SR 702 and SR 7)	10,000 – 20,000

Freight: Freight volumes are particularly high on Canyon Road East, which serves as the primary link between SR 512 and the Frederickson Manufacturing and Industrial Center. Additional warehouse space is being developed in the Frederickson area, which will increase freight volumes. Data suggests many trucks may be using Spanaway Loop Road as an SR 7 alternate route.



Average annual daily truck volumes (Source: WSDOT and Pierce County Data)

Safety

Safety is WSDOT's number one priority. This study will incorporate Target Zero practices to reduce traffic fatalities and serious injuries on Washington's roadways. Across the study area, on all local, county and state roads, there were 387 fatal or serious injury crashes between 2017 and 2021. On state routes in the study area, there were 32 fatality and 102 serious injury crashes.¹

Land use projections

While the study area is mostly in unincorporated Pierce County, it includes the cities of Puyallup, Orting and Roy. Over the next twenty years, it's projected that the population in the study area will continue to grow, with demand for north-south travel to regional highways expected to increase as the growth occurs. Portions of the study area may see population growth as much as 30 – 40 percent in the next twenty years.

Jurisdiction	2020		PERCENT GROWTH (2020–2044)	
	Population	Jobs	Population	Jobs
Puyallup	43,000	30,600	43%	48%
Orting	9,000	1,500	7%	13%
Roy	800	200	38%	50%
Unincorporated High Capacity Transit	157,500	31,500	25%	33%
Unincorporated Urban	79,500	25,900	40%	34%
Unincorporated Rural	169,300	24,200	5%	12%
Pierce County Total	921,100	346,300	30%	41%

Population and jobs growth between 2020-2044
(Source: Pierce County Growth Targets)

¹ Under 23 U.S. Code 148 and 23 U.S. Code 407, safety data, reports, surveys, schedules, list 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 report, surveys, schedules, lists, or data.

Environment

The study will identify the impact of potential improvement strategies on wetlands, stream corridors, floodplains, animal habitat areas and parks. Improvement strategies may be modified or removed from consideration depending on the level of impact they may have on these environmental factors.

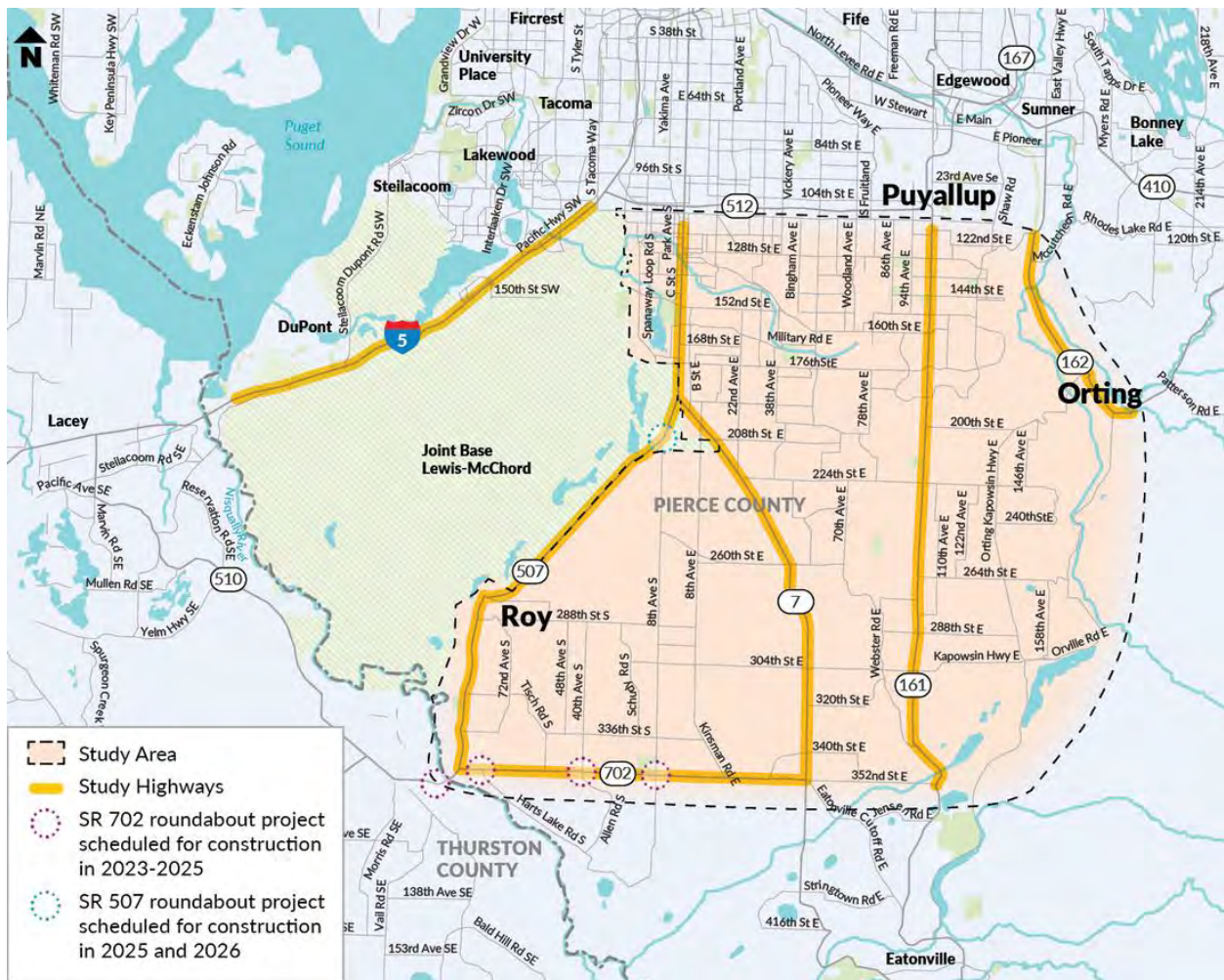
Equity and health disparities

The study will consider the burdens and benefits of potential improvement strategies for areas where minority, low-income, or other disadvantaged communities might be affected. The improvement strategies will seek to better allocate resources towards areas that have historically received less funding and other resources.

Planned future improvements

WSDOT has several projects in the study area ready for construction that are designed to improve safety and travel times, including:

- SR 702 roundabouts at 8th Avenue South, 40th Avenue South and Allen Road South, and Harts Lake Road South. All are scheduled for construction in 2023-2025.
- SR 507 roundabouts at Vail Road Southeast and 208th Street East. Both are scheduled for construction in 2025 and 2026.



Map of study area with future roundabout improvements

Feedback

We want to hear from you! Take the South Pierce Multimodal Connectivity Study questionnaire. Please share your thoughts with us! This questionnaire should take less than ten minutes to complete and will be available through December 16, 2022.

To learn about the study, visit [our webpage](#).

QUESTIONNAIRE

Please share your thoughts with us. All questions are optional.

1. What best describes you? Select all that apply:

- I work at or attend school in the study area
- I live in the study area
- I travel through the study area
- I have family in the study area
- I do not work, live, or travel through the study area

2. What types of trips do you take in the study area? Select all that apply:

- Commute to and from work
- Commute to and from school
- Travel for shopping/errands
- Visit friends and family
- Travel for recreational activities
- Attend services or activities
- Travel for deliveries and freight
- Other (please explain):

3. How often do you travel around or through the study area? Select one:

- Never
- Rarely (a few times a year)
- At least once a month
- At least once a week
- Daily

4. Which study area state route(s) do you travel on regularly? Select all that apply:

- State Route 7
- State Route 161
- State Route 162
- State Route 507

- State Route 702
- Interstate 5
- Other:

5. Do you take an alternate route to avoid traveling on any of the state highways listed above? Select one:

- Yes
- No
- Sometimes
- During peak commute hours only

6. What are the main ways you get around the study area? Select all that apply:

- Walk or skateboard
- Bicycle
- Personal mobility device (scooter, wheelchair, etc.)
- Motorcycle
- Taxi or other private ride-sharing service (like Uber or Lyft)
- Transit/Bus/Vanpool/Paratransit/Microtransit
- Personal vehicle by yourself
- Carpool using vehicle with others
- Commercial vehicle
- Other (please explain):

7. What are the biggest challenges for you when you travel around south Pierce County? Rank 1 being your biggest challenge and 7 being the least challenging.

- Safety concerns for all modes, including people walking, rolling, biking, taking transit or driving
- Lack of sidewalks, crosswalks, bike lanes, or transit service, and other multimodal options
- North-south roadway congestion on State Routes such as SR 161, 162, 7, and 507
- Freight access and congestion
- Few east-west highways to connect travelers to north-south highways
- Lack of options when I-5 or other state highways are closed or at capacity
- Other

8. What can be done to improve travel for people biking, walking and rolling? Select all that apply.

- Add missing sidewalks
- Improve sidewalk access for people using wheelchairs or mobility scooters

- Provide more opportunities to cross the street
- Provide more separation between vehicles and those biking, walking, and rolling
- Reduce vehicle speeds
- Improve lighting
- Implement “complete streets” principles as appropriate (complete streets is defined as: a complete street is safe and feels safe for everyone using the street, for all users regardless of their age and ability).
- Other (please explain):

9. Are there specific roadway or sidewalk locations or places you’d suggest we look at to make improvements for people biking, walking, and rolling? What improvements would you recommend at those locations?

10. What can be done to improve travel for people taking bus transit?

- More frequent transit service on existing routes
- More or new transit routes
- Separate transit lanes
- Providing transit priority at signals
- Improved safety for people using transit
- Other (please explain):

11. If more funding was available for bus transit service, either within the current Pierce Transit service area or an expansion, how would you prioritize the following transit improvements? Please rank the following 1 – 3, with 1 being your highest priority.

- New routes that connect destinations not currently served by Pierce Transit
- More frequent transit service on existing routes, meaning you would be able to catch a bus with less waiting
- Improvements to speed up bus routes so you could get to your destination quicker via transit

12. Do you or your family members use Sound Transit’s Sounder Train from Lakewood, Tacoma, Puyallup or Sumner to travel to work, school or recreation?

- Yes, Lakewood
- Yes, Tacoma
- Yes, Puyallup
- Yes, Sumner
- No

13. If you had the option of traveling by train, would you use it?

- Yes

- No

14. If more funding was available for train transit, within the current Sound Transit service area or future expansion, how would you prioritize the following improvements? Please rank 1-2, with 1 being your highest priority.

- More frequent train service on existing routes including weekend service to and from Seattle
- New routes that connect destinations not currently served by Sound Transit Sounder Train

15. What are some destinations that you would like to be able to access via bus or train transit?

16. How likely would you be to take transit on a regular basis if it was offered in your area? Select one:

- Very likely to take transit regularly if offered in my area
- Likely to take transit sometimes if offered in my area
- Unlikely to take transit even if offered in my area

17. Are there specific locations or places you would like to see improvements for people taking transit?

18. What can be done to improve travel for vehicles (including rideshare, vanpools, carpools, and other vehicles)? Select all that apply:

- Roadway widening
- New roadway connections
- Improved intersection operations
- Matching growth with transportation improvements
- Better signage
- Other (please explain):

19. Are there specific locations or places you would like to see improvements for people traveling in rideshare, carpool, or driving personal vehicles?

20. When thinking about how you travel through the study area, what improvements would you like to see in the future? Please describe in one sentence.

21. What is your zip code?

Optional Demographic Questions

Title VI of the Civil Rights Act of 1964 requires the Washington State Department of Transportation to be sure that everyone in the affected project areas has a chance to be heard and to respond to transportation programs and activities that may affect their community.

To help with that, we ask that you voluntarily provide us information about your race, ethnicity, gender and/or other demographics. You are not required to disclose the information requested to participate in this questionnaire.

WSDOT will handle the information gathered as confidentially as possible. For further information regarding this process please contact the Title VI Coordinator by phone at 360-705-7090.

Please respond to the following questions:

1) Gender:

- ☐ Male
- ☐ Female
- ☐ Non-binary
- ☐ Prefer not to disclose

2) Disability

- ☐ Yes
- ☐ No
- ☐ Prefer not to disclose

3) Ethnicity

- ☐ Hispanic or Latino
- ☐ Not Hispanic or Latino

4) Race (check one or more)

- ☐ American Indian/Alaskan Native
- ☐ Asian
- ☐ Black or African American
- ☐ Native Hawaiian/Pacific Islander
- ☐ Caucasian
- ☐ Other
- ☐ Prefer not to disclose

5) Language spoken at home (check one or more)

- ☐ English only
- ☐ Tagalog
- ☐ Spanish
- ☐ Korean
- ☐ Russian

- Chinese
- German
- Arabic
- Vietnamese
- Prefer not to disclose
- Other

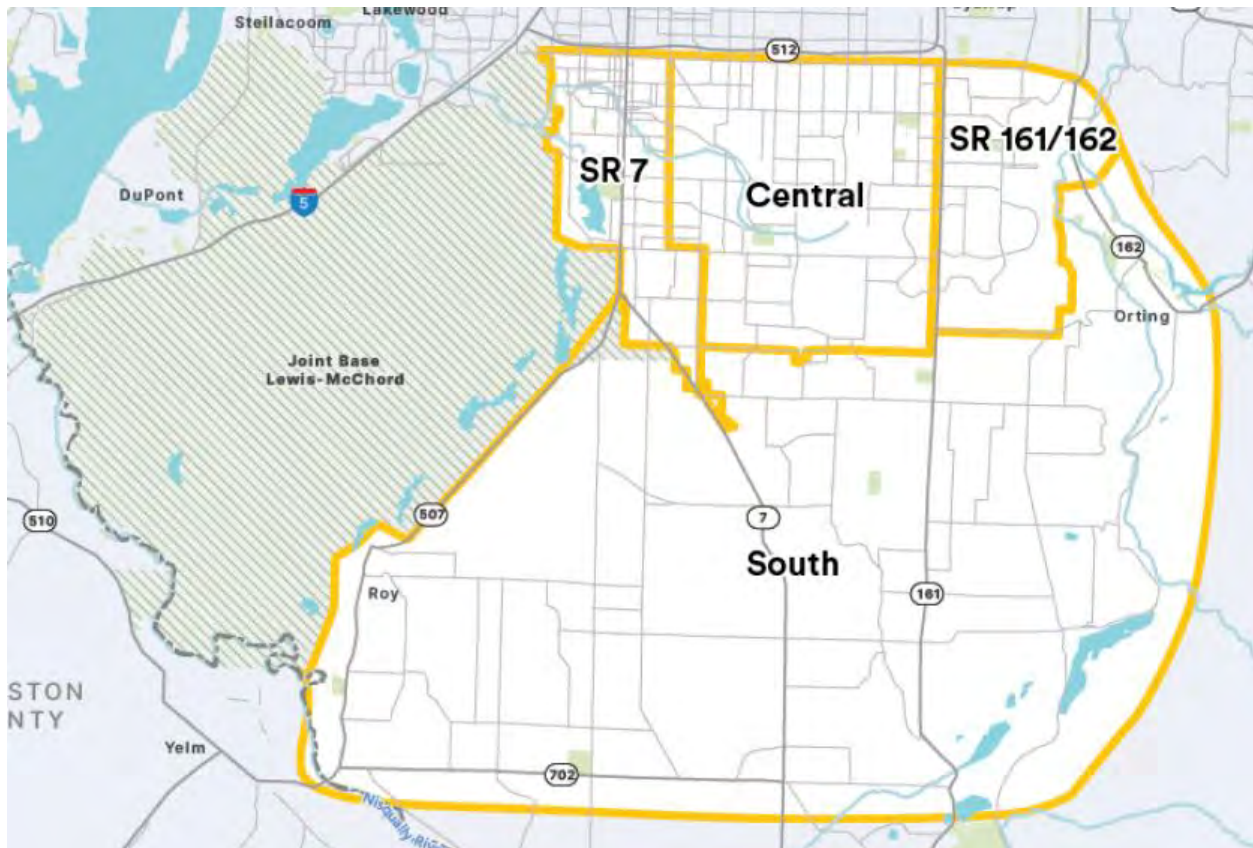
6) Age

- Under 18
- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65-79
- 80+
- Prefer not to disclose

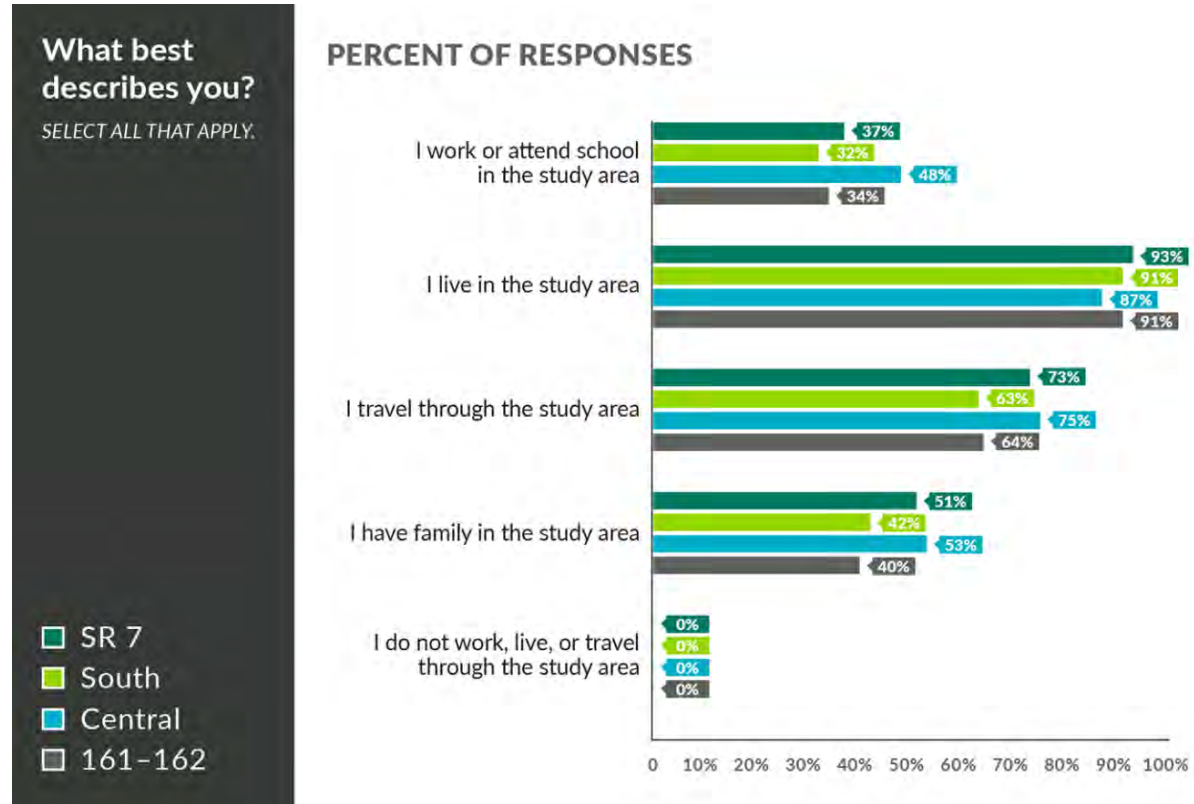
Attachment B

Questionnaire responses by subarea

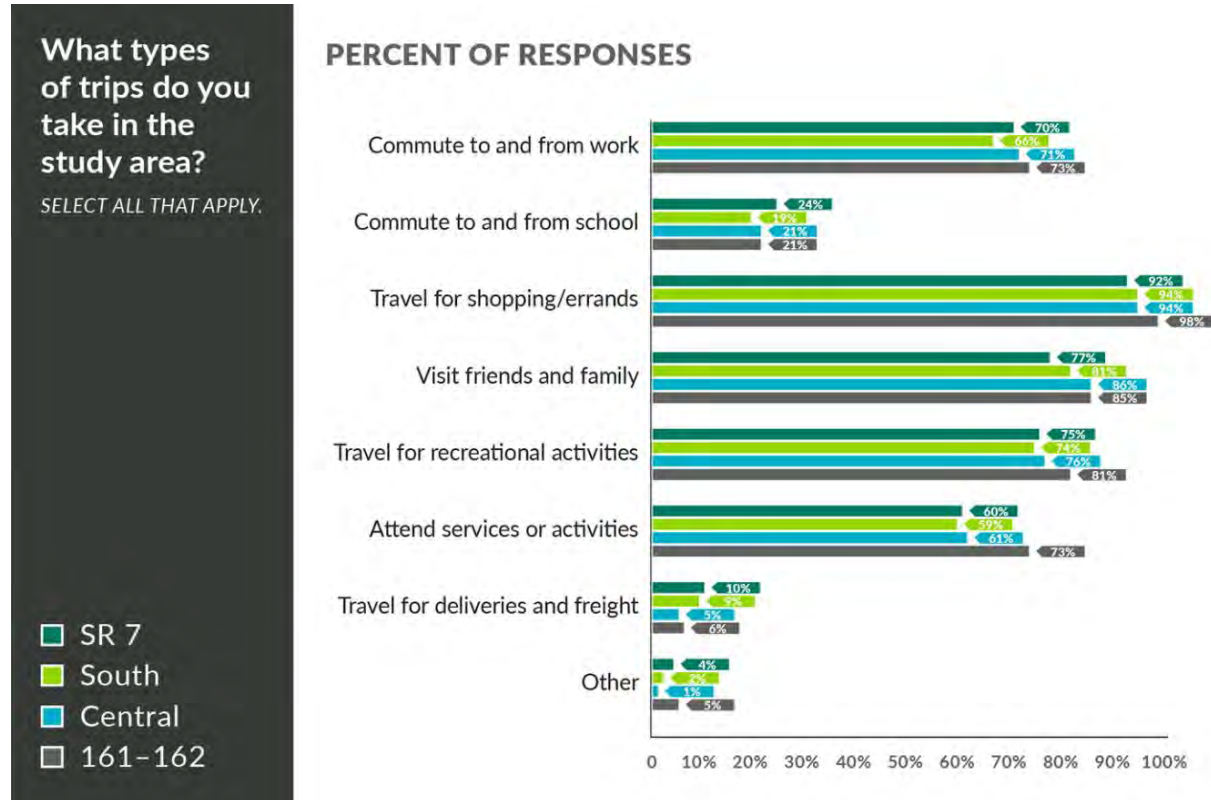
The study team developed four subareas based on feedback from agencies, committees, and community groups reflecting that different parts of the study area have different needs and priorities. These subareas allow the study team to focus on context-sensitive strategies to address existing and future transportation issues. A map of the four subareas is included below:



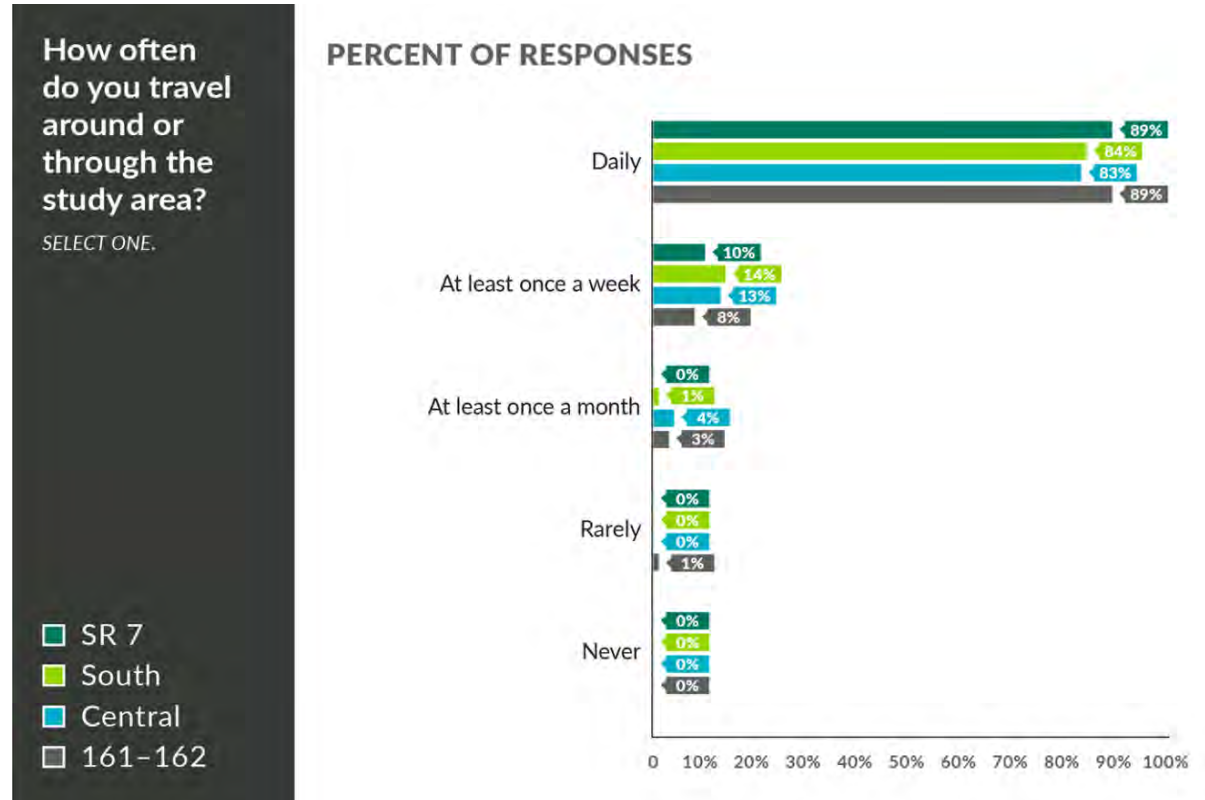
The following information depicts community input across the different subareas to inform the South Pierce Multimodal Connectivity Study. It is not considered a scientific, statistically significant survey. Note that the questions reflected below are only those with multiple choice responses.

Question 1 | What best describes you? Select all that apply:

	SR 7	South	Central	SR 161–162
I work or attend school in the study area	37%	32%	48%	34%
I live in the study area	93%	91%	87%	91%
I travel through the study area	73%	63%	75%	64%
I have family in the study area	51%	42%	53%	40%
I do not work, live, or travel through the study area	0%	0%	0%	0%

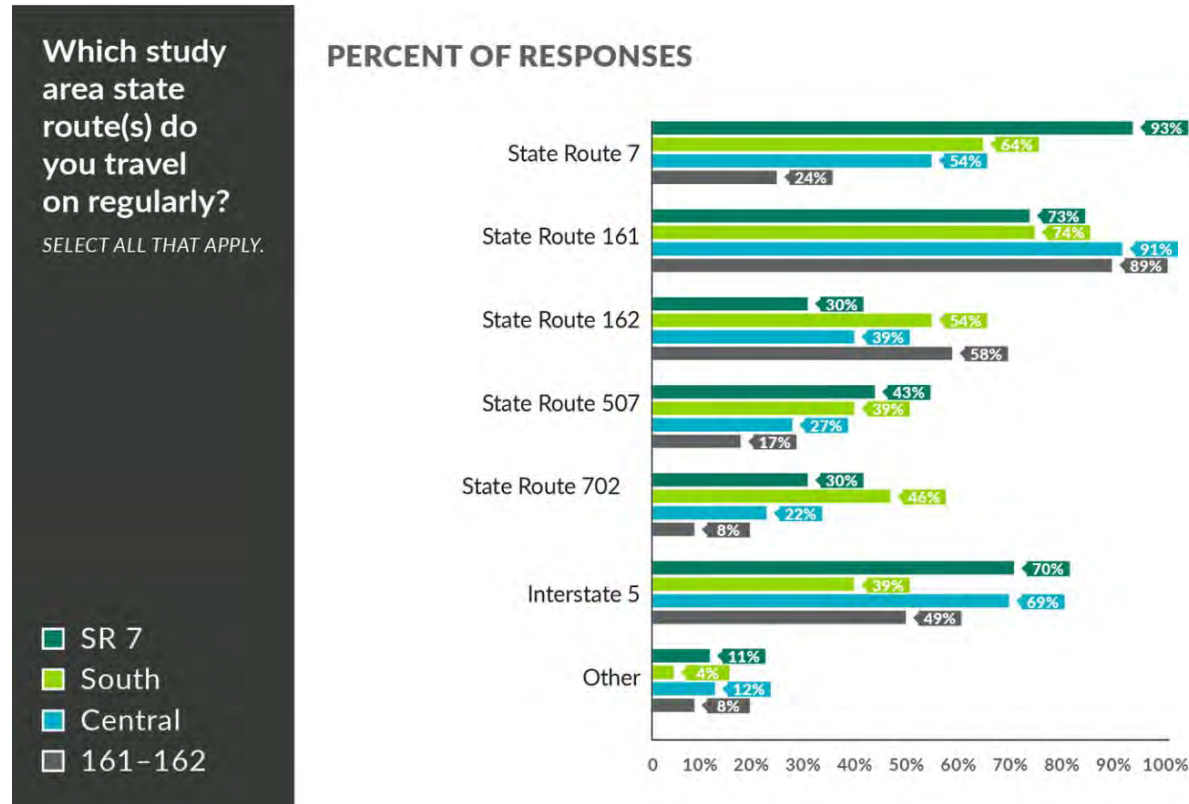
Question 2 | What types of trips do you take in the study area? Select all that apply:

	SR 7	South	Central	SR 161-162
Commute to and from work	70%	66%	71%	73%
Commute to and from school	24%	19%	21%	21%
Travel for shopping/errands	92%	94%	94%	98%
Visit friends and family	77%	81%	85%	85%
Travel for recreational activities	75%	74%	76%	81%
Attend services or activities	60%	59%	61%	73%
Travel for deliveries and freight	10%	9%	5%	6%
Other	4%	2%	1%	5%

Question 3 | How often do you travel around or through the study area? Select one:

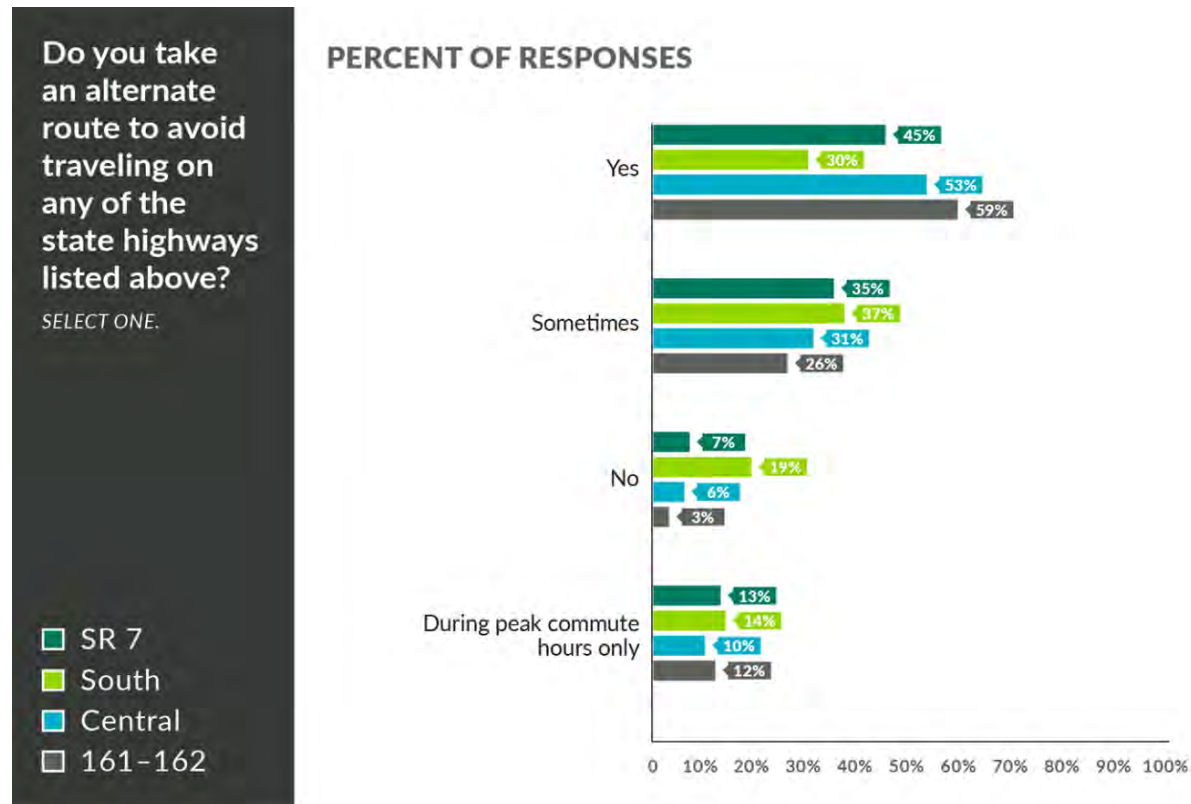
	SR 7	South	Central	SR 161-162
Daily	89%	84%	83%	89%
At least once a week	10%	14%	13%	8%
At least once a month	0%	1%	4%	3%
Rarely	0%	0%	0%	1%
Never	0%	0%	0%	0%

Question 4 | Which study area state route(s) do you travel on regularly? Select all that apply:



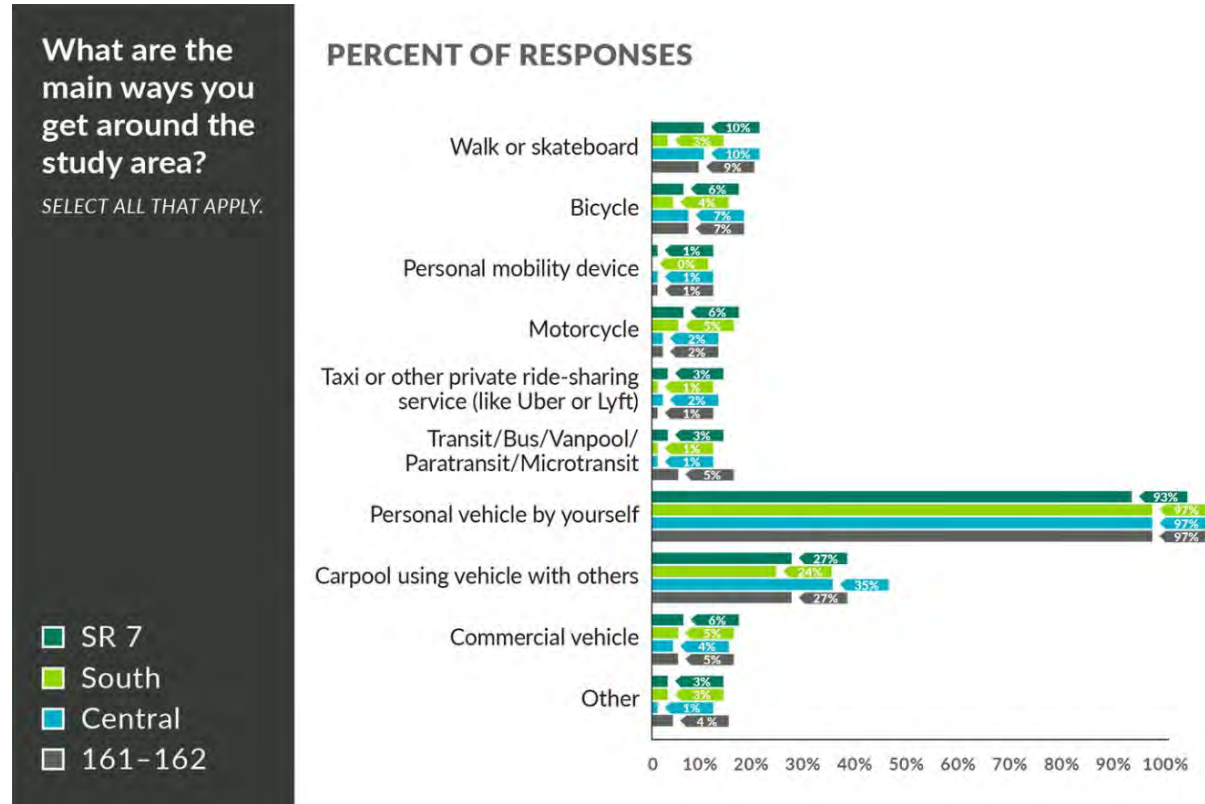
	SR 7	South	Central	SR 161–162
State Route 7	93%	64%	54%	24%
State Route 161	73%	74%	91%	89%
State Route 162	30%	54%	39%	58%
State Route 507	43%	39%	27%	17%
State Route 702	70%	46%	22%	8%
Interstate 5	70%	39%	69%	49%
Other	11%	4%	12%	8%

Question 5 | Do you take an alternate route to avoid traveling on any of the state highways listed above? Select one:



	SR 7	South	Central	SR 161–162
Yes	45%	30%	53%	59%
Sometimes	35%	37%	31%	26%
No	7%	19%	6%	3%
During peak commute hours only	13%	14%	10%	12%

Question 6 | What are the main ways you get around the study area? Select all that apply:



	SR 7	South	Central	SR 161-162
Walk or skateboard	10%	3%	10%	9%
Bicycle	6%	4%	7%	7%
Personal mobility device	1%	0%	1%	1%
Motorcycle	6%	5%	2%	2%
Taxi or other private ride-sharing service (like Uber or Lyft)	3%	1%	2%	1%
Transit/Bus/Vanpool/Paratransit/Microtransit	3%	1%	1%	5%
Personal vehicle by yourself	93%	97%	97%	97%

	SR 7	South	Central	SR 161–162
Carpool using vehicle with others	27%	24%	35%	27%
Commercial vehicle	6%	5%	4%	53%
Other	3%	3%	1	4%

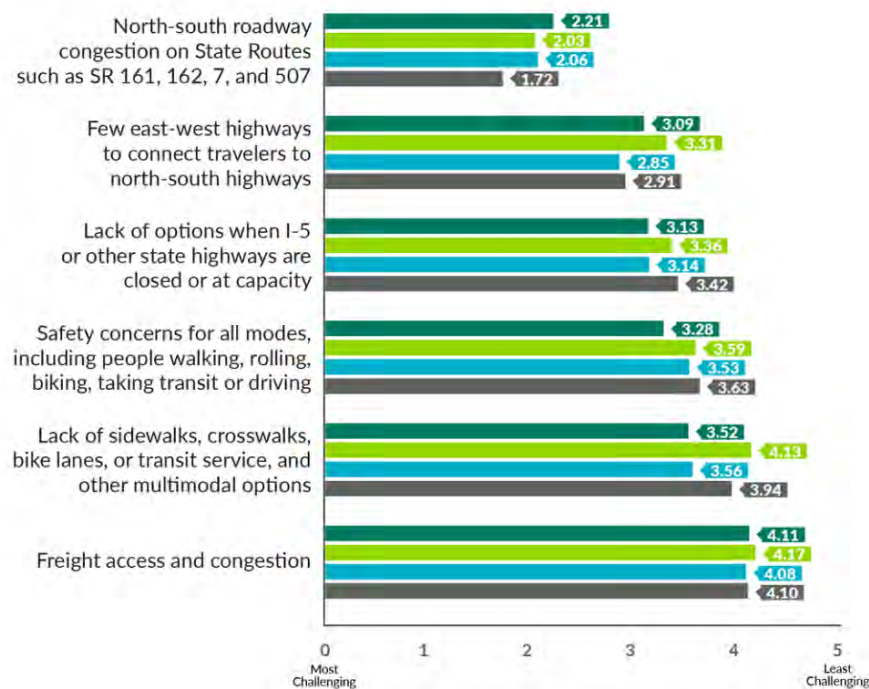
Question 7 | What are the biggest challenges for you when you travel around south Pierce County? Rank 1 being your biggest challenge and 7 being the least challenging.

What are the biggest challenges for you when you travel around south Pierce County?

RANK 1 BEING YOUR BIGGEST CHALLENGE AND 7 BEING THE LEAST CHALLENGING.

SR 7
South
Central
161-162

AVERAGE RANKING BY SUBAREA



Answer	SR 7	South	Central	161-162	Most challenging - - - - - Least Challenging
North-south roadway congestion on State Routes such as SR 161, 162, 7, and 507	2.21	2.03	2.06	1.72	
Few east-west highways to connect travelers to north-south highways	3.09	3.31	2.85	2.91	
Lack of options when I-5 or other state highways are closed or at capacity	3.13	3.36	3.14	3.42	
Safety concerns for all modes, including people walking, rolling, biking, taking transit or driving	3.28	3.59	3.53	3.63	
Lack of sidewalks, crosswalks, bike lanes, or transit service, and other multimodal options	3.52	4.13	3.56	3.94	
Freight access and congestion	4.11	4.17	4.08	4.10	

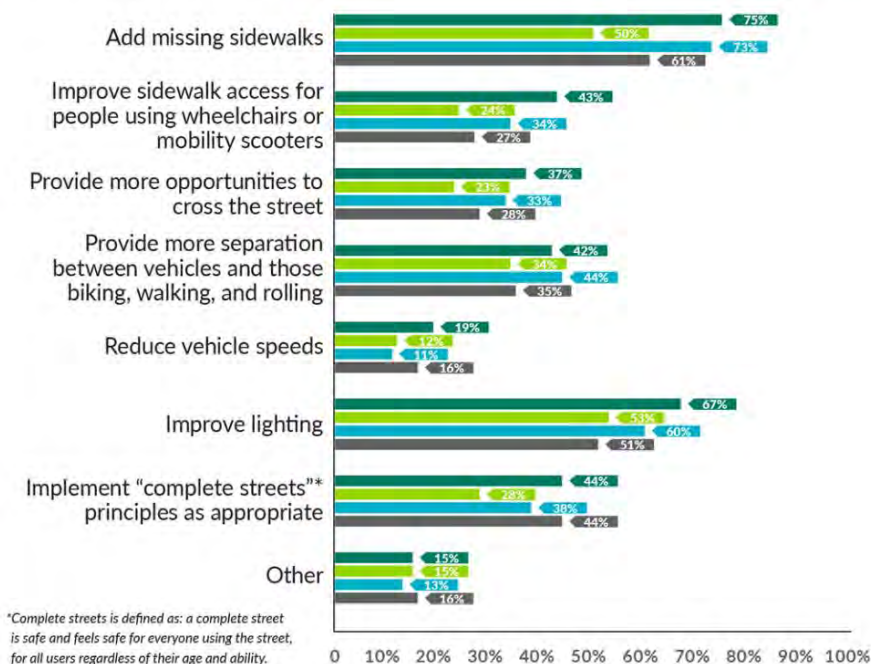
Question 8 | What can be done to improve travel for people biking, walking and rolling? Select all that apply.

What can be done to improve travel for people biking, walking and rolling?

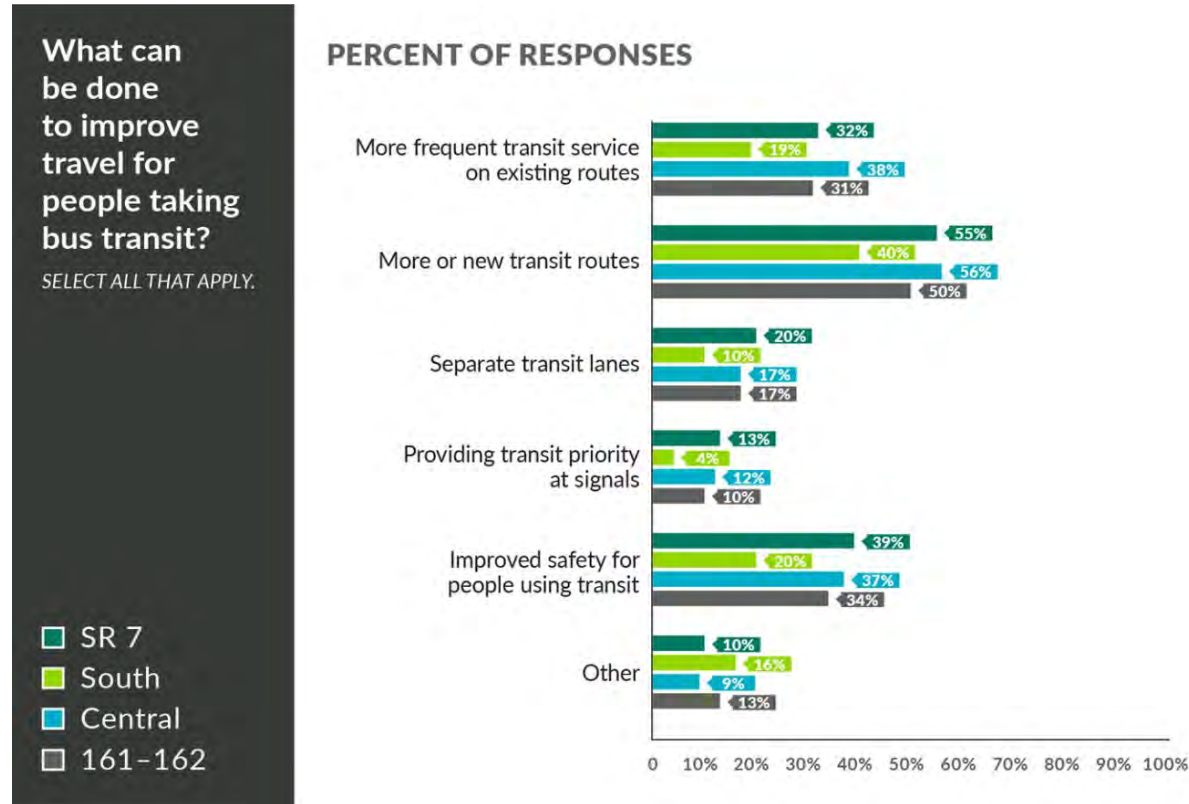
SELECT ALL THAT APPLY.

☐ SR 7
☐ South
☐ Central
☐ 161-162

PERCENT OF RESPONSES

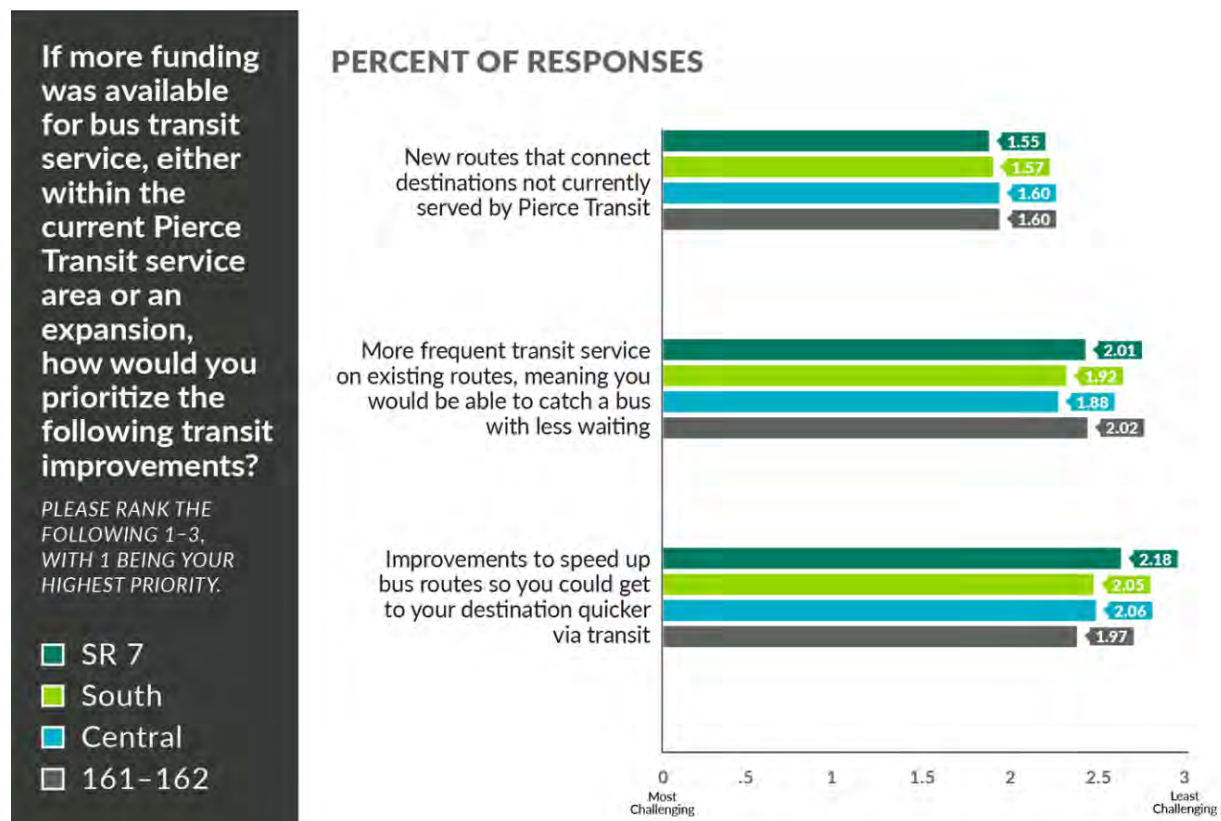


	SR 7	South	Central	SR 161-162
Add missing sidewalks	75%	50%	73%	61%
Improve sidewalk access for people using wheelchairs or mobility scooters	43%	24%	34%	27%
Provide more opportunities to cross the street	37%	23%	33%	28%
Provide more separation between vehicles and those biking, walking, and rolling	42%	34%	44%	35%
Reduce vehicle speeds	19%	12%	11%	16%
Improve lighting	67%	53%	60%	51%
Implement "complete streets" principles as appropriate (complete streets is defined as: a complete street is safe and feels safe for everyone using the street, for all users regardless of their age and ability).	44%	28%	38%	44%
Other	15%	15%	13%	16%

Question 10 | What can be done to improve travel for people taking bus transit?

	SR 7	South	Central	SR 161–162
More frequent transit service on existing routes	32%	19%	38%	31%
More or new transit routes	55%	40%	56%	50%
Separate transit lanes	20%	10%	17%	17%
Providing transit priority at signals	13%	4%	12%	10%
Improved safety for people using transit	39%	20%	37%	34%
Other	10%	16%	9%	13%

Question 11 | If more funding was available for bus transit service, either within the current Pierce Transit service area or an expansion, how would you prioritize the following transit improvements? Please rank the following 1 – 3, with 1 being your highest priority.



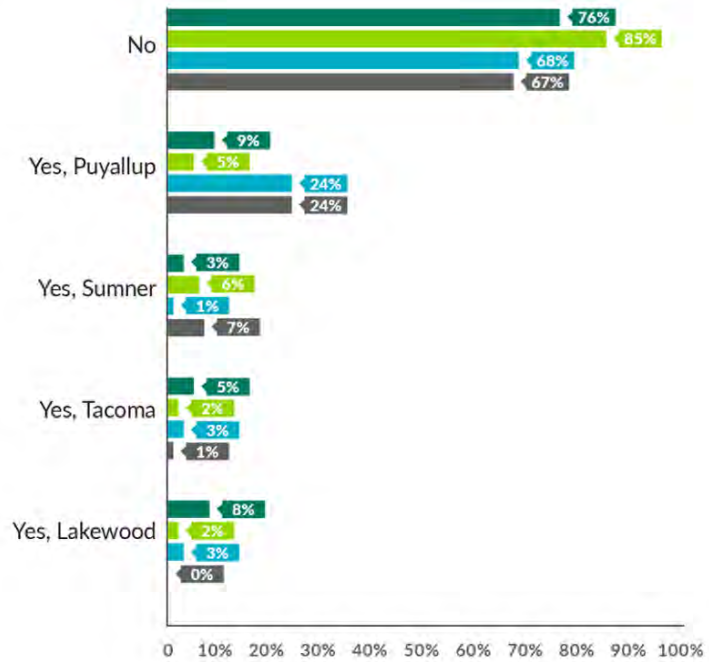
	SR 7	South	Central	161-162
New routes that connect destinations not currently served by Pierce Transit	1.55	1.57	1.60	1.60
More frequent transit service on existing routes, meaning you would be able to catch a bus with less waiting	2.01	1.92	1.88	2.02
Improvements to speed up bus routes so you could get to your destination quicker via transit	2.18	2.05	2.06	1.97

Question 12 | Do you or your family members use Sound Transit's Sounder Train from Lakewood, Tacoma, Puyallup or Sumner to travel to work, school or recreation?

Do you or your family members use Sound Transit's Sounder Train from Lakewood, Tacoma, Puyallup or Sumner to travel to work, school or recreation?

SR 7
 South
 Central
 161-162

PERCENT OF RESPONSES

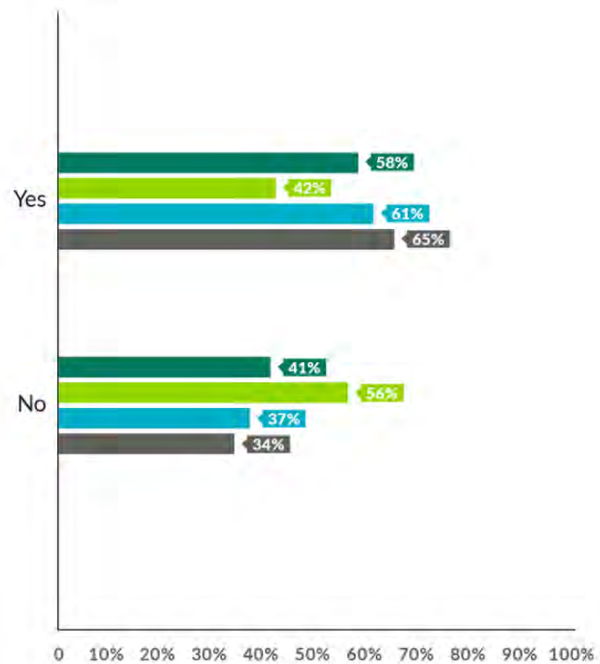


	SR 7	South	Central	SR 161-162
No	76%	85%	68%	67%
Yes, Puyallup	9%	5%	24%	24%
Yes, Sumner	3%	6%	1%	7%
Yes, Tacoma	5%	2%	3%	1%
Yes, Lakewood	8%	2%	3%	0%

Question 13 | If you had the option of traveling by train, would you use it?

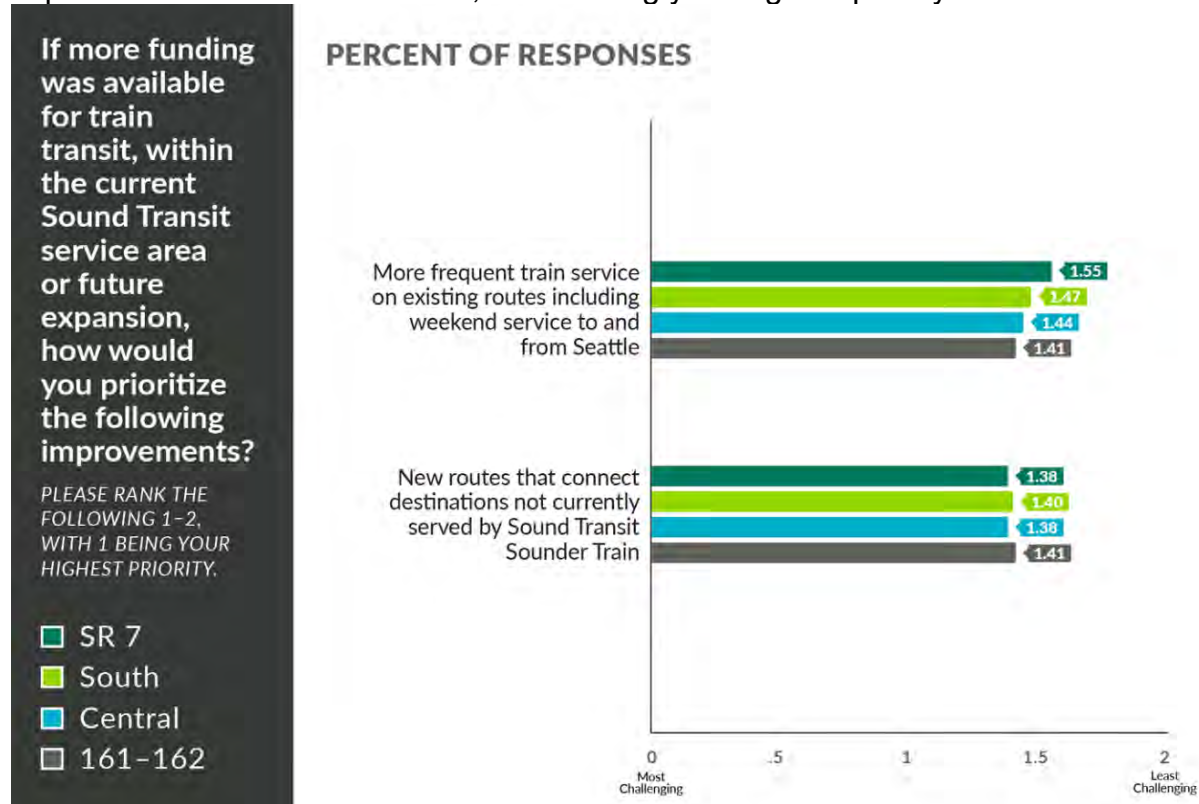
If you had the option of traveling by train, would you use it?

☐ SR 7
☐ South
☐ Central
☐ 161-162

PERCENT OF RESPONSES

	SR 7	South	Central	SR 161–162
Yes	58%	42%	61%	65%
No	41%	56%	37%	34%

Question 14 | If more funding was available for train transit, within the current Sound Transit service area or future expansion, how would you prioritize the following improvements? Please rank 1-2, with 1 being your highest priority.



	SR 7	South	Central	161-162	
New routes that connect destinations not currently served by Sound Transit Sounder Train	1.38	1.40	1.38	1.41	Higher Priority
More frequent train service on existing routes including weekend service to and from Seattle	1.55	1.47	1.44	1.41	Lower Priority

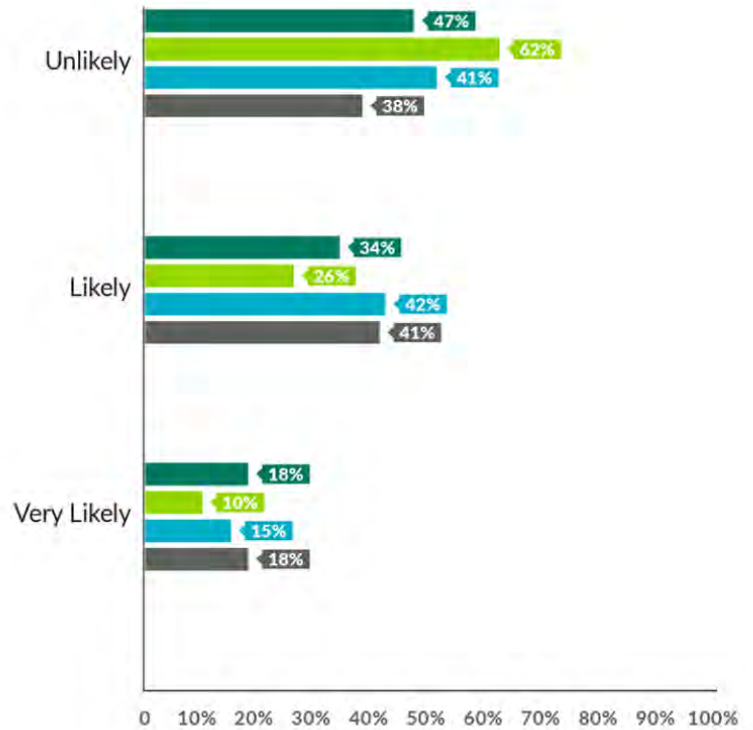
Question 16 | How likely would you be to take transit on a regular basis if it was offered in your area? Select one:

How likely would you be to take transit on a regular basis if it was offered in your area?

SELECT ONE.

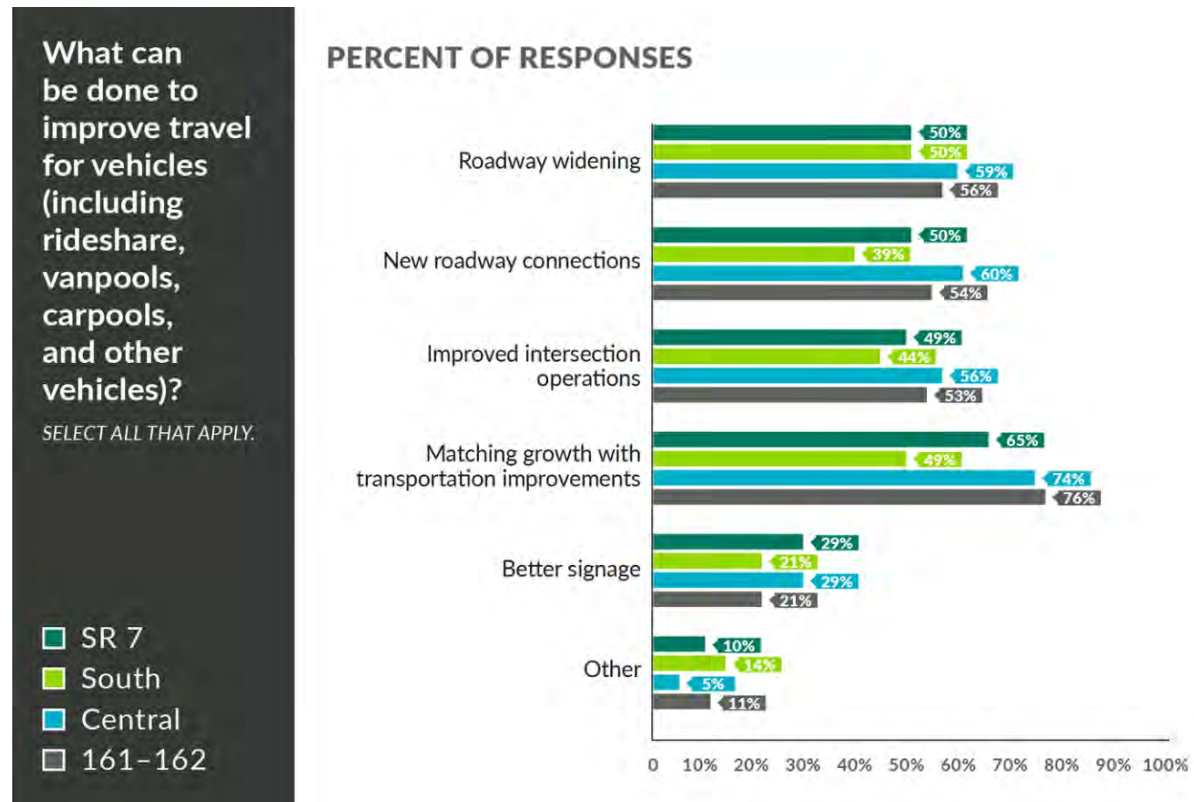
- ☐ SR 7
- ☐ South
- ☐ Central
- ☐ 161-162

PERCENT OF RESPONSES



	SR 7	South	Central	SR 161-162
Unlikely	47%	62%	41%	38%
Likely	34%	26%	42%	41%
Very Likely	18%	10%	15%	18%

Question 18 | What can be done to improve travel for vehicles (including rideshare, vanpools, carpools, and other vehicles)? Select all that apply:



	SR 7	South	Central	SR 161–162
Roadway widening	50%	50%	59%	56%
New roadway connections	50%	39%	60%	54%
Improved intersection operations	49%	44%	56%	53%
Matching growth with transportation improvements	65%	49%	74%	76%
Better signage	29%	21%	29%	21%
Other (please explain):	10%	14%	5%	11%

Appendix H:

SPMCS Illustrative Packages

Evaluation Memo



Prepared by:
Fehr & Peers

In association with:
Stepherson & Associates
Parametrix

Memorandum

Date: September 18, 2023
To: WSDOT Olympic Region
From: Dan Grayuski, Don Samdahl, Michael Adamson
Subject: **SPMCS Illustrative Packages Evaluation**

TC22-0040

Introduction

The South Pierce Multimodal Connectivity Study (SPMCS) gathered existing transportation project lists from all available agency transportation plans:

Studies

[SR 162 Sumner to Orting Corridor Planning Study](#)

[SR 167 Master Plan](#)

[SR 512 Corridor Study](#)

Pierce County Military Road East Alternative Scenarios Study

Plans

[Pierce County Comprehensive Plan 2015](#)

Included are the following community plans:

Alderton-McMillin

Frederickson

Graham

Mid-County

Parkland-Spanaway-Midland

SPMCS Illustrative Packages Evaluation Memo

H-1

Under 23 U.S. Code 148 and 23 U.S. Code 407, safety data, reports, surveys, schedules, list 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 report, surveys, schedules, lists, or data.

South Hill

[Orting Comprehensive Plan](#)

[Orting 2040 Transportation Plan](#)

[Pierce County TIF](#)

[Pierce County TIP](#)

PSRC 2020 RTP

[Pierce Transit Destination 2040](#)

[Pierce Transit Stream](#)

[Pacific Avenue SR 7 Corridor Capital Improvement Plan](#)

[BRT Design Development Concept Plan](#)

[Safe Routes to School Prioritization Analysis 2019](#)

[Pierce County Regional Trails Plan](#)

[WSDOT 2022 STIP](#)

[WSDOT SR 507 and SR 702 Roundabouts Pre-design Study](#)

[Puyallup 2015 Comprehensive Plan](#)

[Puyallup Active Transportation Plan](#)

Approximately 500 potential transportation projects were identified from these plans and studies. A level 1 screening reduced the list to about 200 projects by comparing the projects to the problem statement and goals for the SPMCS study and eliminating projects completely outside of the study area.

In January 2023, the study team defined draft performance measures to perform Level 2 Screening of three improvement packages. The three illustrative packages were built from the post screening one illustrative strategy list and were structured around the following investment focuses:

- A. TSMO and safety focus
- B. County road connectivity and capacity focus
- C. State route capacity focus

The major illustrative strategies included in each package are depicted in **Figure 1** through **Figure 3**. Package C, state route capacity focus, included the widening of SR 161 by one lane in each direction from SR 512 to 264th Street.

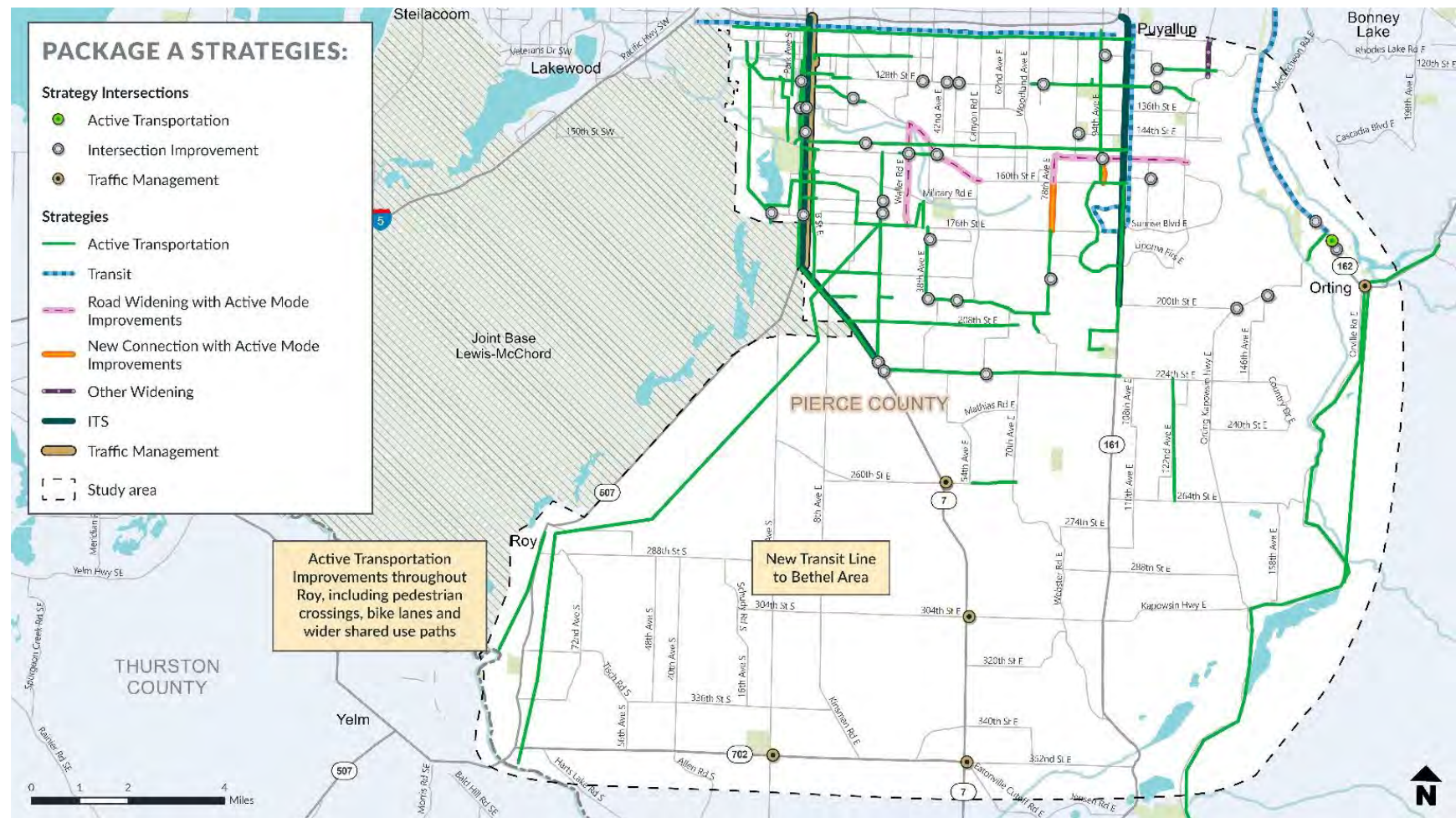


Figure 1. Package A TSMO and Safety Focus Key Illustrative Strategies

SOUTH PIERCE MULTIMODAL CONNECTIVITY STUDY

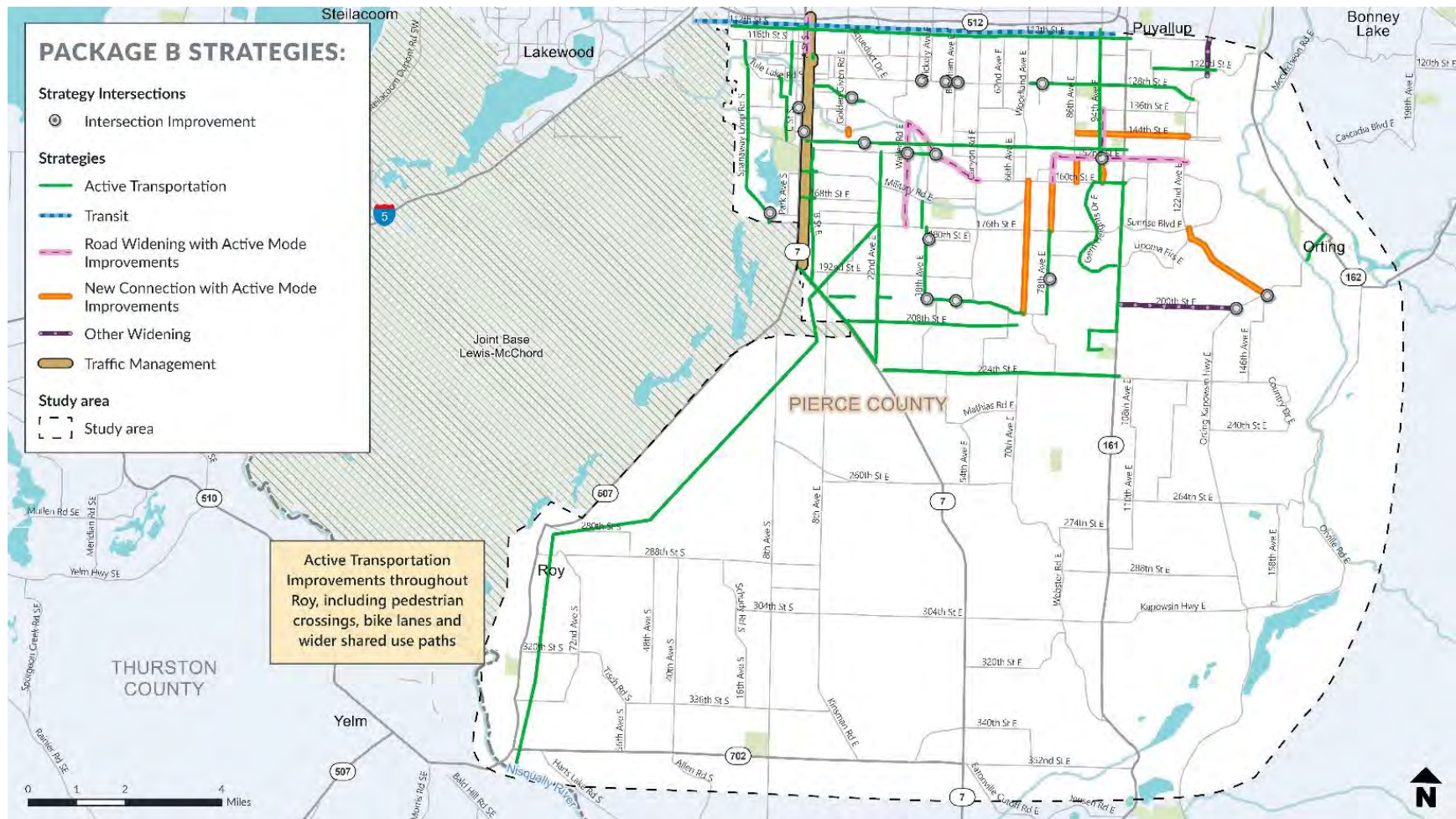


Figure 2. Package B County Road Connectivity and Capacity Focus Key Illustrative Strategies

SPMCS Illustrative Packages Evaluation Memo

H-5

Under 23 U.S. Code 148 and 23 U.S. Code 407, safety data, reports, surveys, schedules, list 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 report, surveys, schedules, lists, or data.

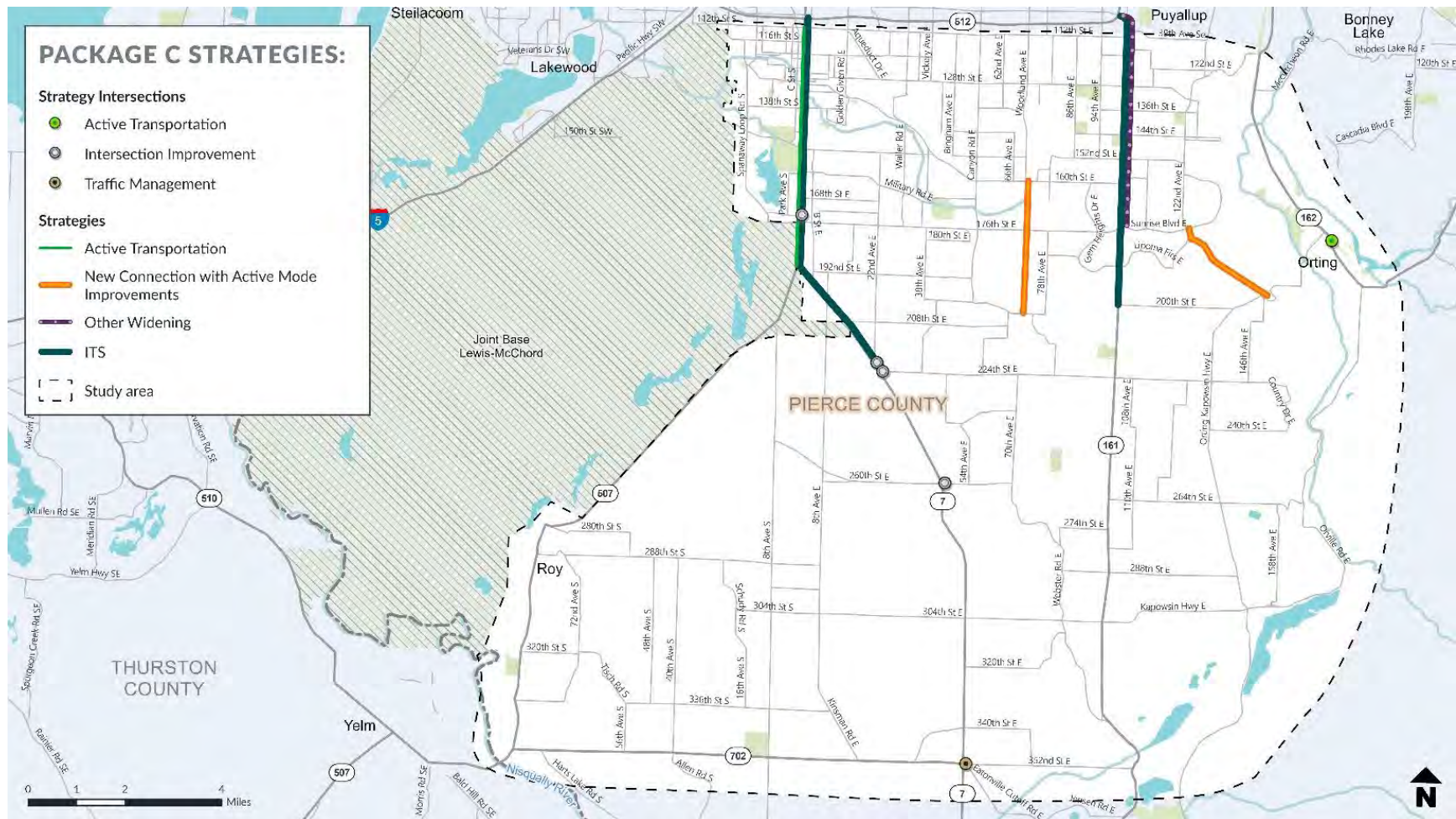


Figure 3. Package C State Route Capacity Focus Key Illustrative Strategies

The packages were evaluated based on the following performance measures:

- Crash Reduction Potential (formerly Safety)
- Consistency with Policy
- Equity
- Quality of Service/Economic Vitality/Travel Reliability
- Environment
- Multimodal Connectivity
- Network Resiliency
- Cost
- Implementation

The project team provided a high-level scoring of each of the packages based on these performance measures. The methods, assumptions, and results for each metric are provided below.

Performance Measures

To measure the effectiveness of each package, the project team subdivided packages into smaller bundles of like strategies. These bundles were then assessed against the performance measures. The qualitative and quantitative results for the bundles were then used to develop a summary rating for each package across each measure.

Crash Reduction Potential

Definition: The implementation of countermeasures and the Safe System Approach to work towards meeting Washington's Strategic Highway Safety Plan: Target Zero goals, to reduce fatal and serious crashes to zero by 2030.

Method: To identify the number of potentially crash reducing improvements focused in areas with a high density of Killed or Serious Injury (KSI) collisions, as shown in **Figure 4**.

Scoring: Results are provided in **Table 1**, with a breakdown of how scoring was defined given below:

- **High:** Includes a large number of safety improvements located within areas with a high density of KSI collisions.
- **Medium:** Includes some safety improvements, but these improvements are not located in areas with a high density of KSI collisions.
- **Low:** Includes little to no safety improvements.

Package A had the highest proportion of safety-related strategies, with the majority of these strategies planned in areas with a high density of KSI collisions. Likewise, many of the strategies in Package B addressed areas with a high density of KSI collisions, but the number of strategies was much lower than Package A. Package C had only a few safety-related strategies, which is why it received a “Low” score.

Figure 4. Density Heatmap of KSI Collisions

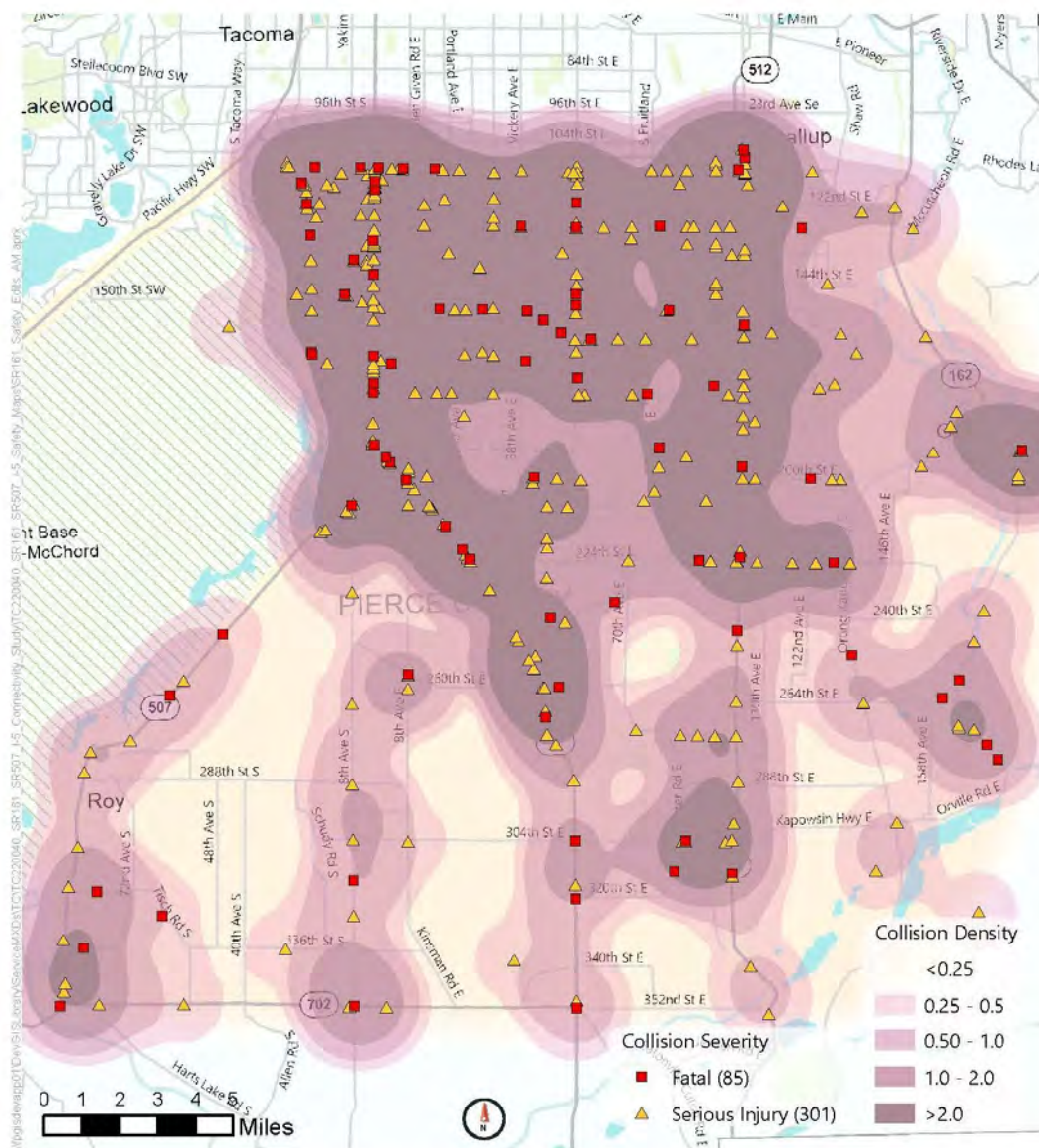


Table 1. Results for Crash Reduction Potential

	A - TSMO	B - County	C - State
Crash Reduction Potential	High	Medium	Low

Consistency with Policy

Definition: The implementation of projects and strategies that are consistent with WSDOT, Pierce County, and local policies and priorities.

Method:

- Identify whether the strategies largely align with WSDOT Strategic Plan and local agency policy guidance from existing plans and legislation

Scoring: Results are provided in **Table 2**, with a breakdown of how scoring was defined given below:

- High:** Majority of investments are consistent with the Strategic Plan and local agency plans.
- Medium:** Majority of investments are consistent with either the Strategic Plan or local agency plans.
- Low:** Investments are largely not consistent with at least one of these policy documents.

Package A most closely aligned with State and County legislation and other policies, particularly around guidance that safe and multimodal transportation networks be prioritized. Package C contained the widening of SR 161 as a major strategy that comprises a large proportion of the overall package cost. This strategy is inconsistent with much of the adopted policy, including WSDOT policies related to prioritizing safety and preservation over vehicle focused capacity improvements and focusing on multimodal and complete streets investments. Package B fell between A and C, with some new vehicle capacity and new vehicle connections included, but no large-scale widening project like Package C.

Table 2. Results for Consistency with Policy

	A - TSMO	B - County	C - State
Consistency with Policy	High	Medium	Low

Equity

Definition: The improvement and protection of health, safety, and accessibility outcomes for vulnerable populations, especially communities of color, populations with limited English proficiency, low-income communities, and persons with disabilities.

Method:

- Equity impacts were assessed qualitatively based on potential impacts to the equity focus areas. The assessment was divided into high efficacy (likely positive impact), medium efficacy (could have a positive or negative impact), or low efficacy (likely negative impact)
 - High Efficacy (likely positive impact):
 - Improves transit access (within Equity Focus Area, see **Figure 5**)
 - Safety-specific improvements (within Equity Focus Area, see **Figure 5**)
 - Strategies developed in coordination with vulnerable/overburdened community groups (within Equity Focus Area, see **Figure 5**)
 - Medium Efficacy (possible positive or neutral impact):
 - Improves transit access (not within Equity Focus Area, see **Figure 5**)
 - Safety-specific improvements (not within Equity Focus Area, see **Figure 5**)
 - Improves walking/biking access to Equity Focus Area without impacting right-of-way (see **Figure 5**)
 - Improves network connectivity without impacting right-of-way in vulnerable/overburdened areas
 - Improves network efficiency without adding capacity (ITS, TSMO network improvements)
 - Low Efficacy (likely negative impact):
 - Improves walking/biking access but requires right-of-way within Equity Focus Area (see **Figure 5**)
 - Adds roadway capacity
 - Adds roadway connections through rights-of-way of Equity Focus areas (see **Figure 5**)

Scoring: Results are provided in **Table 3**, with a breakdown of how scoring was defined given below:

- **High:** Package has a net “High Efficacy” rating after assessment of strategies.
- **Medium:** Package has a net “Medium Efficacy” rating after assessment of strategies.
- **Low:** Package has a net “Low Efficacy” rating after assessment of strategies.

Package A received a “High” score due to the high number of transit and safety-related investments within the package. Package B received a “Medium” score because of its lower investment in transit and safety, and its inclusion of new connections that take right-of-way in Equity Focus Areas. However, its focus on providing operational improvements and active mode improvements still place it at a net medium efficacy. Package C received a “low” because of its principal focus on providing vehicle capacity in an area that would require substantial right-of-way acquisition; additionally, it has low investment in safety-related projects and no investment in transit.

Figure 5. Equity Focus Areas

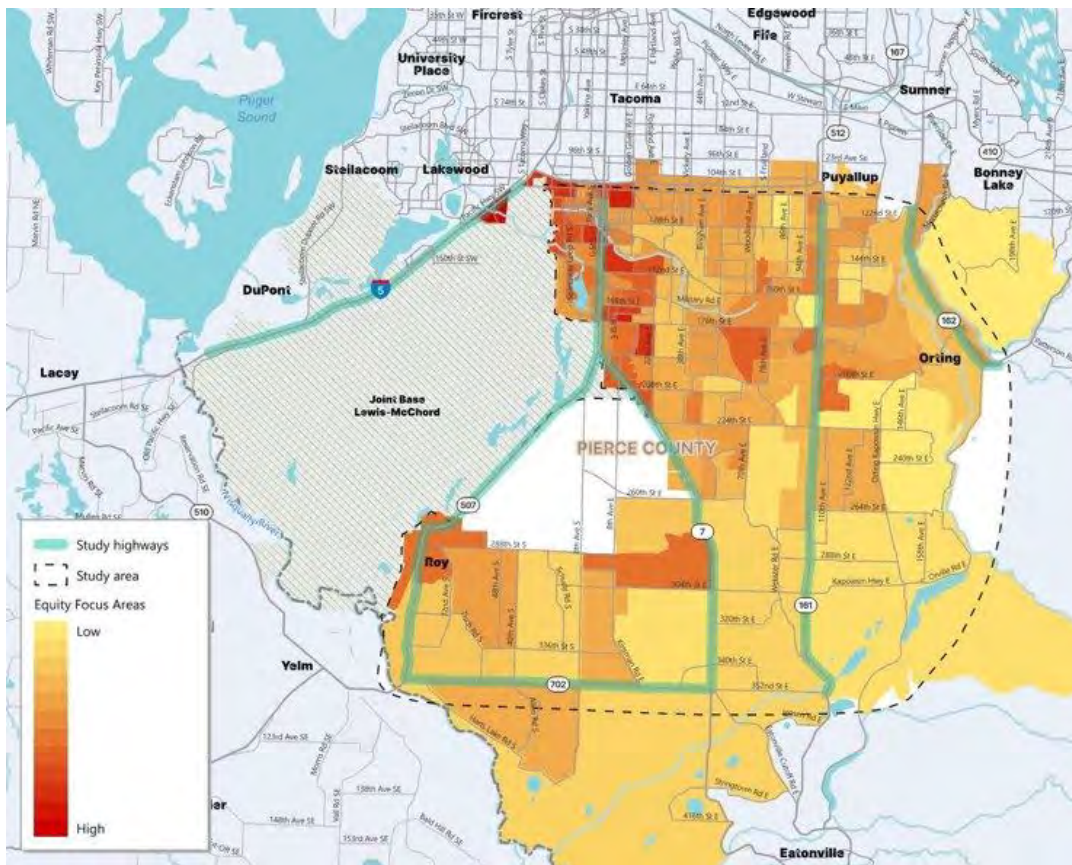


Table 3. Results for Equity

	A - TSMO	B - County	C - State
Equity	High	Medium	Low

Quality of Service/Economic Vitality/Travel Reliability

Definition: Convenience and ease of accessing destinations by vehicle, including consideration of two major factors: (1) enhancing the movement of people and freight and (2) improving reliability to the degree that travelers can plan for on-time arrival with a higher degree of certainty. Each of these factors can influence economic vitality.

Method: For vehicles/freight, calculate study area wide vehicle hours of delay (VHD) (see Multimodal Connectivity metric for active modes/transit). Vehicle hours of delay by package is provided in **Table 4**.

Scoring: Results are provided in **Table 5**, with a breakdown of how scoring was defined given below:

- **High:** Large improvement in vehicle hours of delay along major corridors.
- **Medium:** Some improvement in vehicle hours of delay along major corridors.
- **Low:** Little to no improvement in vehicle hours of delay along major corridors.

Package B and Package C resulted in a similar reduction in overall vehicle hours of delay across all roads in the study area; however, Package C concentrated this benefit along SR 161, while Package B showed a more dispersed benefit across the study area. Package A resulted in a reduction in vehicle hours of delay about 66% that of Package B.

Table 4. Vehicle Hours of Delay by Package

Package	VHD	Percent Change in VHD from Baseline
2050 Baseline	3,200	-
A - TSMO	2,800	-14%
B - County	2,600	-21%
C - State	2,400	-25%

Table 5. Results for Quality of Service/Economic Vitality/Travel Reliability

	A - TSMO	B - County	C - State
Quality of Service/Economic Vitality/Travel Reliability	Medium	High	High

Environment

Definition: The impact of air pollution (GHG emissions), noise pollution, and disturbing of sensitive areas (wetlands, cultural areas, flood hazards, wildlife habitat, etc.) on the environment, and potential mitigations or improvements to protect and restore the environment.

Method:

- **ROW Acquisition:** Estimate how much additional right-of-way is needed for vehicular connections or capacity increases.
- **Built Environment:** Identify whether the package improves the built environment for active mode users.

Scoring: Results are provided in **Table 6**, with a breakdown of how scoring was defined given below:

ROW Acquisition

- **High:** Little or no additional right-of-way required for implementation of strategy.
- **Medium:** Some potential right-of-way needs (such as intersection-level improvements or additional right-of-way needs for non-motorized facilities along existing roadways).
- **Low:** Adds vehicle capacity (such as widening or new connections).

Built Environment

- **High:** Improves the built environment for active mode users.
- **Medium:** Somewhat improves the built environment for active mode users.
- **Low:** Little to no investment in the built environment for active mode users.

Although all packages would require a large amount of right-of-way acquisition for capacity and new connection improvements, it is anticipated that Package C would require the most, considering the SR 161 widening project. Package A includes the largest investment in active modes, which would improve the overall built environment for multimodal users. Package B also includes several active mode investments that would improve the built environment, while Package C includes the least.

Table 6. Results for Environment

	A - TSMO	B - County	C - State
Environment – ROW Acquisition	Medium	Medium	Low
Environment – Built Environment	High	Medium	Low

Multimodal Connectivity

Definition: The ease of reaching major destinations (e.g., jobs, services, schools, ports) from a specific location by different travel modes.

Method:

- **Active Mode:** Calculate the number of total active mode improvements within a 5-10 minute walkshed of schools, libraries, and healthcare facilities. **Figure 6** shows these walksheds, while **Table 7** shows the number of strategies within the walksheds, by package.
- **Transit:** Calculate the change in transit travel shed coverage with new or higher quality transit service for select retail centers or community resources (such as Pacific Lutheran University). See example transit shed comparison to access Pacific Lutheran University). **Table 8** summarizes transit coverage from each sample origin point for each package, while **Figure 7** shows an example of the transit coverage analysis.

Scoring: Results are provided in **Table 9**, with a breakdown of how scoring was defined given below:

Active Mode

- **High:** Majority of active transportation improvements occur within a 5-minute walkshed of community resources.
- **Medium:** Majority of active transportation improvements occur within a 10-minute walkshed of community resources.
- **Low:** Few active mode capacity improvements within a 5-10 minute walkshed of community resources.

Transit

- **High:** Large transit coverage expansion occurs.
- **Medium:** Some transit coverage expansion.
- **Low:** Little to no transit coverage expansion.

Package A has the largest number of active mode strategies, with many of these within a 5- or 10-minute walkshed of community resources. Additionally, Package A has the most extensive level of investment in transit, with a large amount of coverage increase when compared to Baseline conditions. Package B likewise has a large number of active mode strategies, although fewer than Package A, and it only has a small amount of investment in transit strategies. Package C has only a few active mode projects within 5- to 10-minute walksheds and does not have transit strategies.

Figure 6. Walksheds (Yellow Represents 5-Minute, Purple Represents 10-Minute)

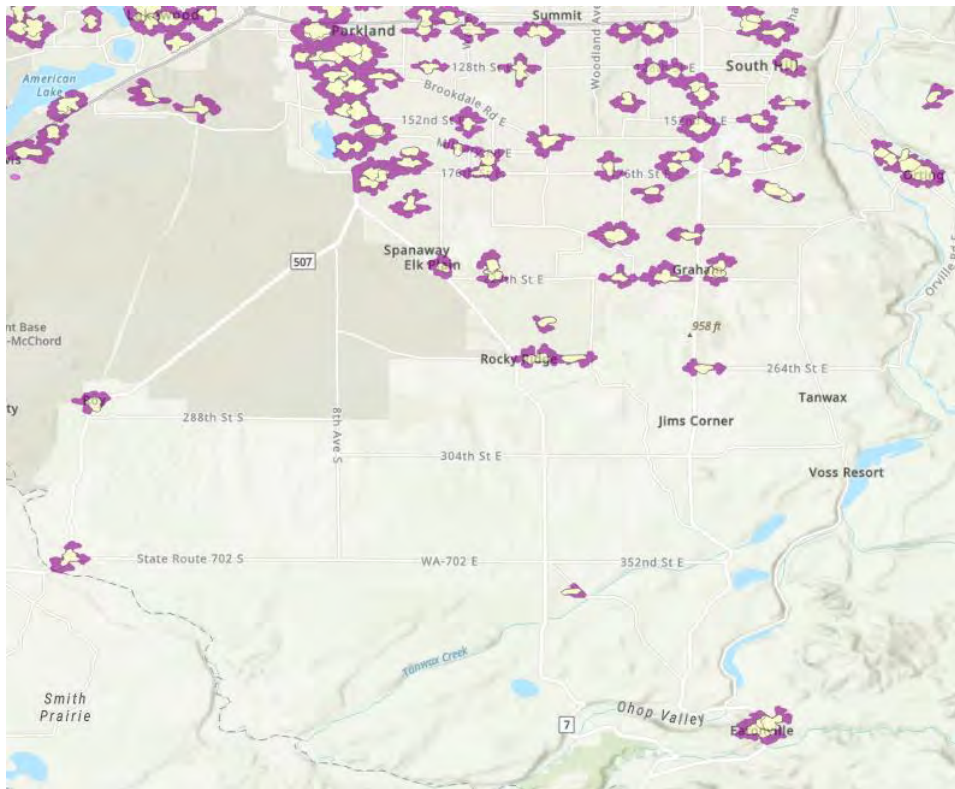


Table 7. Number of Projects within Walksheds, by Package

Package	Strategies Within Walksheds	Strategies Within Walksheds
	5-Minute	10-Minute
A – TSMO	25	6
B – County	18	7
C – State	3	1

Table 8. Transit Coverage from Various Origins, By Package

Location (Destination)	Baseline Population Coverage	A - TSMO Population Coverage	B - County Population Coverage
Multicare Good Samaritan Hospital	52,000 (60 min travel shed)	126,300 (60 minute travel shed)	84,600 (60 minute travel shed)
Pacific Lutheran University	132,200 (60 min travel shed)	147,800 (60 min travel shed)	136,800 (60 min travel shed)
South Hill Mall	66,300 (60 min travel shed)	122,600 (60 min travel shed)	111,600 (60 min travel shed)
Canyon Rd Commercial	87,800 (60 min travel shed)	179,100 (60 min travel shed)	168,300 (60 min travel shed)
Sprinker Recreation Center	78,900 (60 min travel shed)	85,500 (60 min travel shed)	84,400 (60 min travel shed)

Note: No transit analysis occurred for C. State because no significant new transit routes are being added under this Package.

Figure 7. Example Transit Shed Analysis for Pacific Lutheran University

(Travel Times Shown As: Dark Blue – 15-minute, Blue – 30-minute, Light Blue – 45-minute, Red – 60-minute)

Baseline:

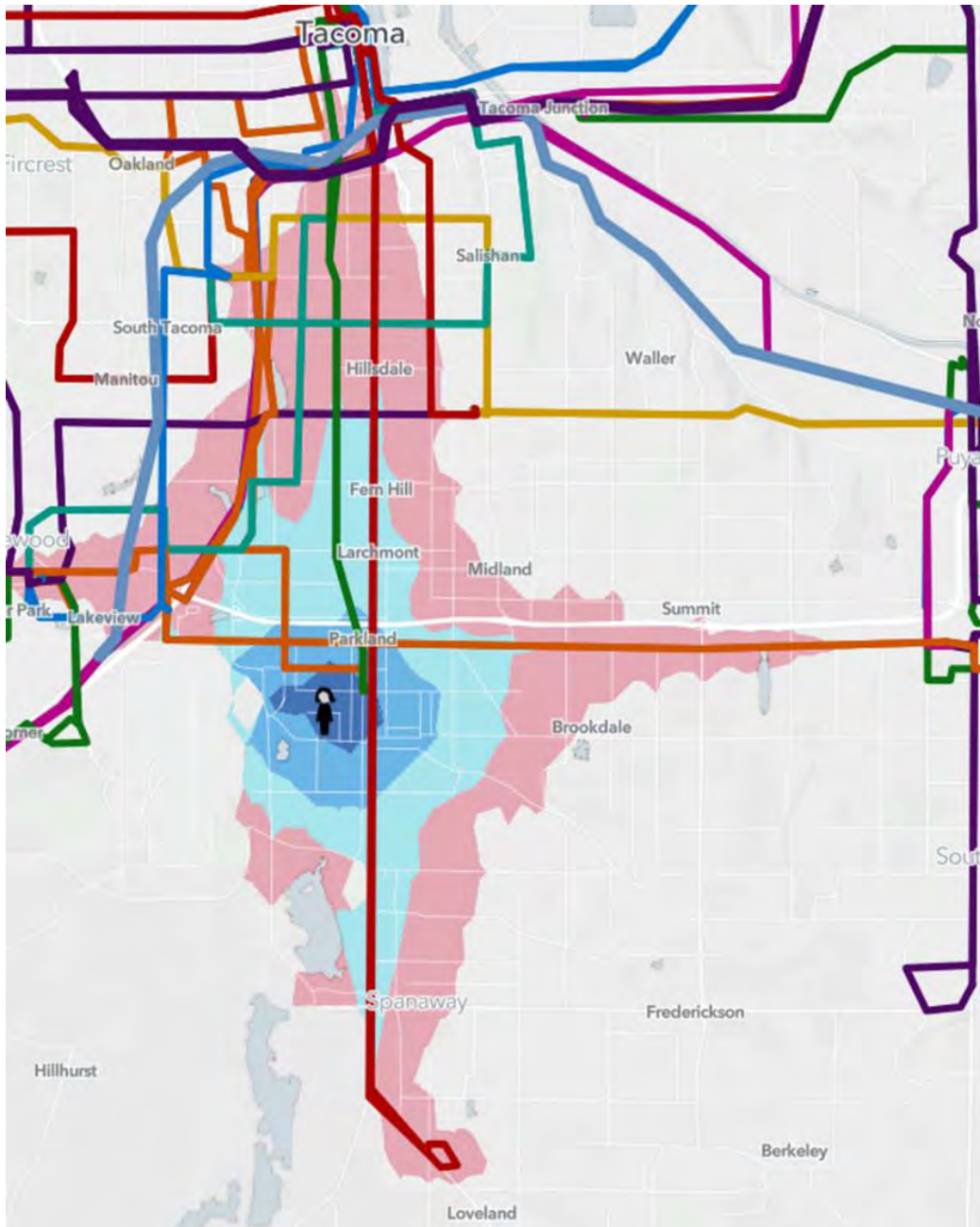


Figure 7. Example Transit Shed Analysis for Pacific Lutheran University (Cont.)

A -TSMO:

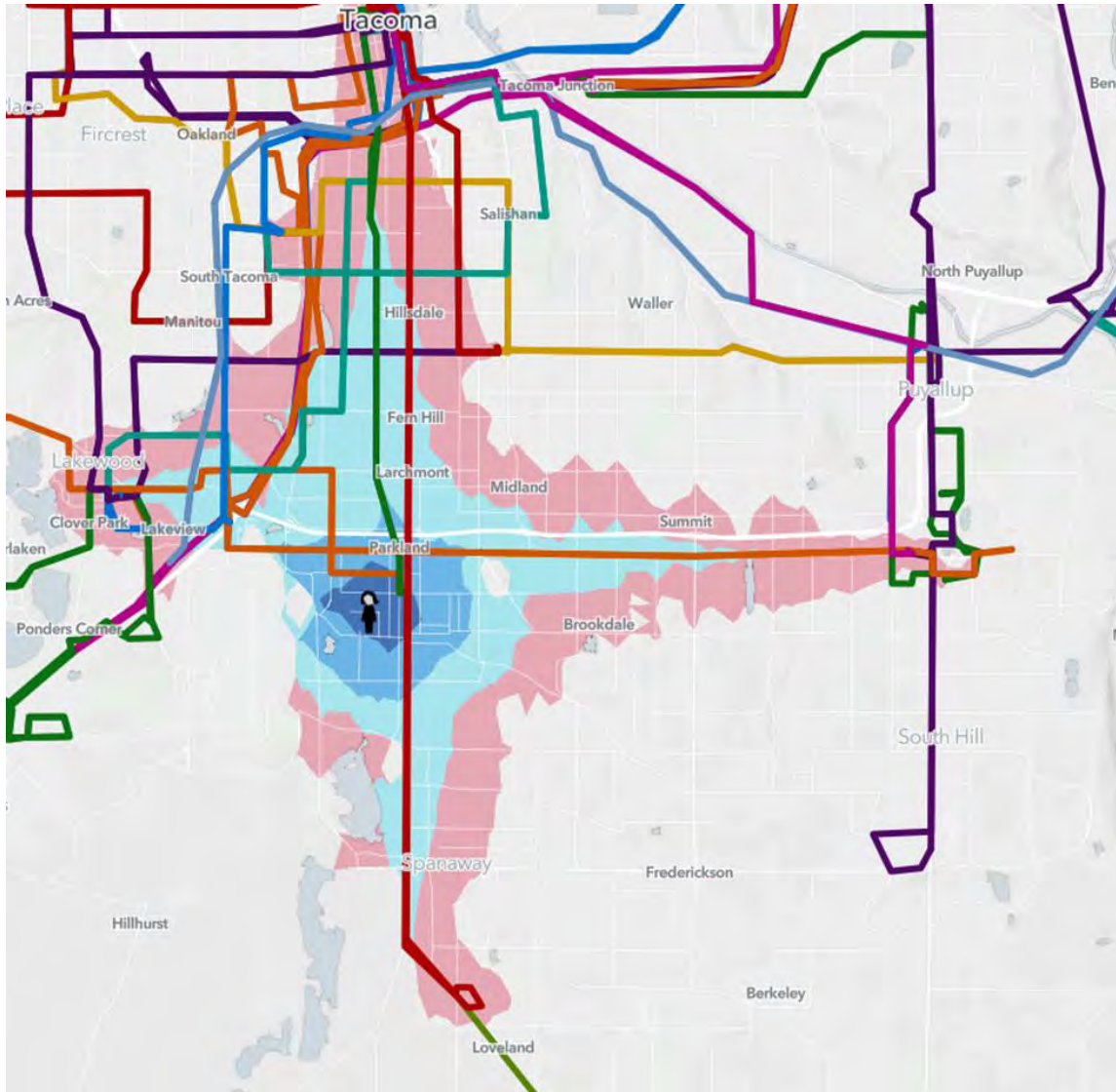


Figure 7. Example Transit Shed Analysis for Pacific Lutheran University (Cont.)

B- County:

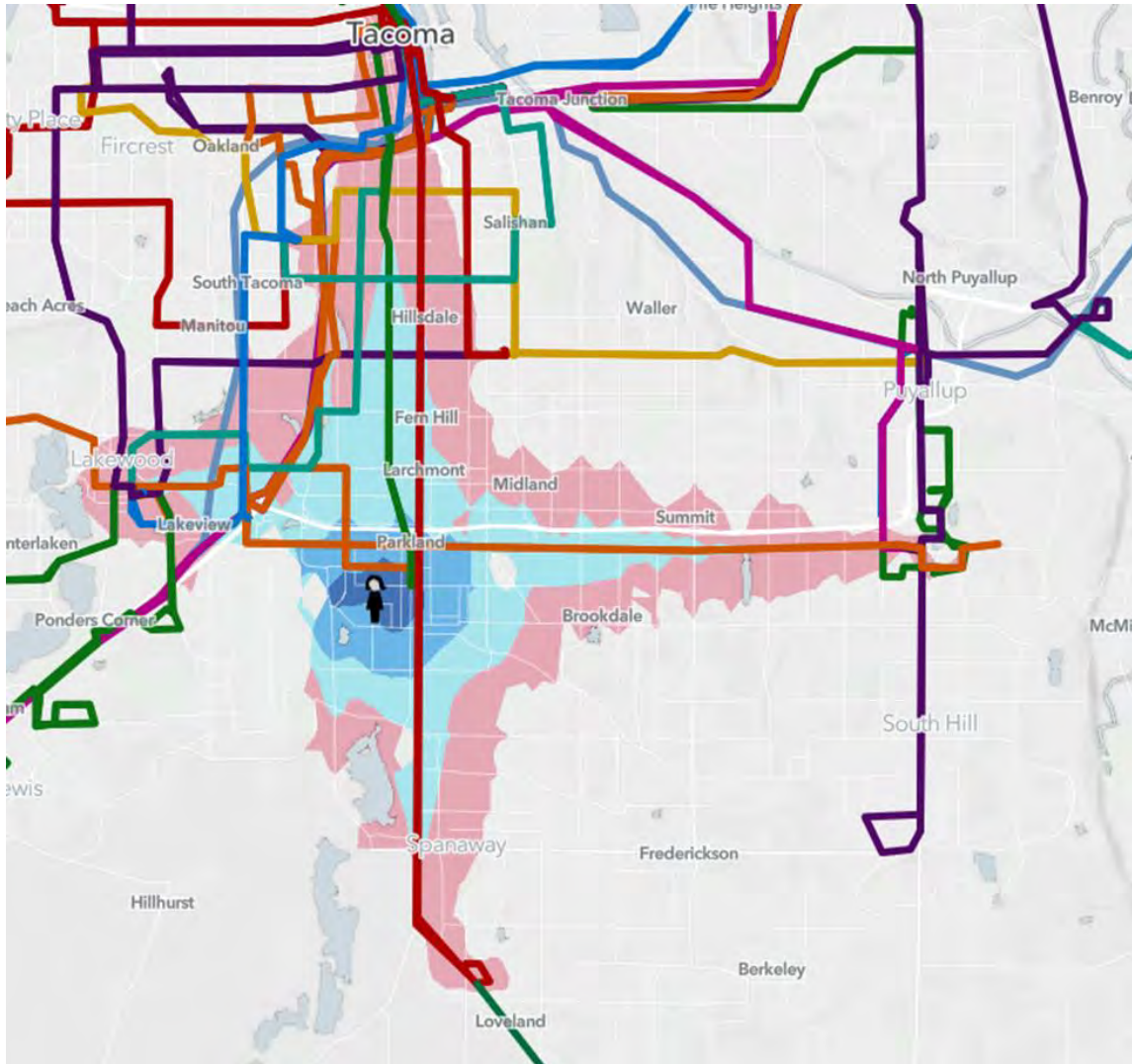


Table 9. Results for Multimodal Connectivity

	A - TSMO	B - County	C - State
Multimodal Connectivity: Active Modes	High	Medium	Medium
Multimodal Connectivity: Transit	High	Medium	Low

Network Resiliency

Definition: The availability of route and mode options to avoid closures and delays.

Method:

- **For vehicles:** Total length of new vehicular connections/parallel routes
- **For Active Mode:** Total length of active mode capacity improvements that fill gaps or create new connections.

Scoring: Results are provided in **Table 10**, with a breakdown of how scoring was defined given below:

For Vehicles

- **High:** High total length of new connections.
- **Medium:** Medium total length of new connections.
- **Low:** Little to no new vehicular connections.

For Active Mode

- **High:** High total length of active mode connections.
- **Medium:** Medium total length of active mode connections.
- **Low:** Little to no new active mode connections.

Package B has the highest number of investments in new connections for vehicles (5% increase in roadway miles within Subarea), while Packages A and C also have some investments that provide additional resiliency (2% and 3%, respectively). In all cases, the new connections being provided do provide additional redundancy at key locations within the county that improve parallel capacity for north-south and east-west corridors. On Active mode resiliency, Package A provides both robust active mode connections (35% increase in sidewalk infrastructure) and new transit connections; Package B likewise provides strong active mode investment (23% increase in sidewalk infrastructure), while Package C provides little to no investment (7% increase in sidewalk infrastructure).

Table 10. Results for Network Resiliency

	A - TSMO	B - County	C - State
Network Resiliency: For Vehicles	Medium	High	Medium
Network Resiliency: For Active Mode	High	Medium	Low

Cost

Definition: Total lifecycle costs, right of way acquisition, and implementation costs.

Method: Package includes a wide range of strategy investments within a nominal \$1B investment

Scoring: provided in **Table 11**, with a breakdown of how scoring was defined given below:

- **High:** Package allows for a wide range of strategy investment within a nominal \$1 billion cost cap.
- **Medium:** Package allows for a narrower range of strategy investment within a nominal \$1 billion cost cap.
- **Low:** Package is limited to funding only a few significant/high-cost strategies.

Package A had the highest number of total strategies, in addition to having a strong multimodal spread of strategies. Due to the costs of capacity and new connection strategies, Package B scored lower, but still had a fairly large spread of strategies. Package C had the lowest variety and number of strategies, due to the high anticipated cost of SR 161.

Table 11. Results for Cost

	A - TSMO	B - County	C - State
Cost	High	Medium	Low

Implementation

Definition: Align investments to engage partners to plan, operate and deliver complementary system investments.

Method: Assess packages based on their potential to generate partnerships and grant funding from various sources. This metric considers recent trends in grant funding types and availability of funds. At the federal, state, and regional level, more grant funding is being shifted towards active mode, TSMO, and safety related projects than ever before, and we expect this trend to continue as agencies seek to operate and maintain the existing transportation system more efficiently.

- High Efficacy (likely to generate funding/partnerships):
 - Provides safe routes to school
 - Improves area with high density of KSI collisions
 - Improves area within vulnerable/overburdened community
- Medium Efficacy (could generate funding/partnerships):
 - TSMO-related congestion relief efforts (ITS, traffic management)
 - Provides active mode improvements
- Low Efficacy (likely will not generate as many funding/partnerships):
 - Roadway widening strategies (without active mode improvements)
 - New roadway connections
 - Other roadway/intersection capacity improvements

Scoring: Results are provided in **Table 12**, with a breakdown of how scoring was defined given below:

- **High:** Package has a net “High Efficacy” rating after assessment of strategies.
- **Medium:** Package has a net “Medium Efficacy” rating after assessment of strategies.
- **Low:** Package has a net “Low Efficacy” rating after assessment of strategies.

Package A has the highest likelihood of generating significant outside grant funding and partnerships, with a focus on TSMO, safety, transit, and active mode connections. Package C would likely require significant funding from state legislative earmarks, similar to other mega projects across the Puget Sound region.

Table 12. Results for Implementation

	A - TSMO	B - County	C - State
Implementation	High	Medium	Low

Summary of All Results

A table summarizing results for all metrics is provided in **Table 13**.

Table 13. Summary of All Results

	A – TSMO	B – County	C – State
Crash Reduction Potential	High	Medium	Low
Consistency with policy	High	Medium	Low
Equity	High	Medium	Low
Quality of Service/Economic Vitality/Travel Reliability	Medium	High	High
Environment	High	Medium	Low
Multimodal Connectivity: Active Modes	High	Medium	Medium
Multimodal Connectivity: Transit	High	Medium	Low
Network Resiliency: Vehicles	Medium	High	Medium
Network Resiliency: Active Modes	High	Medium	Low
Cost	High	Medium	Low
Implementation	High	Medium	Low

Developing the Strategic Vision Package

The study team determined that Package A best addressed the study problem statement. However, based on the performance gaps identified during further evaluation and input from key stakeholders, some strategies were added from Packages B and C and removed from Package A to form the draft strategic vision package.

Package A strategies not advanced:

- Brookdale Rd E turn lanes between Waller Rd E to Canyon Rd E
- Military Rd E turn lanes and paved shoulders from 27th Ave E to Canyon Rd E
- 70th Ave E new connection from 204 St E to 224 St E
- 224th St E turn lanes and paved shoulders from SR 161 to Orting-Kapowsin Hwy E
- C St S paved shoulder from Military Rd S to 122nd St S

Package B strategies pulled into the draft strategic vision package:

- 200th St E turn lanes and paved shoulders from SR 161 to Orting-Kapowsin Hwy E
- 144th St E turn lanes and active facilities from 86th Ave E to 122nd Ave E
- 94th Avenue E widening from 136th St E to 144th St E 152nd St E
- 86th Ave E extension from 152nd St E to 176th St E
- 70th Ave E extension from 160th St E to 204th St E (also in C)

After completion of the Package Evaluation process, the Strategic Vision Package was refined based on stakeholder and study team feedback. Refinements included the following:

- Transitioning to a programmatic (not location specific) investment approach for TSMO, Safety, and Active Mode improvements. This reflects the fact that past planning documents did not systematically consider the need for these types of projects.
- Eliminating some capacity projects based on feedback from Pierce County staff.

A high-level evaluation of the strategic vision package is included in Chapter 4 of this report.

Appendix I: Bethel School District Community Safety Project Needs Assessment Table



Prepared by:
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In association with:
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Parametrix

Bethel School District Community Safety Project Needs Assessment

School Zone Flashing Beacons

Project	Project Details	Benefits/Rationale	Estimated Costs
North Star Elementary	Two School Zone Flashing Beacons along 224th.	Parent queuing extends onto 224th. Some families park along 224th and walk kids onto campus. Cars travel at high rates of speed along 224th. Would be consistent with Bethel High School along the same road with a flashing beacon.	\$5,400 per beacon \$7,300 Installation \$25,400 Total Cost
Rocky Ridge Elementary	Two School Zone Flashing Beacons along 260th.	Cars travel at a high rate of speed around a blind curve just west of the RRE exit. History of accidents including a casualty. Main access route to HWY 7.	\$5,400 per beacon \$7,300 Installation \$25,400 Total Cost
Clover Creek Elementary	Two School Zone Flashing Beacons along 36th Ave E	Cars travel at a high rate of speed along 36th. It is a main cross street between two major east-west corridors (176th and Military). A high residential area as well as two churches in close proximity.	\$5,400 per beacon \$7,300 Installation \$25,400 Total Cost

Sidewalk Projects in Order of Priority

Project	Project Details	Benefits	Possible savings for school district	Estimated Costs
216th St E	-Eustis Hunt Rd to 109th -Approx. 4 blocks	GKHS, Frontier MS, and Nelson ES Boundary <ul style="list-style-type: none"> Eliminate four busses 200 kids able to walk to school 	\$275,000	\$1,364,300 (We have \$700,000 in funding secured and need an additional \$664,300 for the project) (SRTS request)
188th St E	Gap in the sidewalk between 13th Ave ct E and 186th St Ct E -Approx. 1 block	Cedar Crest MS <ul style="list-style-type: none"> Safety of 50 walkers around a dark curve. 		TBD
78th Ave E	-West Side 203rd St Ct E to 194th St E -Eastside 201st Street Ct E to 194th St Ct E - Approx 6 blocks each side.	Pioneer Valley ES and Liberty Middle School Boundary <ul style="list-style-type: none"> Eliminate three bus routes 100 additional kids able to walk 	\$206,100	\$3,863,059.20 (SRTS Request)
Eustis Hunt Rd E	-Eastside of road 77th Ave Ct E to 74th Ave Ct E - 2.5 Blocks -Westside of road 73rd Ave Ct E to 204th -Approx. 3 blocks	Pioneer Valley ES and Liberty Middle School Boundary <ul style="list-style-type: none"> Eliminate two bus routes 80 kids able to walk Additional safety of current walkers 	\$137,000	TBD
172nd St	-5th Ave E to 22nd Ave E -17 Blocks -North and south side of the street	Cedarcrest MS, Evergreen ES and Spanaway Lake High School <ul style="list-style-type: none"> Eliminate 2 bus routes 120 kids able to walk 	\$137,000	\$5,142,009.60 (SRTS Request)

Project	Project Details	Benefits	Possible savings for school district	Estimated Costs
36th Ave E	-1½ block between 169th Street Ct E and 170th Street Ct E on West side of 36th Ave E -1½ block between 172nd St E and 173rd St E on West side of 36th Ave E.	Clover Creek ES Boundary <ul style="list-style-type: none"> • Eliminate one bus route • Approximately 50 additional kids would be able to walk safely to school • Busy road 	\$68,700	TBD
Military Road- Southside of road	-36th Ave E to Waller Road -Approx 6 blocks	Clover Creek ES Boundary <ul style="list-style-type: none"> • 16 kids able to walk • 1/4 of a bus route • Busy road 	\$17,000	TBD
260th St E	-47th Ave Ct E to 50th Ave E on North side of road -Approx. 2 blocks -48th Ave Ct E to 50th Ave E on South Side of road -Approx. 1 block	Cougar Mountain MS Boundary <ul style="list-style-type: none"> • Eliminate two bus routes • 75 kids able to walk safely along 260th 	\$137,000	TBD
Waller Road	-152nd Ste E to 145th St E on Westside of road. -Approx. 7 blocks	Naches Trail ES <ul style="list-style-type: none"> • 12 additional kids able to walk • 1/4 of a bus route 	\$17,000	\$1,061,424 (SRTS Request)
Waller Road	-152nd St E to Military (or 163rd) -Approx. 11 blocks	Naches Trail ES Boundary <ul style="list-style-type: none"> • 20 additional kids able to walk • 1/3 of a bus route 	\$23,000	TBD

Project	Project Details	Benefits	Possible savings for school district	Estimated Costs
B Street (East side of street)	-192nd St E to near 183rd St E - Approx 8 Blocks -181st to Campus -Approx 3 blocks	Camas Prairie ES Boundary <ul style="list-style-type: none"> 30 additional kids able to walk 1/2 of a bus route 	\$35,000	TBD
B Street (West Side of Street)	-192nd St Ct E to 178th St Ct E - approx 14 blocks	Camas Prairie ES Boundary <ul style="list-style-type: none"> 25 additional kids able to walk 1/2 of a bus route 	\$35,000	TBD
204th St E	-Northside of road 96th Ave E to 94th Ave E -Approx 1.5 blocks	Graham Elementary Boundary <ul style="list-style-type: none"> 20 kids able to walk 1/3 of a bus route Busy road 	\$23,000	TBD
159th St E/160th St E	Northside Fifth Ave E to 14th Ave E -Approx 9 Blocks	Thompson ES and Spanaway Lake HS <ul style="list-style-type: none"> Safety of 50-75 walkers 		TBD
159th St E/160th St E	Southside 7th ave Ct E to 14th Ave E -approx 7 Blocks	Thompson and Spanaway Lake HS <ul style="list-style-type: none"> Safety of 50-75 walkers 		TBD
168th St. E	168th St E (B St E to 13th Ave Ct E) North side of road	Impacts Spanaway Middle School, Thompson Elementary and Evergreen Elementary. A high-density road that connects to HWY 7 and Pierce Transit Bus line.		Already approved for SRTS funding. District matching \$500,000.

Project	Project Details	Benefits	Possible savings for school district	Estimated Costs
168th St. E	168th St E (B St E to 13th Ave Ct E) South side of road	Impacts Spanaway Middle School, Thompson Elementary, and Evergreen Elementary. A high-density road that connects to HWY 7 and Pierce Transit Bus line.		The county submitted SRTS funding on the district's behalf.

Street Lights

Project	Project Description	Rationale
14th Ave E	176th St E to 186th St E	Middle School Students walking along a dark and busy north/south road that connects to 176th which is a major East/West corridor.
188th St E	14th Ave E to 13th Ave E	Middle school students are walking around a dark S- curve on busy north/South road. Sidewalks end here and many kids cross the street.
92 Ave E	224th St E to 204th St E	Bus stops along dark road that accesses 224th which is a major corridor. We have had two students struck by cars here.
86th Ave E	86th Ave E & 231st St E	This is an entrance to Grand Flrs Neighborhood. This is a large neighborhood. There is a bus stop at this entrance with many students. There is no street lighting.
86th Ave E	86th Ave E & 236th St E	This is an entrance to Grand Flrs Neighborhood. This is a large neighborhood. There is a bus stop at this entrance with many students. There is no street lighting.
Park Ave E	170th St S to 166th St S	This is a walking area for Spanaway Elementary. It is an urban area with many homes and corresponding traffic.
200th St E	38th Ave E to 74th Ave E	High Density traffic to access Canyon Road which is a major north/south corridor. There are multiple warehouses and businesses along this dark road. There are multiple bus stops along this road that support Pioneer Valley Elementary and Liberty Middle Schools.
62nd Ave E	62nd Ave E & 219th	Bus stop along dark high density road that is used to access 224th, a major corridor)
62nd Ave E	62nd Ave E & 216th	Bus stop along dark high density road that is used to access 224th, a major corridor)
Mathias Road E	70th Ave E to 63rd Ave E	Multiple bus stops along a dark, high density road.
A St S	159th ST E to 168th St E	Walk area for Spanaway Middle School, Spanaway Lake High School and Thompson Elementary. Road gets busy as it parallels Hwy 7
160th St E	14th Ave E to 9th Ave E	Walk area for Spanaway Middle School, Spanaway Lake High School and Thompson Elementary.
50th Ave E	260th ST E to 249th St E	Students walking to Cougar Mountain Middle School along dark road.
51st Ave E	254th St E to 249th St E	Students walking to Cougar Mountain Middle School along dark road.
46th Ave E	224th St E to 240th St E	Bus stops for Centennial Elementary. Very Dark and rural area
240th St E	46th Ave E to Mathias Road E	Bus stops for centennial. Very Dark and rural area

Project	Project Description	Rationale
Mathias Road E	Mathias Road E & Entrance to Centennial Elementary	Heavy traffic/Dark intersection

Appendix J:

Funding Sources Table



Prepared by:
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In association with:
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Parametrix

SPMCS Funding Sources Table

Funding	Type	Source	Strategy Types					
			Capacity	Multimodal	Active	Transit	TSMO	Safety
Carbon Reduction Program	Federal	US DOT	--	X	X	X	X	X
Federal-State Partnership for Intercity Passenger Rail Program	Federal	Federal Railroad Administration	--	--	--	X	--	--
Consolidated Rail Infrastructure and Safety Improvements (CRISI) Program	Federal	US DOT	--	--	--	X	--	X
Building Resilient Infrastructure and Communities (BRIC)	Federal	FEMA	--	--	--	--	--	--
Hazard Mitigation Grant Program (HMGP)	Federal	FEMA	--	--	--	--	--	--
Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation	Federal	Infrastructure Investment and Jobs Act (IIJA)	--	--	--	X	--	--
Congestion Relief Program	Federal	(BIL) Bipartisan Infrastructure Law	X	X	--	X	X	--
Accelerated Innovation Deployment Demonstration Program (AID)	Federal	FHWA	X	X	--	--	--	--
Accelerating Innovative Mobility (AIM)	Federal	FTA	--	X	--	X	--	--
Advanced Driver Assistance Systems (ADAS) for Transit Buses Demonstration and Automated Transit Bus Maintenance and Yard Operations Demonstration Program	Federal	FTA	--	--	--	X	--	--
All Stations Accessibility Program	Federal	FTA	--	--	--	X	--	--
Capital Investment Grants Program (CIG)	Federal	FTA	--	--	--	X	--	--
Community Traffic Safety Grants	Federal	NHTSA	--	--	--	--	--	X
Strengthening Mobility and Revolutionizing Transportation (SMART)	Federal	BIL	--	X	--	X	X	X
Rebuilding American Infrastructure with Sustainability and Equity (RAISE)	Federal	USDOT	X	--	--	X	--	--
Reconnecting Communities Pilot Program	Federal	USDOT	--	--	X	--	--	X
Safe Streets for All (SS4A)	Federal	USDOT	--	X	X	--	--	X

SOUTH PIERCE MULTIMODAL CONNECTIVITY STUDY

			Strategy Types					
Funding	Type	Source	Capacity	Multimodal	Active	Transit	TSMO	Safety
Thriving Communities Program	Federal	USDOT	X	X	X	X	X	X
Areas of Persistent Poverty Program	Federal	FTA	X	X	X	X	X	X
Bus Exportable Power Systems	Federal	FTA	--	--	--	X	--	--
Emergency Relief Program	Federal	FTA	--	--	--	X	--	--
Enhanced Mobility of Seniors & Individuals with Disabilities	Federal	FTA	--	--	--	X	--	--
Enhancing Mobility Innovation	Federal	FTA	--	X	--	X	X	--
Expedited Project Delivery Pilot Program	Federal	FTA	--	--	--	X	--	--
Flexible Funding Programs-National Highway Performance Program	Federal	FTA	--	--	--	X	--	--
FTA Ferry Programs	Federal	FTA	--	--	--	X	--	--
Grants for Buses and Bus Facilities Formula Program	Federal	FTA	--	--	--	X	--	--
Infrastructure for Rebuilding America (INFRA)	Federal	US DOT	X	X	--	--	--	--
Innovative Coordinated Access and Mobility (ICAM)	Federal	FTA	--	--	--	X	--	--
Integrated Mobility Innovation	Federal	FTA	--	X	--	X	X	--
Low or No Emission Vehicle Program	Federal	FTA	--	--	--	X	--	--
Mobility on Demand Sandbox Program	Federal	FTA	--	--	--	X	--	--
Multimodal Project Discretionary Grant Opportunity (MPDG)	Federal	USDOT	X	X	--	X	X	X
Office of Local Defense Community Cooperation (OLDCC)	Federal	U.S. Department of Defense	X	--	--	--	--	--
Public Transportation Innovation	Federal	FTA	--	--	--	X	--	--
Route Planning Restoration Program	Federal	FTA	--	--	--	X	--	--
Small Business Innovation Research Program (SBIRR)	Federal	US DOT	--	--	--	--	--	--
State of Good Repair Grants	Federal	FTA	--	--	--	X	--	--
Connecting Washington Transit Projects	State	WSDOT	--	--	--	X	--	--
Consolidated Grants	State	WSDOT	--	--	--	X	X	--
First Mile/Last Mile Connections	State	WSDOT	--	--	--	X	--	X

SOUTH PIERCE MULTIMODAL CONNECTIVITY STUDY

Funding	Type	Source	Strategy Types					
			Capacity	Multimodal	Active	Transit	TSMO	Safety
Safe Routes to School (SRTS)	State	WSDOT	--	X	X	--	--	X
Pedestrian & Bicycle Program	State	WSDOT	--	X	X	--	--	X
Paratransit/Special Needs and Rural Mobility	State	WSDOT	--	--	--	X	--	--
Paratransit/Special Needs and Rural Mobility Formula Grants	State	WSDOT	--	--	--	X	--	--
Move Ahead Washington: Special Needs Grant Program funding for transit agencies	State	WSDOT	--	--	--	X	--	--
Move Ahead Washington: Transit Support Grant Program	State	WSDOT	--	--	--	X	--	--
Move Ahead Washington: Green Transportation Capital Grant Program Funding	State	WSDOT	--	--	--	X	--	--
Move Ahead Washington: Transit Coordination Grant Program	State	WSDOT	--	--	--	X	--	--
Move Ahead Washington: State Buses and Bus Facilities Grant Program	State	WSDOT	--	--	--	X	--	--
Green Transportation Capital	State	WSDOT	--	--	--	X	--	--
Public Transit Rideshare	State	WSDOT	--	--	--	X	--	--
Regional Mobility	State	WSDOT	X	X	X	X	X	X
Rural Mobility	State	WSDOT	--	--	--	X	--	--
Rural Transit Assistance Program	State	WSDOT	--	--	--	X	--	--
State Buses and Bus Facilities	State	WSDOT	--	--	--	X	--	--
Transit Coordination	State	WSDOT	--	--	--	X	--	--
Transit Support Grant	State	WSDOT	--	--	--	X	--	--
Transportation Demand Management Grant	State	WSDOT	--	X	X	X	X	X
Zero-emission Vehicle Infrastructure Partnerships	State	WSDOT	--	--	--	--	--	--
Regional FHWA and FTA Project Selection	Regional	FHWA/FTA	X	X	X	X	X	X
Rural Town Centers and Corridors	Regional	FHWA/FTA	X	X	X	X	X	X
Special Needs	Regional	FHWA/FTA	--	--	--	X	--	--
Transportation Alternatives program	Regional	FHWA/FTA	--	X	X	X	X	X
Commercial Parking Tax RCW 82.80.030	Local	Local Fees/Taxes	Transportation purposes					

SOUTH PIERCE MULTIMODAL CONNECTIVITY STUDY

Funding	Type	Source	Strategy Types					
			Capacity	Multimodal	Active	Transit	TSMO	Safety
Property Tax County Road Fund Levy Lid Lift RCW 36.82.040 RCW 84.55.050	Local	Local Fees/Taxes	County road improvements					
Local Improvement District / Road Improvement District RCW 35.43 RCW 36.88	Local	Local Fees/Taxes	County road improvements					
Transportation Benefit District	Local	Local Fees/Taxes	Transportation improvements					
Transportation Benefit District – Sales and Use Tax RCW 36.73 RCW 82.14.0455	Local	Local Fees/Taxes	Transportation improvements					
Transportation Benefit District – Vehicle Licensing Fee RCW 36.73 RCW 36.73.065 RCW 82.80.140	Local	Local Fees/Taxes	Transportation improvements					
Transportation Impact Fees RCW 82.02.050 RCW 39.92	Local	Local Fees/Taxes	Public roads addressed by a comprehensive plan					
Local Option Motor Vehicle and Special Fuel Tax RCW 82.80.010	Local	Local Fees/Taxes	Transportation and highway purposes					
Real Estate Excise Tax 1 (REET 1) RCW 82.46.010(5) RCW 82.45.030 RCW 82.46.035(2)	Local	Local Fees/Taxes	Capital facilities element					
Real Estate Excise Tax 2 (REET 2) RCW 82.46.010(5) RCW 82.45.030 RCW 82.46.035(2)	Local	Local Fees/Taxes	GMA capital projects					
Limited Tax General Obligation (LTGO) Bonds RCW 39.36 Article 8, Sec. 6, State Constitution	Local	Local Fees/Taxes	Transportation improvements					
Unlimited Tax General Obligation (UTGO) Bonds RCW 39.36 RCW 84.52.056 Article 7, Sec. 2, State Constitution	Local	Local Fees/Taxes	Capital purposes					

Appendix K: SR 161 to SR 162 Connection Alternatives Memo



Prepared by:
Fehr & Peers

In association with:
Stepherson & Associates
Parametrix

Memorandum

Date: August 2023
To: WSDOT South Pierce Multimodal Connectivity Study Team
From: Fehr & Peers and Parametrix
Subject: **Evaluation of SR 161/162 Connection Alternatives**

TC22-0040

As part of the legislative provisos that created the South Pierce Multimodal Connectivity Study, additional analysis was requested for preliminary evaluation of three parallel alignments to improve connections between SR 161 and SR 162. The study team evaluated transportation impacts, considered environmental impacts, completed high level conceptual engineering for each alternative, and developed preliminary cost estimates. The additional analysis for these three alternatives is documented in this memo.

Alternatives

Three alternatives were evaluated:

- Military Road E Widening (addition of one lane in the uphill/westbound direction from SR 162 to approximately 136th Avenue E and widen to four or five lanes from 136th Avenue E to Shaw Road)
- 128th Street Connection (new two-lane connection from 128th Street at SR 162 to Reservoir Road at 126th Avenue E)
- 144th Street Connection (new two-lane connection from 128th Street at SR 162 to 144th Street E at Hunt Elementary)

Plan views of each alternative are included as an attachment to this memo.

Travel Pattern Changes

The 2050 travel demand model developed for the SPMCS study was used to forecast potential changes in travel patterns with each of these alternatives. While all three alternative models forecast high volumes on the new or widened roadways, the benefits were localized. SR 161, SR 162, and SR 410 showed negligible changes in traffic volumes compared to a no build alternative model.

The travel demand results do indicate that SR 162 would potentially need to be widened between Military Road and 128th Street under the Military Road Widening alternative. This is due to forecasted heavy traffic from the Tehaleh development down to 128th and further west via Military Road. The 128th and 144th connection alternatives provide a direct connection across SR 162 and therefore do not indicate that SR 162 would need to be widened.

To determine if bottlenecks west of the new roadways were limiting the effect of the new connection, an additional test was performed. The 128th Street alternative model was modified to include a hypothetical widening further west of the new connection. Limited changes were forecast, indicating that congestion on regional routes may limit the effectiveness of any new connection.

Although regional travel pattern changes were limited, the new connections may reduce or eliminate a local capacity constraint.

Civil Engineering Evaluation

Parametrix developed a civil engineering evaluation of the three alternatives. The design guidelines considered in this evaluation are detailed in the following sections.

Design References

- Pierce County Manual on Design Guidelines and Specification for Road and Bridge Construction in Pierce County (May 2022)
- Pierce County Stormwater Management and Site Development Manual (July 2021)
- WSDOT Design Manual (September 2022)
- WSDOT Standard Specifications for Road, Bridge and Municipal Construction (2023)
- WSDOT Local Agency Guidelines (June 2022)
- WSDOT Construction Manual (December 2022)

- WSDOT Estimating Manual for Projects (January 2023)
- AASHTO Roadside Design Guide, 4th Edition
- Department of Ecology's Stormwater Management Manual for Western Washington (July 2019)

Design Control/Geometrics

Per the Pierce County Road Classification Ordinance 122nd Street E and Military Road E are classified as a Secondary Arterial from Shaw Road E to SR 162. Secondary Arterial was chosen for new connections both at 128th/Reservoir Road E from 126th Avenue E to SR 162 and at 144th Street E from 750 feet west of 127th Avenue E to SR 162. Current design vehicle standards for Secondary Arterial are a bus/intermediate semi-trailer truck (wheelbase-40).

Speed Limit

Pierce County Manual on Design Guidelines and Specifications for Road and Bridge Construction manual Table 2.4 provides design speeds for arterial roadways within Pierce County. According to the table, the design speed for Secondary Arterials in urban areas is 40 mph. Target speeds based on Land Use Context and Roadway Type in the WSDOT Design Manual (Exhibit 1103-4) require low (35 mph or less) to intermediate speeds (40 to 45 mph) for a minor arterial in an urban area. Military Road currently is posted as 35 mph, with a suggested speed of 25 mph in some of the tighter, curved sections of the road. For Military Road, a 35 mph design speed was chosen to match current existing conditions. For 128th Street connection and 144th Street connection, a design speed of 40 mph was chosen.

Sight Distance

Determining sight distance is outside the scope of this project at this time and was not investigated. Stopping sight distance is a known concern for all concepts, as 10% to 12% grades are in all three concepts. As the preferred alternative progresses to final design sight distances should be evaluated.

Horizontal Alignment

Pierce County uses the following formula, as detailed in the "AASHTO Green Book," to design for horizontal curvatures.

$$R_{\min} = V^2 / [15 (e+f)]$$

Where:

- R = The minimum allowable radius of the curve (ft)
- V = Design speed (mph)
- e = Superelevation rate (%)

Using the tables found in Section 3-2 for a design speed of 35 mph, the “f” factor would be 0.180 and the “e” superelevation would be 0.04. Solving for R min, a minimum radius of 372 feet would be required. For a design speed of 40 mph, the “f” factor would be 0.160 and the “e” superelevation would be 0.04. Solving for R min, a minimum radius of 534 feet radius would be required.

Using lidar/aerial mapping, we laid out a horizontal alignment for Military Road. The horizontal alignment showed a minimum radius of 360 feet, which does not meet the County design standard of a 4% superelevation. Further evaluation is needed to meet current design standards.

Horizontal alignments for the 128th connection and 144th connection were designed to meet current design standards of 40 mph with a superelevation of 4%. Minimum radius of 600 feet was selected for both alternatives. Switchback horizontal layouts were considered but not feasible or preferred with horizontal curvature requirements for a 40 mph design speed.

Vertical Alignment

Per Section 3-3.1 in the Pierce County Manual on Design Guidelines and Specifications for Road and Bridge Construction Grade, the maximum gradient to any new or reconstruction road shall not exceed the following:

Arterials	
<i>Major</i>	8%
<i>Secondary</i>	8%
<i>Collector</i>	10%

The centerline and gutter line gradient of any road shall not be less than 0.7% when an asphalt concrete gutter line is used and not less than 0.4% when a cement concrete gutter line is used.

Using lidar/aerial mapping from Pierce County GIS, a centerline profile was created for a Military Road alternative. Existing profile grades ranged between 0.4% and 12.5%. This approach is a high-level look at existing conditions and may not reflect true existing conditions due to limitation of the lidar data. Based on known existing conditions, it is not feasible to revise the existing grades to meet the County standards of 8% or less; therefore, a deviation will be needed to maintain existing grades and reduce the impact to the surrounding communities.

Both the 128th connection and the 144th connection have an elevation difference of approximately 460 feet from the top to the bottom of the hill near SR 162. This extreme difference in elevation requires a profile grade range of 0.4% to 12% maximum for both alternatives, which is similar to the Military Road existing profile. A deviation will be needed with either alternative to reduce the impact to surrounding properties and the forested terrain the new roads are cutting through.

Roadway Sections

The roadway/surfacing section used in developing the estimate is included in **Figure 1**.

The Military Road section improves the east section of Military Road to three lanes (two lanes uphill and one lane down) and the west section to four to five lanes, with curb, gutter, and sidewalk on both sides.

The 128th Street connection and 144th Street connection are both new two-lane roadway sections with curb, gutter, and sidewalks on both sides.

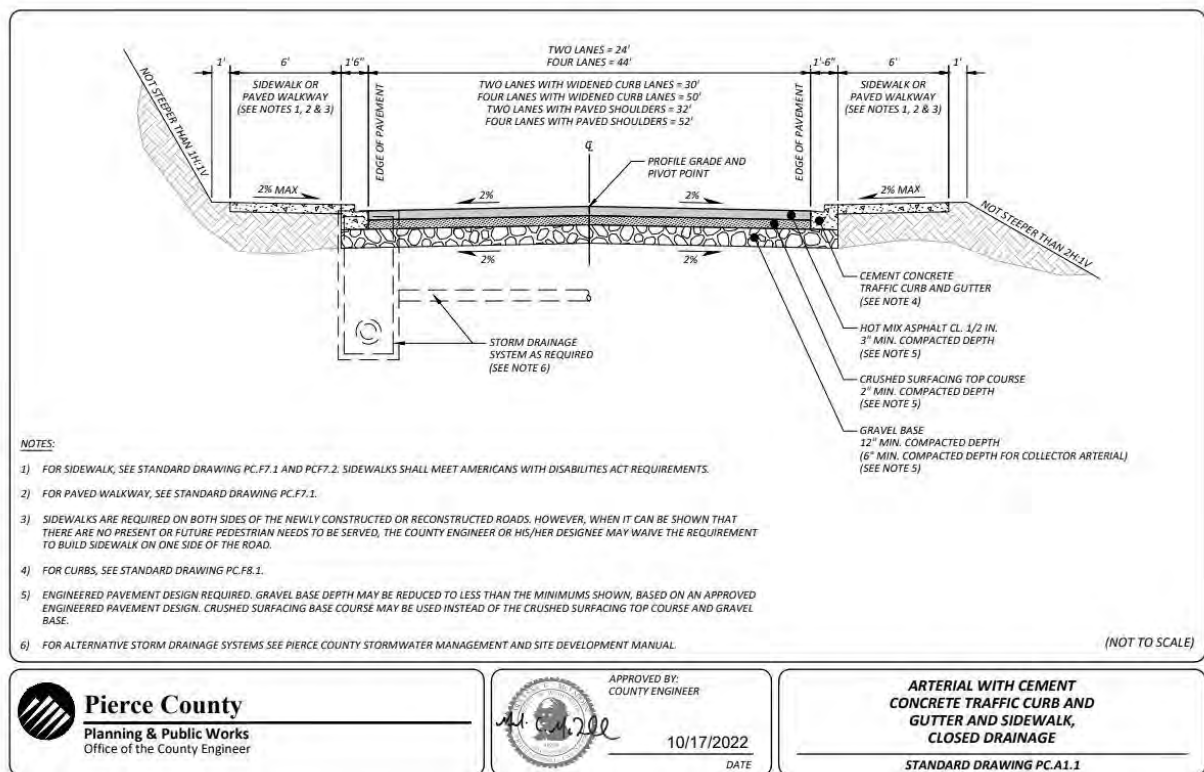


Figure 1. Pierce County roadway cross section.

Stormwater

Design of a stormwater system for the three alternatives will be in conformance with Pierce County's 2021 Stormwater Management and Site Development Manual. Under this manual, there are 10 minimum requirements for stormwater management that may be applicable to all three locations. Military Road falls under redevelopment, while the 128th Street connection and the 144th Street connection fall under new development. Based on Figure 2.2 of the manual, the three projects would be required to meet the Minimum Requirements #1 through #10 in Section 2.4.

During preliminary investigation, it appears that runoff from the west ultimately enters the Puyallup River at Military Road and potentially at the other two alternatives. All projects may require oil control based on future average daily traffic counts, which will need to be determined during final design of a preferred alternative. Two threshold discharge areas (TDAs) have been identified at all three project locations. Final TDA determination will occur during final design at the preferred alternative.

A basic treatment facility would be required based on current knowledge for each project alternative. Based on the level of this study, the location for a treatment facility, the types of soils in the preferred location of the facility, the depth of groundwater and ultimate discharge point at each location, and the type of treatment facility have not been determined or proposed at this time. Based on available information, it appears that the most likely treatment facility options would include:

- Wet Ponds
- Treatment Wetlands
- Combined Detention/Wet Pool

For estimating purposes, combined detention/wet pool was selected.

Wetlands

Based on information contained in Pierce County's GIS, there are CWI-mapped wetlands within the project limits of all three project alternatives. There is a fish-bearing stream, Ball Creek, located within the project limits of Military Road. Wetland and wetland buffer impacts will be determined during design of the selected concept. See **Figure 2** for Pierce County's public wetlands map.

PublicGIS



Figure 2. Pierce County Wetlands map.

Soils

Soil types within the project limits were obtained from the United States Department of Agriculture (USDA) Natural Resources Conservation Service Web Soil Survey. See **Figure 3 – Figure 5** for mapping of soil types found within or near the project limits. Based on the soil types found within the project limits, the decision was made to assume that all the excavation will be hauled off and all the fill material will be brought in based on the somewhat limited to very limited soil types.

Figure 3. Soil survey map.



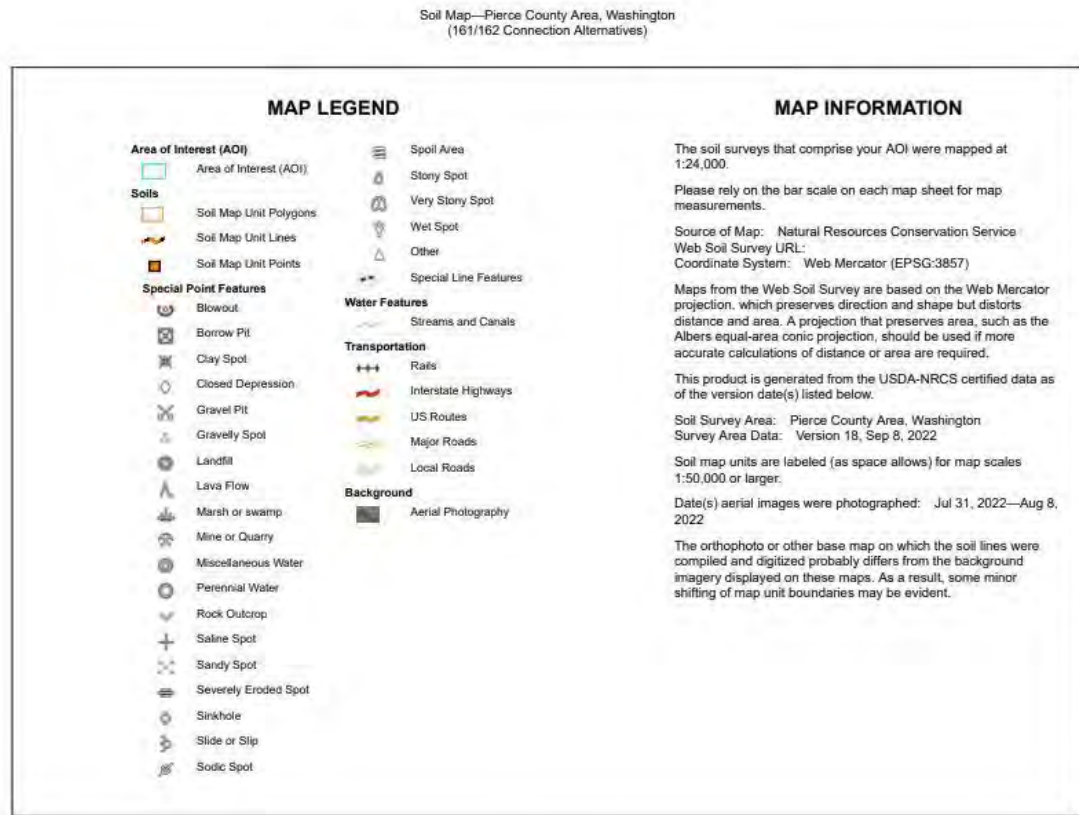


Figure 4. Soil survey map legend.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1C	Alderwood gravelly sandy loam, 8 to 15 percent slopes	27.6	1.4%
1D	Alderwood gravelly sandy loam, 15 to 30 percent slopes	16.0	0.8%
2A	Aquic Xerofluvents, level	81.0	4.2%
12A	Dupont muck	1.1	0.1%
13B	Everett very gravelly sandy loam, 0 to 8 percent slopes	207.8	10.7%
13C	Everett very gravelly sandy loam, 8 to 15 percent slopes	40.0	2.1%
18B	Indianola loamy sand, 0 to 5 percent slopes	44.8	2.3%
18C	Indianola loamy sand, 5 to 15 percent slopes	11.1	0.6%
18E	Indianola loamy sand, 15 to 30 percent slopes	3.4	0.2%
19B	Kapowsin gravelly ashy loam, 0 to 6 percent slopes	336.3	17.3%
19C	Kapowsin gravelly ashy loam, 6 to 15 percent slopes	39.4	2.0%
19D	Kapowsin gravelly ashy loam, 15 to 30 percent slopes	129.6	6.6%
19E	Kapowsin gravelly ashy loam, 30 to 65 percent slopes	21.1	1.1%
20C	Kitsap silt loam, 8 to 15 percent slopes	104.4	5.4%
24D	Neilton gravelly loamy sand, 8 to 25 percent slopes	68.0	3.5%
27A	Orting fine sandy loam	20.4	1.0%
28A	Orting loam	23.9	1.2%
29A	Pilchuck fine sand	79.5	4.1%
31A	Puyallup fine sandy loam	374.1	19.2%
34A	Riverwash	10.3	0.5%
37A	Semiahmoo muck	8.5	0.4%
39A	Snohomish silty clay loam	29.9	1.5%
42A	Sultan silt loam	103.5	5.3%
47F	Xerochrepts, 45 to 70 percent slopes	109.7	5.6%
W	Water	58.2	3.0%
Totals for Area of Interest		1,949.6	100.0%

Figure 5. Soil survey map legend.

Retaining Walls

The roadway traverses steep slopes in all three alternatives, making it necessary to have retaining walls in each alternative. Locations for retaining walls were chosen to limit impacts to heavily forested areas and reduce the additional right of way required because of deep cuts or extreme fills.

The cost of the walls is based on previous project costs. Soil nail walls were chosen for wall in cut locations 25 feet or higher. Fill walls were chosen in fill locations of 25 feet or higher.

Planning-Level Cost Estimates

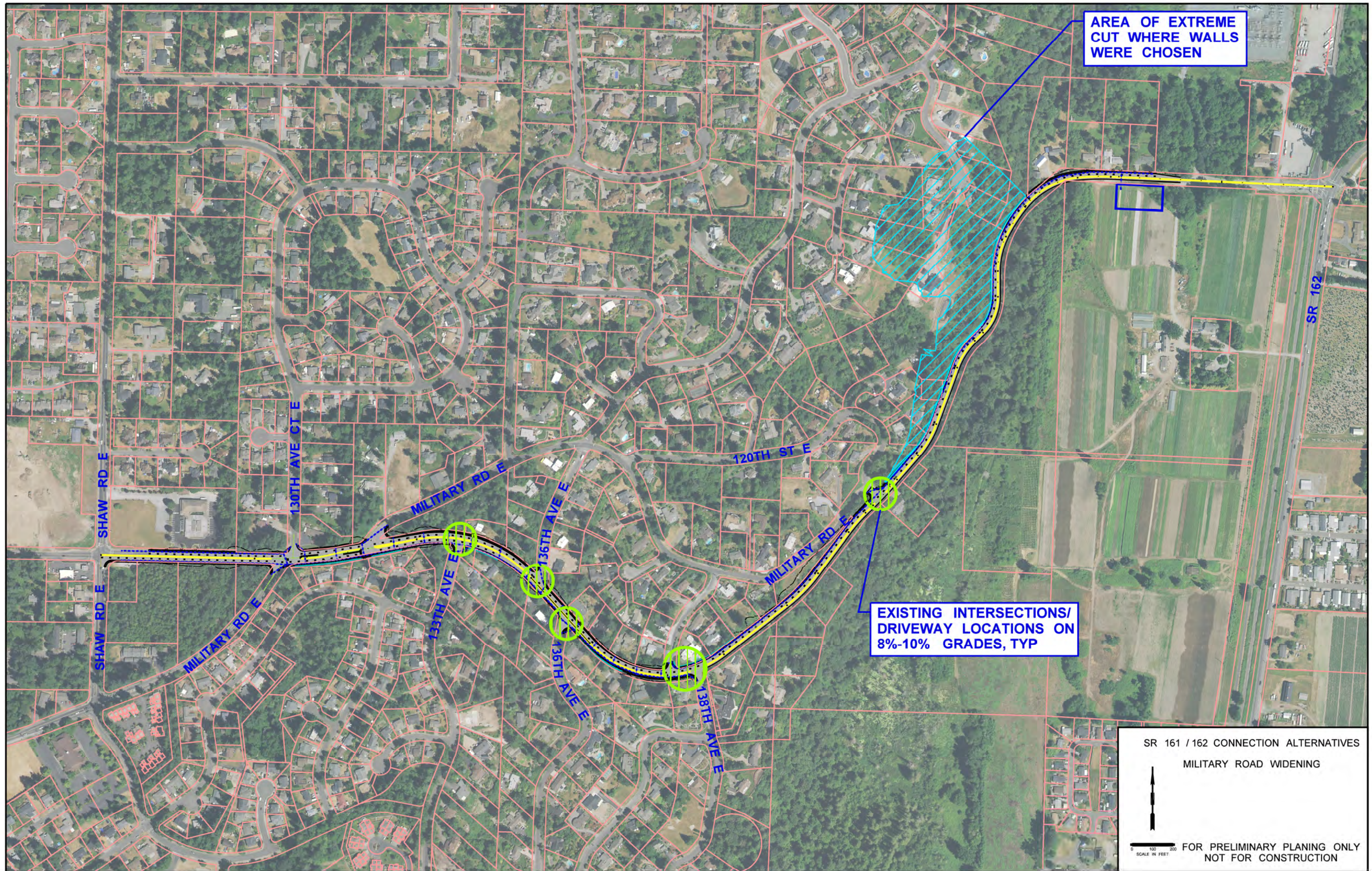
Preliminary engineering cost ranges were estimated for each of the three SR 161/162 connection alternatives (**Table 1**). These cost ranges were estimated based on preliminary design layouts and planning-level cost estimates using the same allocations and contingencies used in the planning-level cost estimates. Full details on each cost estimate are included as an attachment to this memo. The costs of widening SR 162 between Military Road and 128th are included in the Military Road widening alternative in accordance with the findings of the travel demand modeling. Estimated annual maintenance costs are based on WSDOT guidance that biennial expenditures are approximately 0.5% of the total capital cost.

Table 1. Planning-Level Cost Estimates

SR 161/162 Connection Alternatives	Cost (in millions)	Maintenance Costs (Annual)
Military Road Widening	\$114	\$285,000
128th Street Connection	\$127	\$317,500
144th Street Connection	\$152	\$380,000

Conclusions

There is limited regional travel benefit for any of the alternatives. Since there is limited regional benefit and that any improvement would be a Pierce County project, the WSDOT study team does not recommend any particular alternative or implementation decision. This information will be shared with Pierce County to help inform their decision-making process.



AREA OF EXTREME CUT WHERE WALLS WERE CHOSEN

EXISTING INTERSECTIONS/
DRIVEWAY LOCATIONS ON
8%-10% GRADES, TYP

SR 161 / 162 CONNECTION ALTERNATIVES
MILITARY ROAD WIDENING



0 100 200
SCALE IN FEET

FOR PRELIMINARY PLANING ONLY
NOT FOR CONSTRUCTION

COST ESTIMATE
Design Analysis Office

		DESCRIPTION OF WORK									
SR	161/162	This project will widen Military Road E from Shaw Rd E to SR162. Improve east section of roadway to three lanes (two lanes uphill and one lane down) and west section to 4/5 lanes.									
PROJECT TITLE:											
Military Road Widening											
REGION:	Olympic										
Std Item #	Item Description	Standard Item Add On Description OR Non-Std Item Description	Unit of Measure	Non-Std Measure	Item Quantity	Item Cost	Unit	Item	Total	Section Total	NOTES
PREPARATION										\$ 78,000	
0001	MOBILIZATION	Mobilization amount calculated at bottom of sheet	L.S.								
0030	CLEARING AND GRUBBING - SITE		ACRE		5.20	\$15,000.00		\$ 78,000			
	#N/A		#N/A					\$ -			
GRADING & STOCKPILING										\$ 1,174,250	
0310	ROADWAY EXCAVATION INCL. HAUL		C.Y.		27,000.00	\$30.00		\$ 810,000			
0431	GRAVEL BORROW INCL. HAUL		TON		13,150.00	\$25.00		\$ 328,750			
0470	EMBANKMENT COMPACTION		C.Y.		7,100.00	\$5.00		\$ 35,500			
	#N/A		#N/A					\$ -			
	#N/A		#N/A					\$ -			
DRAINAGE & STORM SEWER										\$ 1,085,380	
3091	CATCH BASIN TYPE 1		EACH		91.00	\$2,000.00		\$ 182,000			
3105	CATCH BASIN TYPE 2 48 IN. DIAM		EACH		4.00	\$4,500.00		\$ 18,000			
3106	CATCH BASIN TYPE 2 54 IN. DIAM.		EACH		2.00	\$8,000.00		\$ 16,000			
3541	SCHEDULE A STORM SEWER PIPE 12 IN. DIAM.		L.F.		5,350.00	\$75.00		\$ 401,250			
3542	SCHEDULE A STORM SEWER PIPE 18 IN. DIAM.		L.F.		4,040.00	\$100.00		\$ 404,000			
3151	TESTING STORM SEWER PIPE		L.F.		9,390.00	\$5.00		\$ 46,950			
3090	CATCH BASIN TYPE	2 54 IN. DIAM W/FR & CAGE	EACH		2.00	\$8,590.00		\$ 17,180			
	#N/A		#N/A					\$ -			
SANITARY SEWER & WATER LINES										\$ -	
	#N/A		#N/A					\$ -			
STRUCTURE										\$ -	
	#N/A		#N/A					\$ -			
SURFACING, LIQUID ASPHALT, BST, ATB, CCP, HMA & SEAL COAT										\$ 478,500	
5047	GRAVEL BASE		TON		9,900.00	\$40.00		\$ 396,000			
5120	CRUSHED SURFACING TOP COURSE		TON		1,650.00	\$50.00		\$ 82,500			
CEMENT CONCRETE PAVEMENT										\$ -	
	#N/A		#N/A					\$ -			
HMA										\$ 1,065,000	
5711	PLANING BITUMINOUS PAVEMENT		S.Y.		16,500.00	\$10.00		\$ 165,000			
5767	HMA CL. 1/2 IN. PG	58H-22	TON		6,000.00	\$150.00		\$ 900,000			
								\$ -			
IRRIGATION, EROSION CONTROL AND ROADSIDE PLANTING										\$ 277,000	
6488	EROSION CONTROL AND WATER POLLUTION PREVENTION		L.S.		1.00	\$150,000.00		\$ 150,000			
6408	TOPSOIL TYPE B		ACRE		2.10	\$50,000.00		\$ 105,000			
6418	SEEDING		L.S.		1.00	\$20,000.00		\$ 20,000			
6473	OUTLET PROTECTION		EACH		2.00	\$1,000.00		\$ 2,000			
	#N/A		#N/A					\$ -			
TRAFFIC										\$ 1,871,200	
6700	CEMENT CONC. TRAFFIC CURB AND GUTTER		L.F.		9,520.00	\$60.00		\$ 571,200			
6971	PROJECT TEMPORARY TRAFFIC CONTROL		L.S.		1.00	\$750,000.00		\$ 750,000			
6904	ILLUMINATION SYSTEM		L.S.		1.00	\$550,000.00		\$ 550,000			
	#N/A							\$ -			
OTHER ITEMS										\$ 38,802,500	
7055	CEMENT CONC. SIDEWALK		S.Y.		6,300.00	\$100.00		\$ 630,000			
7058	CEMENT CONC. CURB RAMP TYPE		EACH		16.00	\$4,000.00		\$ 64,000			
N/A	#N/A	Fill Wall Barrier and Moment Slab		L.F.	600.00	\$700.00		\$ 420,000			
N/A	#N/A	Fill Wall		S.F.	5,000.00	\$150.00		\$ 750,000			

COST ESTIMATE
Design Analysis Office

		DESCRIPTION OF WORK									
SR		161/162		This project will widen Military Road E from Shaw Rd E to SR162. Improve east section of roadway to three lanes (two lanes uphill and one lane down) and west section to 4/5 lanes.							
PROJECT TITLE:											
Military Road Widening											
REGION:		Olympic									
Std Item #	Item Description	Standard Item Add On Description OR Non-Std Item Description	Unit of Measure	Non-Std Measure	Item Quantity	Item Cost	Unit	Item	Total	Section Total	NOTES
N/A	#N/A	Cut Wall (Soldier Pile)		S.F.	30,000.00	\$300.00		\$	9,000,000		
		Pond A		S.F.	25,650.00	\$90.00		\$	2,308,500		
		Pond B		S.F.	27,000.00	\$90.00		\$	2,430,000		
		Dual Lane Roundabout		EACH	2.00	\$8,000,000.00		\$	16,000,000		
		SR162 Widening		L.F.	4,500.00	\$1,600.00		\$	7,200,000		
700 LEVEL NON-BID ITEM BREAKOUT										\$	-
700			L.S.					\$	-	These items calculated in Project Totals Below	
			L.S.					\$	-		
			L.S.					\$	-		
			L.S.					\$	-		
			L.S.					\$	-		
800 LEVEL NON-BID ITEM BREAKOUT										\$	-
800			L.S.					\$	-	These items calculated in Project Totals Below	
			L.S.					\$	-		
			L.S.					\$	-		
860			L.S.					\$	-		
			L.S.					\$	-		
			L.S.					\$	-		

Item Sub-Total w/o MOB		\$	44,831,830
Mobilization	10%	\$	4,483,183
Bid Item Sub-Total		\$	49,315,013

Design Allocations	25%	\$	12,328,753
BID ITEM TOTAL		\$	61,643,766

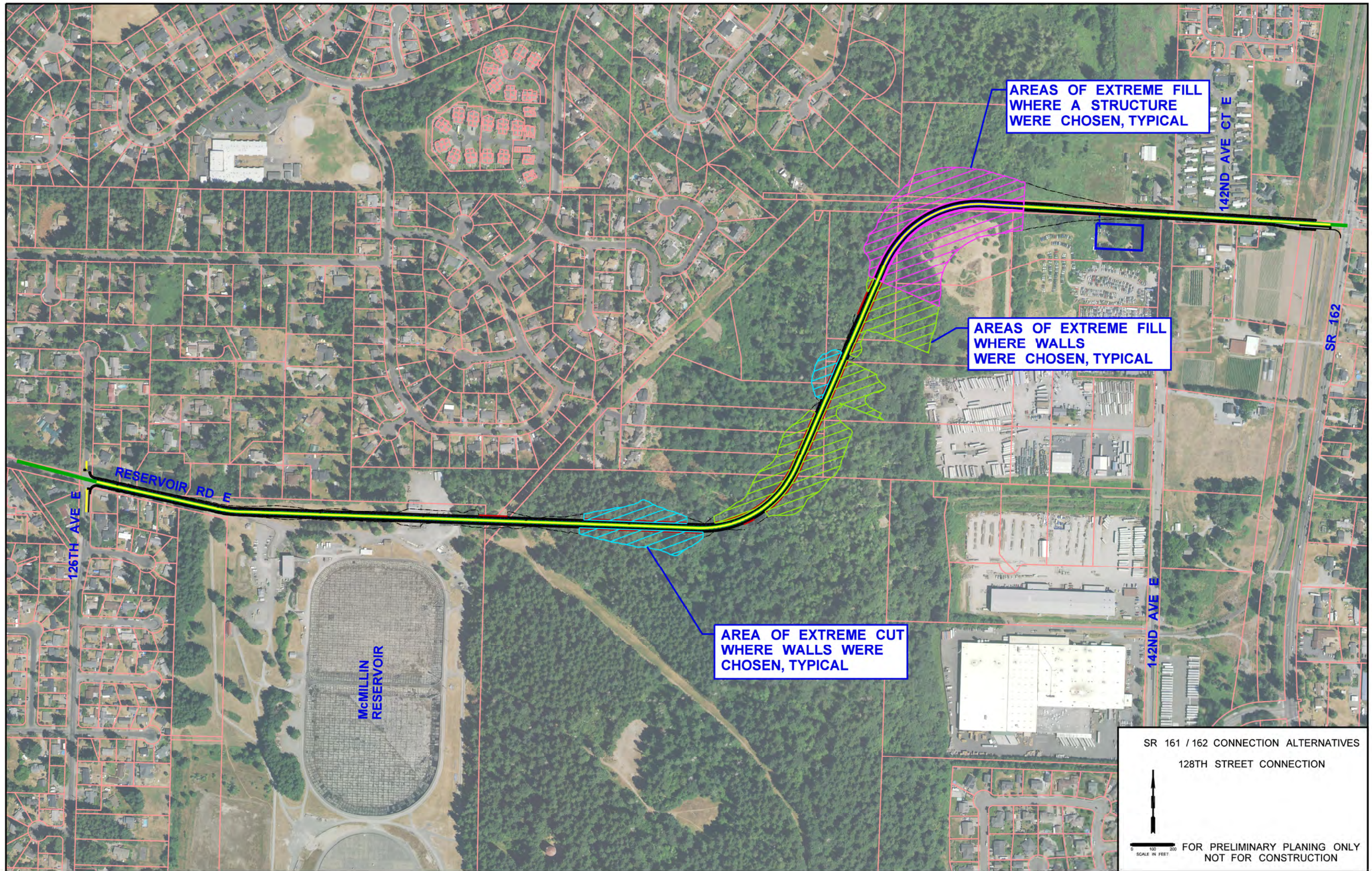
Sales Tax	10%		6,164,377
700 Level Non-Bid Items		\$	-
PROJECT SUB TOTAL		\$	67,808,143

Prelim, PE and Const. Engine	35%	\$	23,732,850
Contingencies	30%	\$	20,342,443
800 Level Items		\$	-
860 Level Items		\$	-

(CN) CONSTRUCTION ESTIMATE		\$	111,883,436
----------------------------	--	----	-------------

(ROW) RIGHT OF WAY		\$	2,100,000
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TOTAL COST OF PROJECT		\$	113,983,436
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AREAS OF EXTREME FILL
WHERE A STRUCTURE
WERE CHOSEN, TYPICAL

AREAS OF EXTREME FILL
WHERE WALLS
WERE CHOSEN, TYPICAL

AREA OF EXTREME CUT
WHERE WALLS WERE
CHOSEN, TYPICAL

SR 161 / 162 CONNECTION ALTERNATIVES
128TH STREET CONNECTION



0 100 200
SCALE IN FEET

FOR PRELIMINARY PLANING ONLY
NOT FOR CONSTRUCTION

COST ESTIMATE
Design Analysis Office

		DESCRIPTION OF WORK									
SR	161/162										
PROJECT TITLE:											
128th Street Connection											
REGION:	Olympic										
Std Item #	Item Description	Standard Item Add On Description OR Non-Std Item Description	Unit of Measure	Non-Std Measure	Item Quantity	Item Cost	Unit	Item	Total	Section Total	NOTES
PREPARATION										\$ 150,000	
0001	MOBILIZATION	Mobilization amount calculated at bottom of sheet	L.S.								
0030	CLEARING AND GRUBBING - SITE		ACRE		10.00	\$15,000.00		\$ 150,000			
	#N/A		#N/A					\$ -			
GRADING & STOCKPILING										\$ 11,828,000	
0310	ROADWAY EXCAVATION INCL. HAUL		C.Y.		93,600.00	\$30.00		\$ 2,808,000			
0431	GRAVEL BORROW INCL. HAUL		TON		325,600.00	\$25.00		\$ 8,140,000			
0470	EMBANKMENT COMPACTION		C.Y.		176,000.00	\$5.00		\$ 880,000			
	#N/A		#N/A					\$ -			
	#N/A		#N/A					\$ -			
DRAINAGE & STORM SEWER										\$ 913,180	
3091	CATCH BASIN TYPE 1		EACH		90.00	\$2,000.00		\$ 180,000			
3105	CATCH BASIN TYPE 2 48 IN. DIAM.		EACH		4.00	\$4,500.00		\$ 18,000			
3541	SCHEDULE A STORM SEWER PIPE 12 IN. DIAM.		L.F.		6,100.00	\$75.00		\$ 457,500			
3542	SCHEDULE A STORM SEWER PIPE 18 IN. DIAM.		L.F.		2,000.00	\$100.00		\$ 200,000			
3151	TESTING STORM SEWER PIPE		L.F.		8,100.00	\$5.00		\$ 40,500			
3090	CATCH BASIN TYPE	2 54 IN. DIAM W/FR & CAGE	EACH		2.00	\$8,590.00		\$ 17,180			
	#N/A		#N/A					\$ -			
SANITARY SEWER & WATER LINES										\$ -	
	#N/A		#N/A					\$ -			
STRUCTURE										\$ 17,840,000	
	#N/A	BRIDGE	#N/A	S.F.	44,600.00	\$400.00		\$ 17,840,000			
SURFACING, LIQUID ASPHALT, BST, ATB, CCP, HMA & SEAL COAT										\$ 562,000	
5047	GRAVEL BASE		TON		11,550.00	\$40.00		\$ 462,000			
5120	CRUSHED SURFACING TOP COURSE		TON		2,000.00	\$50.00		\$ 100,000			
CEMENT CONCRETE PAVEMENT										\$ -	
	#N/A		#N/A					\$ -			
HMA										\$ 791,500	
5711	PLANING BITUMINOUS PAVEMENT		S.Y.		4,150.00	\$10.00		\$ 41,500			
5767	HMA CL. 1/2 IN. PG	58H-22	TON		5,000.00	\$150.00		\$ 750,000			
								\$ -			
IRRIGATION, EROSION CONTROL AND ROADSIDE PLANTING										\$ 454,000	
6488	EROSION CONTROL AND WATER POLLUTION PREVENTION		L.S.		1.00	\$150,000.00		\$ 150,000			
6408	TOPSOIL TYPE B		ACRE		5.04	\$50,000.00		\$ 252,000			
6418	SEEDING		L.S.		1.00	\$50,000.00		\$ 50,000			
6473	OUTLET PROTECTION		EACH		2.00	\$1,000.00		\$ 2,000			
	#N/A		#N/A					\$ -			
TRAFFIC										\$ 1,631,180	
6700	CEMENT CONC. TRAFFIC CURB AND GUTTER		L.F.		13,853.00	\$60.00		\$ 831,180			
6971	PROJECT TEMPORARY TRAFFIC CONTROL		L.S.		1.00	\$250,000.00		\$ 250,000			
6904	ILLUMINATION SYSTEM		L.S.		1.00	\$550,000.00		\$ 550,000			
	#N/A							\$ -			
OTHER ITEMS										\$ 16,201,000	
7055	CEMENT CONC. SIDEWALK		S.Y.		9,160.00	\$100.00		\$ 916,000			
7058	CEMENT CONC. CURB RAMP TYPE		EACH		4.00	\$4,000.00		\$ 16,000			
N/A	#N/A	Fill Wall Barrier and Moment Slab		L.F.	2,135.00	\$700.00		\$ 1,494,500			
N/A	#N/A	Fill Wall		S.F.	52,650.00	\$150.00		\$ 7,897,500			
N/A	#N/A	Cut Wall (Soldier Pile)		S.F.	7,590.00	\$300.00		\$ 2,277,000			

COST ESTIMATE
Design Analysis Office

		DESCRIPTION OF WORK											
SR		161/162											
PROJECT TITLE:													
128th Street Connection													
REGION:		Olympic											
Std Item #	Item Description	Standard Item Add On Description OR Non-Std Item Description	Unit of Measure	Non-Std Measure	Item Quantity	Item Cost	Unit	Item	Total	Section Total	NOTES		
		Pond A		S.F.	20,000.00		\$90.00	\$	1,800,000				
		Pond B		S.F.	20,000.00		\$90.00	\$	1,800,000				
700 LEVEL NON-BID ITEM BREAKOUT										\$ -			
700			L.S.					\$	-	These items calculated in Project Totals Below			
			L.S.				\$	-					
			L.S.				\$	-					
			L.S.				\$	-					
			L.S.				\$	-					
			L.S.				\$	-					
800 LEVEL NON-BID ITEM BREAKOUT										\$ -			
800			L.S.					\$	-	These items calculated in Project Totals Below			
			L.S.				\$	-					
			L.S.				\$	-					
860			L.S.				\$	-					
			L.S.				\$	-					
			L.S.				\$	-					

Item Sub-Total w/o MOB		\$	50,370,860
Mobilization	10%	\$	5,037,086
Bid Item Sub-Total		\$	55,407,946

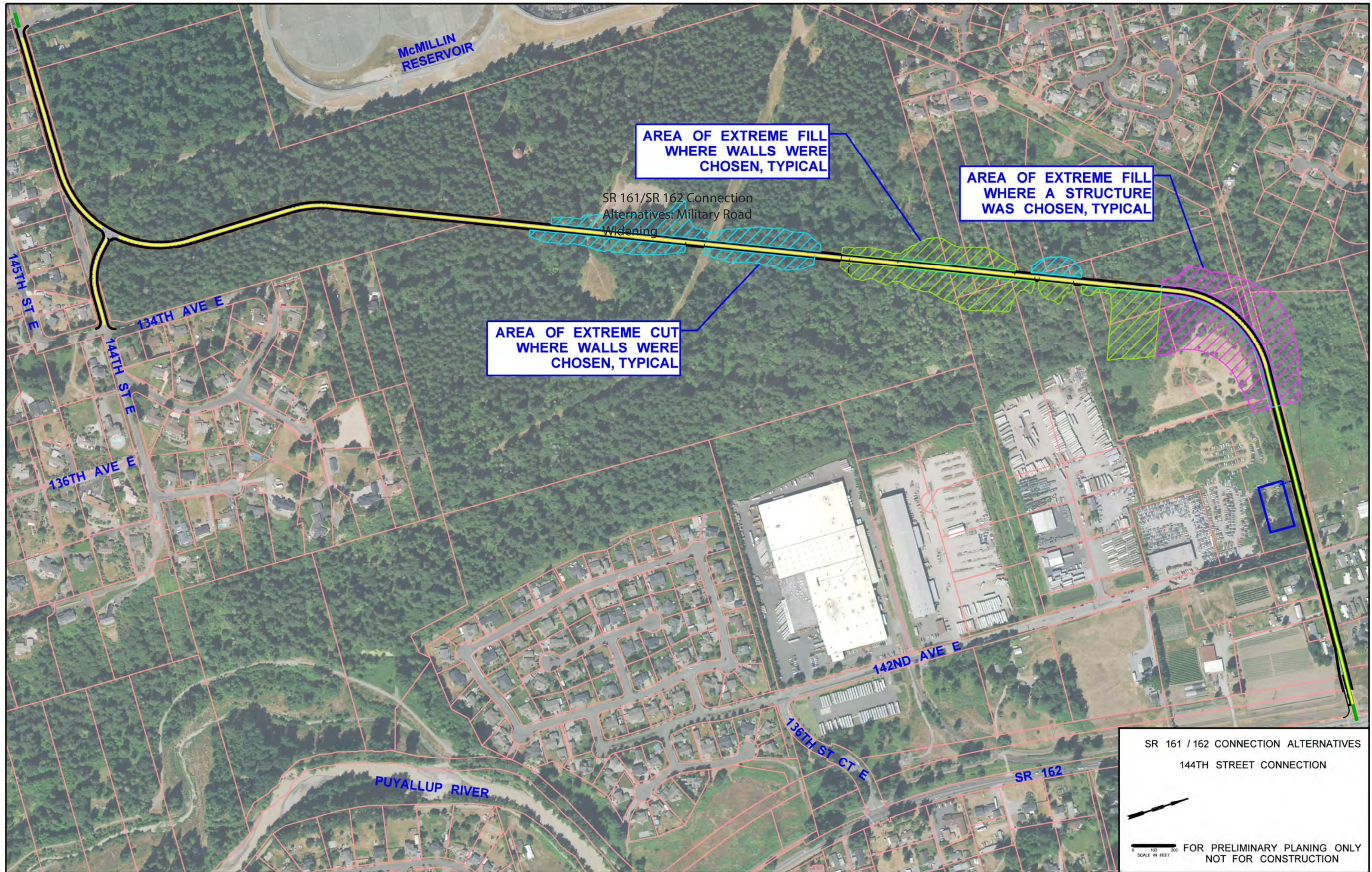
Design Allocations	25%	\$	13,851,987
BID ITEM TOTAL		\$	69,259,933

Sales Tax	10%		6,925,993
700 Level Non-Bid Items		\$	-
PROJECT SUB TOTAL		\$	76,185,926

Prelim, PE and Const. Engine	35%	\$	26,665,074
Contingencies	30%	\$	22,855,778
800 Level Items		\$	-
860 Level Items		\$	-
(CN) CONSTRUCTION ESTIMATE		\$	125,706,777

(ROW) RIGHT OF WAY		\$	1,150,000
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TOTAL COST OF PROJECT		\$	126,856,777
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McMILLIN
RESERVOIR

AREA OF EXTREME FILL
WHERE WALLS WERE
CHOSEN, TYPICAL

SR 161/SR 162 Connection
Alternatives: Military Road
Widening

AREA OF EXTREME FILL
WHERE A STRUCTURE
WAS CHOSEN, TYPICAL

AREA OF EXTREME CUT
WHERE WALLS WERE
CHOSEN, TYPICAL

145TH ST E

134TH AVE E

144TH AVE E

136TH AVE E

142ND AVE E

139TH ST CT E

PUYALLUP RIVER

SR 162

SR 161 / 162 CONNECTION ALTERNATIVES
144TH STREET CONNECTION



0 100 200
SCALE IN FEET

FOR PRELIMINARY PLANING ONLY
NOT FOR CONSTRUCTION

COST ESTIMATE
Design Analysis Office

		DESCRIPTION OF WORK									
SR		161/162									
PROJECT TITLE:											
144th Street Connection											
REGION:		Olympic									
Std Item #	Item Description	Standard Item Add On Description OR Non-Std Item Description	Unit of Measure	Non-Std Measure	Item Quantity	Item Cost	Unit	Item	Total	Section Total	NOTES
PREPARATION										\$ 220,650	
0001	MOBILIZATION	Mobilization amount calculated at bottom of sheet	L.S.								
0030	CLEARING AND GRUBBING - SITE		ACRE		14.71	\$15,000.00		\$ 220,650			
	#N/A		#N/A					\$ -			
GRADING & STOCKPILING										\$ 15,252,750	
0310	ROADWAY EXCAVATION INCL. HAUL		C.Y.		212,700.00	\$30.00		\$ 6,381,000			
0431	GRAVEL BORROW INCL. HAUL		TON		320,250.00	\$25.00		\$ 8,006,250			
0470	EMBANKMENT COMPACTION		C.Y.		173,100.00	\$5.00		\$ 865,500			
	#N/A		#N/A					\$ -			
	#N/A		#N/A					\$ -			
DRAINAGE & STORM SEWER										\$ 1,274,630	
3091	CATCH BASIN TYPE 1		EACH		134.00	\$2,000.00		\$ 268,000			
3105	CATCH BASIN TYPE 2 48 IN. DIAM		EACH		8.00	\$4,500.00		\$ 36,000			
3106	CATCH BASIN TYPE 2 54 IN. DIAM.		EACH		2.00	\$8,000.00		\$ 16,000			
3541	SCHEDULE A STORM SEWER PIPE 12 IN. DIAM.		L.F.		4,040.00	\$75.00		\$ 303,000			
3542	SCHEDULE A STORM SEWER PIPE 18 IN. DIAM.		L.F.		5,850.00	\$100.00		\$ 585,000			
3151	TESTING STORM SEWER PIPE		L.F.		9,890.00	\$5.00		\$ 49,450			
3090	CATCH BASIN TYPE	2 54 IN. DIAM W/FR & CAGE	EACH		2.00	\$8,590.00		\$ 17,180			
	#N/A		#N/A					\$ -			
SANITARY SEWER & WATER LINES										\$ -	
	#N/A		#N/A					\$ -			
STRUCTURE										\$ 17,840,000	
	#N/A	BRIDGE	#N/A	S.F.	44,600.00	\$400.00		\$ 17,840,000			
SURFACING, LIQUID ASPHALT, BST, ATB, CCP, HMA & SEAL COAT										\$ 638,000	
5047	GRAVEL BASE		TON		13,200.00	\$40.00		\$ 528,000			
5120	CRUSHED SURFACING TOP COURSE		TON		2,200.00	\$50.00		\$ 110,000			
CEMENT CONCRETE PAVEMENT										\$ -	
	#N/A		#N/A					\$ -			
HMA										\$ 908,000	
5711	PLANING BITUMINOUS PAVEMENT		S.Y.		5,300.00	\$10.00		\$ 53,000			
5767	HMA CL. 1/2 IN. PG	58H-22	TON		5,700.00	\$150.00		\$ 855,000			
								\$ -			
IRRIGATION, EROSION CONTROL AND ROADSIDE PLANTING										\$ 668,000	
6488	EROSION CONTROL AND WATER POLLUTION PREVENTION		L.S.		1.00	\$150,000.00		\$ 150,000			
6408	TOPSOIL TYPE B		ACRE		8.60	\$50,000.00		\$ 430,000			
6418	SEEDING		L.S.		1.00	\$86,000.00		\$ 86,000			
6473	OUTLET PROTECTION		EACH		2.00	\$1,000.00		\$ 2,000			
	#N/A		#N/A					\$ -			
TRAFFIC										\$ 1,886,600	
6700	CEMENT CONC. TRAFFIC CURB AND GUTTER		L.F.		18,110.00	\$60.00		\$ 1,086,600			
6971	PROJECT TEMPORARY TRAFFIC CONTROL		L.S.		1.00	\$250,000.00		\$ 250,000			
6904	ILLUMINATION SYSTEM		L.S.		1.00	\$550,000.00		\$ 550,000			
	#N/A							\$ -			
OTHER ITEMS										\$ 22,042,000	
7055	CEMENT CONC. SIDEWALK		S.Y.		12,060.00	\$100.00		\$ 1,206,000			
7058	CEMENT CONC. CURB RAMP TYPE		EACH		5.00	\$4,000.00		\$ 20,000			
N/A	#N/A	Fill Wall Barrier and Moment Slab		L.F.	1,628.00	\$700.00		\$ 1,139,600			
N/A	#N/A	Fill Wall		S.F.	87,760.00	\$150.00		\$ 13,164,000			

COST ESTIMATE
Design Analysis Office

		DESCRIPTION OF WORK											
SR		161/162											
PROJECT TITLE:													
144th Street Connection													
REGION:		Olympic											
Std Item #	Item Description	Standard Item Add On Description OR Non-Std Item Description	Unit of Measure	Non-Std Measure	Item Quantity	Item Cost	Unit	Item	Total	Section Total	NOTES		
N/A	#N/A	Cut Wall (Soldier Pile)		S.F.	5,400.00		\$300.00	\$	1,620,000				
		Pond A		S.F.	24,130.00		\$90.00	\$	2,171,700				
		Pond B		S.F.	30,230.00		\$90.00	\$	2,720,700				
700 LEVEL NON-BID ITEM BREAKOUT										\$ -			
700			L.S.					\$	-	These items calculated in Project Totals Below			
			L.S.					\$	-				
			L.S.					\$	-				
			L.S.					\$	-				
			L.S.					\$	-				
			L.S.					\$	-				
800 LEVEL NON-BID ITEM BREAKOUT										\$ -			
800			L.S.					\$	-	These items calculated in Project Totals Below			
			L.S.					\$	-				
			L.S.					\$	-				
860			L.S.					\$	-				
			L.S.					\$	-				
			L.S.					\$	-				

Item Sub-Total w/o MOB		\$	60,730,630
Mobilization	10%	\$	6,073,063
Bid Item Sub-Total		\$	66,803,693

Design Allocations	25%	\$	16,700,923
BID ITEM TOTAL		\$	83,504,616

Sales Tax	10%		8,350,462
700 Level Non-Bid Items		\$	-
PROJECT SUB TOTAL		\$	91,855,078

Prelim, PE and Const. Engine	35%	\$	32,149,277
Contingencies	30%	\$	27,556,523
800 Level Items		\$	-
860 Level Items		\$	-

(CN) CONSTRUCTION ESTIMATE		\$	151,560,878
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(ROW) RIGHT OF WAY		\$	650,000
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TOTAL COST OF PROJECT		\$	152,210,878
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