Draft Active Transportation Plan
Part 1
2020 and Beyond

WSDOT Active Transportation Division
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# WSDOT DRAFT Active Transportation Plan, Part 1, 2020 and Beyond | December 2020

## Chapter 4: Cost estimates for statewide needs and opportunities

### Introduction

- **Speed management for safety**
- **Separated pedestrian and bicyclist facilities**
- **Crossing treatments**
- **High-speed rural segment gaps**
- **Bridge retrofit/improvements for active transportation**
- **Opportunity: Washington bikeways and trails network**
- **Connecting regional trail systems**
- **Wayfinding and signage**
- **Addressing local needs**

### Maintenance and operating support needs

- **Maintenance**
- **Decision analysis tool**
- **Pedestrian and bicyclist count data collection and analysis**
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## Chapter 5: Conclusion

- **Notable concepts**
- **Guidelines and resources**
- **Data**
- **Local and regional planning and development**
- **Meeting the needs of Washingtonians**
- **Future updates**

### Part 2 of the plan

### Appendices

- **Appendix A: Acknowledgements**
- **Appendix B: Guiding themes**
Executive summary

The 2020 Washington State Active Transportation Plan is a comprehensive update to the 2008 Bicycle Transportation and Pedestrian Walkways Plan that:

- Assesses the statewide needs of active transportation users who walk, run, use a mobility assistive device such as a wheelchair, cycle (whether on two wheels or three), or use a small personal device such as a foot scooter or skateboard.
- Defines the state’s interest in active transportation infrastructure (located on, connecting to and across, or serving as an alternate route to use of state highways).
- Focuses on multimodal network connectivity and how level of traffic stress measures can be used to evaluate routes for future changes, particularly in population centers.
- Provides information that decision makers can use in making policy and investment recommendations within a larger context. For example, local and regional efforts have created portions of what could become a statewide active transportation network. Closing these gaps by leveraging past investments in trails can create safer connections in and between communities and support local economies seeking to recover from the effects of the COVID19 pandemic and other challenges.

The statewide active transportation system includes:

- State highways that allow active transportation use. Note that portions of interstates are not open to active transportation use. Chapter 3 provides more information on existing facilities.
- City streets.
- County roads.
- Trails on public lands.
- Sidewalks, bike lanes, and paths in every type of jurisdiction.
- Connections to airports, ferry terminals, passenger rail, and transit.

The plan’s findings identify the current condition of the active transportation system as a patchwork, with high-quality segments in some locations and no facilities in others. It has not
historically been understood or managed as an overall network across jurisdictional boundaries, which has constrained use of active modes. The needs of the system include complete facilities suitable for people of all ages and abilities; safe and well-marked crossings located for route directness; signage and wayfinding; improved capacity to understand and manage these assets; and consistent maintenance and preservation. A focus on population centers will support safety and mobility in places where current and future demand are greatest.

The larger context of active transportation use is grounded in a cyclical process reflected in this plan. It constitutes a positive feedback loop as investments are made:

- Improve the facilities so that
- Participation increases so that
- **Society benefits** from the effects of increased active transportation use.

WSDOT developed this plan through:

- Extensive research that documents the many benefits of active transportation including improved physical and mental health, economic vitality, access to opportunity, and environmental benefits. Chapter 2 provides more information.
- Evaluation of emerging tools and best practices that led to the application of level of traffic stress. LTS provides an objective, quantitative assessment of roadway characteristics that affect safety, mobility, and access for active transportation use. These recommended practices enable evaluation, prioritization, and measurement of change over time. Chapter 3 provides more information.
- Community engagement from thousands of people that identified major barriers or challenges for safety and mobility and reinforced findings from research into best practices. Key themes include the importance of complete and connected facilities, safe crossings, lower speed limits in places where more people need or want to walk or bike, maintenance, and accessible facilities designed to be used by people of all ages and abilities. Chapter 2 provides more information.
Guidance of the Stakeholder Steering Committee that resulted in the plan’s goals of Networks, Safety, Opportunity, Participation, and Partnership. These goals are interrelated and interdependent and acknowledge that partnerships are essential to creation of complete networks that increase and enhance safety, opportunity, and participation. Chapter 1 provides more information.

- Participation of hundreds of WSDOT staff and agency partners who provided technical information and insight and ensured consistency with other planning efforts.

This document is Part 1 of a two-part plan. Part 1 covers:

- Purpose and need of the statewide active transportation plan.
- Goals for active transportation.
- Benefits of active transportation.
- Current state of active transportation in Washington.
- Concerns and priorities gathered through public engagement for the plan’s development.
- Methodology, data sources, and results of a statewide needs assessment focused on state right-of-way and its suitability for active transportation.
- Broad cost estimates for changes to state right-of-way and local systems to improve conditions for active transportation; not presented as location-specific details.

Part 2 will cover:

- Identification and discussion of policy topics relevant to the plan’s analysis and implementation.
- Performance measures associated with the plan’s goals.

**Recommendations**

- Complete a statewide network across jurisdictional boundaries.
- Reduce the level of traffic stress on the network to make it possible for more people to use active transportation safely and comfortably.
• Address gaps on or created by state routes in the best available location, which may be on or off the state route depending on local plans and facilities.

• Align policy changes, funding, and commitment to meet the state’s Target Zero goal of eliminating serious injuries and deaths from traffic and mobility and environmental goals for mode shift.

• Report on the performance measures selected for the plan to track change over time in the context of transportation policy goals.

• Prioritize investments in locations with highest needs to make the most difference.
NEXT STEPS

● Develop and release Part 2 of this plan in 2021 to address policy topics and performance measures.

● Develop an implementation plan for WSDOT’s internal use to apply the plan’s information and analysis in support of the agency’s strategic goals and transportation policy goals.

● Build on this plan’s baseline analysis going forward and continue to deepen understanding.

● Continue efforts to align WSDOT system projects and programmed activities with local plans and projects.

● Evaluate and report progress and issue updates to this plan on a regular cycle.
Chapter 1: Charting a path forward

INTRODUCTION: WE NEED A COMPASS

The Washington state Active Transportation Plan, 2020 and Beyond, provides a foundation for the development and evolution of the statewide active transportation system. As decision makers at every level of government confront budget realities, information on how to identify and prioritize active transportation needs is more critical than ever.

The state and its residents face many challenges including rising costs for health care and housing; land use decisions that result in disconnected transportation networks; and economic shifts that hit individual pocketbooks hard as well as causing cities and towns to reinvent themselves. In the year 2020, the state and nation are dealing with the additional burdens from a pandemic. The good news is that investments in making walking, biking and rolling connections can help address many of these challenges while creating much-needed jobs.¹

“Active transportation” includes walking or running; the use of a mobility assistive device such as a wheelchair or power scooter; cycling; and the use of small personal devices such as foot scooters or skateboards. This definition includes both traditional and electric-assist bicycles and other devices. The plan uses the terms “walking and

“rolling” or “walking, rolling, and bicycling” to refer to the entire range of active transportation.

Washington offers many beautiful places to walk and roll, from town centers and neighborhoods to trails through varied landscapes. But a trip is challenging or even impossible if:

- The sidewalk ends halfway to the bus stop or other destination.
- There is no bike lane.
- There is no curb cut for a wheelchair user.
- No one swept the leaves or plowed the snow.
- Streets are wide, busy, and there are no breaks in traffic, or motorists will not stop and yield to pedestrians.

Recent studies shows that accessible active transportation provides many benefits to individuals and communities, including:

- Low-cost and flexible access to services and opportunities.
- Enhanced quality of life.
- More livable streets and roads.
- Improved personal and community health.
- Increased capacity on roads due to less driving.
- Reduced greenhouse gas emissions and other transportation-related pollutants.
- Improved connections to other modes such as transit, ferries, and trains.
- Reduced “chauffeuring” burdens, particularly for parents.

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Reliable options when other modes of transportation fail.\(^3\)

For all these benefits, people must be able to find their way. In the transportation context, it’s tempting to refer to a plan as a roadmap. Travelers using a defined road network use a road map. Travelers charting new territory – such as the incomplete and, in places, nonexistent statewide active transportation network – rely on a compass. With a compass, they explore unknown terrain and create a path for others to use in the future.

This plan will serve as our compass.

**Plan Contents and Organization**

The 2020 Washington state Active Transportation Plan replaces the 2008 Bicycle Transportation and Pedestrian Walkways Plan. Since 2008, much has changed in the world of transportation and within the Washington state Department of Transportation. The agency has an Active Transportation Division created in 2017 that will lead the implementation of the plan’s

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recommendations. The agency has also adopted a performance program and this plan offers metrics to help prioritize investment decisions as and when funding is available.

This plan is developed in two parts:

- **Part 1:** This portion of the plan covers:
  - Purpose and need of statewide active transportation
  - Current conditions and benefits of active transportation use,
  - Concerns and priorities gathered through public engagement for the plan’s development, and
  - The methodology and results of a statewide needs assessment.

- **Part 2:** To be published after Part 1, this portion will include:
  - Identification and discussion of relevant policies,
  - Performance metrics, and
  - Next steps.

**PLAN PURPOSE**

The purposes of this plan are to fulfill planning requirements as well as meet the needs of WSDOT and federal, tribal, regional, and local partners by:

- Assessing the statewide needs of active transportation users who walk, run, use a mobility assistive device such as a wheelchair, cycle (whether on two wheels or three), or use a small personal device such as a foot scooter or skateboard.

- Defining the state’s interest in the statewide active transportation system as:
  - Identifying and supporting how active transportation contributes to the state’s transportation, health, environmental, economic, and land use goals.
  - Meeting the transportation needs of people who cannot or do not drive.

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4 Appendix H, Planning and Reporting, provides more details on state and federal requirements.
Contributing to the safety and mobility of the traveling public, as per RCW 47.26.300, RCW 47.30.020, and RCW 47.01.078.

Reducing traffic congestion, greenhouse gas emissions, and energy use by shifting uses from driving to active transportation, as per RCW 47.26.300.

Meeting performance goals and complying with reporting requirements.

Offering recommendations for the statewide active transportation system, which includes:

- State highways that allow active transportation use.\(^5\)
- Infrastructure located on, connected to, or serving as an alternate route to state highways, including:
  - City streets and sidewalks.
  - County roads.
  - Trails on public lands.
  - Connections to transit, ferry terminals, passenger rail, and airports.

Focusing on multimodal network connectivity and use of level of traffic stress measures to describe state highways. These recommended practices enable evaluation, prioritization, and measurement of change over time. The application of these principles accomplishes two long-term interrelated goals:

- Completing a statewide network across jurisdictional boundaries.
- Reducing the level of traffic stress on the network to make it possible for more people to use active transportation safely.

Providing information that decision makers can use in making policy and investment recommendations. For example, local and regional efforts have created portions of what could become a statewide active transportation network of trails and bikeways, but this

\(^5\) Some portions of interstates are not open to active transportation use. Chapter 3 provides more information.
network has gaps. Closing these gaps by leveraging past investments in trails can create safer connections in and between communities and support local economies.

**WHY WE NEED TO PLAN FOR ACTIVE TRANSPORTATION**

People who engaged with WSDOT staff during the plan’s development said they want to move through their neighborhoods and travel safely wherever they need to go, and they want to be able to use whichever mode of travel best meets their needs. Yet the complex transportation system created over decades does not fully provide this freedom and independence for active transportation users, especially those who are subject to greater burdens or barriers created by policy, system design, and other factors.

As illustrated in Figure 1.1, every trip that any person makes begins and ends at pedestrian spaces (represented by the circles). People expect these spaces to connect seamlessly to other modes. This is not the case because not all connections accommodate every person.
Figure 1.1 — Active transportation modes can be used from start to finish for a given trip, or as the first and last segments of a trip involving other modes of transportation.

Benefits of measuring multimodal network connectivity

According to the Federal Highway Administration’s Guidebook for Measuring Multimodal Connectivity, measuring connectivity positions a transportation agency to:

- Enhance access to jobs, training, schools, and economic centers.
- Accelerate project delivery by capturing efficiencies in economies of scale, project sequencing, construction phasing, financing, and community involvement.
- Increase accountability of efforts to expand mobility options and system efficiency.
- Prioritize infrastructure investments that fill gaps, address barriers in the transportation network, and increase safety for all users.
- Partner with the private sector to provide innovative multimodal transportation services, and capture opportunities relating to shared-use mobility and automated and connected technology.
The planning process

The project team (listed in Appendix A, Acknowledgements) met with WSDOT staff and external partners in every WSDOT region to hear what core elements the plan should address to improve network connectivity and quality. WSDOT staff emphasized the need for decision-making tools to enable them to assess design alternatives, place individual project locations into a larger context, and support working with local jurisdictions.

The project team developed this plan through:

- Extensive research to document the many benefits of active transportation including improved physical and mental health, economic vitality, access to opportunity, environmental benefits, and more. Chapter 2 provides more information.
- Extensive research that led to the adoption and refinement of level of traffic stress as an objective and quantitative approach to characterize state right-of-way for active
transportation use. Chapter 3 and Appendix D, Methods of Analysis, provide more information.

- Community engagement from thousands of people across the state that aided identification of barriers to active transportation use and goals for the plan. Chapter 2 and Appendix C, Outreach and Engagement provide more information.

- Guidance from the stakeholder steering committee that recommended the plan's goals of networks, safety, opportunity, participation, and partnership. These goals are interrelated and interdependent and acknowledge that partnerships are essential to creation of complete networks that support safety, opportunity, and participation. Appendix A, Acknowledgements, lists members of the committee and project team.

- Participation of hundreds of WSDOT staff and agency partners that provided technical information and ensured consistency with other planning efforts.

**Active Transportation Plan Goals**

Meeting the goals for active transportation requires working through a set of actions like those that created today's complete networks for driving: build it and they will come. When they do, the increase in walking and rolling use provides safety, mobility, and equity benefits for all.

*Figure 1.3 — Networks, Partnerships, Safety, Opportunity, Participation are Active Transportation Plan goals that result in complete, comfortable connections for all.*
The plan's goals are:

- **Networks**: Connect comfortable and efficient walking and rolling networks so people can reach their destinations and other forms of transportation and have everyday access to physical activity.

- **Safety**: Eliminate deaths and serious injuries of people walking and rolling.

- **Opportunity**: Eliminate disparities in access to safe, healthy, active transportation connections for people and communities most dependent on walking, bicycling, and transit.

- **Participation**: Increase the percentage of everyday short trips made by walking or bicycling.

- **Partnership**: Collaborate and coordinate with local, regional, state, tribal, and federal partners to complete and improve the network across boundaries.

*Active transportation in the future*: The integrated transportation system of the future provides safe, welcoming, and connected networks that invite and enable everyone to walk and roll where they need to go.

**GUIDING PRINCIPLES AND THEMES**

The plan's stakeholder steering committee included representatives from a variety of organizations, perspectives, and lived experience. This committee's discussions highlighted principles and themes that reinforced those identified through research and community engagement. These are equally important and mutually reinforcing:

- Comfortable connections make all the difference.

- Benefits for people of all ages and abilities.

- Good roads work for everyone.

- Partnerships are essential.

- The safe systems approach works.

- Equity requires action.

- Transportation dramatically affects health.
A multimodal system provides resiliency.

We can build the future.

These topics are addressed and supported through the performance program, which is summarized below and detailed in Chapter 2 and Appendix B: Guiding Themes.

Figure 1.4 — A positive feedback loop results from improving conditions for walking and rolling. These improvements reduce crash exposure, leading to fewer collisions. People feel comfortable and confident, mode shift redistributes demand, and more active trips result. Benefits include cleaner air and water, improved health, and reduced VMT, GHG, crashes, congestion, and cost. These benefits in turn improve conditions for walking and rolling.
This plan is consistent with WSDOT’s performance program, as it provides information for how active transportation performance can be determined. The steps to improving performance for active transportation are:

1. Improve the facilities so that,

2. Participation increases so that,

3. Society benefits from the effects of increased active transportation use.

Metrics concerning network connectivity and level-of-traffic stress on facilities apply to state-owned infrastructure specifically. Over time with data added for local facilities adjacent to state routes, WSDOT and its partners can develop a more complete picture of network connectivity and usability.

Equity emerged as a critical framework for active transportation throughout research, engagement, and analysis. Regardless of social, economic, or demographic differences, all people need access to transportation options.

Transportation inequities are especially problematic when transportation is the limiting factor for getting to jobs, healthcare, education, and community services. The key equity issues showing up in active transportation in both Washington data and national studies concern fatal and serious traffic crashes; lack of infrastructure, especially ADA-accessible facilities; and long distances between housing, jobs and resources. Not all of these can be addressed through

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6 WSDOT Accountability.

transportation agency work alone, but transportation changes are essential as part of the solutions. Appendix B, Guiding Themes, and context presented in Chapter 2 expand on this.

“Data show the need to direct prevention efforts to communities with poverty rates higher than the state average as well as vulnerable and marginalized populations, such as older adults, individuals with disabilities, people of color, and youth. This will help U.S. improve safety and public health, and decrease the burden on individuals, communities, and the state’s economy.” — Target Zero 2019

Figure 1.6 lists an equity analysis developed for this plan to help planners and engineers identify equity gaps in performance. Addressing equity helps address safety performance, health disparities, connectivity, and partnerships.
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<th><strong>EQUITY CHECKS</strong></th>
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<td><strong>Networks</strong>: Connect comfortable and efficient walking and rolling networks so people can reach their destinations and other forms of transportation and have everyday access to physical activity.</td>
<td>Network completeness: Facility length, reductions in gaps (along and across the system) where facilities are recommended, access to jobs, goods/services and modal connections Network quality: Level of traffic stress</td>
<td>Do certain populations have access to fewer places or fewer miles reachable by high-comfort, low-stress facilities accessible to all abilities?</td>
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<tr>
<td><strong>Safety</strong>: Eliminate deaths and serious injuries of people walking and rolling.</td>
<td>Total number of people killed or seriously injured in driver crashes with pedestrians or bicyclists Lane miles with injury minimization speed limits.</td>
<td>Are certain populations at a higher risk for deaths and serious injuries while walking or rolling?</td>
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<td><strong>Opportunity</strong>: Eliminate disparities in access to safe, healthy active transportation connections for people and communities most dependent on walking, bicycling and transit.</td>
<td>Network performance measures in communities of concern Intermodal access Greenhouse gas emissions avoided by walking/bicycling miles</td>
<td>Are we working with historically disadvantaged communities in ways that enable and empower them to identify their priorities in addressing active transportation disparities? Are we applying investments to address disparities? Are certain populations more subject to health disparities associated with transportation pollutants/emissions?</td>
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### Participation: Increase the percentage of everyday short trips made by walking or bicycling.

**Performance Measures:**
- Percentage of trips by walking/bicycling
- Percentage of adults meeting physical activity recommendations
- Percentage of children walking/biking to school
- Ferry walk-on/bike trips
- Transit access by mode

**Equity Checks:**
- Do certain populations make a smaller percentage of everyday short trips using active transportation?
- Do we understand why, and whether this is due to issues we can seek to address together?

### Partnership: Collaborate and coordinate with local, regional, state, tribal and federal partners to complete and improve the network across boundaries.

**Performance Measures:**
- Percentage of jurisdictions with an active transportation plan that includes measurable goals and prioritization or evaluation methodology
- Percentage of population covered by such plans
- Percentage of total lane miles covered by such plans
- National rankings: America’s Health, Bicycle-Friendly State, Safe Routes to School Report Card

**Equity Checks:**
- Are we building the capacity for partners to participate effectively?
- Are we providing information and guidance for places from very rural to very urban?

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**Figure 1.6** — Goals associated with performance measures and equity checks to help determine whether performance is improving, particularly where needs are higher.

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**Moving forward together**

Implementing this plan and building with its tools will enable WSDOT and partners to make incremental progress toward a bold vision: *A network that works as well for people walking or rolling as it does for people using motor vehicles.*

Washington state won’t get there overnight—and we won’t get there at all if we don’t begin. The saying about planting trees applies equally well to building trails or closing gaps in a network. “The best time to plant a tree (or build a trail or improve the network) is 20 years ago. The second-best time is now.” *Let us move forward together now, compass in hand.*
**Terms Used in This Plan**

**Accessibility**: A measure of mobility; as technically calculated, total travel time between areas weighted by the relative attractiveness of the destination.

**ADA-accessible**: Facilities that meet the requirements of the Americans with Disabilities Act, federal legislation passed in 1990 that protects against discrimination based on disability.

**Active transportation**: Using a human-scale and often human-powered means of travel to get from one place to another; includes walking, bicycling, using a mobility assistive device such as a wheelchair or walker, using micromobility devices, and using electric-assist devices such as e-bikes and e-foot scooters.

**Bicycling** or **Cycling**: Includes use of various forms of bicycles and tricycles, both those propelled solely by human power and electric-assisted bicycles/tricycles.8

**Connectivity**: A measure of how well facilities are linked together to form a convenient network that facilitates everyday trip purposes. In general, this means that the facilities follow the most direct path between origin and destination points.

**Context**: refers to the environmental, economic, and social features that influence livability and travel characteristics. Context characteristics provide insight into the activities, functions, and performance that can be influenced by the roadway design. Context also informs roadway design, including the selection of design controls, such as target speed and modal priority, and other design decisions. For more information, see Chapter 1102 of the [WSDOT Design Manual](https://www.wsdot.wa.gov/designmanual).8

**E-bikes**: Also known as pedal-assist or electric-assisted bicycles, e-bikes are defined in Washington state law as Class 1, 2, or 3, depending on how much assistance they provide (RCW 46.04.169).

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8 Washington state law defines bicycles as two-wheeled or three-wheeled devices ([RCW 46.04.071](https://app.leg.wa.gov/billstatus/RCW/46.04.071)). This plan is not intended to restrict the term “cycling” based on the number of wheels on the device.
Micromobility: Small wheeled devices that may have an electric motor. Includes skateboards, foot scooters, hoverboards, and patented devices such as Solowheels and Segways. Micromobility use is not yet tracked separately and typical data counters do not distinguish between device types. Research on the use of these devices is so new that it isn’t included in the discussion of benefits and other issues below; their use for transportation primarily emerged in 2018-2019.

Network: A system of links (roadway segments), nodes (intersections or crossings), and modal connection points that describe a transportation system.

Pedestrian: As defined under Washington state law, “Any person afoot or using a wheelchair (manual or motorized) or means of conveyance (other than a bicycle) propelled by human power, such as skates or a skateboard” (RCW 46.04.400).

Rolling: Used throughout the plan as a term inclusive of people cycling, using wheelchairs and other wheeled mobility assistance devices, and using micromobility devices.

Trails and shared-use paths: A public way constructed primarily for and open to people walking, bicycling, or rolling (and in some locations, riding horses); does not include sidewalks. For purposes of Washington state law, a trail/path can also include a widened highway shoulder where that has been made part of a trails plan (RCW 47.30.005).

Trips: Agencies use the term “trip” to mean a single event where a person goes from an origin to a destination. A trip may or may not include intermediate stops. Trips can be taken using any transportation mode, including walking, cycling, public transportation, or private vehicle use, among others.

Walking: Includes walking; running where that shows up in counts or survey data (such as run commuters); and people with disabilities using assistive mobility devices.

Other technical terms used in this plan are defined where they first appear in the document, as needed.
Chapter 2: Active transportation in Washington state

INTRODUCTION: INTEREST, OPPORTUNITIES, ISSUES

As WSDOT staff conducted extensive outreach across the state, both interest in increased active transportation use and issues that create barriers to such use emerged. Public comments reinforced findings in state and national data. While people are already walking and bicycling for a variety of purposes, they said they want:

- Walking and biking to be safe from fatal/serious injury crashes.
- Children to be able to walk, bike, and roll to school.
- Drivers to slow down where people walk and bike.
- To be able to cross the state highway walking or bicycling.
- More sidewalks, bike lanes and separated trails.
- Issues of transportation equity to be addressed.

The most common topics across all input channels were safety and the need for facilities. Safety data for the state make it clear that the state cannot attain its Target Zero goal of zero deaths from traffic without addressing pedestrian and bicyclist fatalities, which make up over 20 percent of all traffic deaths. Past efforts have not succeeded in eliminating or even reducing the annual number of traffic deaths and serious injuries for people who walk and bike. In addition, given patterns in the locations of serious injury and fatal crashes, the state cannot attain its Target Zero goals without addressing the disproportionate numbers of such crashes in places that are home to higher percentages of lower-income households and Black, Indigenous and people of color. The high percentage of deaths on roads with posted speeds of 30 mph or more (86 percent of all pedestrian and bicyclist fatalities 2010-2019) points to the importance of speed management, one of the strategies discussed in Chapter 4.

WSDOT applies a variety of measures of active transportation use, none of which provide a complete picture. This plan’s analysis, described in Chapter 3, examines the presence or absence of adequate facilities that will make use more inviting and address critical safety issues. Where
investment in such facilities has been measured, as with Safe Routes to School projects, results show increased walking and bicycling rates and reductions in serious crashes.

Active transportation provides a number of benefits described in this chapter. Increasing walking and bicycling in the state contributes both to transportation goals and other goals such as economic vitality and individual and community health.

Figure 2.1 — An example of the Level of Traffic Stress analysis shared with the public in an online open house and presentations. Chapter 3 describes this methodology in detail.

WHAT PEOPLE IN WASHINGTON SAY ABOUT ACTIVE TRANSPORTATION

WSDOT staff estimate that engagement efforts reached upwards of 80,000 people across the state through a variety of approaches. This chapter provides a brief summary of what WSDOT heard, with more details on the outreach activities in Appendix C, Outreach and Engagement.

The goals and priorities outlined in this plan are based on what Washingtonians told the agency, which reinforced findings from state and national research. Repeatedly, adults, youth, and children; people of different racial groups and economic status; and people in every part of the state told the project team they want safe places to walk, bike, and roll. They want to be able to get across and along state highways to get to their destinations. Below is a list of themes people expressed most often in order of their frequency in questionnaire responses and open-ended comments:

1. Safety and eliminating fatal/serious injury crashes need to be priorities.
2. Make it easier for children to be able to walk, bike, and roll to school.
3. Drivers are going too fast on the state highway where we need/want to walk and bike.
4. We need more and safer places to get across the state highway.
5. We need/want more sidewalks and separated trails. Fill the gaps in existing sidewalks, bike lanes, shared-use paths, and trails.
6. Inequitable availability and access need to be addressed; some places have far better facilities than others.
7. Existing places for walking, bicycling, or riding small devices need maintenance.
8. We need better connections to transit service.

"Essentially every intersection involving a state highway is stressful to use because they have been designed for auto traffic. This seems like a no-brainer." — Online open house comment on the usefulness of analyzing level of traffic stress

Robust community engagement for this plan centered around three milestones. The first round of engagement in early/mid 2019 included informing a broad spectrum of organizations that the process was getting under way and asking them to spread the word, as well as identify issues and priorities. Engagement in fall 2019 included an online open house, webinars, and customized outreach to people who do not typically voice their opinions to government. The final phase includes a review of the draft plan by the public in winter 2020-21, after which the plan document will be finalized.

The outreach efforts revolved around the core concepts of:

- Engaging early with a stakeholder committee to advise WSDOT on outreach and plan development.
- Listening.
- Inviting people to engage using a variety of electronic and in-person options.
- Involving the Cooper Jones Active Transportation Safety Council in discussion of core concepts and goals.
- Using public input to direct, build, and refine the plan.
- Connecting with partners at all levels of government.
• Keeping WSDOT employees informed, with opportunities to engage in developing an actionable work plan.

• Getting the word out about research-based best practices in active transportation and the purpose of the plan.

Figure 2.1 — An example of the flyers distributed by WSDOT directly and through partnering organizations to invite people to take a questionnaire and sign up for e-mail newsletters.
Figure 2.2 — WSDOT staff used email, social media, web pages, questionnaires, and presentations to reach people across the state

The purpose of WSDOT outreach was to understand community priorities and goals for Washington’s multimodal and multi-functional transportation system. Specifically, this effort was about giving Washington residents the chance to say:

- What active transportation in their communities is like now.
- What changes they need to be able to walk, bike, or roll for transportation.
- Where the most important pedestrian, bicyclist, and wheeled mobility connections are and should be in the future.
Based on the total number of social media impressions, email distribution, questionnaire responses, event participation, and e-news sign-ups, WSDOT estimates that 80,000 people or more were made aware of the planning process and/or participated in some way.⁹

Throughout the planning efforts, a statewide Active Transportation Plan Stakeholder Committee provided input and guidance. This group included members of the public, nonprofits, staff from key state agencies, the governor’s office, metropolitan and regional transportation planning organizations, and tribal governments (list in Appendix A, Acknowledgements). The stakeholder committee met regularly to give a public and a statewide perspective to the work. WSDOT staff also held in-depth discussions with the Cooper Jones Active Transportation Safety Council on the analytic methods, goals, and performance measures. Direction from the stakeholder committee and the results of the outreach provided input for the planning process, assessment, performance measures, goals, policy topics, and action steps outlined throughout this plan.

**Benefits of Bicycling and Walking**

This section provides a high-level summary of the ways that walking and bicycling provide health, environmental and financial benefits for the individual who walks or bikes and for the community. Some of the community benefits result when people use walking and biking in place of motor vehicle travel.

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⁹ This estimate incorporates the assumption that some of the social media impressions duplicate other forms of participation. WSDOT has no way of identifying how many people participated in more than one opportunity or how many of the organizations on the outreach contact list forwarded emails to reach more than the numbers represented here. Trackable points of contact and impressions total.
Health benefits

Study after study finds that walking and bicycling can improve physical and mental health.\textsuperscript{10} These benefits do not require becoming a super-athlete; the Centers for Disease Control and Prevention reports that any increase in physical activity can provide health benefits.\textsuperscript{11} Bicycling with an electric-assist bicycle has also been proven to provide physical and health benefits.\textsuperscript{12}


Figure 2.3 — Active transportation provides options for those who have given up driving, choose not to drive, or cannot drive. Photo by Louise McGrody, courtesy of Washington Bikes.

Personal health benefits translate into cost savings for society when they reduce the high costs of preventable chronic diseases. The lists below show the health benefits from regular physical activity, such as walking and biking.

CHILDREN AND ADOLESCENTS
- Cardiorespiratory fitness.
- Muscular strength.
- Stronger bones.
- Improved powers of concentration.\(^\text{13}\)
- Enhanced social skills.\(^\text{14}\)

ADULTS
- Lower risk of early death.

\(^{13}\) Vinther, Dann. 2012. Children who walk to school concentrate better. ScienceNordic.

\(^{14}\) Herrador-Colmenero, M., et al., 2017 – Children who commute to school unaccompanied have greater autonomy and perception of safety, ACTA Paediatrica.
• Lower risk of heart disease and stroke.
• Lower risk of high blood pressure and adverse blood lipid profile.
• Lower risk of type 2 diabetes.
• Lower risk of colon and breast cancer.
• Lower risk of metabolic syndrome.
• Weight management.
• Cardiorespiratory fitness.
• Muscular strength.
• Lower risk of arthritis, asthma, and a host of other conditions.
• Prevention of falls.
• Reduced depression.
• Improved sleep.
• Better cognitive function (for older adults).  

Although most people do not think of it as a health factor, the transportation system has major effects on the risk of disease and injury. In essence, transportation policy is health policy. A study of walkability and health outcomes in King County found that walkable neighborhoods result in more walking, improved health, and lower emission of pollutants.  

This relationship between having good places to walk and more walking as a result is why the Centers for Disease Control

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16 Frank, L., et al., 2006 - Many pathways from land use to health: Associations between neighborhood walkability and active transportation, body mass index, and air quality, Journal of the American Planning Association, 72, 75-8
and Prevention recommend changes to the transportation system to make it easy and safe to get physical activity as a part of everyday routines.\textsuperscript{17}

\begin{quote}
“I am very supportive of this idea (level of traffic stress analysis). By and large, while driving might be stressful, it generally does not keep people from doing it. In comparison, people are more often discouraged from using active modes due to stress. This affects personal outcomes such as health (from inactivity) and economics.”
— Online open house comment
\end{quote}

Health disparities affect Washingtonians in some places and from certain demographic groups more heavily.\textsuperscript{18} As discussed below under Equity in Transportation, availability of the facilities for safe biking and walking also vary by neighborhood. Residents of walkable communities are twice as likely to meet physical activity guidelines compared to those who do not live in walkable neighborhoods. The lack of opportunities for everyday physical activity deepens the inequities for both health and transportation.

When bicycling or walking replace driving trips, it reduces vehicle-related air and water pollution. This offers health benefits to everyone, especially people with asthma and other

\textsuperscript{17} Community Prevention Services Task Force (CPSTF), “Physical Activity: Built Environment Approaches Combining Transportation System Interventions with Land Use and Environmental Design,” The Community Guide.

respiratory conditions and those living closest to major roadways. A final health benefit stems from this switch: reductions in all crashes, including the most serious, due to fewer vehicle miles saves lives.

Environmental benefits

The switch from a car or truck to walking or biking results in benefits to the environment. One of the most significant is reduced pollution and greenhouse gas emissions. In 2017, motor vehicles, boats, planes, and trains caused the biggest single share of the greenhouse gases in Washington state (44.6 percent). Personal cars and trucks made up over half of that. A typical passenger vehicle emits about 4.6 metric tons of carbon dioxide per year. Particles shed from vehicle tires affect water quality for our state's fisheries and ecosystems, regardless of whether the vehicle runs on electricity, gas or diesel. Every motor vehicle trip replaced with a walk or bicycle trip brings down these pollutant numbers.

Figure 2.5 shows a summary of the estimated 2015 emissions (CO2) diverted from vehicles due to bicycle miles traveled (BMT) and pedestrian miles traveled (PMT). The results show an


20 The Highway Safety Manual published by AASHTO lists reductions in vehicle miles traveled as a proven safety countermeasure.


estimated 0.08 million metric tons (MMT) avoided due to bicycle travel and 0.34 MMT avoided due to pedestrian travel. Combined, a total of 0.42 MMT of CO\textsubscript{2} was avoided. A direct offset of one active transportation mile for one vehicle mile was assumed. In 2015, an estimated 0.4 percent of total emissions were avoided by bicycling, while 1.6 percent was diverted by walking. Therefore, the baseline measure for the state avoided CO\textsubscript{2} due to travel by active modes is 0.42 MMT or 2.0 percent of the 21.42 MMT estimated CO\textsubscript{2} produced by vehicles annually. The goal is to increase that amount of avoided emissions to 1.05 MMT annually.

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>BICYCLE TRAVEL (million miles)</th>
<th>PEDESTRIAN TRAVEL (million miles)</th>
<th>TOTAL ACTIVE TRANSPORTATION (million miles)</th>
<th>VEHICLE TRAVEL (million miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miles Traveled</td>
<td>218</td>
<td>938</td>
<td>1,156</td>
<td>59,653</td>
</tr>
<tr>
<td>Emissions (MMT)</td>
<td>0.08</td>
<td>0.34</td>
<td>0.42</td>
<td>21.42</td>
</tr>
<tr>
<td>Emissions (% of total)</td>
<td>0.4%</td>
<td>1.6%</td>
<td>2.0%</td>
<td>98.0%</td>
</tr>
</tbody>
</table>

Figure 2.5 — Summary of estimated 2015 emissions (CO\textsubscript{2}) avoided for VMT due to bicycle and pedestrian travel assuming a direct offset. Sources: Air Quality & Climate, WSDOT, 2019; Office of Strategic Assessment and Performance Analysis (OSAPA), WSDOT, 2018; PSRC MOVES.

Reducing vehicle miles driven by switching to active transportation provides safety and health benefits that are larger than a switch to lower-emission motor vehicles. For example, electric vehicles provide emissions benefits over internal-combustion engines, yet still incur shedding of tire particles that affect water quality and the potential for a crash occurring. A shift towards

25 WSDOT. 2015. Annual Mileage & Travel Information.


more active transportation will reduce the state’s dependence on fossil fuels while benefiting air and water quality and the state’s ecosystems.

**Economic benefits**

Bicycling programs and active transportation facilities such as sidewalks have been shown to deliver economic benefit to society, including increased retail sales and property values. This economic return provides tax revenues to local and state government. In addition to drawing business activity, walkable places support workforce recruitment and retention in smaller towns as well as in larger cities.

Outdoor recreation is big business in Washington state, supporting more direct and indirect employment than aerospace. Active transportation provides an essential foundation for this economic activity; bicycle riders spend a total of over $3.1 billion annually. As the fourth most frequently chosen recreational activity, bicycling represents a substantial number of people getting outdoors and their spending generates economic activity across the state. Bike tourists spend more on average for each day of travel than automobile travelers. Downtown associations and tourism destination organizations promote walkable, inviting business districts

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that attract people to shop, dine, and spend the night, making active transportation investments a support for every type of traveler.

The economic benefits of walking and biking return to individual people as well as to society. The reality for many people is that they cannot afford a reliable working vehicle. This makes access to active and public transportation essential to get to work, education, and services.

A new technology is helping some people: Electric-assist bicycles cost less than a typical vehicle and provide a boost to get up hills and cover more miles. They make it easier to use a bicycle for everyday trips, including hauling children or groceries, for people who might not have considered biking in the past. A national study of electric-bike owners found that 25 percent of respondents had physical limitations that made a regular bicycle too difficult to use, and owners ride farther than they would have on a non-assisted bike. Electric-assist bikes offered through bikeshare systems aren’t available everywhere in the state, but where bikeshare exists it can make these bikes available without the up-front cost of direct purchase.

People who walk and bicycle save money on automobile fuel, parking, and vehicle maintenance, and potentially on insurance as they reduce miles driven. According to the American Automobile Association, the annual cost of owning a car and driving 15,000 miles a year is over $9,200.

Investments in active transportation facilities costs much less to build and maintain than increasing road space for people moving in cars, SUVs, and pickup trucks and creates more

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32 An electric-assist bicycle costs roughly 1/10 the price of the lowest-cost new electric vehicle as of November 2020 ($3,000 vs $30,000).


According to a study requested by the American Association of State Highway and Transportation Officials, active transportation projects create more jobs than any other type of transportation infrastructure, at a return of 17:1. Smaller than a major project, such as a freeway exchange, these active transportation projects may also offer greater potential for smaller firms to win bids, expanding opportunities for disadvantaged business enterprises.

For the approximate cost of one Seattle-area freeway interchange, approximately 300 miles of trail could be constructed.

Mobility, accessibility, and congestion relief benefits

Space-efficient active transportation connectivity investments that close gaps and encourage mode shift make use of existing facilities to leverage past investments. A spectrum of “quick-build” design options enable the creation of bike lanes with varying degrees of separation.

Supporting mode shift provides long-lasting benefits in managing highway capacity. Increases in highway capacity lead to increased driving, something known as “induced demand.” In other words, as more people drive, the system is designed to accommodate more traffic.

For comparison, cost estimates in Chapter 4 show that for the approximate cost of one Seattle freeway interchange ~300 miles of trail could be constructed. Chapter 4 and Appendix F, Cost Estimation Background, provide more specific information on methodology and cost calculations.

Dowell, Paula, and Lisa Petraglia. NCHRP 08-36, Task 103. 2012. Mining Recovery Act Data for Opportunities to Improve the State of Practice for Overall Economic Impact Analysis of Transportation Investments.

This is based on WSDOT’s planning level cost estimate for an interchange that is fully directional for all GP and HOV movements. The trail estimate assumes a cost of $315 million for 300 miles.

Andersen, Michael. No, Protected Bike Lanes Do Not Need to Cost $1 Million Per Mile. People for Bikes.
words, with more lanes apparently available, more people choose to travel by car. The end result is that vehicle miles traveled increase in exact proportion with lane-mileage, and any congestion relief vanishes—in some cases this leads to worse commute times than before the expansion project.39 Building a bike lane or trail that enables some people to shift their travel habits frees up existing lane space for those who still need to drive.

WSDOT oversees a program of grants for Safe Routes to Schools projects. These contribute to overall mobility, not just for the families with children in school. Depending on the school district, anywhere from 10 to 30 percent of traffic congestion during morning and afternoon peak periods comes from parents dropping off and picking up their children at school.40 According to the 2019 Washington state Student Travel Survey, 39.7 percent of children in kindergarten through eighth grade are driven to school in a family vehicle.41 Providing good walk/bike routes to school would enable parents to reduce or eliminate at least some of these trips, thus easing motor vehicle traffic at the busiest times of day.

Good connections for people who walk or bike to reach transit, ferries, and trains also support mobility. These means of transportation extend the usefulness of walking and bicycling. The reverse is also true. A ferry or train can carry people over the longest leg of their trip, and active transportation can provide that first or last mile, freeing up one more vehicle space in the driving lane and another parking space.

39 Hymel, Kent. 2019. If you build it, they will drive: Measuring induced demand for vehicle travel in urban areas. Transport Policy Vol. 76.


41 These statistics were collected before the COVID-19 pandemic affected school transportation in 2020.
“Accessibility” in transportation includes being able to get access to all the things needed for the essentials of life, whereas “mobility” often measures the idea of moving people faster and farther. Evaluating walking and bicycling access to destinations and to other forms of transportation provides understanding about how well the transportation system meets people’s needs. WSDOT has defined performance measures concerning this type of accessibility as part of its mobility performance framework; this plan adds detail for active transportation mobility and accessibility.

“Accessibility” in transportation also refers to fully ADA-accessible connections.

**ACTIVE TRANSPORTATION USE: WHO, WHERE, AND HOW MUCH**

The answers to the questions of who, where, and how much people walk and bike for transportation are complex. The state of the art for understanding these travel modes is not as good as it is for motor vehicle travel but WSDOT’s work and abilities are expanding. For this plan, WSDOT identified national, state, and site-specific data sources. This section describes findings, sources, and limitations.

Data reported here do not reflect any shifts in transportation usage habits created by the COVID-19 pandemic.

**National numbers**

Sources of walk and bike participation survey data include the U.S. Bureau of Labor Statistics, the National Household Travel Survey (NHTS), the U.S. Census, and the American Community Survey (ACS). The most recent national information available comes from the 2017 National Household Travel Survey, which includes trips for all purposes: travel to work, school, recreation, and personal or family trips.

*About half (47 percent) of all trips taken in the U.S. are less than*
3 miles long and could be completed in a 15-20-minute bike ride, yet the vast majority of short trips are made by automobile.

In the U.S. people make about 11 percent of all trips by walking and 1 percent by biking, according to the 2017 NHTS. Nationally, the number of walking trips as a percentage of all trips is on the rise, but the percentage of walking to work trips is decreasing. The percentage of biking trips is relatively stable, but an increasing percentage of workers are bicycling to work.

Figure 2.6 — Graph illustrating pedestrian and bicyclist trip purposes found in 2017 NHTS data.

The 2017 NHTS reports the following U.S. bicycle trip purposes:

- Social/recreational (39%)
- Family (21%)
- Earn a Living (20%)
- Other (11%)

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School/Church (9%)  
The 2017 NHTS reports the following U.S. pedestrian trip purposes:

- Social/recreational (36%)
- Family (26%)
- Earn a Living (7%)
- Other (23%)
- School/church (9%)

Additional noteworthy national trends include:

- An increasing number of bicycling and walking trips by women.
- A decrease in percentage of trips made by children and youth.
- An increase in walking trips by seniors.
- An increase in bicycling trips from people with an income of less than $25,000 per year but a decrease in walking and transit trips.
- A decrease in the percentage of walking and bicycling trips by Black, Indigenous, people of color.  

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According to a 2015 study by the U.S. Bureau of Labor Statistics, 30.4 percent of Americans walk as exercise and about 3 percent ride a bicycle. A more recent nationwide survey conducted in 2018 by People for Bikes found that 32 percent of Americans had ridden a bike at least once in the previous year.

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DATA LIMITATIONS

The National Household Travel Survey, U.S. Census, and American Community Survey only count the means of transportation used for the longest portion of the trip versus including each of the trip segments. These reports would count a trip where the person takes a short walk or bike ride to a transit stop as a transit trip, not a walk or bike trip.

Commuting represents less than 20 percent of the total trips people make. The other 80 percent are for purposes such as getting groceries, going to the doctor, socializing, or getting children to and from school.

Commute-oriented surveys typically capture trips specific to the time period in which people take the survey. They would not identify walk or bike commute trips that would usually be part of a person’s transportation use if the survey is taken during an unusual time, such as a time when the respondent is working from home or on vacation. More accurate statewide estimates require large-scale, costly surveys. National surveys provide a source of information, but limited sample size means they do not provide good local or regional estimates below the state level.

Lastly, it is important to remember that not all people will take a survey, which can result in a bias toward information about some subsets of the population, but not others.46

Active transportation in Washington state

In Washington state, an estimated 12 percent of all trips, 9 percent of commute trips, and 1 percent of all miles traveled were made on foot or by bicycle, according to data from the 2017

46 Factors that can affect whose experiences are represented in survey results include nonresponse bias (differences between respondents and nonrespondents) and coverage bias (households left out due to the data collection methods used, such as using phone surveys of people with landline phones and leaving out non-telephone household and cell-phone-only households). Research by the CensU.S. Bureau indicated survey nonresponse can be linked to demographic characteristics such as race and ethnicity (Griffin, Deborah. N.d. Measuring Survey Nonresponse by Race and Ethnicity. U.S. CensU.S. Bureau.).
National Household Travel Survey. That reflects an average increase of 4.29 percent per year (4.36 percent for walking trips and 3.75 percent for biking trips) from 2009. The state's population during this same period grew by only 1.15 percent per year on average, indicating that a larger percentage of Washingtonians are walking and biking to meet their transportation and recreational needs.\textsuperscript{47} When ranked against other states, Washington ranks ninth for the percent of commuters walking or biking to work. In addition, while not counted as a separate trip, approximately 85 percent of public transportation users in Washington reported walking or bicycling to access transit.

Walking and bicycling use in Washington are growing at a rate larger than the state's population increase. This means a larger percentage of Washingtonians are walking and biking to meet their transportation and recreational needs.

Counts of people walking and biking

As discussed in Chapter 3, usage counts do not provide a complete understanding of the demand for active transportation facilities, although they can be used to measure change over time. WSDOT uses two methods to collect bicyclist and pedestrian physical counts: permanent counters and short-duration counts. WSDOT has 80 permanent pedestrian and bicyclist counters located on trails, city streets, and state routes around the state. Their purpose is to collect data 24 hours a day, seven days a week. The permanent count program uses these to identify long-term patterns in active transportation trips. This allows for the following variables to be taken into account:

- Surrounding land uses.
- Local weather patterns.
- Roadway geometry.

\textsuperscript{47} Rates of walking and bicycling continue to increase throughout Washington. WSDOT Gray Notebook 71, Sept. 2018
Bicyclist/pedestrian facility types in these locations.

Short-duration counts may be conducted using automated equipment, typically as a pre/post project evaluation, or through manually observed and tabulated counts conducted over the course of several blocks of time on several days. The short-duration, manual-count program enlists volunteers at a much larger number of locations than the permanent counter sites; they conduct two-hour counts from 7 a.m. to 9 a.m. and from 4 p.m. to 6 p.m. on weekdays in the fall. Count data are typically site-specific but WSDOT can use them to make estimates for the region or the state. WSDOT funded the development of a guide for best practices in conducting counts that came out in 2017, and used recommendations from the guide to make the estimates below based on the results of short-duration manual counts taken at 212 locations and permanent count data from 61 locations around the state.48

**Count estimates for Washington state**

Based on the permanent counter data and short-duration manual counts, Washingtonians took approximately 20.5 million bicycling trips and 52.3 million walking trips (including use of mobility assistive devices) in 2018.

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Figure 2.8 — In 2018 Washingtonians took approximately 20.5 bicycling trips and 52.3 million walking trips.

In 2018, the manual count volunteers tallied a total of 19,783 bicyclists, 37,966 pedestrians, and 781 other people (in-line skaters, babies in strollers, etc.) at 212 different sites (trails, city streets, and state routes) across 44 cities in Washington.

Appendix E, Usage Counts provides a more complete explanation of the methods used to extrapolate from data sources to develop the statewide estimates.

**Data Limitations**

Manual short-duration counts rely on volunteers who may interpret directions and report results differently from one another. Permanent counters must be maintained; their batteries expire, they may be vandalized, and sometimes data is lost in the time it takes to make repairs and recalibrate.

A more complete state estimate requires much larger samples, which would cost more than available funding currently allows. Additional techniques and data sources would more fully capture when and where people walk and roll. WSDOT is evaluating sources such as smartphone apps people use to record walking, running, and bicycling, as well as other crowd-sourced data sets.
How WSDOT uses count data

Potential or latent demand refers to active transportation use that would occur if facilities were available that people could and would use. This latent demand can be estimated by determining how many places are sited relatively near each other that people could walk or bike to within a short time.

Latent demand is use that would occur if facilities were available. In other words, you don’t have to count the number of people swimming across the river to justify building a bridge.

Perhaps the most important use of the walk and bike count data when it is more complete will be to determine potential crash exposure. As the count data increases or decreases it can be compared to crash data increases or decreases. State and national crash data are reported in terms of vehicle miles traveled (VMT) to calculate potential crash exposure for people driving. Because agencies do not yet have calculations for pedestrian miles traveled or bicyclist miles traveled, they report those crashes in terms of total population (per capita measures). Crash risk is thus reported differently between these various modes of transportation and cannot be directly compared.

Count data can also be used to track changes in walk and bike trips over time. Typically, site-specific information about where people walk/bike is used for basic active transportation planning and to prioritize projects. This is usually done by counting the number of people walking and biking to estimate “demand”—meaning actual observed usage.

DATA LIMITATIONS

WSDOT and other transportation agencies have historically focused on actual counts for decision making. That method does not account for barriers or places where there is a lack of infrastructure; for example, the sidewalk ends and the only option is to walk in the travel lane so...

Litman, Todd. 2013. Accounting for Latent Travel Demand.
fewer people use that sidewalk. It also does not account for the level of traffic stress in a place that discourages people who would otherwise use active transportation. In other words, focusing on counts of people already moving through a place does not account for the people who would be there if adequate facilities were provided.

Counting people who already use active transportation only provides a partial picture. This plan includes action steps to move WSDOT toward more evaluation of latent demand to understand where people could shift to walking or bicycling.

Survey of city and county count programs

In addition to the statewide count programs, local jurisdictions collect active transportation counts. WSDOT sent a survey to cities and counties in Washington asking about their count programs. The purpose of the survey was to see if the local jurisdiction data could be combined with WSDOT data to expand understanding of walking and biking trips. About half of the 116 responses indicated that they conduct regular active transportation counts; some expressed interest in obtaining permanent counters in the future. Most conduct counts on an as-needed basis according to project scopes, funding opportunities, or by request from residents. Appendix E, Usage Counts provides a complete summary of the survey results and other information on counts.

School trips: How children are getting to and from school

Regular physical activity for Washington’s children serves as a goal for both the Office of the Superintendent of Public Instruction and for the State Department of Health. Each school day, over 1.1 million students across Washington state travel to and from their elementary, middle, and high school. Of those in elementary and middle schools, about 11 percent walked and 1 percent biked to school, according to results of the 2019 Washington state Student Travel Survey conducted by WSDOT and the Department of Health. That represents a decrease of _______________________

50 WSDOT will post the study online when finalized.
about 50 percent from the 2016 survey, which indicated that 17 percent of children walked, and 1.4 percent biked to school. It is not clear if the shift is due to general reductions in walking to school or survey collection differences.

“Too many parents drive their kids to school because too many parents drive their kids to school, so now it’s too many + 1.”
— High school student, Major Taylor Project, Tacoma

In 2019, higher rates of walking and biking were found among elementary and middle school children if they attended a school:

- Within 1 mile of their home: 38 percent.
- In an urban area: 12.7 percent.
- Serving a relatively lower income population: 15 percent.
- Serving a lower percentage of Black, Indigenous, or people of color students: 12.6 percent.

Figure 2.9 — Children walking on a sidewalk. Source: Pedestrian and Bicycle Information Center.

People with disabilities and the elderly

Not all disabled people are older and not all older people have a disability. They are discussed together here because there is some overlap in these populations in their transportation barriers and needs.
Approximately 23.5 percent of adults in Washington have some level of disability, and another 20 percent will have temporary mobility challenges at any given time. People with disabilities are less likely to own or have access to vehicles than people without disabilities, and less likely to drive even if they have vehicles.

As the population grows older, a certain percentage will acquire a disability, and the senses and reflexes needed for safe driving decline with age. AARP reports that drivers age 70 and older are expected to outlive their driving years—men by seven years and women by 10. By 2030 the number of Washingtonians age 70+ will grow by nearly 481,000, to approximately 1.287 million people across the state, or over 15 percent of the total population. Comfortable active transportation and access to transit can help maintain transportation independence for many of them.

86% OF PEDESTRIAN & BICYCLIST FATALITIES OCCURRED ON ROADS WITH A POSTED SPEED OVER 25 MILES PER HOUR FROM 2010-2019

Figure 2.10 — The ten-year average is higher than the 2019 figure. 2010-2019, 86 percent of pedestrian and bicyclist fatalities occurred on roads with a posted speed over 25 miles per hour.

51 Centers for Disease Control and Prevention. Disability & Health U.S. State Profile Data for Washington (Adults 18+ years of age).

The Americans with Disabilities Act requires transportation facilities to be accessible, and WSDOT has an ADA Transition Plan approved by FHWA. To make facilities ADA-accessible requires completing active transportation networks with elements such as curb cuts or ramps for wheelchair users, accessible pedestrian signals for those who are blind or low-vision, and trail access suitable for adaptive cycling equipment, which is usually wider than a typical two-wheeled bike. ADA accessibility might also mean allowing longer crosswalk timing at a traffic signal or other operational changes.

These kinds of complete connections improve those facilities for everyone using them, regardless of disability. A trailhead that allows a wider adaptive bike or trike also works well for someone riding a cargo or family bike or carrying large bags on a rack. Curb cuts similarly benefit everyone, not only wheelchair users; workers delivering with heavy carts, a traveler pulling a suitcase, and people pushing strollers all benefit as well.

**Walking and Biking Traffic Crashes**

**Target Zero**

“The Target Zero plan represents a bold vision: zero deaths and serious injuries on Washington’s roadways by 2030.”

—Target Zero 2019

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53 WSDOT. 2018. [WSDOT ADA / 504 Transition Plan for Public Rights of Way and Ferries](https://www.wsdot.wa.gov/policies/504plan/).

Figure 2.11 — More than half (60 percent) of pedestrian fatalities and serious injuries in 2019 occurred when the pedestrian was crossing the road. For 2010-2019 this figure is 62 percent.

The 2019 update to the Strategic Highway Safety Plan, known as Target Zero, lays out the major strategies that all transportation agencies must address to achieve the state’s goal of zero traffic deaths. Some of the key strategies identified in Target Zero for serious and fatal crashes involving people walking or rolling include:55

**Speed:** Most pedestrian and bicyclist fatalities (83 percent) occurred on roads with a posted speed over 25 miles per hour in 2019. For 2010-2019 the figure is 86 percent. Higher driving speed at impact results in more deaths and serious injuries.

**Crossings:** A majority (60 percent) of pedestrian fatalities and serious injuries in 2019 occurred when the pedestrian was crossing the road. For 2010-2019 the figure is 62 percent. Crossings that are appropriately located, designed for context, and ADA-accessible are not available at all crossing locations, meaning people may have to cross in conditions that increase crash risk.

Lack of separated infrastructure and incomplete networks: Providing appropriately designed, functional, and complete pedestrian systems may reduce the potential for active transportation crashes. WSDOT and other agencies do not yet have complete data, and crash reports do not always include information on what types of facilities were present or missing. Comparison of places with and without complete networks provide evidence that having continuous connections and separated facilities reduces crash according to research providing separated bicycle facilities in cities reduces potential for crashes of every mode.  

Roadway design and operations affect the context in which people make decisions about how, when, and where to walk and bike. Sustainable or systematic safety approaches acknowledge that humans are fallible; that humans are physically vulnerable and the human body’s tolerance to impact forces should be a guiding tool; that road safety is a shared responsibility, among all who use the road system, including those who design, build, and operate the road system, not solely those using it; and that a “safe and forgiving road system” provides redundancy in the system so that when one part fails other parts will still provide protection to the road user.  

These protective factors are reflected in the core principles for facilities developed in a Safe Systems Approach, identified in the Target Zero plan as a Priority Level One strategy:  

- Speed control and separation.  
- Functional harmony.


A self-enforcing road, also called a “self-explaining roadway,” is a roadway that is planned and designed to encourage drivers to select operating speeds consistent with the posted speed limit.  

**Predictability and simplicity.**

- Make it easier for everyone to understand how to appropriately use the roadway and interact with other users. People make fewer mistakes when they know

**Forgiveness and restrictiveness.**

**STRATEGIES AS DESCRIBED IN THE TARGET ZERO PLAN**

**Speed control and separation.** Create environments that help drivers select injury minimization speeds more or less “automatically” based on the design of the facility. This reduces reliance on law enforcement for maintenance of appropriate speeds. Where lower speeds are not possible, this principle encourages greater separation between vulnerable users and vehicular traffic. Where land use supports higher operating speeds, more separation is called for so vulnerable road users are not in spaces right next to high-speed traffic.

“Drivers come zooming down the hill when someone needs to cross—they need to drive slower.” — Mountlake Terrace Girl Scout; the group conducted a walking safety audit, presented their findings to the City Council, and held a pop-up traffic safety event at the library that WSDOT staff participated in during plan outreach

**Functional harmony.** Design road characteristics to be consistent with the needs of the expected road user groups and adjacent land-use context. Include appropriately spaced crossing opportunities with treatments such as markings and signals where needed.

**Predictability and simplicity.** Make it easier for everyone to understand how to appropriately use the roadway and interact with other users. People make fewer mistakes when they know

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what to expect, understand what is expected of them, and when their decisions are simple.

Infrastructure and traffic control devices, such as crosswalk beacons, contribute significantly to this principle.

**Forgiveness and restrictiveness.** Design, operate, and use the roadway so that a simple mistake does not result in serious injury (forgiveness), and road characteristics are designed to prevent the user from making decisions that increase the likelihood of mistakes (restrictiveness).

In this way, the road environment is influencing human behavior to reduce crash exposure.

Taken together the strategies and objectives outlined in this plan supports collaborative efforts by WSDOT and its partners to achieve the state’s Target Zero goal, working toward implementation of a Safe Systems Approach.

**Traffic deaths**

The trend for traffic deaths involving people walking and biking on Washington roadways increased over the last 10 years (2010-2019). A comparison of traffic fatalities involving pedestrians—including people in wheelchairs and those using other small rideable devices such as skateboards and scooters—shows a 62.5 percent increase from 64 in 2010 to 104 in 2019. The number of bicyclist fatalities has fluctuated over the years but overall, the trend line indicates an increase between 2010 and 2019.

When state or federal agencies report deaths resulting from traffic crashes, they include only those people who died in 30 days or less following the crashes. This means that someone who dies 31 days or more after the collision does not show up in the statistics even though the crash caused their death. “Not in traffic” crash deaths that occur in driveways, parking lots, and on private roads also may be missing from the data. Traffic fatality statistics thus undercount people killed by crashes. The National Safety Council estimates that this may amount to nearly

3,000 crash deaths per year nationwide, or about 8 percent more on top of the 38,000 traffic deaths reported per year. 

Figure 2.12 — A "ghost bike" is placed as a memorial at a location where a driver killed someone on a bicycle. Ghost bike and memorial at the site of Sher Kung’s 2014 death in Seattle. Seattle Bike Blog image used by permission.

The 2008 state active transportation plan set the goal of decreasing deaths and serious injuries of people walking or rolling by 5 percent each year. The figures below show the gap between what actually happened as the number of deaths increased and what would have happened if that goal had been met each year. (WSDOT cannot identify a specific explanation for the drop in 2013.) If this benchmark of 5 percent reduction per year had been achieved, 439 people would

61 CBS News. 2016. Why hundreds are killed in crashes in parking lots and garages every year.
not have died prematurely and 1,059 people would not have been seriously injured as a result of a driver hitting them.

Figure 2.13 — Graph of pedestrian fatalities 2010-2019 comparing actual deaths to lives that would have been spared if the state had met the goal of 5 percent reduction per year in the 2008 plan.
Figure 2.14 — Graph of bicyclist fatalities 2010–2019 comparing actual deaths to lives that would have been spared if the state had met the goal of 5 percent reduction per year in the 2008 plan.
Figure 2.15 — Graph of combined pedestrian and bicyclist fatalities 2010-2019 comparing actual deaths to lives that would have been spared if the state had met the goal of 5 percent reduction per year in the 2008 plan.

Figure 2.16 — Graph of 2010-2019 pedestrian and bicyclist fatalities as a percentage of all traffic fatalities, rising from 15 percent in 2010 to 21 percent in 2019.
Serious injuries

The trend for traffic-related serious injuries to people walking and biking increased slightly over the 10-year time period 2010-2019. The number of serious injuries in 2010 (408) compared to the number in 2019 (464) shows an increase of 13.7 percent. The number of serious injuries has gone up and down over the years, similar to the fatality pattern above.

Crashes involving people who walk and bike represented 21 percent of all fatal and serious injury traffic crashes in 2019, even though walking and biking for transportation only represents about 12 percent of all trips.

When state or national agencies report “suspected serious injuries” they are referring to specific definitions updated in 2019. Crash reports sometimes use the term “suspected serious injury” because at the scene the police officer initially documents the injury severity; later medical assessment may identify a different level of injury.

For the purposes of this document, we use the term “serious injury.” For the person involved, an injury that does not meet the reporting guidelines may still be serious and/or life-altering.

Whether or not a person is seriously injured or dies when the driver strikes them is also affected by other factors such as whether they’re in a wheelchair, their age, and other variables.

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62 USDOT. Serious Injury Reporting. A suspected serious injury is defined in the Model Minimum Uniform Crash Criteria Guideline, 4th Edition, as any injury other than fatal that results in one or more of the following: severe laceration resulting in exposure of underlying tissues/muscle/organs or resulting in significant loss of blood; broken or distorted extremity (arm or leg); crush injuries; suspected skull, chest, or abdominal injury other than bruises or minor lacerations; significant burns (second and third degree burns over 10% or more of the body); unconsciousness when taken from the crash scene; paralysis.

63 A national study found that wheelchair users have a 36 percent greater chance of dying when a driver strikes them. Kraemer, John D., and Connor S. Benton. 2015. Disparities in road crash

Chapter 2
Figure 2.17 — 2010-2019 pedestrian serious injuries, comparing actual figures to the 5 percent reduction goal from the 2008 plan. Actual injuries exceeded the reduction goal, rising from 291 in 2010 to 361 in 2019.

Figure 2.18 — 2010-2019 bicyclist serious injuries, comparing actual figures to the 5 percent reduction goal from the 2008 plan. The total number of serious injuries vary year to year; in every year except 2013 actual injuries exceeded the reduction goal.

Figure 2.19 — 2010-2019 pedestrian and bicyclist serious injuries, comparing actual figures to the 5 percent reduction goal from the 2008 plan. The trend of an increase in total serious injuries continues to climb.
Figure 2.20 — 2010-2019 pedestrian and bicyclist serious injuries as a percentage of all traffic serious injuries, rising from 15 percent in 2010 to 21 percent in 2019.

Societal value of life

While the loss of a human life is incalculable to those who have lost a loved one, there is also a substantial cost to society. To inform policy decisions, it can be instructive to assign a monetary value to human life and health. Understanding the societal value helps decision makers consider the importance of improvements that will prevent crashes.

The USDOT provides guidance for calculating the value of lives saved and injuries prevented. The calculation represents what people would be willing to pay for safety improvements (reductions in risk) that would prevent a death, known as the Value of a Statistical Life (VSL). Using this methodology, the 110 pedestrian and bicycle fatal crashes and 464 serious injury crashes that occurred in Washington state in 2019 had a societal value of $1.965 billion.

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64 USDOT. Revised Departmental Guidance on Valuation of a Statistical Life in Economic Analysis.
Crash locations and demographics

Figure 2.21 - Locations of fatal and serious-injury crashes involving people walking or bicycling 2010-2019: 61 percent on city streets, 27 percent on state routes, 11 percent on county roads.

The highest number of crashes occur on city streets: 61 percent of fatal and serious traffic injuries that involved people walking and bicycling from 2010-2019 occurred on city streets. Twenty-seven percent of these crashes occurred on state routes and 11 percent on county roads. The higher incidence for city streets reflects the shorter distances between destinations in populated areas, which leads to greater use of active transportation. It is also a measure of exposure in that more populated areas have larger concentrations of pedestrians, bicyclists, and motorists.

State routes in population centers experience an over-representation of fatalities and serious injuries compared with state routes in rural areas. Of the 27 percent of serious injuries/fatalities that occurred on a state route between 2010 and 2019, 83 percent were in population centers (census-designated places). Only about 24 percent of all state route center-line lane miles (1,658 miles) go through a population center. Most of the fatalities on state routes—97 percent—
occurred on state routes with a posted speed of 30 mph or greater. Only about 6 percent of state route lane miles in population centers have a posted speed of 25 mph or less.

Figure 2.22 Percent of fatal and serious injury crashes by jurisdiction where the posted speed is above 30 mph, 2010-2019. City streets, 63 percent; county roads, 81 percent; state routes, 92 percent. Cities have a much higher percentage of lower speed roads than counties or the state system, so proportionally the city percentage is quite high.

DEMOGRAPHIC CHARACTERISTICS OF PEOPLE KILLED OR INJURED

WSDOT examines demographic information based on available data for people who are killed or seriously injured. This analysis is important for exploring patterns in crashes so the agency and partners can develop strategies to reduce crash potential in Washington. Available information does not always permit conclusions about why certain groups experience crashes out of proportion to their number in their general population.

AGE

In proportion to their representation in the population, people in their 20s are more likely to be killed or seriously injured while walking or bicycling. This demographic made up 14 percent of
the total population but was involved in 18 percent of all pedestrian and bicyclist fatal and serious injury crashes.

Compared to other age groups, children/youth and older people are less likely to be killed or seriously injured when walking or bicycling. Children ages 19 and younger comprised 25 percent of the total Washington state population but made up 18.6 percent of pedestrian or bicyclist fatalities and serious injuries. People 65 years and older are also underrepresented; they made up 15 percent of the total population and were involved in 13.6 percent of fatal and serious injury pedestrian and bicyclist crashes. This finding in Washington runs counter to national trends; teens and older people are overrepresented in traffic fatalities nationwide.

**Gender**

As currently collected, data on gender assumes a binary distribution so WSDOT reports it that way. More men than women were involved in pedestrian and bicyclist related fatal and serious injury crashes. Between 2010 and 2019 about 67 percent of them were men and 33 percent were women. This parallels the figures for motor vehicle crashes.\(^{65}\)

WSDOT does not have state-level data on mode use by gender. At the national level, commute to work data and the National Household Travel Survey both show that women are underrepresented among people who bicycle relative to their proportion in the population, but not among people who walk.\(^{66}\) Given that the numbers of pedestrian crashes are much higher than those of bicyclists, this seems to suggest that men are overrepresented in pedestrian serious injuries and fatalities.

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INCOME LEVELS IN CRASH LOCATIONS

Traffic crash data do not include the income level of someone killed or injured in a crash. WSDOT therefore examines demographic characteristics around crash locations to identify possible equity concerns tied to differences between neighborhoods.

This analysis by place serves as a proxy for the crash exposure of people who live in that area. One study found that for the majority of pedestrians and bicyclists injured or killed in traffic crashes, the crash occurred less than a mile and a half from their home, which reflects past studies about where drivers crash. Researchers have found relationships between low-income neighborhoods and crashes; lower-income neighborhoods tend to have less infrastructure dedicated to walking and bicycling and more people who do not own a personal vehicle.

People living in poverty also include an over-representation of other vulnerable groups, such as people who are older or disabled who are more likely to experience severe or fatal trauma in a crash.


For population studies, the state is divided into census block groups (a geographic unit typically between 600-3,000 people). In Washington, about 44 percent of census block groups have higher poverty levels than the state average. About 51 percent of fatal and serious injury crashes occur in these locations, meaning that people are seriously injured or killed in crashes in these neighborhoods in disproportionate numbers.

Race and Ethnicity in Crash Locations

About 33 percent of fatal and serious injuries occurred in census blocks where the percentage of the population that is Black, Indigenous, and/or people of color was greater than the state average. This is out of proportion to the representation of these races/ethnicities; those census blocks only represent 24 percent of all census blocks.
Figure 2.24 - 24 percent of census block groups have Black, Indigenous, and people of color population numbers higher than the state average; 33 percent of fatal and serious injury crashes occur in these locations.

**Disability**

Whether or not a crash victim has a disability is not usually reported in the Police Traffic Collision Report, but it does have a field to record if the person was using a wheelchair. Between 2010 and 2019 a total of 69, or 1.7 percent, of pedestrian suspected serious and fatal injuries involved a person in a wheelchair. About a third of them died. There is no way to analyze the reports to identify other patterns that may exist for people who have low or no vision, hearing loss, or any other type of disability. The only national study of its kind looking at disability data found that wheelchair users have a 36 percent greater chance of dying in a crash.69

69 Kraemer, John D., and Connor S. Benton. 2015. Disparities in road crash mortality among pedestrians using wheelchairs in the USA: results of a capture–recapture analysis. British Medical Journal Open, Vol. 5, Issue 11. doi: 10.1136/bmjopen-2015-008396. The study also found that in 75 percent of these crashes, there was no indication that the driver made an attempt to brake or otherwise avoid the collision.
TAKEAWAYS FROM CHAPTER 2

The people of Washington are interested in active transportation and want more reasonably safe options that provide opportunities to get to their destinations. Many data gaps exist, especially as they relate to the numbers of people walking and biking, who is walking/biking and where. This information is needed to better understand changes over time and crash trends associated with walking and biking. Lastly, it is clear that additional walking and biking infrastructure investments will yield many benefits—not least of all, serving the needs of the people of Washington.
Chapter 3: Understanding the system and needs

Introduction

Part A of this chapter describes how WSDOT analyzed active transportation connections on the state system as a core element of this plan. Part B looks at existing facilities and statewide needs for tracking and monitoring active transportation assets.

WSDOT set out to understand and describe travel needs for active transportation. For this plan, active transportation travel need has been defined generally as the need to travel in a given direction in order to reach various destinations by walking, biking, or rolling. While a given roadway might align with an active transportation travel need, it may not be the best option to serve that need depending on design, context, traffic volumes, and other variables.

WSDOT’s analysis in this plan focuses on state routes and the role they play in the overall network. In the past, WSDOT has not analyzed state highways for how well they serve the needs of people walking and bicycling across jurisdictions. Local jurisdictions generally do not plan for changes to state routes they do not manage; WSDOT policy is to review local plans when a state route passes through a local jurisdiction. Additionally, a project team only evaluates the locations they are working on, not the broader context of walk/bike connectivity. Yet the design and operations of state highways affect whether the local system works well for people walking and rolling on, near, and across those roads. This plan begins the process of bringing the pieces together to understand the network as a whole. The intent for the future is to work closely with WSDOT’s partners for more in-depth planning.

WSDOT chose level of traffic stress (LTS, discussed below under New Methods for Making Decisions) as the best measure available to describe current network quality and identify gaps and issues to address in the future. Many agencies across the United States have adopted and adapted level of traffic stress methods to describe the quality, safety, and comfort of a network.

70 Mineta Transportation Institute, Low-Stress Bicycling and Network Connectivity, 2012.
based on characteristics that the agency can measure objectively. State departments of
transportation applying some form of LTS analysis include Colorado and Oregon, among others.
Several jurisdictions in Washington already apply some version of this approach including
Spokane, Seattle, and Bellevue. Other jurisdictions have developed area bike maps that seek to
capture elements of LTS, including maps for Skagit County and the Wenatchee Valley.

**PARTNERSHIPS TO FIND SOLUTIONS**
**THAT COMPLETE THE NETWORK**

In 2009, Island County identified a conceptual trail alignment adjacent to state routes
20 and 525 on Whidbey Island. This “Whidbey Isle Trail” extends from Deception Pass
to the Clinton Ferry Terminal. The concept guided development of trail segments
serving the population centers of Coupeville and Freeland. Those segments built in
partnership with WSDOT offer low traffic stress active travel options along the corridor.
In 2018, Island County identified additional segments associated with the conceptual
alignment in their Non-Motorized Trails Plan. One segment, the Goldie Street to
Hoffman Road project, was approved for funding. This segment idea came about as a
result of conversations between staff from Island County and Naval Air Station
Whidbey Island. The Navy was interested in helping the county locate trail
opportunities that allowed sailors to bike to work and people to see some of the
impressive naval aircraft monuments at the north end of Oak Harbor.
Further discussion with the City of Oak Harbor identified a potential alignment along
State Route 20 that would serve low-income communities connecting to services,
residents looking for recreational facilities, and visitors to Whidbey Island. A fourth
partner, WSDOT, would provide most of the needed right of way.
When agencies work together, they can generate innovative ideas and overcome
barriers that a single agency would not be equipped to address. WSDOT recognizes
that many state system solutions do not start with our agency. Often, local partners are
best suited to the job of identifying creative ways to use the state system for everyone’s
benefit.
This plan does not identify specific changes or designs in particular locations. WSDOT will address that work through the regular process of corridor studies and plans, project scoping and development, and everyday activities such as scheduled maintenance (Figure 3.1 provides a simplified illustration of the many planning and project development processes). The information from this plan should be factored into all these processes as WSDOT coordinates with local, regional, and other state agencies.

Cost-effective and efficient practical solutions require consultation with partner agencies and alignment with local plans and projects. After developing and testing the LTS method on state routes, WSDOT conducted an additional test with local data from two non-WSDOT planning contexts. The contexts included one that is more urban (City of Seattle) and one that is more rural (Walla Walla Valley region). WSDOT did this to learn how this approach can be extended in the future to help identify the best possible connections through a corridor that includes a state route. Understanding how the pieces fit together, with every agency working on a shared plan,
will enable the right partners to make the right improvements in the right places. Appendix D, Methods of Analysis, provides more detail on LTS and describes this supplemental analysis.

The project team needed to determine whether WSDOT’s analytical approach worked to identify the main issues. WSDOT staff asked for input from local agency partners and the public regarding the principles and approaches the agency was developing. Outreach and engagement (described in more detail in Chapter 2 and Appendix C, Outreach and Engagement) allowed members of the public to provide information on changes that would make it possible for them to increase their walking, rolling, and bicycling. The barriers and issues they identified align with the approach WSDOT has taken to identify needed improvements. The online open house available to the public September through December 2019 included an early draft of the results of the analysis and offered an opportunity for feedback.

The following sections in Chapter 3 provide an overview of new methods for analyzing the state highway network for active transportation. Technical details about the methods used appear in the appendices.

**PART A: A NEW DIRECTION FOR DATA-BASED DECISION MAKING**

Counting vehicles (also known as user demand) is a well-tested decision-making tool for assessing the needs of motorists. However, the same type of approach cannot be applied to active transportation decision making at present. User demand ignores the real question of whether it is possible or desirable for people to be there at all. In a transportation system primarily built for high-speed auto travel, counts of people walking and biking will not indicate true levels of need.

In a transportation system primarily built for high-speed auto travel, counts of people walking and biking today will not indicate need. Past planning practices have often not addressed travel need adequately for active transportation for a variety of reasons. Planning and providing safer and more direct connections will help address expectations with respect to both current and potential demand.
Incomplete connections prevent active travelers from reaching the places they need to go, so user counts remain low even when the need for travel is high. Therefore, in making decisions about where to locate active transportation changes, a focus on safe and direct connections will have the greatest effect on both existing and future demand.

Active transportation today is in approximately the same state as motoring was around 1910, before good roads had been built everywhere. In fact, bicyclists launched the Good Roads Movement in the United States to advocate for improved roads between cities back when those roads were dirt or gravel.\textsuperscript{71} Going back further in time, roads themselves often followed paths created as the continent’s first inhabitants sought water, food, and other resources.\textsuperscript{72} Many roads in a sense thus reflect walking as the original transportation mode.

Measuring demand by counts often drives decisions concerning changes to the system, but those changes tend to further accommodate drivers since it is vehicles rather than people being counted. Where active transportation networks were also constructed, they were often less complete and followed roadway networks rather than considering distances and the physical effort needed of those on foot or riding bicycles. Evidence of that mismatch can be spotted along state highways where dirt trails show how people attempt to make connections on their own, rather than walking along roadways that might double or triple their trip distance, as Figure 3.2 illustrates.


Figure 3.2 — Desire line trails. User-made trails reduce the distance pedestrians must take between destinations. This path connects to a large freeway interchange in Olympia, WA. Both sides of the interchange offer housing, services and employment centers. Trails such as this may be very useful to those with the ability to follow them, but they are neither approved routes nor accessible to all users.

To assess how well the system is performing, WSDOT started by measuring whether a mobility opportunity exists for active travelers by looking at the facilities and connections present (see New Methods for Making Decisions, below). This kind of measurement is generally less applicable for motorists, as the road network already provides relatively convenient door-to-door connections everywhere in the state.

The level of traffic stress methods developed for this plan provide decision-making tools that enable the agency to consider walking and bicycling at each phase of project work. WSDOT can apply the information in all aspects from planning and budgeting, through scoping and design, to maintenance and operations. The approach represents a major step forward in understanding what makes facilities work well in support of comfortable active transportation connections.

Focusing active transportation network development in population centers

A 2009 WSDOT study identified 180 communities of all sizes throughout Washington where a state route runs through the center of town and serves as its Main Street. In total, over 600 miles
of state highway were operating as “Main Street highways” in incorporated areas. They provide access to centers for shopping, entertainment, and other needs, and at the same time serve regional mobility needs for people passing through.

CENSUS-DESIGNATED PLACES

Unincorporated census-designated places (CDP) are named communities that lack their own government. Their boundaries are not defined by law, but they are used by the Census Bureau to identify the community’s location.

Many CDPs look a lot like towns or cities. Like towns and cities, they may be large or very small and they may be as old as the state or relatively new communities. A CDP may also have a clear downtown or center, or a more sprawling or suburban form.

When it comes to active transportation one thing is clear: towns, cities, and CDPs are places where people live, work, go to school, catch a bus, find entertainment, and buy their groceries.

A great deal of growth has occurred outside of incorporated areas over the past 11 years. Looking at population centers rather than just incorporated cities and towns provides an important update to the Main Street highway approach to identify communities that may function similarly to towns and cities. WSDOT used the concept of a U.S. census-designated place combined with posted speeds below 45 mph to identify these locations on the state system for this plan. Adding incorporated communities to census-designated places, Washington has 628 population centers; 495 of those have 1,713 miles of state highways passing through them. Figure 3.3 identifies these locations around the state. Current and potential walking and bicycling needs in these locations resemble those on roadway segments identified as Main Street highways. Focusing on all population centers where state highways are found enables WSDOT’s active transportation analysis tools to more comprehensively include the locations where people live, work, shop, and go to school.
Figure 3.3 — Washington has 281 incorporated communities and 347 unincorporated Census Designated Places. 1,685 miles (based on HPMS 2017) of state highways pass through 495 of those communities.

Analyzing level of traffic stress

WSDOT’s level of traffic stress methodology examines roadway characteristics to assess conditions for walking and bicycling along and across state highways. It provides a quantitative assessment of several variables that affect safety and mobility of people using active transportation:

- Posted speed limit.
- Number of motor vehicles present.
- Number of travel lanes.
● Presence and width of bike lanes.
● Presence and width of shoulders.
● Sidewalks.
● Separation from motor vehicle travel lanes.
● Types of land use near the roadway.
● Roadway crossings and intersections.

WSDOT applied a new data-driven method for evaluating state right-of-way for active transportation use: level of traffic stress. Where LTS is high (LTS 3 or 4), highway locations are identified as gaps in the active transportation network. Gaps are further evaluated with criteria for safety, equity, and potential demand to identify locations where a future change would make the biggest difference for these factors.

LTS analysis helps WSDOT determine if a state roadway is suitable for active travel. It uses available roadway characteristics data, such as posted speed and number of travel lanes, to give the roadway segment an LTS score. Figure 3.5 illustrates the concept.

Figure 3.4 — Linear roadway characteristics and Level of Traffic Stress (LTS). A number of roadway characteristics can be used in LTS measurement such as driving speed, number of travel lanes, the amount of traffic present, and whether there are shoulders, bike lanes, or sidewalks. In practice, some characteristics are harder to measure versus others. Panel A shows a simple roadway and a low volume of traffic, but there is no dedicated space for people walking or biking. Also, roads like this often post higher speeds. Panel B shows a simple roadway, but a high volume of traffic. In this scenario there are road shoulders that offer some separation from traffic for people walking or biking. Panel C adds sidewalks and bike lanes that offer separation from traffic. Panel D shows a multilane roadway and a high volume of traffic. Although there are
sidewalks and bike lanes in this scenario, the extra lanes increase overall roadway complexity and traffic stress.

**Figure 3.5 — Intersection characteristics and Level of Traffic Stress (LTS).** A number of intersection characteristics can inform LTS measurement including driving speed, number of travel lanes, the amount of traffic present, and whether there are shoulders, bike lanes, or sidewalks. Crossing improvements such as marked crosswalks, flashing beacons and signals are additional elements that influence an intersection’s LTS. In practice, some characteristics are harder to measure versus others. Panel A shows a simple intersection and no separation between drivers and active travelers. Depending on the traffic volume, driving speed and turning frequency, the location might be higher or lower stress. Panel B shows an intersection that is common in urban areas. Such an intersection is managed by traffic signals, which helps to lower traffic stress, but the bicycle rider is operating in heavy traffic and the pedestrian has a very long crossing distance. Both active travelers have to watch for right turning traffic.

WSDOT keeps data on the state roadway network, but some of the data are incomplete or exist in formats that make them difficult to evaluate together with other data. For example, the agency currently has limited sidewalk data, making it difficult to use. Appendix D, Methods of Analysis, provides more detailed information.

The review of state highway conditions for walking and biking included a four-step process:

1. **LTS scoring:** Compute an LTS score all state roadways and intersections.
2. **Gap designation:** Designate highway segments/intersections with the highest LTS scores as gaps.
3. **Gap evaluation:** Score each gap using safety, equity, and demand information about the location to aid in future decision making.

4. **Outreach:** Get input from cities, counties, and other transportation partners on the evaluation results to begin aligning results with local and regional plans.

**LTS SCORING**

People experience more travel stress when a roadway has many drivers operating motor vehicles at high speeds on multiple lanes of traffic. Even though stress is subjective, it is associated with quantifiable roadway characteristics and can be reliably measured. The combination of roadway characteristics that make up LTS also describe exposure to the potential for a crash. Importantly, the kinds of roadways that receive a higher LTS score based on their characteristics are also those that have more pedestrian and bicyclist serious injuries and deaths. Figure 3.6 illustrates this concept.

For population centers in Washington state, LTS is measured on a four-point scale ranging from LTS 1, which provides the lowest stress and is often considered suitable for all ages and abilities, to LTS 4, the highest stress locations that most people walking or bicycling will avoid unless absolutely necessary. This is especially true when the active transportation user must use the vehicle lane or the edge of the road. Appendix D, Methods of Analysis, provides more details on LTS methodology.
Figure 3.6 — Level of Traffic Stress (LTS) in population centers and rural high-speed routes. Four LTS levels were established. The highest stress, LTS 4, was primarily found near the state’s largest cities. More rural population centers, which are much more widely distributed across the state, show a range of LTS values reflecting a diversity of speeds and roadway characteristics found in the various communities.

The scoring approach for this plan builds on adaptations to the original LTS methodology developed by the Oregon Department of Transportation to address differences between urban and rural contexts and revised the determination of LTS 3 and 4 with respect to posted speed.
In addition, a new element in WSDOT’s LTS analysis is the separate analyses of rural highways and those in population centers.

The idea of LTS can be applied to roads that serve people who bicycle (BLTS) and people who walk or roll as pedestrians (PLTS); Figures 3.7 through 3.10 provide more information. While WSDOT has bike lane data as of 2014 for state highways, sidewalk data was still being developed at the time of this analysis and therefore needed to be considered outside of the LTS process. Sidewalks managed by local jurisdictions also exist along state routes. Future incorporation of WSDOT and local data on sidewalks will improve the analysis. For purposes of this plan, WSDOT staff developed an approximation of the miles of state routes with adjacent sidewalk without assessing sidewalk condition or ADA accessibility; Chapter 4 and Appendix F, Cost Estimation Background, provide more information.

Figure 3.7 — Bicycle Level of Traffic Stress (BLTS) is illustrated by associating user types with examples of types of facilities that they feel comfortable using. The BLTS 1 scenario shows facilities that are likely to appeal to 100 percent of people who want to ride a bicycle. For BLTS 2 the facilities include buffered bike lanes which offer more separation than standard bike lines, but no physical barrier. 81% of bicycle riders would use this facility. For BLTS 3 standard bike lanes are provided and about 12 percent of riders would use this facility. Only about 1 percent of riders would use BLTS 4 facilities where no separated space is offered.

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74 Oregon Department of Transportation Analysis Procedures Manual, Chapter 14.5. Appendix D, Methods of Analysis, provides further discussion.
Figure 3.8 — Pedestrian Level of Traffic Stress. Like Bicycle LTS, PLTS can apply to trips along and across motor vehicle lanes. These photos illustrate an example of a PLTS 4 situation on Aurora Ave in Seattle. Crossing is legal here, which the curb ramps highlight, but with a posted speed of 40 mph, high traffic volumes, four travel lanes and three special purpose lanes, it would be a challenging crossing for any adult. Marked crossings with pedestrian signal phases are available two blocks north or one block south of this location, but these options add to a pedestrian’s trip distance, which could be a factor for some people.

Figure 3.9 — Pedestrian Level of Traffic Stress (PLTS) is illustrated by associating user types with examples of types of facilities that they feel comfortable using. In the PLTS 1 scenario the facilities are presumed to appeal to anyone who wants to walk. For PLTS 2 the facilities are presumed to appeal to a high percentage of people who want to walk. For PLTS 3 the facilities are likely to appeal to many people who want to walk, but separation from traffic is lower and there are more potential challenges, especially when it comes to crossing considerations (although these are not illustrated). For PLTS 4 the facilities are unlikely to appeal to very many people who want to walk. There is minimal separation from traffic and there are more potential challenges associated with a complex and wide roadway, especially when it comes to crossing considerations.
<table>
<thead>
<tr>
<th>CHARACTERISTICS</th>
<th>PLTS 1</th>
<th>PLTS 2</th>
<th>PLTS 3</th>
<th>PLTS 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stress</td>
<td>minimal/none</td>
<td>low</td>
<td>moderate</td>
<td>high</td>
</tr>
<tr>
<td>Required attentiveness (to traffic)</td>
<td>minimal/none</td>
<td>low</td>
<td>moderate</td>
<td>high</td>
</tr>
<tr>
<td>Unsupervised Suitability</td>
<td>all ages and abilities</td>
<td>8 years and up</td>
<td>adult</td>
<td>adult</td>
</tr>
<tr>
<td>Accessibility</td>
<td>all ages and abilities</td>
<td>possible limitations for wheeled mobility device</td>
<td>likely limitations for wheeled mobility device</td>
<td>presents barrier to wheeled mobility device use</td>
</tr>
<tr>
<td>Traffic conditions</td>
<td>low speeds and volumes if facilities are near traffic</td>
<td>moderate speeds and volumes</td>
<td>higher speeds and volumes</td>
<td>highest speeds and volumes, typically multilane roadways</td>
</tr>
<tr>
<td>Linear facility</td>
<td>shared-use path or well-maintained sidewalk with buffer</td>
<td>adequate sidewalk, often buffered and generally in good condition</td>
<td>pedestrian facilities inadequate and sometimes absent</td>
<td>no pedestrian facilities</td>
</tr>
<tr>
<td>Crossing Facility</td>
<td>bridge/tunnel or enhanced crosswalk</td>
<td>enhanced crosswalk</td>
<td>marked crossing</td>
<td>limited legal crossings and unmarked crossings</td>
</tr>
</tbody>
</table>

Figure 3.10 — Infrastructure and traffic characteristics associated with pedestrian LTS.

WSDOT initially applied the LTS approach to high-speed rural roads as well as population centers, but the metrics were adjusted for this context where less people are likely to walk or bike. As originally developed, this methodology assumed people who walk and bike on rural highways, such as bicycle tourists and backpacking travelers, will have more skills to handle traffic stress than those in a population center, such as children in town walking to school. In order to clarify LTS for these different contexts, it was labelled differently. Where traffic volumes were lower, the designation “high speed low volume” was used. Someone biking or walking on
that highway may not encounter as many drivers as in an urban area, but those drivers will be moving fast and shoulder space may or may not be available. The designation High Speed 3 and High Speed 4 were used to identify where traffic volumes were higher, with the idea being that these would be identified as gaps. As it turns out LTS is not as well suited to the high-speed context. While a roadway designated as high-speed low volume might be acceptable to some active travelers, some people walk and bike on higher-stress rural roads by necessity rather than choice. And where a roadway is high-speed high volume, there may be little desire for people to use the facility even where shoulders are wide so identifying them as a gap to be fixed does not make sense. Given the complexities of the high-speed context the planning team also relied on input from cities, counties, and other transportation partners. WSDOT asked its partners to point out where the LTS as defined by the data should be higher. As noted in the beginning of this chapter, partner agencies may not be accustomed to planning for needs on WSDOT’s system. For this reason, the discussion will continue concerning where high-speed routes in more rural areas require more attention for active travel. Considerations regarding planning for the high-speed context is discussed in further detail in chapter 4.

Figure 3.11 — Walking along high-speed routes by necessity.

GAP DESIGNATION

WSDOT divided its network into roadway segments of 3 miles or less for purposes of assigning an LTS and identifying a segment as a gap. If a portion of a segment fell into the highest category (LTS 3 or LTS 4), that segment was defined as a gap in the system. The gaps also included places with a physical barrier, or where state law does not allow walking or biking.
Figure 3.12 — This map depicts the Yakima Heritage Trail plan that connects communities such as Yakima, Toppenish, White Swan and Mabton. In addition to highlighting historical tribal travel routes, this conceptual trail system is focused on improving active travel opportunities along high-stress roadways where serious injuries and deaths have occurred. Much of the system is aligned with state routes where Level of Traffic Stress analysis show existing gaps in the system.

The following three figures (3.13-3.15) illustrate the three gap types identified: intersection, segment, and ramp.
Figure 3.13—Intersection gaps. This image shows an intersection gap on State Route 28. The speed limit here is 50 mph on a stretch of highway with residences on both sides. People biking or walking must use what available shoulder exists. In this case, what appears to be a shoulder the bicycle rider is using is actually a right-hand turn lane. Here we also see the rider facing traffic. People riding bicycles may act in ways that feel safe to them; in this situation, the rider might be concerned about crossing high-speed traffic lanes in order to ride on the other side. So like a pedestrian who is advised to walk against traffic, this person may feel this option is safer. Image source: Google Maps.

Figure 3.14—Segment gaps. Segment gaps were found throughout the state, with some of the most challenging for bicyclists found in larger cities. State Route 104 has multiple lanes, high traffic volumes, and relatively high-speed traffic. The roadway lacks dedicated space for people on bikes; the best solution may or may not be on the state system in locations like this. This segment has a sidewalk on one side, so it could still pose a challenge for some pedestrians depending on which side of the road they are on at the beginning or end of their journey. Image source: Google Maps.
Figure 3.15 — Ramp gaps in Walla Walla. This image shows the intersection of on and off ramps (red x’s) with a local roadway. Note that many residences sit just beyond the upper left corner of this image. The roadway has sidewalk and bike lanes on both sides, but on the side with the red arrow, it lacks marked crosswalks and other crossing aids where the pedestrian route and bike lanes cross the highway ramps. In addition, the intersections are wide, built for freight, and designed to allow drivers to enter and exit at high speeds. In this context, the sidewalk on the other side of the local road allows a pedestrian to avoid the ramp conflicts, but that route still lacks a marked crossing (orange triangle) on the pedestrian path. The green triangle shows where a marked crossing is available. Image source: Google Maps.

These gaps represent places where travel needs exist and the state highways do not provide comfortable walking and biking facilities. As WSDOT works with partners to meet the travel need for movement along or across the state highway, this need could be met either by improving the highway or by connecting to or improving a nearby local segment. The example in Figure 3.16 illustrates the connection between system gaps and travel need.
Figure 3.16 — Analyzing active travel gaps in terms of travel need. A high LTS indicates gaps on a given segment of highway and suggest a potential travel need that should be considered. The figure considers gaps on two highways that pass through a city. Panel A shows a portion of an interstate and a state route, along with a parallel local road. Both highways are shown as having gaps with respect to bicycling (purple lines). Panel B indicates many destinations exist along these highways including residences, restaurants, grocery stores, shopping, and schools. Panel C shows that the gaps really represent north-south and east-east travel needs. Those travel needs might be addressed on the highway itself, but this may not represent...
the best candidate for bicycle improvements. The local road where all the destinations are located could be a better candidate for improvements that close this gap.

GAP EVALUATION

State roadways designed primarily for motor vehicle traffic understandably have many gaps for active travel users—far too many to fix all at once, even if funding were available. This plan provides information to help WSDOT and partners address the gaps over time with funds from state or federal sources, or in combination with other projects (state or local) constructed at the gap locations.

Transportation funding sources tend to be tied to a variety of policy goals. Therefore, it is useful to know the details about the gaps and land use around them to understand which places present the most potential for meeting transportation policy goals if the travel need is met. Those details were part of the gap assessment. The assessment criteria chosen for this plan relate to the location's measures of safety, equity, and potential demand. Specific assessment criteria (discussed in more detail in Appendix D, Methods of Analysis) are listed below.

Demographic characteristics included in the equity analysis are measured at the census block level and compared with state averages.

**SAFETY**

- History of driver crashes with bicyclists or pedestrians that result in death or serious injury.
- Systemic safety - based on roadway characteristics that contribute to crash potential.
- Connections to and between destinations (including intermodal links and trails).

**EQUITY**

- Places with relatively high numbers of people living in poverty.
- Places with relatively high numbers of Black, Indigenous, and other people of color.
- Places with relatively high numbers of people with a disability.
POTENTIAL DEMAND

Potential demand based on population density, density of jobs, proximity to schools, bus. stops/intermodal connections, and other destinations.

Having this information helps indicate where increased active transportation connectivity could make the biggest difference in improving safety, mobility, accessibility, and equity. Appendix D, Methods of Analysis, provides more details regarding the gap assessment as well as technical definitions for evaluation criteria.

DEMAND REVISITED

As discussed in Chapter 2 and above in this chapter, measuring existing user demand is not an effective way to identify active transportation need. The concept of potential demand, in contrast, shows where improvements are likely to generate more active travel trips. Potential demand refers to the number of people who would start walking or biking, or do more of it, if conditions were right. A high-quality sidewalk that starts in the middle of nowhere and connects to nothing will not be likely to attract many users. People walk more where they can reach more stores, restaurants, health providers, recreation facilities, employment opportunities, and other goods and services within walking distances.

Statewide data sources do not adequately capture walking and biking activity. Additionally, the number of people walking and biking at a location is tied to how useful the location is to their trip and how safe people feel when they are there, which relates directly to whether facilities are available and accessible. Current usage in most locations is thus not the best measure of need for active transportation.

Figure 3.17 shows the results of WSDOT’s active travel demand analysis. The analysis considered several measures of potential demand including the ease of access to destinations for people walking and biking, population, employment, presence of colleges, commercial activity, and presence of intermodal connections. Appendix D, Methods of Analysis, provides details on the destination-based demand analysis.
Figure 3.17 — Demand analysis map. This map shows where potential demand for walking and biking is greater (more color) versus locations where people are less likely to use active travel regularly. The urban scale (green) compared areas that are more densely populated. More intense green can be seen in the vicinity of the largest cities such as Seattle and Spokane. More rural locations (purple) were compared to other rural locations. More intense purple is found in Aberdeen and Clarkston, for example, than in Republic or Neah Bay.

Recognizing the effects that bigger cities have on density of destinations, the demand analysis accounted for urbanization. More precisely, heavily populated metropolitan planning areas were compared with each other on one scale and all other areas were compared on the other scale. Figure 3. shows the metropolitan planning areas on a map.
Figure 3.18 — Metropolitan planning area boundaries used in demand analysis. For purposes of evaluating demand, heavily populated metropolitan planning areas were compared with each other on one scale and all other areas were compared on another scale.

Short trips for utility purposes represent one type of potential demand. Long-distance bike connections generate another kind of demand by serving as tourism attractors. The route itself provides the destination—the longer the better to attract national and international travelers seeking a new experience. Bike tourists seek separated trails and/or bicycle-friendly roads with lower traffic volume and speed, as well as paved, well-marked shoulders.\textsuperscript{75}

Many parts of Washington offer this opportunity. Network links in rural areas provide vital connections among communities and destinations. In many parts of the state, the highway provides the most direct route (sometimes the only route), usually with the least amount of climbing required to get up a hill or mountain.

The demand calculation included in the evaluation criteria does not address network connectivity or total trail mileage directly as a potential generator of increased participation. In presenting the concept of a statewide bikeways network linking a combination of trails and highway segments discussed below, this plan points out the opportunities to grow bike tourism while also providing connections for everyday transportation.

**OUTREACH: INPUT FROM TRANSPORTATION PARTNERS**

WSDOT staff shared the results of the data review of walk and bike conditions on state highways with cities, counties, and other transportation partners. WSDOT asked partners to provide input about the results produced using the available road data. In particular, jurisdictions could compare the analysis with their plans and proposed future projects to lay the groundwork for understanding the broader network needs and opportunities. WSDOT is committed to continued collaboration with local, regional, and tribal partners as active transportation projects evolve.

**DATA LIMITATIONS AND FUTURE ASSESSMENTS**

Currently, WSDOT lacks a centralized database to collect walk and bike data on infrastructure such as sidewalks and trails. Additionally, while many cities and counties have their own GIS data, no standard data definitions exist, which makes it difficult to share information. Different jurisdictions may store data in different formats. For example, sidewalk information might be stored within a spreadsheet in one location and within a web map elsewhere.

Currently WSDOT collects some basic information about pedestrian and bicycle infrastructure. The following system-level information is available for all state roadways:

- Location and width of roadway shoulders.
- Location of permanent bicycle and pedestrian counters.
Location of traffic signals.
Location of crossing information.

The following system-level information is partially available:

Location and width of bike lanes.
Location of sidewalk or walkway.
Width of sidewalk or walkway.
Compliance of infrastructure with the ADA.

During the development of this plan, WSDOT completed a detailed assessment of its infrastructure data collection. The assessment identified missing data that, if collected, can be used to develop a more robust and detailed understanding of WSDOT’s walk and bike infrastructure. It also identified the need to develop recommendations for data collection methods, storage, and frequency of updates as a future action for implementation and updates of this plan.

Identified data gaps include:

- Side path / trail data including location, name, managing agency, surface type, width, and access points.
- On-street bike facilities in addition to shoulders: standard bike lanes, width, buffer or protection, including those implemented by local jurisdictions.
- Curb ramps.
- Cross walks and other pedestrian crossing treatments.
- Rumble strips.
- Sidewalks including width, surface material and compliance with ADA standards.
- Right-of-way data.

In addition to the feature attributes recommended here, WSDOT could choose to collect additional data attributes in future that would assist in more fully characterizing the condition of
active transportation assets (for example, crosswalk striping material, curb ramp orientation, signal timing).  

Highway crossing availability

WSDOT examined the extent to which state highways act as barriers to active transportation. In addition to evaluating traffic stress on the state system, WSDOT undertook a multimodal connectivity study using a new set of route analysis methods that should be released in 2021. Preliminary results from this study have been incorporated into this plan. The study calculated a Route Directness Index (RDI) that shows how far out of their way a person would need to travel in order to cross a state highway.

With grant support from FHWA, WSDOT is developing an informational tool to inform future decision-making by measuring highway crossing availability. This tool evaluates the extent to which state highways act as a barrier to people who are trying to get to and from destinations on either side of a highway. Combined with level of traffic stress, this new analysis will help identify where crossings might benefit from enhancement, or where new crossings might need to be developed in the future.

Research indicates that most people are willing to walk about 1 mile or bike about 3 miles on a given trip, and they are only willing to travel short distances out of their way to cross a roadway. Focusing on population centers where destinations such as residences, schools, jobs, 

76 Additional guidance and recommendation on collection practices and data attributes can be found in FHWA 2017 Model inventory of Roadway Elements MIRE 2.0.


78 Add source citation

and services are located, WSDOT applied LTS and RDI data together to identify areas for consideration of new or improved crossings for pedestrians and bicyclists. Achieving a desired maximum distance between low-stress crossings in population centers could be achieved by:

- Improving the quality of existing crossings.
- Working with partners to establish shorter routes to existing crossings.
- Building new crossings.

Improving the availability of low-stress crossings that are well integrated into connected active transportation networks will increase the opportunity for people to choose walking and biking modes. It would also improve the efficiency of those modes for people who have no other choice. Figure 3.19 illustrates the concept of using RDI and LTS together when considering active travel.

Figure 3.19 — Combining Route Directness and LTS. This set of illustrations considers both how direct a pedestrian’s trip is to their destination (straight versus a winding path) as well as how stressful a crossing is on their route (symbolized by a smiling or frowning face). Illustration A offers the best scenario as it shows a direct route for the person walking between where they are and their destination, and a smiley face indicates that the crossing is low stress. Illustration B also offers a direct route, but the crossing is high stress. In C the route requires out-of-direction travel. In D, a local system link has been constructed to an existing low stress...
crossing. Scenarios B and C depicts the pedestrian considering whether to drive instead. Assuming driving is an option, the person would be more likely to use a car when both distances and traffic stress are greater.

Illustrating highway crossing availability challenges

The town of Granger provides a real-world example of where limited highway crossing opportunities create challenges for people walking or rolling. With a population of just less than 4,000, this small town is divided by SR 223 into northwest and southeast sections. Most of the town destinations, including the schools, are located on the northwest side of SR 223. There are two intersections (3rd Street or Bailey Avenue) where the highway can be crossed, both of which lack marked crosswalks or other treatments. A railroad line forms a second barrier that renders the Bailey Avenue crossing unavailable for people on the southeast side of the highway (Figure 3.20). In addition, SR 223 is designated as a T-2 on the Freight and Goods Transportation System and carries approximately 4.4 million tons of freight per year.

Development is occurring on the southeast side, including low-income housing near the railroad tracks. Children traveling to school from the low-income housing or others who wish to reach the town are relatively close as the crow flies, but they must walk down to 3rd Street in order to reach town legally. 3rd Street is a high traffic stress crossing requires significant out of direction travel when the school is the destination. Sometimes children from the southeast side make the trip via 3rd Street. Often however, they follow a more direct route by illegally walking along the railroad tracks that pass under the highway.

Potential solutions for the intersection at 3rd Street could lower its LTS. Addressing the crossing availability issue is more complicated. Are there enough intersections to serve the southeast side? Is there a way over the highway? Is there room for both a rail line and safe trail option under the highway? Addressing the availability of relatively direct highway crossings for active travelers is not easy. The best solutions that consider all modes are not always obvious.
Figure 3.20— Illustrating highway crossing availability challenges. The map of Granger shows a town divided by State Route 223. Most of the destinations, including schools, are on the northwest side of the SR 223. There is housing on the southeast side of the highway. The red arrow shows the only highway intersection available to people on the southeast side. The black dashed line shows a rail line. Children are often observed walking along the rail line to reach town, as the route is more direct and does not involve finding a gap in highway traffic.
PART B: STATE ROUTES AND FACILITIES

This discussion focuses on what WSDOT learned examining facilities on state routes. Many of the highways that WSDOT manages may not be appropriate for most of the state’s population to use for active transportation.

Existing network

ROADWAYS AND HOW THEY LINK TO WHERE PEOPLE LIVE

Looking at roadways as individual lines on a map, the existing network of state routes has more than 7,000 miles of highway. In addition to rural highways between towns, the system includes highways inside urban areas that function as principal arterials; highways that function as the main street of a city or town; and highways with lower speed limits through populated areas that are not incorporated but resemble a town. Furthermore, many highways are divided, with spurs, loops, and other elements which complicate systemic analysis. For purposes of this plan, the highway lanes that go in one direction, somewhat less than 7,000 miles, were used to define gaps.

About 180 miles of state route are prohibited to bicycle riders and more than 1,100 miles are prohibited to pedestrians. In addition, 4,300 of about 7,000 miles of roadway open to bicycle riders provide shoulders of 4 feet or more.

State highways provide 127 miles of bike lanes and WSDOT manages about 38 miles of paved trail. Many more trail miles have been built within WSDOT rights of way, with facilities managed by partner agencies.

State routes in some locations have little to no roadway shoulder. Roadway shoulders provide space for people on bicycles out of the general travel lane. On many highways pedestrians may also use roadway shoulders, though shoulders are considered an extension of the roadway and
are not typically considered pedestrian facilities. About 4,300 miles of highway shoulders equal to or greater than 4 feet in width are open for use by people biking; another 2,500 miles are legally open for bicycling but have shoulders less than 4 feet in width (Figure 3.21 and Figure 3.22). While shoulders less than 4 feet wide may provide some benefit to people who bike, WSDOT recognizes a 4-foot roadway shoulder in current design standards as the minimum needed for accommodation of bicycle riders—wider where guardrails or barriers encroach on the clear space for riding.

37 percent of state route miles, or 2,502 miles, have shoulders less than the WSDOT Design Manual minimum standard of 4 feet.

<table>
<thead>
<tr>
<th>ROADWAY POSTED SPEED (MPH)</th>
<th>STATE HIGHWAY MILES</th>
<th>LESS THAN 4 FT SHOULDER</th>
</tr>
</thead>
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<tr>
<td>25</td>
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<td>79</td>
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<td>328</td>
<td>164</td>
</tr>
<tr>
<td>50+</td>
<td>5787</td>
<td>1789</td>
</tr>
</tbody>
</table>

Figure 3.11 — State highway miles of shoulder less than four feet wide.

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80 WSDOT Design Manual, Chapter 1510.
Figure 3.22 — Map illustrating highways where bicycling is permitted, but less than 4-foot shoulders are provided (green) as opposed to locations where shoulder widths are 4 feet or greater (pink). Roads with less than 4-foot shoulders are widely distributed across the state and make up about 37 percent of those roads that can be used by bicyclists.

Bicycling is prohibited on about 180 miles of state routes and pedestrians are prohibited on many more. For bicyclists, these prohibitions are generally only on stretches of limited-access highways through major cities. Examples would be I-5 through Seattle or I-90 through Spokane. Pedestrians are prohibited from using most limited-access highways, which make up more than 1,100 miles of the system. Figure 3.24 illustrates bicyclist and pedestrian restrictions.
Figure 3.23 — Image showing a section of limited access highway open to bicyclists, but not pedestrians.
Source: Google Street View.

Figure 1.24 — Bicyclists and pedestrians are prohibited from using some portions of limited access highways.
Pedestrians are usually restricted from most limited-access highways, which make up more than 1,100 miles
of the state system. Considering both directions of travel, bicyclists are restricted from using about 180 miles of limited-access routes. In some cases, a bicyclist restriction is only imposed for a single travel direction.
Wayfinding signage is a 24-hour solution for helping active travelers navigate the safest and most efficient routes for their mode of travel. WSDOT has not used extensive wayfinding focused on active transportation users in the past. However, a new roundabout and associated trail in Anacortes provides a good example of signage application (Figure 3.25). In addition to helping active travelers choose the lowest stress routes on state facilities, WSDOT worked with partner agencies to ensure wayfinding was coordinated between state and local systems.

In addition to wayfinding signage, many traffic operations tools facilitate walking and biking. Paint alone keeps most drivers in their lanes and reminds them to stop where crosswalks are marked. Paint is not protection, but when well-maintained and used correctly it can improve safety and identify dedicated space for active travelers. It is most effective when supported by other infrastructure that does afford protection. A combination of paint and technology improves mobility for people on bicycles in the form of bicycle detection at traffic signals (Figure 3.26). Other traffic operations tools include a leading pedestrian interval, which allows pedestrians to get a head start at some crossings, and bike boxes that provide a high-visibility staging area for bicyclists to wait at red lights.
Figure 3.15 — WSDOT provided comprehensive wayfinding signage associated with a new roundabout at Sharpe’s Corner in Anacortes. The signage helps active travelers choose the lowest traffic stress routes to several town centers at this critical junction. WSDOT worked with partner agencies to place signage on both local and state facilities, providing a seamless transition for people walking and biking.

Tools for managing traffic operations such as signage and pavement markings, in conjunction with protective infrastructure, play a key role in developing safe, connected, and efficient networks for walking and biking. Some examples of tools WSDOT and other jurisdictions use include bicycle detection systems and bike boxes at signalized intersections.
Figure 3.26 — Traffic signal detection for bicyclists. The bicycle rider stencil shown above helps riders position their bikes in the intersection so they are detected by the traffic signal and given an opportunity to cross. This detector is located at Reservation Road and SR 20 in Skagit County.

BIKE LANES, TRAILS, AND CONNECTING ELEMENTS

State routes have approximately 127 miles of bicycle lanes out of more than 1,700 miles of highway that are associated with population centers. The bicycle lanes are mostly concentrated in areas within and directly north of Seattle.

WSDOT identified over 1,600 miles of existing trail that serve active transportation needs. Most of these are not managed by WSDOT.

Agencies around the state shared plans for many additional miles of trail that would serve active transportation.

WSDOT manages about 38 miles of multi-use trail. Many additional trail miles have been constructed in WSDOT rights of way, but are owned, maintained, and operated by partner agencies. WSDOT trails include ones that provide regionally significant transportation
connections, such as the SR 520 bridge trail and the I-90/Mountains to Sound Greenway Trail.

Figure 3.27 — Image of bicyclist and walkers crossing Lake Washington on the SR 520 Trail

WSDOT also manages trails or segments that connect to local and regional systems. Often WSDOT’s role in trail management involves maintaining trail-related bridges that are within the agency’s rights of way.

Figure 3.28 — The Children of the Sun Trail in north Spokane along State Route 395, constructed as part of a Connecting Washington project. Image source: TrailLink.

An example that illustrates a connected system involving multiple jurisdictions and partners is the Children of the Sun Trail in Spokane along SR 395 (owned by WSDOT), which connects to
the Spokane River Centennial Trail (owned by Washington state Parks, maintained in a partnership among State Parks with Spokane County and various cities, and supported by the efforts of the nonprofit Friends of the Centennial Trail). The trail will soon connect to the Ben Burr Trail (City of Spokane) on the east end of downtown Spokane, at the Riverpoint Campus near the newly constructed pedestrian/bicyclist University District Bridge. These trails collectively create facilities that also could become part of a future U.S. Bicycle Route (discussed below).

Figure 3.29 — Pedestrian Land Bridge over Highway 14 in Vancouver, WA. Source: https://www.kpff.com/portfolio/project/vancouver-pedestrian-land-bridge

Separated pedestrian and bicyclist bridges provide important connecting elements. Like multi-use trails, these bridges represent facilities with the lowest LTS on the state system. WSDOT owns and manages 113 structures that do not necessarily facilitate travel along the highway system, but are associated with it. Some of these facilities are works of art such as the Vancouver Land Bridge over SR 14. The Land Bridge provides a safe crossing of the highway as part of the local system of sidewalks, bike lanes, and trails connecting the waterfront and downtown.

WSDOT owns and operates 113 active-transportation bridges that are separated from motor vehicle traffic. Bridges and tunnels are generally not the first choice for highway crossings, but provide a critical link in some locations.
Separated active transportation bridges or tunnels are usually not the first solution WSDOT considers to enable active transportation users to cross state highways. Research shows that people generally prefer to cross at ground level, and many ground-level crossings can be improved for the cost of a single bridge or underpass. Some research also suggests that providing a separated bridge give drivers the signal that they do not need to be aware of pedestrians who may still be crossing at ground level, and can signal drivers to increase their speed above the posted limit.\(^8\)

Where these structures have been constructed, WSDOT recognizes the need to maximize their value by working with partner agencies to improve routes that include them. In some cases, it can be hard to find where bridges connect with the adjacent street network. Wayfinding signage and visibility improvements could be low-cost strategies to increase use of current investments and help people to feel less isolated when using them. The highway crossing availability study’s route directness data (discussed above), when finalized, will help the agency evaluate the need for other such structures in the future.

\(^8\) Institute for Transportation & Development Policy. 2019. Pedestrian Bridges Make Cities Less Walkable. Why Do Cities Keep Building Them?
Figure 3.31 — Three WSDOT owned pedestrian crossings, spaced about 600 feet apart, are found between Woodland Park and the Woodland Park Zoo.

Figure 3.32 — Locations of separated pedestrian/bicyclist bridges owned and managed by WSDOT.

Figure 3.32 shows the locations of separated active transportation bridges throughout the state and Figure 3.33 provides examples that represent different functions these structures serve.
Most of these bridges are in-town connectors and many offer key links across major highways. Without them, walking and bicycling trips would be much less convenient and require people to interact with much more motor vehicle traffic or go farther out of their way to find a safe crossing.

<table>
<thead>
<tr>
<th>CROSSING TYPE</th>
<th>NUMBER OUT OF 114</th>
<th>EXAMPLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over water, rail, terrain or other</td>
<td>23</td>
<td>Children of the Sun Trail (near Francis Ave.), Spokane</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fairweather Creek, 28th St, Medina</td>
</tr>
<tr>
<td>Over traffic</td>
<td>91</td>
<td>South Custer Road, Spokane</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vancouver Land Bridge, Vancouver</td>
</tr>
<tr>
<td></td>
<td></td>
<td>G Street Off-Ramp to 101 Bridge Sidewalk, Aberdeen</td>
</tr>
<tr>
<td>Major active transportation trail</td>
<td>46</td>
<td>Palouse to Cascades Trail, Thorpe</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Main Street Lowell River Trail Access, Everett</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Children of the Sun, East Farwell Road, Mead</td>
</tr>
<tr>
<td>In-town connector</td>
<td>68</td>
<td>South Regal Street, Spokane</td>
</tr>
<tr>
<td></td>
<td></td>
<td>132nd Street, Burien</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mainstreet, Monitor</td>
</tr>
<tr>
<td>Intermodal connector</td>
<td>5</td>
<td>I-405 Southbound Flyer Stop, Kirkland</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sea-Tac Airport Light Rail Station, SeaTac</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I-5 Mountlake Terrace Transit Center, Mountlake Terrace</td>
</tr>
<tr>
<td>Parallels highway (not trail related)</td>
<td>6</td>
<td>I-90 Bridge, Moses Lake</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ebey Island/U.S. 2 Eastbound Bridge, Snohomish County</td>
</tr>
<tr>
<td>Other</td>
<td>19</td>
<td>Chinook Pass, Pacific Crest Trail, Yakima County</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blue Heron Resort, Union</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alpoa Creek Bridge, Clarkston</td>
</tr>
</tbody>
</table>

Figure 3.32 — WSDOT owns and operates many bridges across the state. Some bridges provide pedestrian and bicyclist access alongside motor vehicles, while others are separated structures. This table lists examples of separated structures.
United States bicycle route system

The United States Bicycle Route (USBR) System is the national cycling route network. It consists of interstate long-distance cycling routes that use the best available bicycling infrastructure, including off-road paths, bicycle lanes, and low-traffic roads as well as highway shoulders. Like a state highway, a USBR identifies a cross-state route, but someone may use it for a short local trip because it represents the best possible bike route through a particular area. The Adventure Cycling Association makes use of designated USBRs in its long-distance bike touring maps so USBRs serve as invitations to bike travel and touring visitors, particularly for small towns and rural areas.

Four USBR system routes have been designated in Washington state, with a combined length of 734 miles. Many other potential routes have been identified, which if designated would form an extensive network across the state. USBRs make use the best available existing facilities including trails and local roads as well as highway shoulders.

To identify a USBR, local bike advocates volunteer to suggest and test routes and compile the recommendation. Designation of a USBR requires support from the jurisdictions responsible for segments of the route. WSDOT staff prepare and submit the route for national recognition. The highway numbering committee run by the American Association of State Highway and Transportation Officials (AASHTO) reviews and approves proposed routes. This process is like the one used to designate state highway and interstate numbers or scenic byways.

In Washington state four USBRs have already been designated. Washington received national and international recognition when USBR 10 became the first route to be designated on the West Coast.\textsuperscript{82} USBR 10, 468 miles long, runs between Newport and Anacortes, primarily along SR

20, but using local roads as well. The other three, USBRs 87, 95 and 97, are north/south routes located in Whatcom, Island and Skagit counties. Together, they cover another 266 miles.

Figure 3.34 shows existing and proposed USBRs for Washington state. Work is under way to identify the turn-by-turn specifics of USBRs shown here as conceptual corridors. Portions of the conceptual routes identified align with the western segment and terminus of the “Great American Rail-Trail”, a project of the Rails-to-Trails Conservancy (Figure 3.35). The conservancy is promoting a cross-country rail-trail from Washington, DC, to Washington state. In Washington, it would include the Palouse to Cascades Trail, Olympic Discovery Trail, and other connections needed to reach from the Idaho border to the Pacific Ocean.

![Map of existing Washington state USBRS routes (in purple) and conceptual corridors (in pink).](image-url)
Figure 3.35 — Western limit of the Great American Rail Trail. This cross-country trail project aligns with a proposed USBR route and uses several existing trail corridors. Source: Rails-to-Trails Conservancy.

**Significant trails and networks in Washington**

Washington state has more than 1,600 miles of existing trails, including ones of regional or statewide significance. These include regional “super” trails that may carry heavy commuter use during peak periods and/or serve as destination attractions for bike tourism. Significant trails serve both local needs and long-distance travel. This function is similar to how people use state highways, which may be used by someone driving across the state or by someone getting on at one interchange and off at the next. Local trail systems and other comfortable bike/walk connections expand the value of the regional trails by making it possible to travel door-to-door on a low-stress system. This is similar to how local streets connect to the highway system for drivers.

Investments to close the gaps in these trail networks would leverage the investments of the past and enhance their value. As the total number of connected trail miles increases the
The attractiveness of the trail system, and hence the asset to tourism, also increases. These long-term investments take time to pay off. As the proverb goes, the best time to plant a tree was 20 years ago. Second best time to plant a tree: Today.

The same is true for trail development; the Burke-Gilman Trail, for example, would not carry so much traffic today if people had not worked on it and its connections piece by piece. When WSDOT added the SR 520 bridge trail, analysis of data from counters showed an increase in ridership. This represented more than just a shift from other facilities; the new connection invited new riders.83

Figure 3.36 shows where trails exist today and where proposed or conceptual segments would connect them and increase their usefulness. The Recreation and Conservation Office’s statewide trails plan also includes the goal of linking trails with transportation.84 The development of this conceptual map parallels that of the U.S. Bicycle Route System by starting with the state highway map. Representation of a conceptual trail does not indicate any specific route—the statewide map serves as a starting point for discussion among jurisdictions and stakeholders about the potential for future trail development.

83 SR 520 Regional Trail improves connectivity and shows evidence of latent demand for active transportation. WSDOT Gray Notebook 71, Sept. 2018

Figure 3.36 — Existing, locally planned and statewide concept trails serving a transportation function. This map shows many of the existing trails across the state that could generally be considered to serve a transportation need, as opposed to only a recreational one. Several trails are only partially improved. The map also shows local agency planned and/or conceptual trails and system of statewide conceptual trail linkages. The statewide conceptual trails would link between existing trails and/or trails proposed by local agencies. The statewide conceptual trail system uses the currently proposed United States Bicycle Route System corridors to suggest where a system of statewide trails might be added.

Conceptual statewide connector trails were identified as links between existing and proposed trails from other agencies. Proposed United States Bicycle Route System alignments (discussed previously) were used to identify the statewide links. Many smaller existing segments across the
state connect people within communities to local destinations. These small trails often begin to link up and some may eventually become part of longer, regional trail networks.

**Modal connections**

A well-designed multimodal system creates places where people can make both long and short trips without driving. This approach adds capacity to the existing system, allowing more flexibility to meet demand. It also provides transportation independence for those who cannot or do not drive.

This plan recognizes the need for well-planned modal connections that serve active travelers. People who walk and bike often make connections with transit modes such as buses, ferries, and trains. In some locations, safe rolling or walking access to stations or landings can be challenging and may discourage this type of multimodal trip.

To serve shorter parts of the longer multimodal trip the “first and last mile” connections are important. People must have convenient, efficient access to locations where they can make use of other modes. Many modal connections on the state system have sidewalks, but dedicated bicycle lanes, trails, and pedestrian crossings are less common.

Most WSDOT modal plans include strategies to improve bicyclist and pedestrian connections. The Washington state Rail Plan includes strategies to improve first and last mile connections. Of the 26 rail stations in Washington state, 20 have sidewalk connections but only six have bike lanes that allow people to access the stations. Amtrak Cascades trains have 10 spots on each train that people can pay to reserve for their bicycle. These spots regularly sell out, an indicator of the popularity of bike/train trips.85

The Washington state Ferries (2040) Long Range Plan update released in 2019 calls for support of opportunities to incorporate improved bike and pedestrian infrastructure in terminal improvement projects. It also highlights the need for partnerships with local agencies in ferry

85 [2019 Washington state Rail Plan](https://www.wsdot.wa.gov/plans-and-policies/plans/ completa) WSDOT. This statement was true pre-COVID19.
communities to improve connections for bicyclists and pedestrians. For the 10 ferry routes in the system, the plan projected an average ridership increase of 45 percent for passengers versus 21 percent for drivers with vehicles. The plan calls for significantly increased growth in walk-on and bicycling passengers as the most space-efficient fares they carry.86

The Washington state Public Transportation Plan and state transportation demand management plan include recommendations to improve first and last mile pedestrian connections as a key strategy.87 The data compiled for the Active Transportation Plan shows 1,733 public transit stops on state routes in population centers88. These locations should provide for people crossing the road safely as well as moving along it to reach the stop. Figure 3.37 shows an enhanced highway crossing associated with a bus stop on SR 11 in Bellingham. Figure 3.38 shows communities in the Tri-Cities area and the concentration of transit stops within those communities. The figure shows how locations identified as walking and biking gaps on state highways through this plan’s analysis are closely associated with transit stops. Airports may also be destinations for people who use active transportation; for example, private pilots may travel with a folding bicycle they use upon landing to reach a local restaurant or hotel.

How Washington state plans relate to and inform each other is outlined in Appendix G, Planning and Reporting.


Figure 3.37 — Enhanced crossing serving transit stops. This crossing of SR 11 in Bellingham provides a safe crossing opportunity for people accessing the transit stops on either side or other destinations nearby.

Figure 3.38 — Public transit bus stops in the Tri-Cities area. This map shows the boundaries of population centers and active transportation gaps associated with state routes through those locations. Most public
transit stops serve locations where people live, work, and go to school. Looking at the information together might help planners align overlapping active transportation and transit needs. Note that only General Transit Feed Specification (GTFS) bus stops were included in this graphic.

To identify access to multimodal travel opportunities, WSDOT included connection points to other modes when analyzing the transportation system. Improving sidewalks, bike lanes, or trails and shared-use paths leading to these locations adds to their value and increases the potential and range for multimodal trips.

**Tracking and Monitoring Statewide Needs**

*Facilities inventory*

WSDOT, like other transportation agencies and jurisdictions in the state, has only partial information on the facilities they own and manage that provide space for walking and rolling. This information is critical for understanding and stewarding the quality and completeness of the system for all users.

As discussed in Chapter 2, WSDOT and other agencies also lack complete data on current usage. Where active transportation congestion exists—on a crowded downtown sidewalk or busy trail, for example—that information isn’t yet captured and defined as a rationale for system expansion.

With all this in mind, this plan and the underlying methods focus on factors that contribute to travel conditions for active transportation use on the state network and whether those conditions meet travel needs. The approach taken aligns with what Washingtonians told WSDOT would contribute to increased use of walking and bicycling for transportation: complete, comfortable connections to get where they need to go. This plan also applies the newest approaches recommended by the Federal Highway Administration.⁸⁹

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The first question to answer was, what data is available through WSDOT or other authoritative sources to answer these questions.

**Walk and bike facility types**


In order to understand the statewide need for making connections and providing mobility opportunities WSDOT examined available data for sidewalks, shared-use paths or trails, protected bike lanes, buffered bike lanes, “conventional” bike lanes, shoulder bikeways, intersections, and crossings, including ramp crossings.

Appendix F, Cost Estimation Background, defines in detail the bicyclist and pedestrian infrastructure types commonly used on the Washington state roadway system or in the WSDOT right of way. For purposes of understanding the need to provide mobility opportunities across the state, WSDOT considered sidewalks, shared-use paths or trails, protected bike lanes, buffered bike lanes, “conventional” bike lanes (indicated with a single stripe of paint), shoulder bikeways, intersections, and crossings, including ramp crossings.

With regards to sidewalks, they may be present on WSDOT right of way but managed by the jurisdiction through which that state route passes. Traffic signal operations on state routes within city limits in these larger jurisdictions are also the city’s responsibility. Under RCW 47.24.020, this population cut-off for responsibility will increase at specific points, meaning that WSDOT will acquire new sidewalk responsibilities, as follows: 2023, 30,000; 2028,
The development of this plan, inquiries into sidewalk data availability, and data limitations have highlighted the need for further discussions about sidewalk roles and responsibilities. An agreement between WSDOT and the Association of Washington Cities concerning maintenance is due to be updated.

Asset management

Asset management is the strategic and systematic process of operating, maintaining, upgrading, and expanding physical assets effectively throughout their life cycle. Good asset management practices provide the greatest return to taxpayers; maintenance and preservation extend the useful life of transportation facilities at lower cost than building new facilities. Federal law now requires WSDOT to produce a Transportation Asset Management Plan (TAMP), and the agency has begun the work of identifying definitions and objectives for its assets.91

WSDOT does not maintain an asset management plan specific to active transportation. Creation of the Active Transportation Plan has clarified the value of more comprehensive basic information about pedestrian and bicyclist infrastructure on the state system.

The TAMP does not currently track active transportation infrastructure as a separate category. Highway shoulders, for example, are not evaluated for whether their condition is appropriate for bicycling. The TAMP does call for the following:

32,500; 2033, 35,000. For more information on sidewalk responsibilities, the Municipal Research and Services Center has a page with links to relevant statutes.

91 Statewide Asset Management Plan. WSDOT.

https://www.wsdot.wa.gov/about/assetmanagement/statewide-asset-management-plan

Chapter 3
● Develop and manage an inventory and condition assessment of assets.
● Define and establish State of Good Repair standards for each asset.
● Establish maintenance performance measures.
● Develop strategies to achieve the lowest life-cycle cost for investments.

Every jurisdiction with responsibility for sidewalks is required to have an ADA transition plan. In May 2018, the Federal Highway Administration approved WSDOT’s ADA Transition Plan, which calls specifically for collection of complete and accurate data on assets related to accessibility. In developing its transition plan, WSDOT inventoried pedestrian facilities on state right of way between 2009 and 2012. ADA features include accessible pedestrian signals, crosswalks, bridge end ramps, curb ramps, detectable warning surfaces, driveways, edge protection, handrails, rest areas, pedestrian bridges, shared use pathways, walkways, islands, ADA parking areas, rail crossings, sidewalks, stairways, and ferries. An updated inventory would enable WSDOT to use the information to program improvements that provide accessible active transportation.

The creation of this Active Transportation Plan has helped WSDOT staff understand the need for basic information about pedestrian and bicyclist infrastructure on the state system. This planning process identified a number of data gaps. When WSDOT addresses these, the agency can update the overall analysis.

**Best practices in bicyclist and pedestrian infrastructure data collection**

Any asset management practice is only as strong as the supporting data. While information about other transportation modes is typically collected comprehensively, detailed and complete collection of bicyclist and pedestrian infrastructure data at the state level is an emerging practice. Recent advances in remote and automated data collection promise to make this data collection easier and more affordable.

WSDOT can collect bicyclist and pedestrian asset data at either the system level or the project level. Figure 3.9 provides a comparison of the two data levels.
### METHOD CHARACTERISTICS

<table>
<thead>
<tr>
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<th>SYSTEM-LEVEL METHOD</th>
<th>PROJECT LEVEL METHOD</th>
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<td>Attributes</td>
<td>Presence or absence of infrastructure and Type of infrastructure</td>
<td>Type of infrastructure and details (ex., slopes and quality information)</td>
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<td>Collection Method</td>
<td>Lidar surveys, aerial surveys</td>
<td>Field data collection, plan data and drawings</td>
</tr>
<tr>
<td>Storage Method</td>
<td>Data can be stored spatially (e.g., GIS mapping) or in a database</td>
<td>Hard copy or digital drawings</td>
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<tr>
<td>Update Frequency</td>
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<td>Typically not updated</td>
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<tr>
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<td>Used in planning, analysis, reporting</td>
<td>Used for project construction, or historical reference</td>
</tr>
<tr>
<td>Data Cost</td>
<td>Low to High</td>
<td>Low</td>
</tr>
</tbody>
</table>

**Figure 3.9 — Active transportation data collection.**

As WSDOT continues to transition towards a multimodal transportation focus, the collection of system-level data for all modes should become more common. A successful system-level data collection effort should consider:

- Data collection methods
- Data storage mechanisms
- Potential data stewards and partnerships
- Variety of current potential uses and future data uses
- Data validation and quality control
- Ongoing data maintenance and funding
- Attributes collected and common data definitions
- Data licensing and data sharing considerations
TAKEAWAYS FROM CHAPTER 3

The process of developing and testing this approach provided information for WSDOT about needed improvements to data collection and management and the challenges inherent in maintaining this analysis over time. As the agency makes improvements, it will need to be able to update the baseline evaluation to provide a clearer picture of conditions on state routes.

The analysis described in Chapter 3 serves as a “snapshot in time” of WSDOT right of way with respect to active transportation based on an objective and quantitative evaluation method. It can serve as the basis for rational selection of projects and programming to provide mobility for people and goods, as directed in RCW 47.05.010. In using this analysis as the basis for estimation of costs to lower level of traffic stress in population centers, WSDOT learned additional lessons described in Chapter 4.
Chapter 4: Cost estimates for statewide needs and opportunities

INTRODUCTION

The assessment of needs on state routes is grounded in the principle that active transportation should be a safe and comfortable option for travel within population centers in order to reduce traffic congestion created by motor vehicle use for short trips. State routes present barriers to walking and bicycling in many population centers around the state. Establishing a safe, complete connection may involve a change on the state right-of-way and/or identification of a preferred route on the local system.

A Level of Traffic Stress (LTS) 1 indicates facilities and/or roadway designs suitable for people of all ages and abilities. Applying the principles of safety, equity, and demand and methodology described in Chapter 3 focused the needs assessment on state routes with LTS 3 or 4 within population centers.

Working toward a future complete and connected active transportation network will require close coordination among partner agencies and jurisdictions. The goal is a set of shared priorities that align efforts across boundaries for cost-effective implementation.

By undertaking an assessment of state right-of-way, WSDOT has created information to support its role as a partner. Context-specific changes can then be developed in consultation with communities and residents as local and regional plans are updated to incorporate needs on state routes, filling a critical gap in past plans. WSDOT region offices can use the information in corridor studies, planning studies, and site-specific project planning and design as they coordinate with other agencies. A similar need for collaboration and a guiding principle of making improvements “to reduce unintended gaps in condition, nonmotorized systems, ADA
accessibility, and environmental mitigation” were identified in a 2019 report to the legislature’s Joint Transportation Committees in an assessment of city transportation funding needs.92

In evaluating needs this analysis does not assume that future connections to meet identified needs would be completed on state right-of-way. Where a gap exists due to lack of facilities or the level of traffic stress, the preferred or most feasible solution may be on a nearby local route.

This plan provides broad estimates at a statewide level for what it would take to arrive at Level of Traffic Stress 1 or 2 on state routes or associated local routes in population centers. In addition, it identifies funding needs for local active transportation projects and the opportunity for a bikeway network connecting regional trail systems and U.S. Bicycle Routes into a statewide system.

The assessment of needs on state routes is grounded in the principle that active transportation should be a safe and comfortable option for travel within population centers in order to reduce traffic congestion created by motor vehicle use for short trips. State routes serve as arterials or present barriers to walking and bicycling in many of these population centers around the state.

Population center improvements to reduce level of traffic stress where it is currently too high to support safety and mobility needs will include:

- Speed management to lower the operating speed of some roads to reduce the speed differential between people walking, biking and driving, which reduces crashes and improves outcomes for all road users.

● Completion of connected linear facilities with designated space for active travelers that is separated to the extent necessary based on adjacent road characteristics (higher speeds and traffic volumes need more separation).

● Provision of adequate crossing opportunities (protected to the extent needed based on road characteristics) with a frequency based on pedestrian need to cross (proximity to destinations, route directness).

● Identification of existing or future connections on local routes that serve a state interest by providing a lower-stress and reasonably direct route once they are connected and wayfinding is provided on and off the state right-of-way; these may serve as the preferred alternative to making changes on the state route in a given location.

Building on this plan’s analytical tools to identify the most cost-effective strategies using Practical Solutions will enable the agency to more fully incorporate active transportation planning and design. Where multiple needs and issues can be addressed during work on a project or programmed activity, this will result in less disruption to the traveling public and the state’s ecosystems at the same time it facilitates increased active transportation use that frees up road capacity.

Washington has a total of around 81,000 miles of public roads. As discussed in Chapter 3 and Appendix D, Methods of Analysis, WSDOT used data from the 2017 Highway Performance Monitoring System (HPMS) and examined 6,977 miles of state highway. To estimate active transportation need and cost the agency divided the system into two categories:

● Population centers: Cities, towns, and census-designated places.
  ○ Total mileage: 1,685.
  ○ Gaps in population centers have associated cost estimates below.

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93 WSDOT. Highway Performance Monitoring System.

94 The analysis uses highway miles marked in HPMS as “increasing direction”, referring to the direction of milepost numbering.
High-speed rural routes: Everything else.

- Total mileage: 5,292.
- No cost estimate was associated with these segments; planning factors and data needs are discussed in Appendix D, Methods of Analysis.

The need categories considered included both infrastructures focused on population centers and the planning and the engineering support needed for future alignment of local plans with state analysis, data collection, analysis and evaluation, and technical assistance and training.

Transit, ferry, train, and airplane riders are often also active transportation system users. Very few transit users other than those using paratransit will be picked up in front of their residence and dropped off at their final destination. The FHWA indicates most people are willing to walk 1/4 to 1/2 mile to/from a transit stop and those on bicycles may travel farther to make a connection, given the greater time efficiency of cycling. To support multimodal safety and mobility this analysis includes consideration of the 1,733 public transportation bus stops located on the state system. Transit centers, ferry landings, train stations, and airports were included as destinations; most are within population centers and/or have transit stops associated with their location.

**Summary of Needs and Estimates:** The total estimated cost to address gaps in population centers identified through this analysis appears below. Infrastructure needs consider existing gaps based on best available data. WSDOT anticipates that new development along state highways and population growth might create additional needs not captured here, and that refinement of facilities data will result in adjustments to the baseline in the future.

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Only stops included in the General Transit Feed Specification (GTFS) dataset were included. Some communities have transit stops on the state system that are not captured by this data and this source does not capture school bus stops. School districts work with WSDOT for placement of signage to indicate the presence of a school bus stop on a state route.
improvements to be suitable for walking and bicycling—are not a surprise since state highways were not originally designed or constructed for the purpose of providing safe active transportation connections. Given rapid growth along and around highways, hundreds of miles of state routes now function as primary community streets with associated needs for design suitable to local short trips, and state law now directs WSDOT to “balance system safety and convenience...to accommodate all users of the transportation system”.  

In some locations an expenditure for one type of treatment could reduce or eliminate the need for another type of treatment. These estimates do not reflect that possibility because it will require site-specific planning and design to determine that. Nor do they incorporate the potential for cost savings if WSDOT were able to address gaps with changes incorporated into routine activities.  

Tables below present cost estimates in four main categories. The first two, Infrastructure/Traffic Systems and Bikeways and Trails Network, are presented as totals with no timeframe specified for implementation. The second two are presented as ongoing needs with amounts per biennium.  

Identification of a gap associated with state right-of-way does not mean the analysis specifies which agency or jurisdiction might receive funding to close a gap in the future. Regardless of which agency is ultimately responsible once an appropriate solution is identified, every gap has an associated cost incorporated here.  

Costs represent estimates for the purposes of this plan based on an average toolkit of treatments for each Level of Traffic Stress given the roadway characteristics. Appendix F, Cost Estimation Background, presents detail on cost calculations.

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96 RCW 47.01.078
Infrastructure/Traffic Systems: Needs based on gap analysis of current conditions in population centers. Presented as total not related to a given timeframe for implementation.

- Speed management for safety.
- Separated pedestrian and bicyclist facilities.
- Crossing, intersection, and ramp treatments.
- Bridge retrofit/improvements.

Bikeways and Trails Network: Opportunity to complete and connect trails to leverage past investments in trails $1.7 billion (estimate of the value of existing trail assets). This is presented as a total and not related to a given timeframe for implementation.


Local Needs: Ongoing needs identified as local priorities on the local system; needs on state routes within cities and counties are included in the infrastructure/traffic systems category above. Presented as amount per biennium.

- Grant programs backlog and future projects identified by jurisdictions.

Maintenance/Operating Support: Operating needs that support the ability to align WSDOT and local plans, incorporate information from the gap analysis into WSDOT processes and procedures, and maintain facilities. Presented as amount per biennium.

- Maintenance: Calculated as 4 percent of capital identified above distributed over 20 years

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97 Value of existing trail mileage calculated at average cost per mile on the same basis used for network completion estimate in this plan. Appendix F, Cost Estimation Background, provides details and sources.

98 WSDOT is continuing to refine this figure while this draft document is out for public review and comment and will provide details in an appendix when finalized. Active transportation maintenance has not been separately budgeted for existing facilities and WSDOT has identified a large maintenance backlog on the highway system in general.
Engineering and partnership development to support infrastructure work: Decision analysis tool, pedestrian/bicyclist count data collection and analysis, accessible active transportation network analysis and asset management data, capacity to apply innovation and adaptation in work of WSDOT and partners.

<table>
<thead>
<tr>
<th>INFRASTRUCTURE PROGRAM OR PROJECT CATEGORY</th>
<th>TOTAL IDENTIFIED NEED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed management for safety</td>
<td>$283 million</td>
</tr>
<tr>
<td>Separated pedestrian and bicyclist facilities</td>
<td>$1,828 million</td>
</tr>
<tr>
<td>Crossing treatments</td>
<td>$1,600 million</td>
</tr>
<tr>
<td>Bridge retrofit/improvements for active transportation</td>
<td>$1,980 million</td>
</tr>
<tr>
<td>Total</td>
<td>$5,691 million</td>
</tr>
</tbody>
</table>

Figure 4.1 — Needs based on gap analysis of current conditions in population centers. Presented as total not related to a given timeframe for implementation.

<table>
<thead>
<tr>
<th>BIKEWAYS AND TRAILS NETWORK PROGRAM OR PROJECT CATEGORY</th>
<th>TOTAL ESTIMATED COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washington Bikeways Network, U.S. Bicycle Routes, regional trail systems</td>
<td>$2,620 million</td>
</tr>
<tr>
<td>Bikeways and Trails Network signage and wayfinding</td>
<td>$4.5 million</td>
</tr>
<tr>
<td>Total</td>
<td>$2,625 million</td>
</tr>
</tbody>
</table>

Figure 4.2 — Opportunity to complete planned local and regional trails, finish designation of U.S. Bicycle Routes, develop trails or shoulder improvements to create connections between trail systems, and provide signage and wayfinding. Presented as total not related to a given timeframe for implementation.

<table>
<thead>
<tr>
<th>LOCAL NETWORK PROGRAM OR PROJECT CATEGORY</th>
<th>PER BIENNMIUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local projects funded through active transportation grant programs</td>
<td>$200 million</td>
</tr>
</tbody>
</table>

Figure 4.3 — Ongoing needs identified as local priorities. Presented as amount per biennium based on continuing increases in applications to Safe Routes to School and Pedestrian/Bicycle Program grant calls for projects.
### Maintenance/Operating Support Program or Project Category

<table>
<thead>
<tr>
<th>Category</th>
<th>Per Biennium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance</td>
<td>$32.65 million</td>
</tr>
<tr>
<td>Engineering support, data analysis and tools</td>
<td>$1.04 million</td>
</tr>
</tbody>
</table>

Figure 4.4 — Operating needs that support the ability to address the results of the gap analysis, align WSDOT and local plans, and maintain facilities. Presented as amount per biennium.

Infrastructure needs can be thought of as a set of interdependent choices and options. The strategies described below will serve to bring Level of Traffic Stress down—in some places if used alone, in other places much more effectively if used in combination.

Figure 4.5 illustrates how WSDOT refined its focus based on the initial analysis to arrive at a statewide set of roadway segments and crossings most in need of changes. If funding becomes available to actually make changes, these gap locations could be further prioritized by applying criteria WSDOT has defined for safety, equity, and demand, as described in Chapter 3 under Gap Evaluation and in Appendix D, Methods of Analysis. A statewide comparison of evaluation criteria applied to crossing treatments appears in Appendix D for illustrative purposes.
Figure 4.5 — Generalized graphic showing state highway miles evaluated (based on HPMS, 2017) for needs assessment. Of the 6,677 miles considered, need was estimated from the subset of those miles that exist in population centers. Depending on the category of need examined, population centers were further subdivided into the portions where no sidewalk had been identified, where no bike lanes exist, or where speeds were 30 mph or greater.

INFRASTRUCTURE NEEDS

WSDOT applied parameters described below to the Level of Traffic Stress analysis to define and constrain the number of miles for which estimated costs were calculated in each category. Appendix F, Cost Estimation Background, provides additional information on the basis for cost per mile. WSDOT drew on FHWA cost estimation guidelines for a toolkit of potential treatments depending on LTS rating and roadway characteristics.99

The needs assessment is grounded in data about the characteristics of locations where fatal and serious injury crashes occur disproportionately. These data point to clear priorities: speed management in population centers, crossings, and separated facilities.

Majority of bicyclist and pedestrian fatalities and serious injuries on state highways are in population centers
Bicyclist and pedestrian fatalities and serious injuries on state highways; 2010 through 2020

Rural areas 17%
Population centers 83%

Figure 4.6 — This chart divides state highways into two categories, population centers and rural areas based on where serious injuries and fatalities occur.

Speed management for safety

As indicated in Chapter 2, 86 percent of pedestrian and bicyclist fatalities in Washington occurred on roads with posted speeds of 30 mph or higher; only 14 percent occurred on roads with posted speeds of 25 mph or less, 2010 to 2019.

Speed management is a systematic approach needed to attain zero fatal and serious injury crashes, particularly those involving people who walk and bike; these approaches also reduce potential harm for all roadway users. Speed is one of the most important physical variables determining whether the active traveler will survive when a motorist strikes them with a
vehicle. In addition, at higher speeds motorists are less able to react in time and avoid crashes. For these reasons Washington’s 2019 update to the Target Zero plan identifies speed management design practices as a recommended strategy.

**Figure 4.7** — A driver’s visual field narrows as driving speed increases. A mistake at 40 mph has significantly greater consequences than one at 25 mph. Image: NACTO.

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100 AAA Foundation. 2011. *Impact Speed and a Pedestrian’s Risk of Severe Injury or Death.*

Posted speed: The maximum legal speed as posted on a street, road, or highway using regulatory signs.

Operating speed: The average speed at which most drivers travel in a given roadway segment, regardless of posted speed, under free flow conditions.

Target speed: The intended ultimate speed for a roadway segment regardless of current posted or design speed. Speed management measures may be applied to reduce operating speed to the target speed.

Land use changes create new and evolving conditions that may render formerly successful solutions less suitable. Redesign for an appropriate speed limit is especially important where higher-speed roadways coincide with urban-type land uses and contexts with greater numbers of people bicycling and walking, such as where housing and services have developed on either side of a state route.

As context changes, design engineering and traffic management interventions become necessary to support safer target speeds. These changes include road reconfigurations and other measures to cue drivers to operate at appropriate speeds for the conditions. The cost estimate is based on making changes on 849 miles of state highways in population centers where the speed is 30 mph or more. Treatments would be intended to change the road to support driver compliance with a posted speed below 30 mph. Costs will depend on the mix of treatments used and the current posted speed. Reductions from higher speeds require a broader mix of treatments and incremental change over time to achieve the appropriate speed for the context.

A self-enforcing road, also called a “self-explaining roadway,”

is a roadway that is planned and designed to encourage drivers to select operating speeds consistent with the posted speed limit.\textsuperscript{103}

Fitting Highway Speeds to Context vs. Maintaining Speeds with Separated Facilities for Active Travel

When considering ways to accommodate safe and accessible active travel on a system historically designed for moving motorists, the project team identified two key strategies to consider. The first is to lower the operating speed and provide active transportation facilities appropriate to that lowered speed. The second is to build safe active transportation facilities that work well for those moving along and across higher-speed facilities.

In population centers the potential demand for walking and biking by a variety of users is high. In such places, the choice to maintain high-speed facilities (strategy 1) creates a need for active travel infrastructure that offers significant separation or barrier protection from motor vehicle traffic. Intersections on state routes in particular present the dual need to offer safe crossing opportunities and address intersections that are often too wide or complex for some users to cross in a timely fashion. Another issue involves availability of crossing opportunities at both intersections and possibly mid-block locations. Where driving speeds are high, active transportation users need an acceptable way to cross high-speed routes that does not require undue out-of-direction travel.

The second strategy, matching the operating speed to the population center context, may offer advantages in terms of cost, safety for all roadway users, and increased walking and biking activity. The cost of active transportation infrastructure where speeds are lower is usually less than in corridors where separated facilities are constructed. On a 25 mph road, conventional bike lanes and lower-cost crossing facilities are sometimes possible. Costs vary, however. Reducing a 50 mph roadway to 25 mph for example, would require more infrastructure and traffic control changes than going from 35 to 25 (Figure 4.8 provides examples of roadway characteristics).
Figure 4.8—Posting a lower speed limit is only a partial solution for achieving a lower speed. Roadway characteristics need to change as well. It may be more costly to design for a lower operating speed when the roadway at the intersection is functioning at 50 mph with five lanes (Lakeview, right image) than on a roadway at an intersection that is posted at 30 mph with three lanes (Quilcene, left image). Image source: Google.

Even where substantial speed changes are considered, the full suite of roadway and operational changes may cost less than the separated facility treatments needed on high-speed roadways. An added benefit of the speed-lowering strategy is increased safety for both active travelers and drivers. High-speed routes that pass through population centers encounter more intersections and activity, making conflict more likely for all users.

Total statewide need was calculated by multiplying the number of miles of state highway in population centers with LTS 3 or 4 by the average cost of speed management improvements per mile (details in Appendix F, Cost Estimation Background).104 Some locations identified as LTS 1 or 2 based in part on posted speed may have higher actual operating speeds and thus might also require speed management measures. Such locations were not identified through the analysis process, but could be identified through a routine safety audit. Treatments that might be applied in Separated Pedestrian and Bicyclist Facilities and Crossing Treatments, discussed below, also provide speed management benefits.

104 More detail on cost calculations in Appendix F, Cost Estimation Background.
Speed Management: Population Center Opportunities

Figure 4.9 — Total state route miles evaluated, subset of total showing active transportation gaps within population center boundaries, and subset of gap miles where posted speed is 30 miles per hour or greater. The latter would be candidates for speed management treatments.

<table>
<thead>
<tr>
<th>MILES OF HIGHWAY WITH SPEED MANAGEMENT NEEDS</th>
<th>AVERAGE COST PER MILE</th>
<th>TOTAL STATEWIDE NEED (ROUNDED)</th>
</tr>
</thead>
<tbody>
<tr>
<td>849</td>
<td>$333,480</td>
<td>$283,000,000</td>
</tr>
</tbody>
</table>

Figure 4.10 — Total statewide speed management for safety needs. Total Statewide Need was calculated by multiplying miles of state highway bicycle gaps in population centers by the average cost of speed management improvements per mile. The gaps were obtained from the Network Analysis methodology as it applied to the bicycle network since complete data on sidewalk presence was not available and on-street bicycle facilities are in closer proximity to general-purpose travel lanes than sidewalks.

Separated pedestrian and bicyclist facilities

Providing dedicated, separated space for people bicycling and walking significantly reduces the likelihood of fatal or serious injury crashes and as noted above is especially important where driver speeds are high. The higher the speed the greater the separation needed for sidewalks, bicycle lanes, and crossing facilities.

From 2010 to 2019, 27 percent of fatal and serious injuries involving people walking and bicycling occurred on state routes. Even though state routes represent only about 10 percent of total lane miles in Washington they were the sites of 45 percent of all pedestrian and...
This plan considers sidewalks as the primary pedestrian facility. Separated paths are also effective treatments that can support all forms of active transportation given sufficient width of the path and available right-of-way. In some cases, the best solution is to partner with local agencies to find alternatives to state routes for pedestrian facilities, while still providing relatively direct access to destinations. In those cases, wayfinding signage on both systems would likely be part of the treatment.

Note that for crossing facilities “separation” most often refers to separation in time coupled with a designated crossing space; drivers stop while people cross. It can also refer to a grade-separated crossing such as a pedestrian bridge; this is a much more expensive facility type. Crossing treatments are discussed in more detail below.

**Pedestrian Network Gaps: Population Center Opportunities**

Figure 4.11 — Total state route miles evaluated, subset of total showing active transportation gaps within population center boundaries, and subset of gap miles that were estimated to not have sidewalks. The latter would be candidates for pedestrian linear treatments such as sidewalks or separated paths.

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105 WSDOT Gray Notebook 78, June 2020.
Estimation of pedestrian need was based on known roadway characteristics that were used to identify gaps, and an estimate of the amount of sidewalk present. Of the 6,977 miles of highway considered, WSDOT identified 861 miles of potential population center gaps in the pedestrian network. The gaps excluded fully controlled, limited access highways where pedestrians are generally prohibited.

**Existing sidewalk adjustment:** In general, sidewalks are considered to address pedestrian network gaps, though sidewalk width and the presence of buffers are factors in full determination of level of traffic stress. At the time the overall gap analysis was conducted, existing sidewalk data for all state highways was not easily available. To address this lack of data, WSDOT undertook a preliminary visual scan of satellite imagery to evaluate the presence or absence of sidewalks along state routes. Based on this effort, the agency was able to estimate that 38 percent of the 861 miles of state highway within population centers have sidewalks on at least one side. This figure likely overestimates the presence of ADA-accessible sidewalks and will be adjusted based on ongoing/future data collection efforts and coordination with local agencies. The gap estimate was adjusted to exclude the existing sidewalk, reducing it to 542 miles. Appendix C, Cost Estimation Background, provides more information on the agency’s efforts to collect basic data and adjust for the presence of existing sidewalks. It was not possible to evaluate condition or ADA accessibility of sidewalks.

<table>
<thead>
<tr>
<th>Miles of Pedestrian Gaps in Population Centers</th>
<th>Average Cost Per Mile (Both Sides of Roadway)</th>
<th>Total Statewide Need ( Rounded)</th>
</tr>
</thead>
<tbody>
<tr>
<td>542</td>
<td>$2,321,585</td>
<td>$1,258,000,000</td>
</tr>
</tbody>
</table>

*Figure 4.12 — Total statewide need was found by multiplying miles of state highway pedestrian gaps in population centers by the average cost of sidewalk improvements per mile. Appendix C, Cost Estimation Background, provides details.*
For people riding bicycles, WSDOT identified 1,152 miles of population center gaps, which exclude highway segments prohibited to bicyclists. Excluding highways that currently provide bike lanes, leaves 1,142 miles of bicyclist gaps. Existing bike lanes may not reflect the most recent design standards, but any needed design changes would be addressed as part of maintenance and preservation of a given facility.

This plan considers bike lanes that offer various degrees of separation and protection as the primary bicyclist facility. Separated paths are also effective treatments and can support connectivity for all active transportation users, given sufficient path width. In some cases, the best solution is to partner with local agencies to find alternatives to state routes for bicyclist facilities, while still providing relatively direct access to destinations. In those cases, wayfinding signage on both systems would likely be part of the treatment.

106 WSDOT. Washington state highway segments closed to bicyclists.
The specific change that provides a safer and more complete facility depends on local plans and conditions, available right-of-way, availability of parallel lower-stress facilities, and other variables. This plan’s analysis is intended to become part of the practical solutions approach to arrive at the best treatments for the partners, budget, and other constraints in a given location.

Standard bike lanes are relatively low-cost and could be added during regular preservation activities, usually with little to no additional cost for materials. Such improvements would still require some funding, given the need for design work and community engagement that are beyond the scope of routine preservation work.

Cost estimates were based on a range of bike lane needs from standard lanes to barrier-protected or grade-separated facilities, with toolkits of treatments based on roadway characteristics. Appendix F, Cost Estimation Background, provides additional detail on the cost basis used for estimates.

<table>
<thead>
<tr>
<th>MILES OF BICYCLIST GAPS IN POPULATION CENTERS</th>
<th>AVERAGE COST PER MILE (BOTH SIDES OF ROADWAY)</th>
<th>TOTAL STATEWIDE NEED (ROUNDED)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,142</td>
<td>$499,145</td>
<td>$570,000,000</td>
</tr>
</tbody>
</table>

Figure 4.14 — Total statewide need was found by multiplying miles of state highway bicyclist gaps in population centers by the average cost of bike lane improvements per mile. Excluding intersections, the primary bicyclist linear facility is some form of designated bike lane.

Combined linear facilities need

Looking at linear facilities for pedestrians and bicyclists together, the total estimated cost is about $1,828 million ($1.828 billion). If funding were made available to address these needs, funds would be used to develop a site-specific mix of treatments for each segment based on alignment with local active transportation plans. Where possible, WSDOT and partners could utilize opportunities to leverage cost savings by combining this work with other programs and projects. In some locations it may not be necessary to provide changes on both sides, for example in a location where a sidewalk on one side of the road and adequate crossing treatments together meet pedestrian travel needs. The best solution in a given location might
include a mix of state route changes and improvements on local roadway systems to tie the
overall active transportation network together for greatest gains in safety and mobility.

**Crossing treatments**

Roadway crossing designs, where they are located, and how frequently they are provided are
key considerations for active transportation. The right crossing treatment or intersection design
and operation can help active travelers be more conspicuous to motorists and encourage safer
driving speeds and turning behaviors. Well-placed, and more frequent, crossing opportunities
courage active travelers to use the treatments provided.

*From 2010-2019, 62 percent of fatal and serious injury crashes involving pedestrians occurred when they were crossing a roadway.*

*During the same period, 55 percent of bicyclist fatal and serious injury crashes were intersection-related.*

One important crossing consideration is connecting people to other modes of transportation. As
of 2019 there are 1,733 bus. stops on state routes in population centers. People of all ages and
abilities need to be able to cross the highway safely to reach transit stops and other
destinations.
Figure 2.15 — Typical ramp intersection with a local roadway system. In general, ramp intersections are associated with roadway characteristics that produce a high level of traffic stress. In this scenario, pedestrians are provided with sidewalks and marked crosswalks, however those features are not always present. Even with such features, additional crossing enhancements may be needed where traffic volumes and speeds are high. Note in this scenario there are no bike lanes present and the turn radii onto and off of the ramps allows drivers to maintain a high rate of speed as they merge, creating a difficult situation for bicyclists.
Intersection & Highway Ramp Gaps: Population Center Opportunities

Signalized intersections: Traffic signals control the intersection and crossing opportunity and are likely to have more use than nearby unsignalized crossings. Available data do not indicate whether intersection designs and signals are optimized for pedestrian or bicyclist crossings or require pushing a call button to trigger the WALK signal.

Unsignalized intersection: No traffic signal. All intersections in Washington are legal crossings for pedestrians and bicyclists whether or not they have a marked crosswalk or signal (RCW 46.61.235). More recently, curb ramps have been added to crossings which reinforce the pedestrian’s right to cross, even though these intersections may not offer other crossing improvements.

Ramp junctions: Where a highway on-ramp or off-ramp meets another state highway or a local street or road.

Through the network analysis and level of traffic stress ratings 7,564 intersections in population centers were identified as gaps for active travel on state routes. (The highway crossing analysis...
based on route directness described in Chapter 3 is new information and was not factored into this plan’s calculations.)

Of the 7,564 intersections, 1,323 were identified as highway ramps. A single ramp is associated with more than one point of intersection, including where limited-access highways connect to a ramp and where the ramp connects to another roadway. In characterizing intersection needs for active travelers, WSDOT made the decision to exclude those intersections where ramps merge with limited access highways (the gore area) and most ramp-ramp intersections (discussed in Appendix D, Methods of Analysis). Such locations are generally only legally open to bicycle riders and the limited data available suggests riders are avoiding these crossings. In addition, while some treatments have been proposed such as orienting the bicyclist perpendicular to the ramp before they cross, no research-backed solution to address the crash potential for bicyclists crossing ramp gore areas was identified. Bicyclists do have the option to exit each off-ramp and reenter the route at the corresponding on-ramp, though extra effort and time is required for this maneuver. While other crossing types have associated toolkits of treatments that can serve as the basis for identifying need and estimating costs; these complex scenarios will require more analysis to identify the range of treatments and costs and site-specific evaluation of potential alternative routes.107

With support from FHWA, in 2018 WSDOT developed an action plan for pedestrian safety at crossings. It describes types of countermeasures appropriate to roadway and traffic characteristics and provided a basis for information included in cost estimates for this category of need.108


6,241 non-ramp intersections were identified within population centers. Intersection cost estimates were made for each gap with a toolkit of treatments based on roadway characteristics (details in Appendix XX).

<table>
<thead>
<tr>
<th>NUMBER OF NON-RAMP INTERSECTION GAPS</th>
<th>Average Cost Per Intersection</th>
<th>TOTAL STATEWIDE NEED (ROUNDED)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6,241</td>
<td>$229,054</td>
<td>$1,430,000,000</td>
</tr>
<tr>
<td>Number of Ramp Gaps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,323</td>
<td>$124,807</td>
<td>$165,000,000</td>
</tr>
<tr>
<td>Total Intersection Gaps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7,564</td>
<td>$210,820</td>
<td>$1,595,000,000</td>
</tr>
</tbody>
</table>

Figure 4.17 — Intersection facility needs for bicyclists and pedestrians in population centers. Total statewide need was found by multiplying the numbers of state highway intersection gaps in population centers by the average cost of intersection changes (Appendix F, Cost Estimation Background, provides details).

Mapping intersection needs: When intersection needs are mapped statewide, patterns emerge that can facilitate future prioritization discussions. While all identified intersection gaps are LTS 3 or 4 in terms of roadway characteristics, each intersection was assessed across a number of safety, equity, and demand criteria. Appendix D, Methods of Analysis, provides maps comparing the results of evaluation on each of these sets of criteria.

Overall, it appears that evaluation based on equity criteria places appropriate emphasis on larger population centers (where the potential to address safety and demand is high), without overlooking the many places where people with transportation (and other) disadvantages are located throughout the state.

High-speed rural segment gaps

Regardless of the lack of facilities, some people who walk or bicycle for transportation will need to travel along high-speed rural state routes, while others such as bike tourists often choose certain high-speed rural routes that offer relatively lower traffic volumes. Shoulders serve
multiple needs for the traveling public, most of which benefit motorists, but bicyclists are permitted on all sections of highway that do not restrict their access and WSDOT’s Design Manual reflects shoulder use by bicyclists.
Key questions for WSDOT and partners to consider in evaluating high-speed state routes and alternatives on local roads:

- Is this a designated U.S. Bicycle Route or part of a regional bike plan?
- In terms of active travel, who are the users of the route?
- Is the route the only facility that addresses the travel need?
- Which roadways have characteristics that do more to serve the safety and comfort of active transportation users?

Figure 4.18 outlines safety considerations for shoulder use by active travelers. Discussion of future analysis required to identify high-speed rural segments in need of treatments appears in Appendix D, Methods of Analysis. The opportunity outlined under Statewide Bikeways and Trails Network, below, would address need in some locations.
Figure 4.18 — Considerations for understanding shoulder use for active transportation in two high-speed, rural highway contexts. On the left is a low volume road with no shoulders where drivers need to adjust their position to provide space for active travelers. The low volume context reduces an active traveler’s exposure to noise, vehicle emissions and opportunity for conflict, but when a conflict does occur the space available for roadway users to manage it is low. On the right is a high-volume road with shoulder space. Here noise and emissions reduce the opportunity for active travelers to have a healthy and appealing trip. The shoulders provide space for managing potential conflict; however, the number of vehicles increases the opportunity for conflict.
Local comprehensive plans, trail plans, and active transportation plans need to address these questions to develop preferred local network connections. To address the needs of active transportation users, particular effort needs to be made to engage people without access to a vehicle and to align WSDOT plans with local and regional active transportation network plans. A decision tree to support evaluation of the need for active travel facilities versus shoulders on high-speed routes is presented in Figure 4.19.

Figure 4.19 — Decision tree regarding the types of active transportation facilities that might be considered with respect to different trip purposes on high-speed rural facilities. Reading left to right, two travel need types are considered, touring/recreation and access to destinations. The top branch of the tree (yellow) considers touring/recreation and it is divided into state route facilities only and a branch where state and local routes are available. Considering where the state route is the only facility available, the next consideration is potential use. Where potential use of the state route is high, separated facilities should be considered. Where potential use is low, shoulders may be the most appropriate facility. Where both state and local facilities are available consideration should be made for which facility is lower volume and/or more scenic. In both cases, shoulders could be a solution but investment focused on where the active traveler is more likely to be found will contribute more to network completeness and utility. Considering the access to destinations branch (green) similar considerations can be made regarding which facility to focus on; however, the preferred solution is separated facilities rather than shoulders because facilities that access destinations, such as in population centers, need to serve all users.
Most of the more than 3,200 state-owned bridges in Washington state were constructed primarily to serve motor vehicle drivers and therefore present challenges for active transportation use. Sidewalks, when present, may only exist on one side of the road and/or they may be too narrow to accommodate people using assistive devices such as wheelchairs or mobility scooters. Bike lanes are uncommon on many bridges and shoulders may be narrow to nonexistent as well. Bridge structures present pinch points in the system, where active travelers have no exit in the event a driver encroaches on the shoulder if one is present. In some cases, the only option is to share a lane with those driving fast-moving motor vehicles.

Bridges have a lifespan of 70+ years. A bridge constructed without adequate pedestrian and bicyclist facilities affects more than two human generations of use.

WSDOT staff examined bridges in population centers and on rural highways for this analysis. Costs were not generated for the high-speed rural highway context or for locations prohibited to pedestrians or bicyclists. Similar to linear gaps, multiple considerations affect which bridges would be addressed first (Appendix D, Methods of Analysis, discusses high-speed rural segment gaps).

The WSDOT Design Manual calls for a four-foot minimum shoulder width, with wider shoulders where guardrail or barriers affect the usable space. Where conditions will not allow for that space, speed management strategies (see above) would reduce the Level of Traffic Stress and provide more time for drivers to see and respond to the presence of active transportation users.

Out of the 3,269 bridges on WSDOT state routes that span 20 feet or more, 680 are associated with pedestrian and/or bicyclist linear gaps in population centers. WSDOT considered retrofits and separated structures in arriving at the basis for a cost estimate (details in Appendix F, Cost Estimation Background).
Figure 4.20 — Bridge retrofit and/or improvement need. Total statewide need was found by multiplying the feet of bridge needing improvement by the estimated cost associated with building a separated pedestrian/bicyclist bridge, as the average cost of retrofits to add active transportation facilities to various types of existing bridge structures was higher than the average cost of a separated bridge. Where the added facility would serve both bicyclists and pedestrians the assumed width was 14 feet. 10 feet was used as the width when only a single mode was identified as lacking facilities.

Opportunity: Washington bikeways and trails network

As described in Chapter 3, Washington has 864 miles of designated USBRS and 2,340 miles of planned USBRS for a total of 3,204 miles. The state also has more than 1,600 miles of trails, including regional “super trails” that carry commuter traffic as well as bike travelers.

Connecting regional trail systems

In coordination with the Recreation and Conservation Office and their data sources, WSDOT identified over 1,600 miles of shared-use paths and other separated pedestrian/bicyclist facilities that can serve a transportation function around the state. These existing trails represent decades.
of investments and are a $1.7 billion asset. To leverage these existing assets this section provides an estimate of costs to connect trails to each other and/or to other designated active travel routes such as the U.S. Bicycle Route System.

The statewide bikeways network conceptual plan links existing and planned trail segments and U.S. Bicycle Route designations. This utilizes the definition of “trail” or “path” in RCW 47.30.055, which includes highway shoulders for bicyclist use. This plan and future updates serve as a comprehensive plan for trails to meet the purposes of that statute.

The concept provides estimates for multi-use trail facilities that are paved and available for all ages and user abilities.

The cost for multi-use trails varies depending on a number of factors, including availability of right of way, the presence of critical areas, and crossings. The agency used an average standard cost estimate for 85 percent of trail needs and a high cost estimate for the remaining 15 percent where urban areas or proximity to wetlands would make trail construction more expensive.

For around the average cost of one urban freeway interchange per biennium, Washington state could have a statewide trail network in a couple of decades, leveraging the estimated $1.7 billion value of past trail investments.

109 Value of existing mileage calculated at average cost per mile on the same basis used for network completion estimate. Appendix F, Cost Estimation Background, provides details.

110 Pedestrian and Bicycle Information Center: Costs for Pedestrian and Bicyclist Infrastructure. This estimate used “Multi-Use Trail – Paved” category.

<table>
<thead>
<tr>
<th>Locally Proposed Trail Mileage</th>
<th>Cost Per Mile</th>
<th>Statewide Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>819</td>
<td>$1,052,000</td>
<td>$862,000,000</td>
</tr>
<tr>
<td>Existing, But Primitive Trail Mileage</td>
<td>Cost Per Mile</td>
<td>Statewide Estimate</td>
</tr>
<tr>
<td>464</td>
<td>$1,052,000</td>
<td>$488,000,000</td>
</tr>
<tr>
<td>Statewide Connector Trail Mileage</td>
<td>Cost Per Mile</td>
<td>Statewide Estimate</td>
</tr>
<tr>
<td>1,209</td>
<td>$1,052,000</td>
<td>$1,270,000,000</td>
</tr>
<tr>
<td>Total Trail Mileage</td>
<td>Cost Per Mile</td>
<td>Total Statewide Trail Estimate</td>
</tr>
<tr>
<td>2,492</td>
<td>$1,052,000</td>
<td>$2,620,000,000</td>
</tr>
</tbody>
</table>

Figure 4.21 — Total statewide route cost estimate was found by multiplying planned and conceptual miles of paved multi-use trail by an estimated cost per mile. The estimated cost of $1.052 million per mile included a high estimate for 15 percent of the trail mileage and standard estimate for the remaining 85 percent. 112

Wayfinding and signage

Wayfinding signage and pavement markings indicate preferred routes and distances to destinations. In addition, their use can provide a low-cost interim solution while longer-term infrastructure changes are made on more direct network linkages where indicated. Signage placement can also alert drivers to the likely presence of active transportation users.

WSDOT does not have a complete inventory of or dedicated budget for signage specific to wayfinding for active transportation users. Examples of signage needs specific to active transportation include locations where a local trail offers an alternate route; locations where it would be prudent to advise bike travelers they are approaching a narrow bridge or tunnel that Sound, $201.32M in Vancouver, $199.97M in Spokane. These figures have not been adjusted for inflation and site-specific variables affect the cost of any given mile of trail or highway.  

112 Pedestrian and Bicycle Information Center: Costs for Pedestrian and Bicyclist Infrastructure. This estimate used “Multi-Use Trail – Paved” category.
lacks a shoulder; and bridges in population centers that do not have a sidewalk or other appropriate ADA-accessible pedestrian space or an alternate route.

Figure 4.23 — SR 101 along Lake Crescent where shoulders are not available and logging truck activity is relatively high. The posted speed on this section of highway has been reduced to 35 mph due to roadway space constraints. User-activated warning beacons are provided for bicyclists to alert drivers to their presence on the route, however the button may not be accessible to all users. The flashing signal will remain on for 1 hour, which is long enough for a person pedaling at 12 mph pass through the area.
In addition to general applicability in any bicyclist and pedestrian improvement strategy, a specific need has been identified to implement signage and wayfinding for the United States Bicycle Route System (USBRS) in Washington state. The mapping effort to create a USBR designation identifies the best available route through an area, and providing signage is similar to a local jurisdiction putting up bike route signage. Wayfinding signage would identify these formally designated routes on the state system and highlight biking connections between the state system and local active transportation networks. This parallels highway signage for drivers, with indication of business loops and exits to local roads and destinations.

The USBR 10 Wayfinding Pilot Project under way in Skagit County in 2020 serves as the basis for estimates of the cost to purchase and install wayfinding signage.
Figure 4.24 — Image of a dynamic warning system on State Route 150 along Lake Chelan. The system will alert drivers to the presence of bicyclists ahead. A flashing beacon is activated automatically when a bicyclist passes the detector. “Dismount to push button” signs do not comply with ADA requirements. 113

### Designated USBRS Route Mileage

<table>
<thead>
<tr>
<th>Designated USBRS Route Mileage</th>
<th>Cost Per Mile</th>
<th>Existing Statewide Route Need (rounded)</th>
</tr>
</thead>
<tbody>
<tr>
<td>864</td>
<td>$1,400</td>
<td>$1,210,000</td>
</tr>
<tr>
<td>Planned USBRS Route Mileage</td>
<td>Cost Per Mile</td>
<td>Planned Statewide Route Need (rounded)</td>
</tr>
<tr>
<td>2,340</td>
<td>$1,400</td>
<td>$3,280,000</td>
</tr>
<tr>
<td>Total USBRS Mileage</td>
<td>Cost Per Mile</td>
<td>Total Statewide Route Need (rounded)</td>
</tr>
<tr>
<td>3,204</td>
<td>$1,400</td>
<td>$4,490,000</td>
</tr>
</tbody>
</table>

**Figure 4.25 — United States Bicycle Route System (USBRS) wayfinding signage program. Total statewide route need was found by multiplying existing and planned miles of USBRS by the estimated cost per mile to place signage in both directions, similar to placement of highway route signage.**

### Addressing local needs

In an effort to address active transportation needs on local systems, the needs assessment incorporates local and regional plans by reference. Appendix E, Usage Counts, provides an inventory of these plans, noting when they were last updated. Not all jurisdictions have a plan updated within the past five years; some jurisdictions do not have any specific active transportation network plan. In future as more jurisdictions conduct planning with local engagement, aligning WSDOT activities with local and regional efforts will streamline future updates to the local needs assessment element of this plan.

As a reasonable cost approximation, this plan includes projected level of need as indicated by applications to the Safe Routes to School and Pedestrian/Bicyclist Program grants administered by WSDOT. This approach underestimates total need by an unknown factor. Local jurisdictions have indicated to WSDOT that they do not always apply to these grant programs because they are highly competitive, with around 20 percent of applications receiving funding in the past two rounds. In the 2021-23 call for projects, 85 cities applied out of 281 incorporated municipalities; 15 of 39 counties; and four of 29 federally recognized tribal governments.

These projects that do get identified through this mechanism are not necessarily associated with a plan aimed at providing a complete network; that varies by jurisdiction. It is likely that other
needs exist beyond those identified through grant applications. A report on city transportation funding needs prepared for the Joint Transportation Committee identified topics that parallel the findings in this plan. That report presented broad categories of need such as preservation, deferred maintenance, and capital investment, and did not provide a cost estimate specific to active transportation elements of local systems.\(^{114}\)

> "Many opportunities exist to connect levels of government and jurisdictional boundaries to achieve more efficient and effective use of resources.... Partner to develop a highly connected, safe, and accessible nonmotorized system.... funding efforts should collaborate to accelerate development of an integrated network of nonmotorized facilities."\(^{115}\) —Assessment of City Transportation Funding Needs prepared for the Joint Transportation Committee

The Pedestrian and Bicycle Program (PBP) and Safe Routes to School (SRTS) program provide funding for active transportation projects to local agencies, schools, tribes, Office of Superintendent of Public Instruction, WSDOT region offices, and eligible nonprofit organizations. The improvements developed through this funding are associated with reductions in serious injuries and fatalities where they have been constructed.\(^{116}\)

In 2005 when the programs launched, jurisdictions submitted a total of 125 project applications asking for $31,229,810. Less than a quarter of the requested funding ($7,019,536) was allocated and a third (40) of those projects were ultimately funded. Since that time the number of


\(^{115}\) Berk Consulting. June 2019. [Assessment of City Transportation Funding Needs](#).

\(^{116}\) WSDOT compares crash data from three years before and after a project is constructed to evaluate effects on safety.
applications has risen, and the funding requests have increased sharply as project costs have
gone up.

Parent drop-off and pick-up is responsible for an estimated 10-30 percent of morning/afternoon congestion, so projects that help students walk or bike address congestion at the same time.  

Available funding has grown more slowly than the requests. For the 2019-21 biennium, jurisdictions submitted 255 applications requesting a total of $187,394,435—a new highwater mark in the amount requested. 22 percent of requested funding ($41,766,723) was made available in that cycle, and about 21 percent of the projects (53) were funded. For the 2021-23 biennium jurisdictions submitted 232 applications requesting a total of $190 million, the highest amount requested to date.

WSDOT anticipates growing need based on the project backlog, the increasing level of requests in each successive biennium, projected population increases, and future plan updates by jurisdictions that have not applied in the past.

**Local Network Program or Project Category**

| Local projects funded through active transportation grant programs | $200 million |

Figure 4.26 — Ongoing needs identified as local priorities. Presented as amount per biennium based on continuing increases in applications to Safe Routes to School and Pedestrian/Bicycle Program grant calls for projects, based on a backlog of 985 projects requesting $552,917,487 identified and not funded in past cycles and the amount requested for the 2021-23 biennium of $190 million.

MAINTENANCE AND OPERATING SUPPORT NEEDS

Active transportation use is evolving and expanding. Incorporating new understanding from the tools developed in this plan and other sources will require capacity beyond what is currently available within WSDOT. Local jurisdictions turn to WSDOT for information, guidance, and training specific to the Washington context. The needs described below respond to capacity constraints in engineering support as well as regular maintenance.

Maintenance

To serve as good stewards of the public’s facilities and to comply fully with the Americans with Disabilities Act, active transportation assets must be stewarded similar to other assets owned and managed by WSDOT. Maintenance needs for active transportation include repair of physical facilities, pavement markings and signage, sweeping, snow/ice and debris removal, and environmental factors such as vegetation and weather-related changes.

Broken pavement, potholes, upheaved trail surfaces, and snow and ice can contribute to falling and loss of control for the person walking or biking. A 2012 survey by the National Highway Traffic Safety Administration found that 24 percent of pedestrian respondents reported being injured as a result of tripping on an uneven sidewalk. The Washington state Appeals Court issued a ruling that bicycling is defined as “ordinary travel” and jurisdictions have a responsibility to maintain streets for bicycling to the same standards that apply for other traffic.

Facility maintenance also has mobility implications. Debris and vegetation growth can limit usable sidewalk, multi-use path, bicycle lane, and road shoulder spaces. Where line of sight is


reduced, the active transportation user may avoid a particular crossing if they do not feel drivers
can see them. This outcome reduces a road user’s mobility and accessibility to a given location.
Where WSDOT provides maintenance of active transportation facilities it does so out of existing
budgets, which the agency deems insufficient for maintenance of all assets for all modes.

<table>
<thead>
<tr>
<th>OPERATING/SUPPORT PROGRAM OR PROJECT CATEGORY</th>
<th>PER BIENNium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance</td>
<td>$32.65 million</td>
</tr>
<tr>
<td>Engineering support, data analysis and tools</td>
<td>$1.04 million</td>
</tr>
</tbody>
</table>

*Figure 4.27 — Maintenance needs for active transportation facilities. Other estimates are based on 2021-23 labor pricing and current estimated costs for items such as data acquisition.*

**Decision analysis tool**

This plan utilized new tools for data analysis that assign a Level of Traffic Stress to state routes.
High-stress locations (gaps) were associated with different contexts and with safety, equity and
demand data to better inform decision-making. Data tools were also developed that help the
agency determine the availability of highway crossing opportunities and whether people who
walk and bike can make reasonably direct trips to reach destinations near where they live.

Work is under way to integrate these new tools into existing analytical frameworks and business
practices of the agency. From a high-level perspective, WSDOT’s operational model has three
primary phases: planning, scoping, and project development. All of these phases are under the
umbrella of the Practical Solutions process, where stakeholders at each stage help the agency
achieve its goal of delivering the right project, at the right time, in the right place.

Planning, scoping, and project delivery are separated in time and operate at different scales with
a number of associated processes and procedures. Consideration of active transportation data
during scoping is particularly important given that budget decisions are generally made at this
phase. The analysis techniques used in this plan are designed to provide active transportation
data needs that can be considered at each phase and applied to current as well as future
activities. They will provide information about the effects of projects on network connectivity,
safety, mobility, and Level of Traffic Stress.
In addition to initial integration of active transportation data into the agency’s decision-making framework, the tools will need to be maintained as new data becomes available through efficient and timely data stewardship. New data would include new corridor plans, completed projects, a more complete inventory of existing assets such as sidewalks, new local agency plans and priorities, and even new research that might suggest needed adjustments to tool criteria. Data integration and ongoing stewardship will enable WSDOT to incorporate the multiple elements described in this chapter into programs and projects for the most cost-effective practical solutions approach.

**Pedestrian and bicyclist count data collection and analysis**

As discussed in Chapter 2, many decisions in the transportation system are based on traffic counts of motor vehicles, yet WSDOT and other jurisdictions have incomplete data concerning the millions of miles traveled each year walking or biking. At present, WSDOT has a limited number of permanent bicyclist/pedestrian counters and a short-duration manual count program. While useful for observing usage of specific trails and facilities, these counting resources are not sufficient to capture population center demand or provide the data needed to determine crash exposure rates the same way it is calculated for motorists.

Data obtained from the various collection tools can inform planning, design, operations and maintenance; help to track change over time; and measure increases and decreases in crash exposure to support systemic safety prioritization. Estimates for this category include purchase, installation and maintenance of permanent counters; purchase of crowd-sourced bicyclist and/or pedestrian data; and funding for a short duration/manual count program and data stewardship activities.

**Accessibility and asset management data**

Understanding existing active transportation assets, including ADA facilities, is critical to ongoing network analysis, performance measurement, prioritization, and cost-effective project development and program management. Active transportation and ADA asset data maintained by WSDOT is incomplete.
New tools and software will require evaluation and subsequent training and implementation if adopted. In addition to a data collection program, the data must be managed and stewarded so that it will be available for use in the decision analysis tool discussed above.

**Innovation and adaptation**

From new connected technologies to new types of small wheeled devices, the transportation world is adapting to rapid change. Design and operational practices for moving people in motor vehicles are well developed and continue to show innovation. For active transportation, many of the tools are relatively new, and neither WSDOT nor the agency’s local partners are fully prepared to evaluate or incorporate innovations that can affect safety, mobility, accessibility and equity.

New techniques and technologies will need to be evaluated for their direct and indirect effects. Examples include new sensor technologies for use in traffic signals, vehicle automation interaction with pedestrians and bicyclists, safety implications of personal delivery devices on sidewalks, and sidewalk width relative to newer power wheelchair designs, among many emerging issues. Technical guidance and training for WSDOT and its partners is essential to leverage the right opportunities and avoid or mitigate the implications of others that hold problems as well as promise.

This need focuses on innovation and new mobility with particular attention to the safety and mobility of the most vulnerable road users. Funding would support work in three key areas. The first is the need to identify opportunities and processes to incorporate active transportation elements effectively and efficiently in programs and projects. The second is the ongoing work of writing and revision of standards, guides, and other materials as well as dissemination of that information to partners through statewide training. The third need is to provide internal and external project development support for design and operational alternatives, supporting capacity development among WSDOT staff and partners as they apply the new tools and insights this plan provides.
Chapter 5: Conclusion

The process of developing the Washington state Active Transportation Plan, 2020 and Beyond, drew on a wide-ranging body of research, best practices, and the engagement of partner jurisdictions and Washingtonians. The results provide a starting point for understanding the current state of the statewide active transportation system. The plan’s findings rely on the best available data for state facilities; they do not highlight every element of need for every jurisdiction. Going forward, the lessons learned in this process point to future steps in drafting Part 2 of the plan itself and in working with communities and decision makers to build on and implement the plan.

Notable concepts

This plan incorporates a number of concepts that are not yet addressed across the full spectrum of WSDOT policies, practices, and procedures. These include:

- Network connectivity across jurisdiction boundaries
- Focus on population centers
- Level of traffic stress as a metric
- Travel need and latent demand as justification for facilities development, not usage counts alone
- The importance of route directness and crossing availability
- Application of equity factors in evaluation and future prioritization

An action plan for implementation will help accelerate adoption and application of these concepts and associated findings. Over time applying these concepts will point to additional facets that require further development for implementation.

Guidelines and resources

Understanding and applying the concepts identified in the plan will require updates to guidance documents and ongoing workforce development. WSDOT resources often serve as authoritative references for local and regional jurisdictions, making them critical tools in dissemination and adoption of best practices.
Data

At a number of points along the way, lack of data limited the ability to arrive at a full understanding of active transportation topics, needs, and facilities. The process of developing and testing the new network analysis approach applied in the plan provided information for WSDOT about needed changes to data collection and management. As the agency makes these improvements, it will be able to update the baseline evaluation and provide a clearer picture of conditions on state routes.

During the plan’s development WSDOT received an FHWA grant for around $60,000 from the State Transportation Innovation Committee to begin building on the initial GIS analysis. The implementation steps to be developed once this draft plan is complete will point to more work to be done on this; the grant funds a beginning, not all the work that lies ahead.

Local and regional planning and development

Development of a statewide plan requires a macro-level approach to summarize issues and needs broadly. The analysis in this plan points to travel needs on road segments and crossings in population centers; it does not prescribe how WSDOT and partners would meet those needs. Incorporation of the level of traffic stress approach will require further evaluation to understand these sites within the context of local and regional plans and priorities, and WSDOT’s existing processes for corridor studies and project development will provide additional site-specific information needed to prioritize changes and identify specific treatments. Alignment and integration of plans across jurisdictional levels represents ongoing work for WSDOT and its partner agencies as they collaborate on corridor and planning studies, capital projects, and programmed activities in maintenance, preservation, and operations.

Active transportation in the future: The integrated transportation system of the future provides safe, welcoming, and connected networks that invite and enable everyone to walk and roll where they need to go.
Meeting the needs of Washingtonians

The residents of Washington described their current and desired use of active transportation through questionnaire responses, participation in live and online discussions, and other channels. They do not define their travel needs by jurisdictional boundaries—they just want reasonably safe, complete connections when they are trying to get somewhere. They highlighted gaps and barriers that reinforce the factors that come up in research and state crash data. More robust data collection on transportation use, opportunities, and disadvantages would further focus the priorities for all jurisdictions.

Future updates

This plan focuses on facilities needs because active transportation is not at the advanced stage of development that facilities for driving have arrived at. This plan would read very differently if these statements were all true:

- A complete, accurate, and current inventory of active transportation assets is available for every jurisdiction.
- All jurisdictions have a plan with the goal of completing the networks for walking and rolling and making them safe and comfortable.
- All jurisdictions have aligned these plans and agree on priorities.
- All jurisdictions have compared their timelines for completion and have identified opportunities to combine efforts at a given location.
- Funding to continue planning and then project development to meet these needs is available and can be programmed based on these shared priorities and timing opportunities.
- Maintenance and operations activities have the same coordinated approach in place.
- Updates to the statewide plan can describe progress toward these shared goals.

This plan’s performance metrics take the stage of development into account. So, for example, one of the metrics to be described in Part 2 is how many jurisdictions have a current plan. When plans are in place it will be possible to move toward that alignment of priorities, timing, and opportunities described as an ideal future state.
Beyond this draft plan’s examination of facilities, other topics in active transportation such as education and encouragement will be addressed in future updates.

**PART 2 OF THE PLAN**

While the public reviews this draft of Part 1, WSDOT staff will develop Part 2. That will describe policy topics relevant to the plan’s analysis and implementation and propose performance metrics associated with statutory and reporting requirements and with the plan’s goals, which will serve as the closing points for this draft of Part 1:

- **Networks**: Connect comfortable and efficient walking and rolling networks so people can reach their destinations and other forms of transportation and have everyday access to physical activity.
- **Safety**: Eliminate deaths and serious injuries of people walking and rolling.
- **Opportunity**: Eliminate disparities in access to safe, healthy, active transportation connections for people and communities most dependent on walking, bicycling, and transit.
- **Participation**: Increase the percentage of everyday short trips made by walking or bicycling.
- **Partnership**: Collaborate and coordinate with local, regional, state, tribal, and federal partners to complete and improve the network across boundaries.

*Let us move forward together now, compass in hand.*
Figure 5.1 — Illustration of the Active Transportation Plan goals that result in complete, comfortable connections for all: Networks, Partnerships, Safety, Opportunity, Participation
Appendices

Appendices are being finalized and will be available upon request.

APPENDIX A: ACKNOWLEDGEMENTS

- List of stakeholder steering committee members, writing team, consultants and reviewers.

APPENDIX B: GUIDING THEMES

- Discussion of themes that came out consistently through research, outreach, and analysis.

APPENDIX C: OUTREACH AND ENGAGEMENT

- Details of outreach including events and communication channels used.

APPENDIX D: METHODS OF ANALYSIS

- Network analysis methodology.
- Supplementary analysis.
- Project gaps.
- Destination-based demand analysis.
- Evaluation criteria detail: Maps showing distribution of crossing needs when the three categories of evaluation criteria are applied.
- Highway crossing analysis.

APPENDIX E: USAGE COUNTS

- Map/list of permanent counter locations.
- Map/list of 2018 manual short-duration count locations.
- Local counts survey detail/results.
APPENDIX F: COST ESTIMATION BACKGROUND

- Facility types.
- Sources for costs used.
- Parameters for calculations (how we constrained or defined number of miles or crossings).
- Assumptions.
- List/map of bridges identified as gap locations.

APPENDIX G: PLANNING AND REPORTING

- Matrix showing interrelationships between this plan and other state plans and required performance reporting.

APPENDIX H: REFERENCES CITED