

4 Regional Connections

Having safe connections is one of the most important aspects to encouraging people to walk and bike. Complete streets alone do not make complete networks. Transportation planning can be narrowly focused on auto traffic solutions and do not address gaps in bicycle and pedestrian networks. Local communities should consider the accessibility and networks of the bicycle and pedestrian system along with planning for other transportation solutions. Planning for complete networks is the first step toward assessing the appropriate treatment for local communities.

The third goal of the active transportation plan is to contribute to the creation and completion of an active transportation network that connects regional centers, improves access to transit and is accessible to people of all ages and abilities. The PSRC will work with the BPAC to raise awareness and continue to foster collaboration to support the development of regional networks and educate regional partners by providing resources and continuing to foster regional collaboration.

4.1 Safe Routes to Schools

What is Safe Routes to School?

Safe Routes to School (SRTS) programs are designed to enhance the opportunity for more children to walk and bike to school safely. They use a variety of education, engineering and enforcement strategies that help make routes safer and entice more children to walk and bike. SRTS programs have grown popular in recent years with the increasing emphasis on:

- benefits children receive from increased physical activity
- growing congestion issues around schools
- the increasing cost to operate school buses

Implementing SRTS is consistent with the region's transportation goals. **Transportation 2040** states that children, in particular, have a need for safe ways to walk and bike. Walking and biking to school can yield significant health benefits and reduce transportation costs for families and school districts.

There are many creative ways of implementing SRTS programs. In addition to improving the sidewalks, bike facilities and crossings, these are some examples of SRTS activities:

- **Walking School Bus** – A group of children walking to school, usually with one or more adults, picking up students along the way
- **Bicycle Train** – Similar to a Walking School Bus but on bicycles
- **Walk to School Celebrations and other events** throughout the school year
- **Pedestrian and Bicycle Safety Education Classes** – training sessions for adult volunteers, teachers and students
- **Walking field trips around school campuses** – appropriate learning stations around the school



- **Safe Routes Mapping** – walk and bike route maps using a community engagement process.
- **Drop-off and Pick-up Zone Improvements** - morning and afternoon car count, observation and a report quantifying walking hazards and troublesome driving patterns with tools for schools to follow up on recommendations and measure progress.
- **Social Marketing Plan** - identify strengths, weaknesses, opportunities and threats associated with walking to school and conduct focus groups with parents and staff.
- **Walking Audit** - A walking audit involves training for parents, school officials and students on walking safety and to identify safest walking routes to school.

School districts can take innovative steps to get kids excited about walking and bicycling. For instance, the Mountlake Terrace Elementary school purchased 42 new bikes to support their bicycle education program. These bikes stay at school and allow the school to expand bicycle education to every elementary school in the district. The bikes were purchased through a [Safe Routes to Schools](#)⁷⁵ grant, which was obtained through a partnership between the City of Mountlake Terrace, Cascade Bicycle Club and the Edmonds School District. The grant also paid for a new sidewalk, two bike trailers, a free bike helmet for every child at Mountlake Terrace Elementary, a weekly Wheels Club, a Bike Rodeo in May, and an inspiring school assembly with mountain biker Ryan Leech.



Funding Safe Routes to School Programs

There are many interesting ways schools can incorporate activities that promote bicycling and walking. Many of the examples noted above can be implemented at a low cost without a formal Safe Routes to Schools program. However, schools often have success implementing their SRTS programs when taking a more comprehensive approach.

Safe Routes to School is a Washington State and [Federal Highway Administration](#)⁷⁶ (FHWA) funded program which was created to enable and encourage children to walk and bicycle to school safely as a more appealing transportation alternative, thereby encouraging a healthy and active lifestyle from an early age. Washington's SRTS program, administered by the Washington State Department of Transportation, has awarded projects that serve approximately 230 schools statewide, making walking and biking conditions safer for about 100,000 children. Since its inception in 2005, the number of

⁷⁵ Washington State Department of Transportation (n.d.). *Safe Route to School Program*. Retrieved from <http://www.wsdot.wa.gov/LocalPrograms/SafeRoutes/default.htm>

⁷⁶ U.S. Department of Transportation. Federal Highway Administration (n.d.). *Safe Routes to School*. Retrieved from http://www.fhwa.dot.gov/environment/safe_routes_to_school/

children biking and walking has increased by approximately 20%. However, the need is much greater. Approximately \$50 million has been awarded, but requests exceeded \$195 million.

SRTS Resources

The [National Center for Safe Routes to School](#)⁷⁷ has developed an online resource developed by the Pedestrian and Bicycle Information Center (PBIC) in collaboration with SRTS experts from around the country and support from the National Highway Traffic Safety Administration (NHTSA), Federal Highway Administration (FHWA), Centers for Disease Control and Prevention (CDC) and Institute of Transportation Engineers (ITE). This [Safe Routes to Schools Guide](#)⁷⁸ includes a wealth of resources for communities planning their own SRTS programs.



The [Washington State Department of Transportation \(WSDOT\) Safe Routes to Schools](#)⁷⁹ provides no-cost technical assistance to past, current and future funding recipients, applicants and interested communities. It helps fund cost effective projects within two miles of primary and middle schools (K-8) to provide children a safe, healthy alternative to riding the bus or being driven to school. Technical services include assistance developing walk route plans as a way of helping schools and communities identify safe walking routes and locations that need improvements. WSDOT collaborates with the Office of the Superintendent of Public Instruction and Washington Bikes to implement the SRTS Bike and Pedestrian Safety Education Program. The program provides curriculum and materials for physical education classes about bicycle and pedestrian safety for students in grades 6- 8 across the state.



[SafeRoutes WA.org](#)⁸⁰ has a wealth of resources including Safe Routes to School information for multiple stakeholders and a bike and pedestrian safety curriculum for teachers. The

website is managed cooperatively by Feet First and Washington Bikes, and was initially funded by a grant from the Washington State Department of Transportation.

⁷⁷ National Center for Safe Routes to School (n.d.). *National Center for Safe Routes to School*. Retrieved from <http://www.saferoutesinfo.org/>

⁷⁸ National Center for Safe Routes to School (n.d.). *SRTS Guide: Introduction to Safe Routes to School: the Health, Safety and Transportation Nexus*. Retrieved from <http://guide.saferoutesinfo.org/introduction/index.cfm>

⁷⁹ Washington State Department of Transportation (n.d.). *Safe Route to School Program for Washington State*. Retrieved from <http://www.wsdot.wa.gov/localprograms/saferoutes/>

⁸⁰ Safe Routes to School WA (n.d.). *Safety Education Curriculum and Resources*. Retrieved from <http://www.saferouteswa.org/schools-safety-education-curriculum-and-resources.aspx>

There are also several local non-profit organizations that assist schools with youth programming and SRTS programs:



[Feet First](#)⁸¹ is a Seattle-based non-profit organization that specializes in SRTS education and encouragement programs, grant services, materials development and policy advancement.

Feet First provides assistance for anything from one-day walk-to-school campaigns to comprehensive, multi-year plans to establish SRTS programs in communities. They provide training on best practices, as well as technical assistance to enrich new and existing programs, many of which are noted below. Feet First manages the Safe Routes to School Action Network, a coalition of grass-roots stakeholders working in communities around the State of Washington.



The [Cascade Bicycle Club](#)⁸² also provides bicycle education and safety training regionally for Safe Routes to Schools programs and events, including the “Basics of Bicycling” skills education curriculum taught in many local schools, an after school urban bicycling club and bike rodeo community events.



[Washington Bikes](#)⁸³ is the statewide nonprofit focused on bike advocacy, education and outreach. They support communities, schools, and bicycle organizations in improving the riding conditions around schools and encouraging more students to ride to or from school. Washington Bikes provides trainings and technical assistance

to school districts for the [Bike and Pedestrian Safety Education Program](#)⁸⁴, bike to school encouragement activities, best practices with policies and programs, and assessments of bicycle infrastructure.



Bike Works⁸⁵ builds sustainable communities by educating youth and promoting bicycling. Their youth programs offer an innovative combination of education, bicycle repair and ownership, outdoor activities, and community service.

⁸¹ Feet First (n.d.). *Feet First*. Retrieved from <http://www.feetfirst.org/>

⁸² Cascade Bicycle Club (n.d.). *Cascade Bicycle Club*. Retrieved from <http://www.cascade.org/>

⁸³ Washington Bikes (n.d.). *Growing Bicycling Statewide*. Retrieved from <http://wabikes.org/>

⁸⁴ Washington Bikes (n.d.). *Bike and Pedestrian Safety Education*. Retrieved from <http://wabikes.org/growing-bicycling/srts/safety-education/>

⁸⁵ Welcome to Bike Works | Bike Works. (n.d.). Retrieved from <http://bikeworks.org/>

Additional Resources

[Safe Routes to Schools WA - Curriculum](#)

[Walk Bike Schools](#)

[Bike and Pedestrian Safety Education Program Evaluation Report](#) (January 2013)

[Washington State Department of Transportation – Safe Routes to School Flier](#) (January 2013)

[Center for Safe Routes to School in Washington State](#)

[Safe Routes to School National Partnership](#)

[National Center for Safe Routes to School](#)

[Walk Bike to School](#) (additional resources from the National Center for Safe Routes to School)

4.2 Safe Routes to Transit

Active transportation includes people taking transit because most people walk or bike to a transit stop or center. Transportation 2040 states that well-designed, strategically located bicycle and pedestrian facilities also provide increased and safer access to transit for more people. However, access to and from transit locations can be a challenge for potential transit riders because many destinations are located beyond practical walking distances from fixed route transit, and few safe walkable and bikable routes may exist, or they may be intermittent. This access deficiency between transit locations and final destinations is often referred to as the “last mile.”



The Federal Transit Authority (FTA) recognizes the importance of walking and biking to transit:

The success of public transportation can often be limited by poor “first and last mile” access to the system. Further, safe walking and bicycling access can be important inducements to using public transportation. Thus, it is essential to develop safe, secure, and appropriate pedestrian and bicycle infrastructure if the users of public transportation are to have safe, convenient and practical access routes to, as well as appropriate amenities to enhance the utility of, public transportation systems across the country.

[Federal Transit Authority](#)⁸⁶

⁸⁶ U.S. Department of Transportation. Federal Transit Administration (2011, August 19). *Final Policy Statement on the Eligibility of Pedestrian and Bicycle Improvements Under Federal Transit Law*. Retrieved from <https://www.federalregister.gov/articles/2011/08/19/2011-21273/final-policy-statement-on-the-eligibility-of-pedestrian-and-bicycle-improvements-under-federal>



FTA has clarified pedestrian and bicycle infrastructure eligibility for FTA funds to include all pedestrian improvements located within one-half mile and all bicycle improvements located within three miles of a public transportation stop as a *de facto* physical and functional relationship to public transportation and therefore eligible for FTA funds. Transit agencies are encouraged to utilize these funds and work with

local jurisdictions to complete bicycle and pedestrian networks that lead to transit locations.

SOUND TRANSIT'S COMMITMENT
The Sound Transit Board of Directors is committed to incorporating bicycles into Sound Transit's infrastructure and services. Bicycle policies provide the framework for the agency to plan and implement bicycle projects.

Ensuring safe walking and bicycling connections to transit has additional benefit for people who have special transportation needs. **Removing barriers for people with special needs to access fixed route transit** alleviates pressure on dial-a-ride van services and other special transportation services while providing increased transportation options for people with limited mobility.

Part of removing barriers to transit also includes **amenities at transit locations** that benefit pedestrians and bicyclists such as safe and well-lit waiting areas, pedestrian friendly aesthetics, bike lockers, rest rooms and bike racks on buses. These amenities are important for removing barriers for potential transit riders and to ensure the safety of existing transit riders as they traverse the "last mile" to their destination.



Regional Coordination

The Puget Sound Regional Council together with regional partners are developing a **Transit Supportive Planning Toolkit** as a resource for communities to plan to support transit. This tool will be available on the PSRC website and includes active transportation as a tool to support transit.

A primary element of this toolkit is to provide multimodal access to transit. The strategies outlined in this toolkit are:

- Promote facilities that connect riders to transit, such as crossing facilities, wayfinding signs, continuous sidewalks, shared use paths, bike lanes, protected bicycle lanes and bicycle parking.
- Adopt Complete Street policies to integrate the needs of pedestrians, bicyclists, motorists, and riders of public transit into transportation planning.
- Encourage clear, formalized, and interconnected streets and small blocks to make destinations visible and easier to access.
- Expand the sidewalk network in areas where it is incomplete or non-existent and can provide a linkage to a transit corridor.
- Prioritize multi-modal improvement projects and include them in the six-year Transportation Improvement Plan (TIP).

- Design park-and-ride facilities to meet the needs of all users, including pedestrians, bicyclists, and motorists.

The [Growing Transit Communities Partnership](#)⁸⁷ (GTC Partnership) was formed in 2011 as a regional coalition of governments, non-profit organizations, business groups, and community stakeholders for the purpose of promoting the successful development of thriving and equitable communities within walking distance of current and planned public transportation services in the central Puget Sound region. The partnership was funded by a three-year grant from the federal Partnership for Sustainable Communities and is housed at the Puget Sound Regional Council.

“Transit communities” are generally the areas within a half-mile radius of, or approximately ten-minute walking distance from, high-capacity transit stations such as light rail, bus rapid transit, streetcar, and other major transit hubs. Adopted regional policy recognizes that accommodating growth in transit communities can lead to a range of substantial social and environmental benefits, including the potential to:

- Promote health by encouraging walking and biking, cutting air pollution, and reducing motor vehicle accidents
- Lower household expenses for transportation
- Reduce municipal infrastructure costs
- Help meet the growing demand for “walkable communities”



⁸⁷ Puget Sound Regional Council (n.d.). *Growing Transit Communities*. Retrieved from <http://www.psrc.org/growth/growing-transit-communities>

4.3 Pedestrian Networks

Transportation 2040 calls for the development of local and regional pedestrian networks. Identifying networks can help direct resources to those areas with the greatest likelihood to result in increased walking. Everyone is a pedestrian at some point. The first step to creating adequate pedestrian networks is to ensure an adequate sidewalk system that connects destinations to and from where people live and work. Many vehicle trips are taken to places that are within a reasonable walking distance. There are many reasons people may choose not to walk, but a system that supports active transportation would ensure that walking is a safe and viable option.

Specifically, centers (both regional and locally designated) and transit station areas are ideal locations for investments that support and encourage more walking. Further, following the direction of VISION 2040 and encouraging compact development patterns near transit should result in places that are more walkable.



Sidewalks

Sidewalk systems that are non-existent, in disrepair or are in places not conducive to walking are the first barrier for people making a choice to go by foot. Incorporating sidewalks into roadway construction and maintenance projects is a first step to completing the sidewalk system. However, local communities should plan for complete sidewalk networks and not wait until sidewalks are built with development or other projects.

In order to plan for and prioritize the sidewalk system, cities must include sidewalks in the inventory of the transportation system, and then prioritize appropriate sidewalk investments.

Sidewalks are opportunities for social engagement as well as for taking walking trips. In small centers and rural main streets, the sidewalk becomes an integral part of community character.



Connectivity

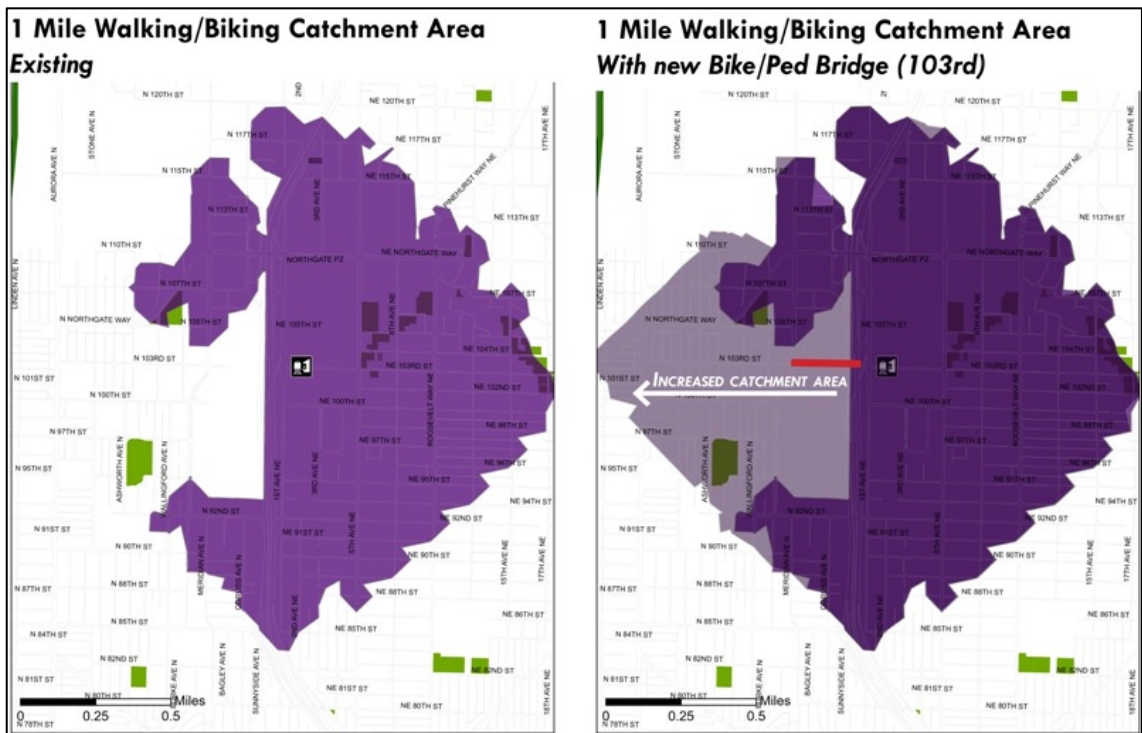
Local communities often struggle for how to prioritize transportation investments. When completing a sidewalk system, jurisdictions should **first consider the destinations** people may walk to such as local and regional centers, connections to transit and schools, and access to food and amenities. Local communities should then consider **the walking distances and existing infrastructure** from these destinations when assessing pedestrian routes. An industry standard for an average pedestrian trip is about one-half of a mile. Considering the walking distances, conditions and routes to access these destinations is the first step in developing a pedestrian network. Another very important aspect is ensuring safe crossings at bus stops and intersections and within reasonable walking distances in order to prevent dangerous jaywalking on roadways where limited crosswalks are available. Community outreach is one of the key elements to assessing pedestrian networks. Jurisdictions are encouraged to engage with community members to identify needs.

This graphic, from the City of Redmond's Transportation Plan, emphasizes how connections can be made to help shorten pedestrian travel distances.



Walkshed tool: A walkshed tool helps visualize the extent a person can comfortably walk from a specific center point. Walksheds are distinct from straight-line buffers. They take into account the pedestrian infrastructure on the ground, and can be adapted to also account for steep hills and other physical barriers. Walksheds can help identify the gaps and missing links that prevent more people from walking.

Below is an example for how a walkshed (otherwise referred to as a catchment area) can be used. This image (by the Cascade Bicycle Club) shows what a catchment area would look like with and without a proposed pedestrian and bicycle bridge over Interstate 5.



The [City of Tukwila](http://www.tukwilawa.gov/dcd/walkandroll.html)⁸⁸ used a similar method for assessing walking distances in order to prioritize investments. This map shows blue rings at one-fourth and one-half mile walking distances from priority destinations such as schools, shopping centers and employment hubs. This information overlays the existing transportation system, including sidewalks, paved shoulders, existing, and future separated shared use paths.



⁸⁸ City of Tukwila (n.d.). *Walk & Roll Program*. Retrieved from <http://www.tukwilawa.gov/dcd/walkandroll.html>

4.4 Regional Bicycle Network

Developing local bicycle networks entails a similar process as developing pedestrian networks in that assessing destinations and considering the connectivity around barriers are the first steps. Additionally, communities should consider opportunities to provide safe and comfortable connections for people of all ages and abilities where appropriate. When communities assess network connectivity, this provides an opportunity to make decisions on the appropriateness of facility type. In some cases, neighborhood greenways may provide the best solution, particularly in places where a local parallel roadway may have higher traffic speeds or may be more appropriate as a route that supports freight, for example. In other cases, a complete street option may be needed if no other routes are available. Rural areas have particular challenges due to narrow roadways, high speeds and a limited street grid. In these cases, shoulders may be the most viable option if they have adequate widths and are free of debris and rumble strips. Rumble strips are a series of raised strips along a roadway edge which alert drivers if they cross the vehicle lane. These often impede a bicyclist from using the shoulder of a roadway if there is not enough smooth shoulder edge for a cyclist to ride. In these situations, bicyclists merge into the traffic lane causing less safe conditions.

PSRC took similar steps to plan for a regional network which identifies locations that have a regional benefit and then assessed the network links that connect these locations.

The active transportation plan responds to the VISION 2040 Action (T-Action-19) which states that:

The Puget Sound Regional Council will work with member jurisdictions and others to establish a safe and efficient regional nonmotorized network that provides connections to and within centers and along corridors connecting centers.

Purpose and Need:

The purpose of the **Regional Bicycle Network** is to identify a future network of key bicycle connections between regional locations across the central Puget Sound region and to use this network as a planning tool for regional coordination and cross-jurisdictional cooperation. The goal is a future safe and comfortable network of bicycle facilities that accommodate people of all ages and abilities to access important regional destinations using active transportation.

Transportation 2040 calls for developing a regional bicycle system network and pedestrian networks oriented to designated regional centers and transit station areas, as a framework for regional and local nonmotorized transportation planning and investment

Transportation 2040, p 72

Development

PSRC staff worked with the Bicycle and Pedestrian Advisory Committee (BPAC) to develop initial criteria for the development of the Regional Bicycle Network. The criteria are guided by policies in VISION 2040 and Transportation 2040 that emphasize support for centers and connectivity to transit. Other locations of regional significance identified by the BPAC include regional transit locations, regional parks, etc.

Route criteria:

Based on Transportation 2040 guidance, provide connections to:

- regional centers
- regional transit locations

Considering regional and local priorities; provide connections to:

- high employment zones
- higher education institutions and high schools with high enrollment rates
- regional parks
- major trails in surrounding counties
- military bases



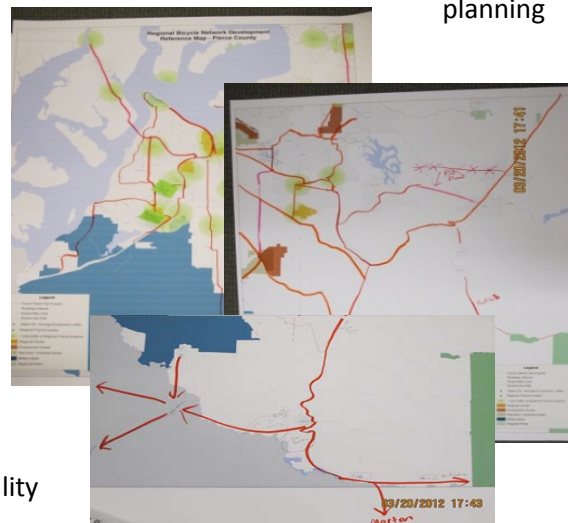
Once the criteria were finalized, PSRC staff held eight planning charrettes across the region. Planners from the cities and counties were invited, as well as representatives from the transit agencies and advocacy organizations. Stakeholders shared local plans and discussed connections between the regional locations that support local plans. PSRC staff created maps that included existing facilities, regional destinations outlined by the criteria, and additional information such as population data and other demographic information. At each county charrette, smaller area maps facilitated conversations for subareas within each county. Each group vetted existing network data, discussed connectivity across jurisdictional boundaries, and communicated current planning efforts.

Criteria emphasis on:

- Continuous and connected network
- Cross-jurisdictional links
- Connecting regional locations (transit, centers, etc.)

Facility definition comprised of:

- existing and proposed facilities
- identified gaps in the network
- recognition that this will not include every bike facility



The proposed network was then further reviewed to ensure it represented the most appropriate connections throughout the region. This entailed reviewing comprehensive plans and following up with local planners who may not have attended the charrettes. The network was then thoroughly vetted by the Bicycle and Pedestrian Advisory Committee.



Built-in Flexibility

The Regional Bicycle Network is a framework, within which local jurisdictions will develop exact route alignments and facility types. Built-in flexibility is key to successful implementation because local priorities, solutions and needs change over time.

This flexibility is demonstrated in the following ways:

Regional network routes are identified by a half-mile-wide preferred alignment (a quarter-mile “buffer” on each side of the identified route). This provides flexibility in route alignment at the local level.

- **Flexibility in rural areas** beyond the half-mile-wide preferred alignment is needed in some areas due to specific challenges in these areas. Rural areas tend to have less dense roadway networks with fewer parallel facilities that can serve as viable alternatives to the main road right-of-way for bicycle and pedestrian accommodation. In addition, roadways can pose challenges due to traffic speeds, limited right-of-way, and the width of road shoulders. However, this plan has identified some routes that are important for connecting regional destinations. In these instances, the routes are identified on the Regional Bicycle Network maps with dotted lines to indicate the buffer to accommodate local flexibility does not apply.

Facility Types on the Regional Bicycle Network

The Regional Bicycle Network is a vision for safe bicycle facilities for people of all ages and abilities to connect to regional destinations. The Bicycle and Pedestrian Advisory Committee recommends that as the regional network is built, it should meet this vision by providing safe regional networks. Therefore, it is recommended that as facilities are built to connect this network, they should be separated from motor vehicle traffic or be located on a local roadway with slow speeds. **Recommended facility types for the regional network include shared use paths, protected bicycle lanes (also known as cycle tracks), neighborhood greenways or bike lanes.**

The region does recognize that in some cases, other facility types may be required to fill a gap. It is recommended that if paved and striped shoulders or shared-lane markings (sharrows) are used, they should be used to fill a gap on the regional network only if no other reasonable option is feasible, the facility has low traffic speeds and the treatment is for a short distance (less than one-mile). Additionally, widths should be adequate for safe bicycling with no rumble strips on the shoulders of the road. Wayfinding should also be included.

More information on the adopted Bicycle Facility Typology list can be found in section 6.1 (Facility Data and Conditions) and in section 6.4 of this report.

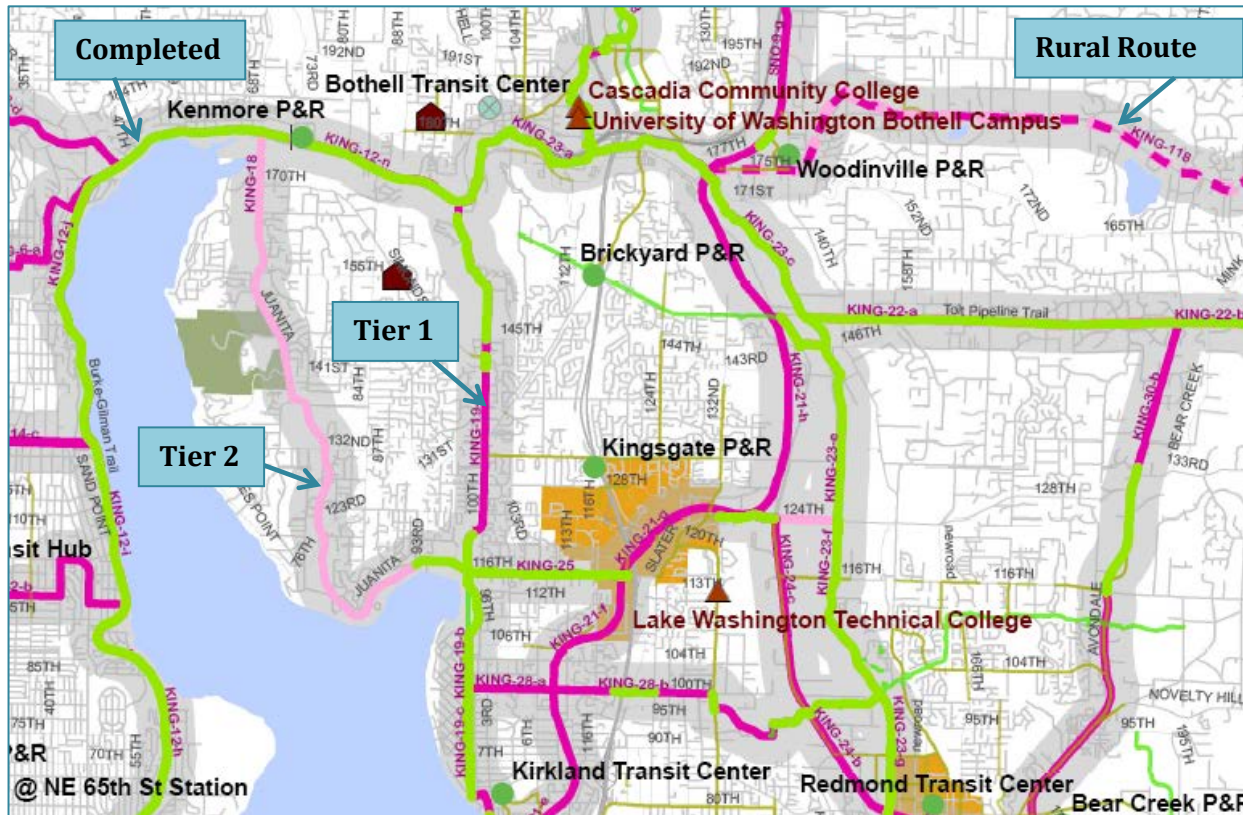
Areas with Significant Challenges

Some areas of the region face significant challenges when planning for bicycle connections. These areas are limited by significant barriers, steep slopes or industrial zones that often have little or no bicycle or pedestrian access. Port facilities are employment hubs where many of the port industries have staggered employment hours that start either very early or late in the morning so increased bicycle connections into and around port facilities will service employees that may be unable to drive or strive for the convenience of biking to work.

Other areas have even greater challenges such as in places where steep ravines, rail yards, a river or a major interstate highway can block bicycle connections. In these circumstances, jurisdictions should assess the best possible and safe route for all users. In some case, this means working with other agencies to solve these challenges. More information on overcoming physical barriers can be found in section 4.5 of this report.

Tiering the Network

PSRC has conducted additional analysis to identify the links **which most directly connect between regional locations** as well as a few locations that connect to other counties. This will help to better prioritize the regional bicycle network. Because distance is so pertinent to biking, the top tier links of the regional bike network are those connections that are the shortest path between two regional destinations.



Regional Bicycle Network Maps and Gap list

See Attachment A

4.5 Overcoming Barriers

There are many types of barriers that keep people from biking and walking. Barriers can include high traffic speeds, dangerous crossings or inaccessibility along a route. Too short a crossing time at larger intersections, or having to walk long distances with no place to rest, are other examples of environmental barriers. Circumstantial barriers exist for people with limited resources or experience, such as the inability to afford a bike or having no bike riding experience. Perception of safety is also a limiting factor when choosing to walk or bike. Safety from crime and from motor vehicles is an important factor when making transportation choices. Barriers for people of special needs, in communities underserved or with limited access, and other safety issues, are discussed in chapter 5.

This section will discuss strategies to address environmental barriers like hills and other infrastructure barriers, such as interstate freeways and large industrial areas.

Missing Links and Physical Barriers, Including Slope

Because the average bike or walk trip is relatively short, bicycle and pedestrian travel is susceptible to being readily abandoned if there are system gaps or barriers that require lengthy diversions. The presence of a river, freeway, or major arterial with no convenient crossing, or a wall or fence around a major development, tend to deter most people from biking or walking even if the distance is close “as the crow flies.” Sidewalks and bike lanes that end without warning, forcing users into busy traffic or onto shoulders undermine confidence and reduce willingness to walk or bike.

Emphasized throughout this report is the need for safe pedestrian and bicycle *networks*. When steep slopes or other significant barriers exist, transportation planners may need to evaluate the best solution for a route that will work for people while assessing how far people will traverse to avoid the barrier or whether they will choose another mode. A typical bicycle trip is about three miles and a typical walking trip is about one-half mile. A pedestrian may be more likely to jay-walk across a busy road if the nearest crossing is a significant distance away.

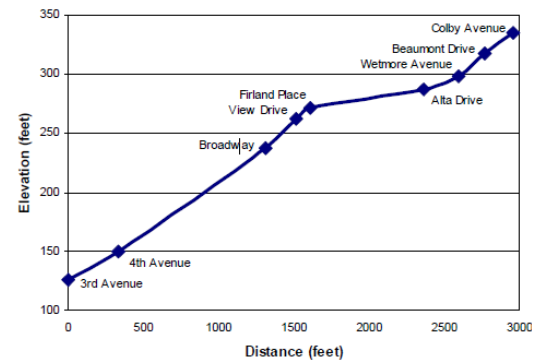


Figure 1 - Elevation profile of proposed bicycle climbing lane along 52nd St SE and Lowell Road

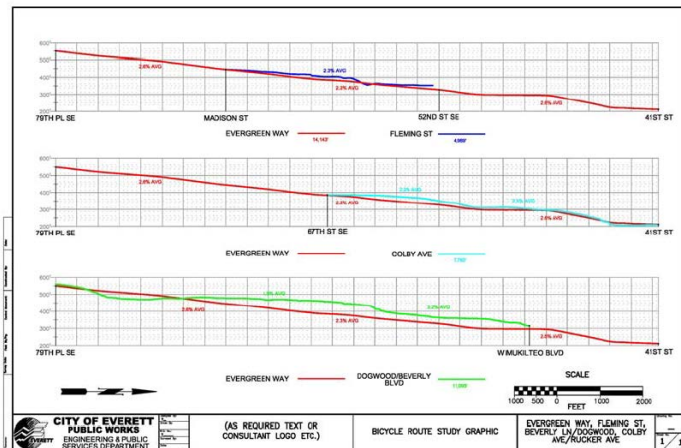
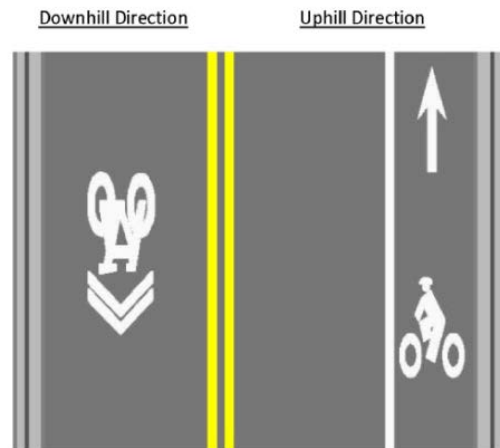


Figure 2 - Elevation profile of Evergreen Way and parallel routes

The City of Everett has some good examples in their Bicycle Master Plan for evaluating slope when considering the most appropriate bicycle routes. The hilly topography in the Puget Sound region represents challenges for cyclists, particularly in areas outside of central cities where few parallel facilities exist along major roadways, and where streets have narrow lanes. Hills can be a deterrent for new cyclists, so it is important to provide alternate routes that minimize hills to the extent feasible. A

further issue is that hills can significantly slow bicycle speeds, presenting conflicts between cars and bicycles where a bicycle facility is not provided. One alternative for cyclists is to put their bike on transit for the uphill portion of a trip. Another solution is climbing lanes where a separate bicycle lane is provided in the uphill direction on narrow roadways where separate bicycle facilities may not be feasible for both sides of the roadway.

If a hill is unavoidable, an uphill climbing lane, a bicycle passing lane and buffered bike lanes are all strategies that can help cyclists safely traverse hills at varying ability levels. These facilities also separate bicyclists from drivers therefore reducing traffic delay as bicyclists often have reduced speeds on hilly slopes.



Networks and Critical Links

Throughout this report, the need for complete and connected networks is a common theme. This network planning is critical for assessing the best routes around significant barriers. Roadways over and under interstates, bridges and access roadways across industrial zones are all locations that often end up as **convergence points** for all transportation modes due to the lack of alternative options. In these locations, all users of the transportation system should be ensured safe access as the region grows and improves the choices for all users. Some examples of areas with significant challenges are discussed in section 4.4.

The Federal Highway Administration (FHWA) calls for the design and construction of new facilities to anticipate likely future demand and not preclude the provision of future improvements. In addition, FHWA encourages transportation agencies to go beyond minimum standards to provide safe and convenient facilities for bicycling and walking.

New Innovations

Communities should continue to seek new innovations when planning for active transportation system. One way that bicyclists accommodate themselves when traversing hills is by using electric bikes. As more people seek to find solutions to bike and walk across varying topography, local communities can support these activities by considering new innovations. Electric bike charging stations is one such innovation that may be considered if a large number of people choose electric bikes. This strategy may be more important in cities and towns with greater topographical challenges.

4.6 Considering Health and Equity

Human health is affected by the health of the natural environment, the strength of the region's communities and social networks, and the way cities and transportation systems are built. Attention to health as part of planning and infrastructure decisions can improve quality of life, reduce health care costs and lessen impacts from lost productivity.

Increasingly, communities around the country are taking steps to address health issues through local, county and regional planning efforts. Health issues lend themselves to being easily connected with other community issues, such as pedestrian safety, walkable communities, and reduction in air pollution. Equity is a key factor to address when planning for improved health and well-being — ensuring that all residents of a community or region have full access to opportunities that allow them to attain their full potential.

The region is growing. For the region to move toward a sustainable and equitable future that will benefit all people, health and equity must be a strong consideration in transportation planning decisions and actions. “Access to affordable and reliable transportation [widens opportunity](#) and is essential to addressing poverty, unemployment, and other equal opportunity goals such as access to good schools and health care services. However, current transportation spending programs do not equally benefit all communities and populations.”⁸⁹

The [USC Program for Environmental and Regional Equity](#)⁹⁰ states that transportation equity refers to:

- Equitable access to quality, affordable transportation options and therefore employment, services, amenities, and cultural destinations.
- Shared distribution of the benefits (e.g., jobs) and burdens (e.g., pollution) of transportation systems and investments.

⁸⁹ The Leadership Conference (n.d.). *Transportation Equity*. Retrieved from <http://www.civilrights.org/transportation/>

⁹⁰ University of Southern California (n.d.). *USC Program for Environmental and Regional Equity*. Retrieved from <http://dornsife.usc.edu/perc>

“Research findings link the country's obesity epidemic in part to both community design and food choices. Physical inactivity is a growing health problem in the United States, contributing not only to obesity, but also to chronic disease, osteoporosis, depression, and premature death. Several studies link low-density development and travel behavior to the lack of everyday physical activities that are known to prevent certain life-shortening illnesses.” — Excerpt from VISION 2040, page 58

VISION 2040 Built Environment and Health: Goals and Policies

Goal: *The region's communities will be planned and designed to promote physical, social, and mental well-being so that all people can live healthier and more active lives.*

MPP-DP-43: *Design communities to provide an improved environment for walking and bicycling.*

MPP-DP-44: *Incorporate provisions addressing health and well-being into appropriate regional, countywide, and local planning and decision-making processes.*

MPP-DP-45: *Promote cooperation and coordination among transportation providers, local governments, and developers to ensure that joint- and mixed-use developments are designed to promote and improve physical, mental, and social health and reduce the impacts of climate change on the natural and built environments.*

MPP-DP-46: *Develop and implement design guidelines to encourage construction of healthy buildings and facilities to promote healthy people.*

- Partnership in the planning process that results in shared decision making and more equitable outcomes for disadvantaged communities while also strengthening the entire region.

Displacement by a transportation project can have significant negative impacts on community members, whether it is residents displacement by a new highway or increased real estate values. Research has shown several potential negative health outcomes, including “increases in infectious disease, chronic disease, stress, and impeded child development,” due to change in living conditions, ability to meet basic needs, or sense of stability/belonging ⁹¹(Malekafzali & Bergstrom, 2011, p.61).

A [report](#)⁹² prepared for the EPA, indicates that ethnic/racial minorities and persons of lower socioeconomic status are more likely to live near potential environmental hazards. In addition, these hazards are correlated with negative health effects. Several studies showed positive associations between proximity to waste sites and central nervous system defects in children. Residential proximity to roadways or increased exposure to traffic-related pollution were associated with increased risk of childhood leukemia in several European studies, and proximity to gas stations was also associated with an increased risk for childhood leukemia.

Access to parks (in particular, access by transit, bicycle, or foot), is important for youth and adult physical activity, especially for designated environmental justice communities, where transit-dependency is often high (U.S Department of Transportation, p.3).⁹³

Transportation projects can be responsible for increased ambient noise both during the construction phase and throughout the remainder of the project’s lifespan, due to the addition of new roadways or increased traffic. According to a report from Translink, there is mounting evidence that “cardiovascular health is harmed by exposure to traffic noise. Loud noises produced by typical traffic sounds have been shown to contribute to general irritation throughout the day, and contributing to the loss of sleep and hypertension. The effects of vibration make sound more acutely perceived and have been shown to act upon diastolic blood pressure.”⁹⁴

⁹¹ Malekafzali, S., & Bergstrom, D. (2011). *Healthy Corridor for All: A Community Health Impact Assessment of Transit-oriented Development Policy in Saint Paul, Minnesota*. Retrieved from PolicyLink website: http://www.policylink.org/atf/cf/%7B97c6d565-bb43-406d-a6d5-eca3bbf35af0%7D/HEALTHY%20CORRIDOR%20TECHNICAL%20REPORT_FINAL_20120111.PDF

⁹² Maantay, J., Chakraborty, J., & Brender, J. (2010). *Proximity to Environmental Hazards: Environmental Justice and Adverse Health Outcomes*. Retrieved from U.S. Environmental Protection Agency website: <http://www.epa.gov/ncer/events/calendar/2010/mar17/abstracts/brender.pdf>

⁹³ U.S. Department of Transportation (2012). *Metropolitan Area Transportation Planning for Healthy Communities*. Retrieved from https://www.fhwa.dot.gov/planning/health_in_transportation/resources/healthy_communities/mpohealth12122012.pdf

⁹⁴ Health & Community Design Lab: University of British Columbia, Procyk, A., Frank, L., Loon, J. V., Frank, A., Poulos, G., & Bohle, S. (2013). *Integrating Health into Transportation Planning in the Metro Vancouver Region: Context Report*. Page 22. Retrieved from http://www.translink.ca/~media/Documents/plans_and_projects/regional_transportation_strategy/Research/Transportation_and_Health.a shx

Air pollution has been linked to adverse health impacts including birth outcomes, asthma, diminished lung function, and cancer, all of which have been linked to exposure to traffic emissions⁹⁵

The demographics of our region will change dramatically during the next 25 years. On April 1, 2013, population in the central Puget Sound region reached an estimated 3,780,900 persons. Between 2012 and 2013, population grew by 38,300 people and is expected to reach 5 million by 2040. By 2040, a smaller percentage of the overall population will drive or own vehicles, making active transportation and equity critical investment priorities. Increasing health disparities and the increasing cost of health care have become serious issues for many people in the Puget Sound region. Implementing active transportation policies and programs contributes to positive health outcomes. [One study suggests](#)⁹⁶ that a 5% increase in neighborhood walkability is associated with 32.1% more minutes devoted to physically active travel and about one-quarter point lower Body Mass Index or BMI (0.228).

VISION Policy MPP-T-7
Develop a transportation system that minimizes negative impacts to human health



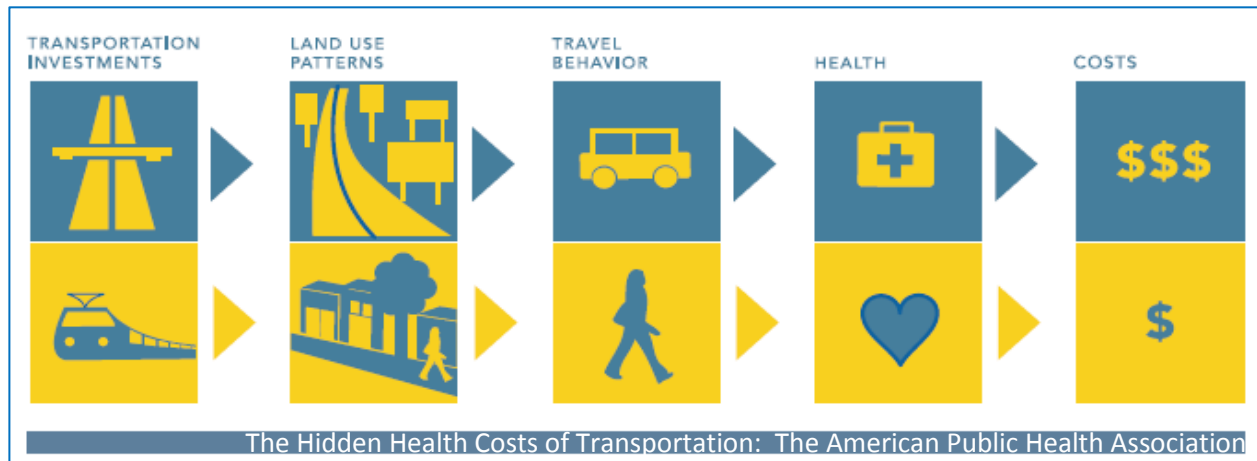
image from Policy Link that provides resources and toolkits for equitable development (resource link below)

⁹⁵ Centers for Disease Control and Prevention (2009, October 15). *Respiratory Health and Air Pollution*. Retrieved from <http://www.cdc.gov/healthypaces/healthtopics/airpollution.htm>

⁹⁶ Frank, L. D., Sallis, J. F., Conway, T. L., Chapman, J. E., Saelens, B. E., & Bachman, W. (2007). 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(1), 75-87. Retrieved from <http://www.tandfonline.com/doi/abs/10.1080/01944360608976725#.Up2Q0DnTldg>

Health and Equity When Making Investments

Most transportation planners and policy makers agree that health and transportation are connected, but health impacts (other than crash-related) are rarely included in cost-benefit analysis for transportation projects. Competition for transportation funding is fierce, making it more important than ever to effectively evaluate and prioritize bicycle and pedestrian projects based on their ability to deliver strong performance and environmental benefits.



Health impacts and costs have typically not been considered in the transportation policy, planning and funding decision-making process, and there are few standards or models for estimating health-related costs. According to the [American Public Health Association](#)⁹⁷ (APHA), investment in a “healthier transportation system is critical.” Methods for quantifying the benefits of active transportation to human health are evolving rapidly. The APHA recommends that health impacts, costs and benefits should be included in federal planning, funding practices, and decision making.

Health and Equity in State and Regional Planning

At the state policy level, [The Washington State Nutrition and Physical Activity Plan](#)⁹⁸ included a primary objective to increase the number of active community environments in Washington State. The priority recommendations from this plan include: promoting physical activity in urban planning choices, supportive zoning and land use, new transportation policy, funding to promote walking and bicycling, and enhanced safety and perceived safety of communities to improve walkability and bikeability. The region also supports these objectives.

⁹⁷ Urban Design 4 Health, Inc. (2010). *The Hidden Health Costs of Transportation*. Retrieved from American Public Health Association website: <http://www.apha.org/NR/rdonlyres/F84640FD-13CF-47EA-8267-E767A1099239/0/HiddenHealthCostsofTransportationShortFinal.pdf>

⁹⁸ Washington State Department of Health (2008). *Washington State Nutrition & Physical Activity Plan*. Retrieved from <http://depts.washington.edu/waaction/plan/>

A study by the [Washington State Department of Health and the Washington Coalition for Promoting Physical Health](#)⁹⁹ estimated costs related to physical inactivity in Washington State at \$5 billion in 2002 (primarily through lost productivity). While the lack of activity is largely determined by individual decisions, those decisions are strongly affected by the availability of opportunities for activity. VISION 2040 addresses factors such as pedestrian and bicycle networks, availability of shops and services near homes and near each other, and access to recreation opportunities.

VISION 2040 calls for planning and decision-making that support a healthy environment, increase economic prosperity and enhance social equity. It provides a regional policy framework which also addresses the relationship between the built environment, transportation, and public health, and recognizes that healthy communities have a healthy natural environment, including clean water and air, have good facilities for walking and bicycling, and are safer for all residents. The strategy calls for providing mobility choices for people with special needs, including persons with disabilities, older adults, youth, and low-income populations. Transportation 2040 also commits to ensuring that all residents of the region benefit from improved mobility, and that low-income, minority and other vulnerable populations are not adversely impacted.

The multicounty planning policies in VISION 2040 provide a framework for addressing health considerations in regional and local planning and decision-making processes. **To be consistent with requirements in the Growth Management Act, as well as with regionally adopted planning policies, cities and counties should incorporate health provisions in their local comprehensive plans.** These provisions should address improving the safety of their local transportation systems and making investment decisions that support opportunities to walk or bicycle for recreation and for transportation. Improvement programs should invest in building and upgrading sidewalks and trails to link neighborhoods with commercial districts and community facilities. Local regulations should encourage the construction of healthy buildings and promote compact, mixed-use, and walkable land use patterns.

VISION MPP-T-22: Implement transportation programs and projects in ways that prevent or minimize negative impacts to low-income, minority, and special needs populations.

⁹⁹ Washington State Department of Health, & Washington Coalition for Promoting Physical Activity (n.d.). *Physical Inactivity Costs Billions in Washington State*. Retrieved from <http://www.tpchd.org/files/library/e8fa3edf84dde6dd.pdf>

Regional Coordination

In 2005, PSRC staff worked with local jurisdictions and public health agencies to provide [guidance and recommendations](#)¹⁰⁰ regarding the link between health, growth management, economic development and transportation. This collaborative effort resulted in recommendations for how to incorporate health into planning for communities and for developing policies. In the years since, many of these recommendations are reflected in VISION 2040.

- The adopted multicounty planning policies in VISION 2040 include a category of policies on the built environment and health.
- Leadership and staff of the region’s four health agencies are actively involved in both local and regional planning efforts and have been invited to participate on a variety of transportation planning boards and committees.
- In September 2012, PSRC and the Growing Transit Communities Partnership held an ***Equity and Health in Transportation Conference*** in Tacoma to bring transportation and health practitioners together to discuss these topics. The presentations from this conference can be found on [the PSRC website](#)¹⁰¹.
- Health agencies involved in the PSRC’s Growing Transit Communities project, and with funding provided through the grant, sponsored [training on implementing NACTO Bikeways Guidelines](#)¹⁰² for transportation planners and engineers across the region.

The Puget Sound Regional Equity Network brings together community organizations and advocates for social equity as well as cities, housing authorities, counties, public health agencies, affordable housing advocates, educational institutions and development interests. As a resource, the equity network has put together [a set of principles for equitable development](#)¹⁰³ which include developing safe and healthy communities, promote broader mobility and connectivity, to achieve full accessibility.



¹⁰⁰ Puget Sound Regional Council (2004). *Issue Paper on Health: What’s Health Got to Do with Growth Management, Economic Development and Transportation?* Retrieved from <http://www.psrc.org/assets/2019/appIF1-health.pdf>

¹⁰¹ Puget Sound Regional Council (n.d.). *Equity and Health in Transportation Conference Presentations*. Retrieved from <http://www.psrc.org/growth/growing-transit-communities/public-involvement-events/equity-health-conference/>

¹⁰² Puget Sound Regional Council (n.d.). *King County MUTCD NACTO Transportation Training*. Retrieved from <http://www.psrc.org/growth/growing-transit-communities/public-involvement-events/king-county-mutcd-nacto-transportation-training/>

¹⁰³ Growing Transit Communities (2013). *Puget Sound Regional Equity Network: Principles of Equitable Development*. Retrieved from Puget Sound Regional Council website: <http://www.psrc.org/assets/8720/EquityPrinciplesFinal2012.pdf>

The Regional Equity Network and partners held a **Puget Sound Equity Summit** in November 2013. This was an action-oriented summit that brought together stakeholders across the region to discuss the following goals:

1. Identify shared issue areas and further develop key strategies to achieve healthy communities, building upon community organizing and work underway.
2. Create a structure for community, policy makers, and philanthropy to jointly identify key issues and solve problems.
3. Connect various efforts and people in the region focused on equity/equitable development and create a platform for community leadership.



Opportunity Mapping

PSRC partnered with the Kirwan Institute for the Study of Race and Ethnicity in Ohio to develop **Opportunity Maps**¹⁰⁴ building off the Institute’s work on “Communities of Opportunity” across the country (see the **King County Opportunity Maps**¹⁰⁵ from 2010). The partnership with Kirwan has enabled a thorough regional look at equity and opportunity in the Puget Sound region. “Opportunity” is a situation or condition that places individuals in a position to be more likely to succeed or excel. Opportunity maps illustrate where opportunity-rich communities exist, assess who has access to those neighborhoods, and help to understand what needs to be remedied in opportunity-poor neighborhoods.

These thematic maps show U.S. Census Tracts (2010 geography) shaded by level of access to opportunity (“levels of opportunity”: very low, low, moderate, high, and very high) as defined by a series of 20 indicators that represent five major categories of opportunity: education, economic health, housing and neighborhood quality, transportation/mobility, and health and environment.

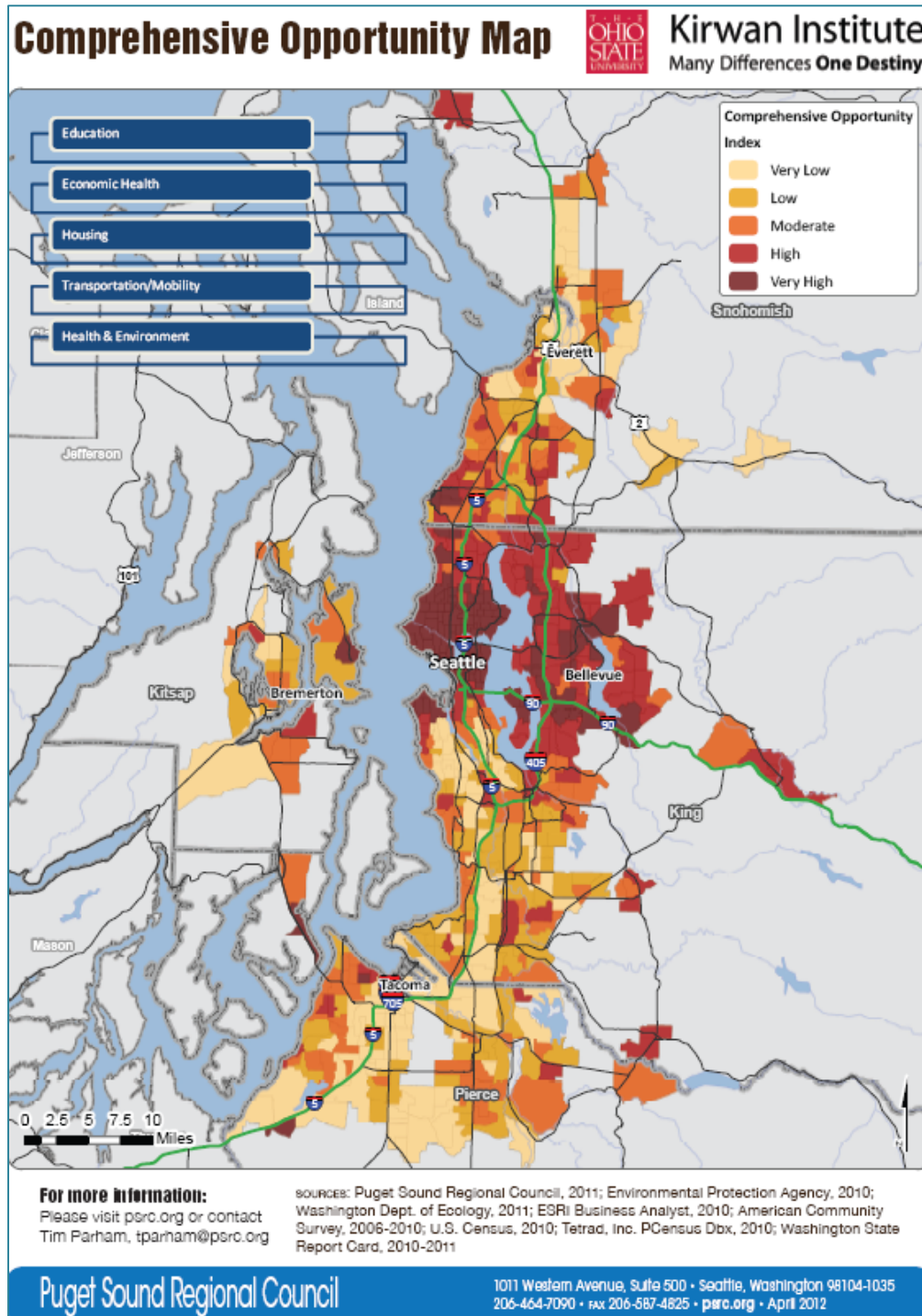
Education	Economic Health	Housing and Neighborhood Quality	Mobility and Transportation	Health and Environment
<ul style="list-style-type: none"> • math test scores • reading test scores • student poverty • teacher qualification • graduation rates 	<ul style="list-style-type: none"> • access to living wage jobs • job growth trends, 2000–2010 • unemployment rate 	<ul style="list-style-type: none"> • vacancy rate • foreclosure rate • high cost loan rate • housing stock condition • crime index 	<ul style="list-style-type: none"> • cost per commute • proximity to express bus stops • average transit fare • percent of commuters who walk 	<ul style="list-style-type: none"> • distance to nearest park or open space • proximity to toxic waste release • percent of area that is within a food desert

¹⁰⁴ Growing Transit Communities, & Kirwan Institute (n.d.). *Equity, Opportunity, and Sustainability in the central Puget Sound region*. Retrieved from Puget Sound Regional Council website: <http://www.psrc.org/assets/7831/EquOppSusReport2.pdf>

¹⁰⁵ Reece, J., Gambhir, S., Ratchford, C., Martin, M., Olinger, J., Powell, J. A., & Grant-Thomas, A. (2010). *The Geography of Opportunity: Mapping to Promote Equitable Community Development and Fair Housing in King County, WA*. Retrieved from The Ohio State University Kirwan Institute for the Study of Race and Ethnicity website: http://www.psrc.org/assets/6894/king_county_wa_opportunity_mapping_apr_2010.pdf

These opportunity maps are available as a resource and can be used in the following ways:

- Assess project connectivity that provides access for people from a low-opportunity area to a high-opportunity area
- Encourage affordable housing in areas of high opportunity
- Guide investment in areas with low opportunity



Health and Equity in Local Planning

Through the local planning process, jurisdictions can work directly to improve environmental conditions that support health equity. For example, local governments can collaborate with representatives from diverse communities to assess mobility and accessibility needs and develop solutions and opportunities that provide benefits for the entire community.

Social equity means all people can attain the resources and opportunities that improve their quality of life and enable them to reach their full potential. Addressing the history of inequities in current systems and their on-going impacts in the region's communities is a shared responsibility. Social equity also means that those affected by poverty, communities of color, and historically marginalized communities have leadership and influence in decision-making processes, planning, and policy-making.

Strategies for incorporating health and equity into local plans	
Health	Equity
Creating a stand-alone planning strategy for health and wellness	Political structures and institutional practices that assure fairness and opportunity for all
Integrating health-related goals and policies into existing plan elements	Actual adjustments to the conditions that allow people to reach their full potential
Including health in the cost-benefit analysis for transportation projects	Services for individuals and families to treat problems

Here are some local examples for how health and equity have been incorporated into local planning within Puget Sound communities:

- [HealthScape](#)¹⁰⁶ is **King County's** effort to promote public health by improving how communities are built. This effort continues the work originating from the [2005 Land Use, Transportation, Air Quality and Health \(LUTAQH\) study](#)¹⁰⁷ and now offers a new [I-PLACE3S Health and Climate Enhancements](#)¹⁰⁸ tool which offers a web-based modeling platform for scenario planning.

¹⁰⁶ King County (n.d.). *HealthScape*. Retrieved from <http://www.kingcounty.gov/transportation/HealthScape.aspx>

¹⁰⁷ Lawrence Frank and Company, Inc. (2005). *A Study of Land Use, Transportation, Air Quality, and Health (LUTAQH) in King County, WA*. Retrieved from King County website: <http://your.kingcounty.gov/exec/news/2006/pdf/lutaqhupdated.pdf>

¹⁰⁸ Lawrence Frank and Co., Inc., The Sacramento Area Council of Governments, & Mark Bradley Associates (n.d.). *I-PLACE3S Health & Climate Enhancements and Their Application in King County*. Retrieved from King County website: <http://your.kingcounty.gov/kcdot/planning/ortp/HealthScape/I-PLACE3S-FINALREPORT%2006-01-09.pdf>

- The **City of Bellevue** has incorporated health-related objectives into broader planning goals that address multiple issues. The city has highlighted benefits for health, accessibility, and the built environment that have resulted in policy changes that support physical activity. Also, the city's zoning code now requires bicycle and pedestrian facilities and provides development incentives for active recreation areas near proposed light rail stations.
- The **City of Des Moines** adopted a [Healthy Des Moines Element](#)¹⁰⁹ into the city's comprehensive plan and wove [additional goals, policies, and strategies](#)¹¹⁰ that promote health into other plan elements, including Land Use, Transportation, and Parks, Recreation and Open Space. The city was recognized by the Centers for Disease Control and Prevention as a "health champion" for its efforts to address health inequities and to improve the well-being of the community.
- A [Health Impact Assessment \(HIA\)](#)¹¹¹ is a tool or process that uses qualitative or quantitative data to assess the public health consequences of a policy, project or program with a special focus on social equity to determine its potential effects on the health of a population. The HIA reviews the potential relationship of changes to health-promoting factors such as physical activity, safety, social connectedness, and equal access.

Resources

[American Planning Association Planning and Community Health Research Center](#)

[King County Board of Health — Planning for Healthy Communities Guidelines](#)

[Municipal Research and Services Center of Washington — Healthy Communities](#)

[Policy Link, advancing economic and social equity](#)

¹⁰⁹ City of Des Moines (2012). *City of Des Moines Comprehensive Plan: Healthy Des Moines Element*. Retrieved from <http://www.desmoinesmail.com/WebPDF/CommDev/PDF/CompPlan/Plan/12.Healthy.pdf>

¹¹⁰ Anderson, S., & Lathrop, D. (2011). *Healthy Des Moines Initiative*. Retrieved from Puget Sound Regional Council website: http://www.psrc.org/assets/6829/rfpc_101411_des_moines.pdf

¹¹¹ Roof, K., & Oleru, N. (2008). *Public Health: Seattle and King County's Push for the Built Environment*. Retrieved from Centers for Disease Control and Prevention website: http://www.cdc.gov/nceh/ehs/Docs/JEH/2008/july-aug_w_case_studies/JEH_Jul-Aug_08_Seattle.pdf

4.7 Meeting Special Needs

Alternatives to driving are becoming increasingly important for many residents of the Puget Sound region, particularly for the growing special needs populations: youth under 18, people over 65, low income individuals, and people with disabilities and varying mobility levels. When access is increased, safe networks exist and other barriers are addressed, active transportation provides for a healthy and often necessary alternative for these populations.

VISION MPP-T-25: Ensure mobility choices for people with special transportation needs, including persons with disabilities, the elderly, young, and low-income populations.

Individuals with health impairments or disabilities often have difficulty using fixed route transit systems, because of factors such as poor pedestrian accessibility or the lack of accessible design features at buses and rail stations. Maintaining clear sidewalks with adequate pavement and accessibility features that connect to fixed route transit is one way to help alleviate the pressure on dial-a-ride vans by increasing the number of people with disabilities who can access fixed route transit.

As the population ages, more people are outliving their ability to drive. One in five Americans aged 65 and above does not drive. (Transportation Facts – T2040, Aging in Place p.26). According to a surface transportation policy project [report on aging Americans](#)¹¹², more than 50% of non-drivers age 65 and older stay home on any given day partially because they lack transportation options; older non-drivers have a decreased ability to participate in the community and the economy. For these older adults, lack of transportation options means 15% fewer trips to the doctor, 59% fewer shopping or restaurant trips, and 65% fewer trips for social purposes.

Overcoming barriers to biking and walking for special needs and aging populations

Physical amenities and engineering solutions can help remove barriers to biking and walking for populations with special needs. Benches are important for people who are able to walk distances but need frequent rests. Without **resting stops**, people who require these amenities are less likely to choose an active mode of transportation.

Another barrier to walking is lack of **safe crossing times** that are too brief for a slower person to safely cross large intersections. Planning for safe crossing times, pedestrian refuge islands, and bulb-outs that reduce distances, are all strategies that address barriers to crossing



¹¹² Bailey, L. (2004). *Aging Americans: Stranded without options*. Retrieved from Surface Transportation Policy Project website: http://www.transact.org/library/reports_html/seniors/aging.pdf

busy roadways. In addition, frequent crossings and safe crossings near transit stops help to prevent jaywalking and encourage more people of all levels of mobilities to bike and walk.



Keeping **sidewalks clear of debris and signage** is another way for cities to accommodate people with disabilities. The Puget Sound region has a large population of people with visual impairments. These people use the transit system and rely on sidewalks to be clear for safe passage. The [FHWA](#)¹¹³ says that “sidewalks, shared use paths, street crossings (including over- and under-crossings), pedestrian signals, signs, street furniture, transit stops and facilities, and all connecting pathways shall be designed, constructed, operated and maintained so that all

pedestrians, including people with disabilities, can travel safely and independently. Moreover, accommodating people of all ages and abilities within the transportation system benefits everyone.

Inclement Weather

Snow removal and treatment for ice on sidewalks during inclement weather reduces potential injury and allows people to continue to walk when driving is hazardous during snowy conditions and is a pedestrian accessibility issue. In accordance with [FHWA](#)¹¹⁴ [28 CFR § 35.133](#)¹¹⁵, a public agency must maintain its walkways in an accessible condition for all pedestrians, including persons with disabilities, with only isolated or temporary interruptions in accessibility. Part of this maintenance obligation includes reasonable snow removal efforts.

The Municipal Research and Services Center of Washington has assembled several city and county policies on [sidewalk snow removal](#)¹¹⁶ as possible models for other jurisdictions.

¹¹³ U.S. Department of Transportation. Federal Highway Administration (2014, February 10). *Accommodating Bicycle and Pedestrian Travel: A Recommended Approach*. Retrieved from http://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/design_guidance/design.cfm#d4

¹¹⁴ U.S. Department of Transportation: Federal Highway Administration (2008, August 27). *Snow Removal on Sidewalks Constructed with Federal Funding Memorandum*. Retrieved from <http://www.fhwa.dot.gov/preservation/082708.cfm>

¹¹⁵ Maintenance of Accessible Features, 28 C.F.R. § 35.133 (2013).

¹¹⁶ Municipal Research and Services Center (n.d.). *Snow and Ice Removal*. Retrieved from <http://www.mrsc.org/about.aspx>

4.8 Safety Program

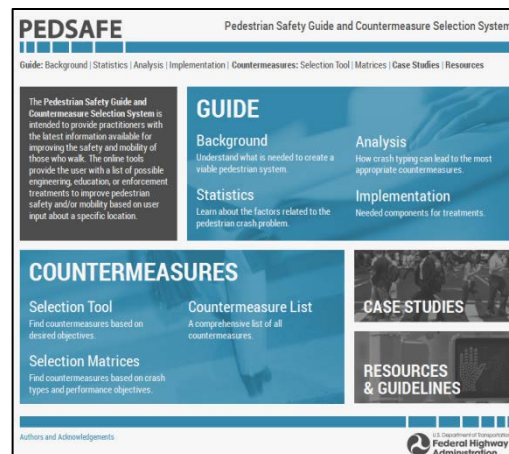
The World Health Organization has listed traffic safety as an international public health priority. The Centers for Disease Control and Prevention identifies collisions as a [leading cause of death](#)¹¹⁷ for young people. Everyone has different preferences when it comes to transportation, but there's one that all road users share—everyone is a pedestrian. Unfortunately, pedestrians were one of the few groups of road users to experience an increase in fatalities in the United States in 2011, [totaling 4,432 deaths nationwide](#)¹¹⁸. Additionally, shared roadways that blend cars and people bicycling do not adequately address the safety of all users of the roadway.

Addressing safety-related issues is a key implementation strategy when encouraging people to bike and walk. As stated elsewhere in this report, safety can mean separate facilities that keep bicycles and pedestrians away from motor vehicle traffic, safety features at crossings, and other infrastructure improvements that address the interaction between all users of the transportation system. Additionally, lighting and enforcement strategies as well as creating dense, walkable communities are other ways that jurisdictions can address safety.

State and National Safety Resources

Livable communities are a high priority of the U.S. Department of Transportation, which defines livable as having safe and convenient transportation choices to all citizens, whether by walking, bicycling, transit, or driving. The [FHWA's Office of Safety](#)¹¹⁹ has developed projects, programs and [materials](#)¹²⁰ for use in reducing pedestrian and bicyclist fatalities. These tools include how to develop a safety strategic action plan, crash facts, tools for education and outreach and much more.

Additionally, the [Pedestrian Safety Guide and Countermeasure Selection System](#)¹²¹ is intended to provide practitioners with the latest information available for improving the safety and mobility of those who walk. The online tools provide the user with a list of possible engineering, education, or



¹¹⁷ The Seattle Department of Transportation (2012). *2012 Road Safety Summit action plan*. Retrieved from <http://www.seattle.gov/besupersafe/docs/SDOT-SafetyActionPlanWEB.pdf>

¹¹⁸ National Highway Traffic Safety Administration (NHTSA) (2013). *Everyone is a Pedestrian*. Retrieved from <http://www.nhtsa.gov/nhtsa/everyoneisapedestrian/index.html>

¹¹⁹ U.S. Department of Transportation. Federal Highway Administration (n.d.). *Pedestrian & Bicycle Safety*. Retrieved from http://safety.fhwa.dot.gov/ped_bike/

¹²⁰ U.S. Department of Transportation. Federal Highway Transportation (n.d.). *Tools to Diagnose and Solve the Problem*. Retrieved from http://safety.fhwa.dot.gov/ped_bike/tools_solve/

¹²¹ University of North Carolina Highway Safety Research Center, Vanasse Hangen Brustlin, Inc., & Toole Design Group (2013, August). *Pedestrian Safety Guide and Countermeasure Selection System*. Retrieved from <http://www.pedbikesafe.org/PEDSAFE/index.cfm>

enforcement treatments to improve pedestrian safety and/or mobility based on user input about a specific location. These resources provide a wealth of information for communities planning for safety.



The National Highway Traffic Safety Commission also has tools for [bicycle safety programs](#)¹²² with a focus on research, education, and enforcement of bicyclists' and motorists' behavior to enhance roadway safety and reduce bicycle injuries and fatalities in our nation.

The [Washington State Traffic Safety Commission](#)¹²³ aims to end traffic deaths and serious injuries by 2030 as part of [Target Zero](#)¹²⁴, the Strategic Highway Safety plan for Washington State. This plan prioritizes traffic safety needs and objectives, identifies proven, effective strategies, sets timelines for decreasing traffic deaths and disabling injuries, guides government investment in traffic safety, and encourages agency partnerships that make the best use of government resources. Target Zero includes three priority levels based on collision data collected across the state. As part of the update to Target Zero, pedestrians have moved up to priority two.



Priorities set in Target Zero are based on collision data. Many bicycle and pedestrian related collisions are not recorded unless there is a serious injury or fatality. The region recommends that as future priorities are set, other factors should be included, such as vulnerable populations. When pedestrian and bicycles are involved in a crash, the likelihood of serious injury is much greater than for passengers inside motor vehicles. More information on collisions and vulnerable transportation users is included in the next section of this report.

Regional Coordination

The second goal of the active transportation plan is to improve safety and comfort of active transportation users. The PSRC will work with the BPAC to identify needs and opportunities for regional collaboration bicycle and pedestrian safety. This work has already started. On May 30, 2013, PSRC staff coordinated with the Bicycle and Pedestrian Advisory Committee to host the first **Pedestrian and Bicycle Transportation Safety Coordination Meeting**. Transportation planners, researchers, health professionals, and pedestrian and bicycle advocates met to discuss potential collaboration regarding safety issues for pedestrians and bicyclists. Some major themes discussed at this meeting were on

¹²² National Highway Traffic Safety Administration (NHTSA) (n.d.). *Bicycles*. Retrieved from <http://www.nhtsa.gov/Bicycles>

¹²³ Washington Traffic Safety Commission (2013). *Target Zero Overview*. Retrieved from <http://www.wtsc.wa.gov/target-zero/>

¹²⁴ Washington Traffic Safety Commission (2010). *Washington State's Strategic Highway Safety Plan 2010*. Retrieved from <http://targetzero.com/PDF/TargetZeroPlan.pdf>

Policy and Planning, Education and Encouragement, Infrastructure and Environment, and Data and Research.

The group shared information and discussed the primary themes listed above. Information was collected from this group from large and small group discussions as well as through individual surveys. The group was then asked if collaboration on this topic was a desired outcome of this campaign. Participants expressed great interest in ongoing collaboration. Regional staff will continue to meet quarterly to coordinate on safety topics related to active transportation.

Local Efforts to Improve Safety

After several tragic fatalities in the Seattle area, the City of Seattle launched a 2012 Road Safety Summit that brought together community members with elected officials to discuss road safety issues at several meetings across the city. The 2012 Road Safety Summit Action Plan was a result of this effort.

“Getting to where we need to go, safely, is a deeply shared objective, if not always top of mind. Serious injuries and fatalities happen in a heartbeat but have eternal effects that often come with a heavy personal burden. Because collisions are a leading cause of death for Seattle residents’ ages 5-24 years, reducing collisions is a matter of public health. And it is estimated that the vast majority of collisions are a result of human error. So, with greater individual deliberation behind the wheel, handlebars, or in the crosswalk we can keep our kids, grandparents, neighbors and friends safe.” Message from the Co-Chairs, 2012 Road Safety Summit

The solutions outlined in this action plan are as follows:

- Creating a culture of empathy
- Fewer people speeding
- Fewer people traveling while distracted
- Fewer people traveling while impaired
- More people know and follow the rules of the road
- Safer roadway design for all

The Be Super Safe campaign implements the 2012 Road Safety Summit Action Plan in a way that targets various audiences that are most in need of safety education and intervention strategies. This campaign provides safety resources for community members to make a difference locally.



On September 6, 2013, the Port of Seattle, Seattle DOT, WSDOT, BNSF Railway, Cascade Bicycle Club and other partners hosted the Bike & Truck Safety Fair. This event was to educate bicyclists and truck drivers about sharing roadways. The Port of Seattle had some freight trucks at this event and used cones and tape to demonstrate where

the blind spots are for trucks, particularly when they are turning. Bicyclists were also invited to ride inside so they can see first-hand what the trucks see when they are out on the roadway. This event was the first of its kind. The transportation departments, bicycling community and freight community will continue to collaborate on these important safety events.

This is another example of regional coordination for safety. This bus ad is from a partnership between King County Metro, Cascade Bicycle Club and Washington Bikes (formerly the Bike Alliance of Washington).

King County Metro also hosted a Transportation Safety Summit



Other Resources

[Bicycle Road Safety Audit Guidelines and Prompt Lists](#) (FHWA Safety)

[Bicycle and Pedestrian Safety and Education Program](#) (Pedestrian and Bicycle Information Center)

[Countermeasures that Work](#) (National Highway Traffic Safety Administration)

[Pedestrian Safety Manual for Decision Makers and Practitioners](#) (World Health Organization)

[Bicycle and Pedestrian Safety Transportation Overview](#) (National Conference of State Legislatures)

4.9 Collisions and Unintentional Injury

Promoting active transportation has many benefits, but concerns about the safety of walking or riding in close proximity to motor vehicle traffic keep many people from walking and bicycling. Many strategies for increasing safety are covered in this report, including increased lighting and enforcement, reducing speed limits, and providing safe, separated and complete networks.

This section will discuss traffic speeds as related to vulnerable users, considerations for sharing the roadway, collision data, and recommendations for use of collision information.

Traffic Speeds and Vulnerable Users

Data supports the reality that higher speeds [increase the probability](#)¹²⁵ of a fatal or serious injury when a person driving a vehicle collides with a pedestrian or a bicyclist. Motor vehicle traffic crashes are the leading cause of unintentional injury-related death in the United States, and pedestrians represent [13%](#)

¹²⁵ SafetyNet (2009) Pedestrians & Cyclists, retrieved from http://ec.europa.eu/transport/road_safety/specialist/knowledge/pdf/pedestrians.pdf

[of these fatalities](#)¹²⁶. Between 2008 and 2012, bike and pedestrian collisions **made up 3% of all traffic collisions, yet comprised 23% of all fatal collisions in the central Puget Sound region** (WA State collision data 2008-2012).

Vehicle speeds play a significant role when providing for safe environments. The following graphic, courtesy of the City of Seattle, shows that a small reduction in vehicle speeds has a tremendous impact on the safety of streets and on survival rates of those who may be hit by a vehicle.

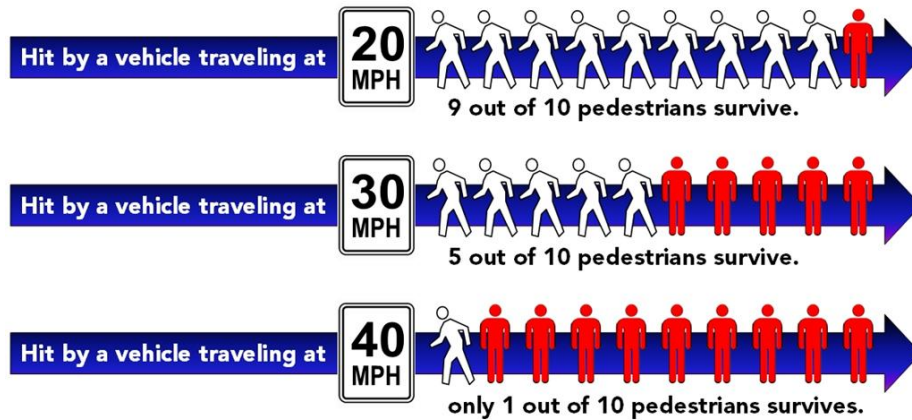


Image courtesy of the City of Seattle

Because of the high correlation between vehicle speed and the severity of injuries for vulnerable users, more efforts seek to raise awareness and enforcement for safety on the roadways. In May 2011, Governor Chris Gregoire signed the [Vulnerable User Bill](#)¹²⁷ into law which requires people who seriously injure or kill a more vulnerable road user to do more than simply mail in a traffic ticket, as was formerly often the case. The new law establishes a larger fine, revokes driving privileges, and requires community service.

The [Neighborhood Safe Streets Bill](#)¹²⁸, recently signed into law, authorizes cities and towns to set speed limits to 20 miles per hour on non-arterial streets. The bill does not provide a mandate but gives cities and towns the local flexibility to set local speed limits absent engineering and traffic studies. This change allows cities and towns to improve the safety of non-arterial streets without the longer process that formerly required additional funding and staff.

As the region evaluates safety improvements for all roadway users, it is important to focus efforts where speed may play a role in pedestrian or bicycle safety. In these locations, providing safe and separate accommodations for active transportation users, reducing speeds, and educating the public about

¹²⁶ Centers for Disease Control and Prevention (2013, April 19). *Motor Vehicle Traffic-Related Pedestrian Deaths — United States, 2001–2010*. Retrieved from <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6215a1.htm>

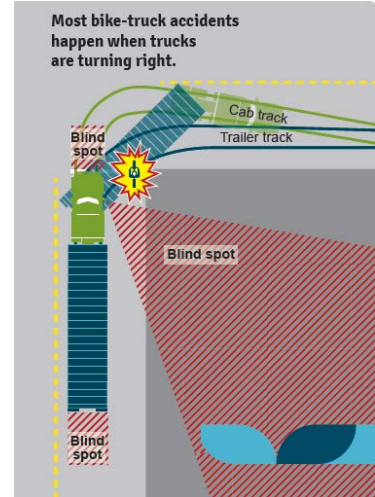
¹²⁷ Washington State Legislature (2012). *SB 5326 - 2011-12*. Retrieved from <http://apps.leg.wa.gov/billinfo/summary.aspx?bill=5326&year=2011>

¹²⁸ Washington State Legislature (2013). *HB 1045 - 2013-14*. Retrieved from <http://apps.leg.wa.gov/billinfo/summary.aspx?bill=1045&year=2013>

vulnerable users of the transportation system can all play a significant role when reducing serious injuries and fatalities on the region’s roadways.

Sharing the Roadway

Collisions can often be avoided when people who share the road understand the limitations of other users. Collaborating with people who represent all modes of transportation is an excellent way to increase mutual understanding, awareness and compassion on the region’s roadways. Section 5.2 of this report demonstrates some examples of regional coordination efforts that strive to achieve safe transportation environments for all users. Section 6.4 offers resources for engineering solutions that can provide for safer shared environments.



Collision Data

In Washington State, collision data is collected by state police departments and local police jurisdictions on state and local roadways. Collision and injury data is also obtained from hospital emergency rooms data. Between 2008 and 2012 Bike and Pedestrian collisions made up 3% of all traffic collisions, yet comprised 23% of all fatal collisions in the central Puget Sound.

Central Puget Sound Traffic Collisions: 2008-2012						
	All Collisions		Fatal Collisions		Serious Injury Collisions	
	Total	% of Total	Total	% of Total	Total	% of Total
All Modes	300,696	100%	865	100%	5,068	100%
Bike	4,253	1%	27	3%	379	7%
Pedestrian	6,065	2%	168	19%	889	18%
Bike + Pedestrian	10,318	3%	195	23%	1,268	25%

Collision data is a key component for prioritizing investments, but it should not be the only factor when making decisions. Rather, a person should not have to be severely injured or killed for investments to be prioritized. Often, motor vehicle speed and lack of safe facilities prevent people from walking or bicycling in the first place.

When utilizing collision data for decision making, other reference data should be included, such as adequate count data or other demographics. Areas with high levels of usage will often have higher levels of collisions that may appear on a collision map as ‘high accident’ locations. Accidents in these locations may not be the results of high speeds or poor design, but simply the result of high levels of vehicle traffic mixing with high levels of people bicycling or walking. Alternately, a location with less usage but with high accident rates might indicate the need for speed controls or design solutions. A [Walking Index](#)¹²⁹ is a useful tool for reference data. More on this tool can be found under the resources section in section 3.2 of this report. Usage and collision data, as well as speed, traffic volume, and facility data, can help communities evaluate priorities for local investments.

Other Resources

[Pedestrian and Bicycle Crash Types](#) – FHWA

¹²⁹ The University of British Columbia. School of Population & Public Health (n.d.). *Walkability Index*. Retrieved from <http://health-design.spph.ubc.ca/tools/walkability-index/>