seattle bicycle master plan

April 2014



SDOT

Seattle Department of Transportation

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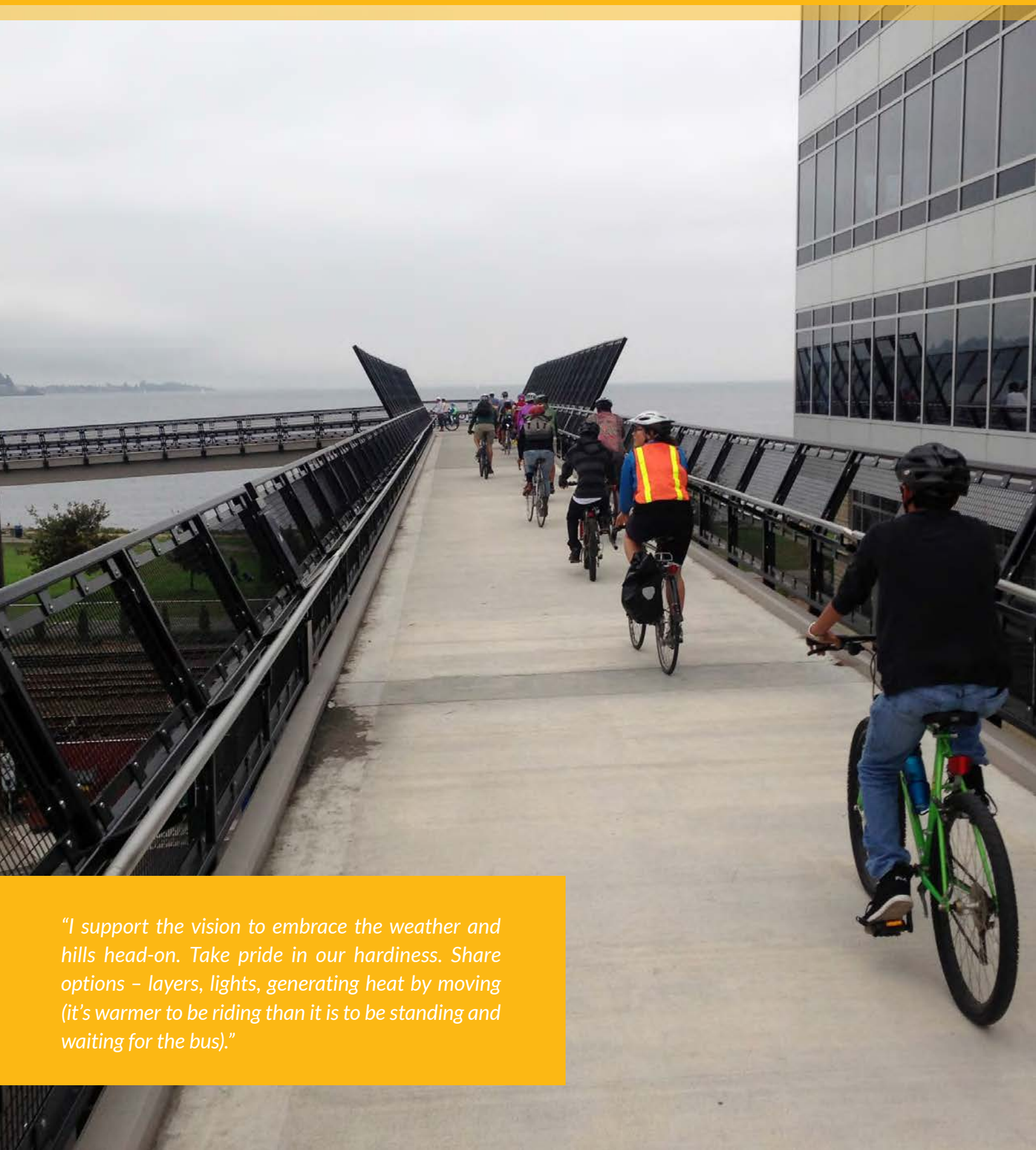
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Executive

SUMMARY



"I support the vision to embrace the weather and hills head-on. Take pride in our hardiness. Share options – layers, lights, generating heat by moving (it's warmer to be riding than it is to be standing and waiting for the bus)."

The Vision of the Seattle Bicycle Master Plan:

"Riding a bicycle is a comfortable and integral part of daily life in Seattle for people of all ages and abilities."

Introduction

A bikeable city is one where people ride bikes because it is a convenient, fun, safe and healthy choice. It is a city in which people of all ages and abilities bicycle for any trip purpose. While many people in Seattle currently ride bicycles, the 2013 Seattle Bicycle Master Plan (BMP) aspires to encourage and accommodate even more people to ride a bike. The BMP provides a blueprint to make it easier to decide to ride through a focus on:

- Enjoyable and safe places to ride – whether on a residential street, multi-use trail or cycle track (protected bicycle lane)
- Connected and well-maintained bicycle facilities that link the places people want to go – shops, schools, jobs, services, and parks, as well as to transit for access to further destinations
- A traveling public that is educated on how to safely, respectfully and predictably share the road
- Community support for bicycling, including from businesses, schools and government
- Places to securely park bicycles at destinations
- Increased access to bicycles
- People of all ages and abilities riding bicycles – young and old, beginners and confident riders
- Populations of historically underrepresented in bicycling - women, economically disadvantaged, and people of color

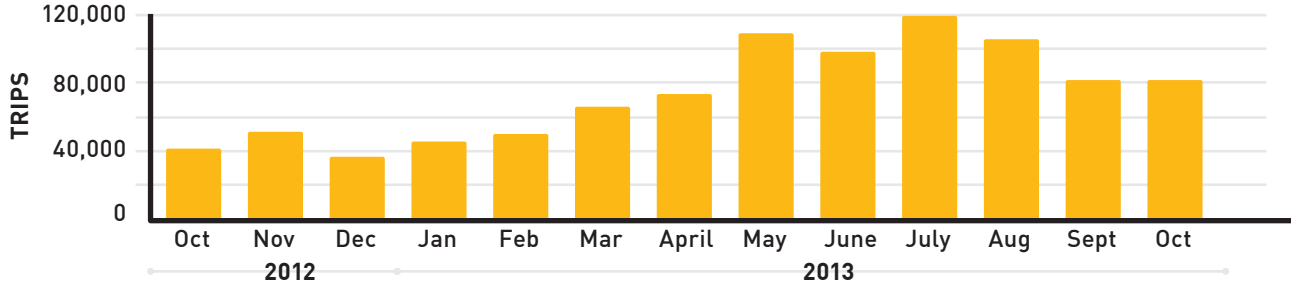
Over the next 20 years, Seattle will add 120,000 new people and 115,000 jobs within city limits. That is more growth than Seattle experienced over the last 20 years. Key to accommodating this growth will be bicycle investments and nurturing of the Seattle's bicycle culture in a manner that purposefully benefits the city's livability, affordability, public health, economic competitiveness, and natural environment. The BMP charts a path to these outcomes.

Vision

Riding a bicycle is a comfortable and integral part of daily life in Seattle for people of all ages and abilities. This is the future envisioned by the Bicycle Master Plan, and it signifies an evolution in the way Seattle accommodates people who will be riding a bicycle for any trip purpose.

There are several important themes embedded in the vision statement. First, the idea that bicycling is "comfortable" suggests it is a safe, convenient, and attractive travel option for a large number of people. "Integral to daily life in Seattle" means that bicycling is not a niche activity only for the fast and fearless riders, but is desirable for a wide variety of people and trip purposes, especially shorter trips. Finally, "all ages and abilities" is a key theme for the entire plan, meaning that the emphasis is on planning, designing and building bicycle facilities that will be used by a broad range of people throughout the city.

Bicycle Traffic Over the Fremont Bridge



Goals

The plan's bold vision is supported by five goals which articulate the plan's future achievements. The goals set the basis for the plan's performance measures and frame the prioritization criteria that help define which projects should be built first:

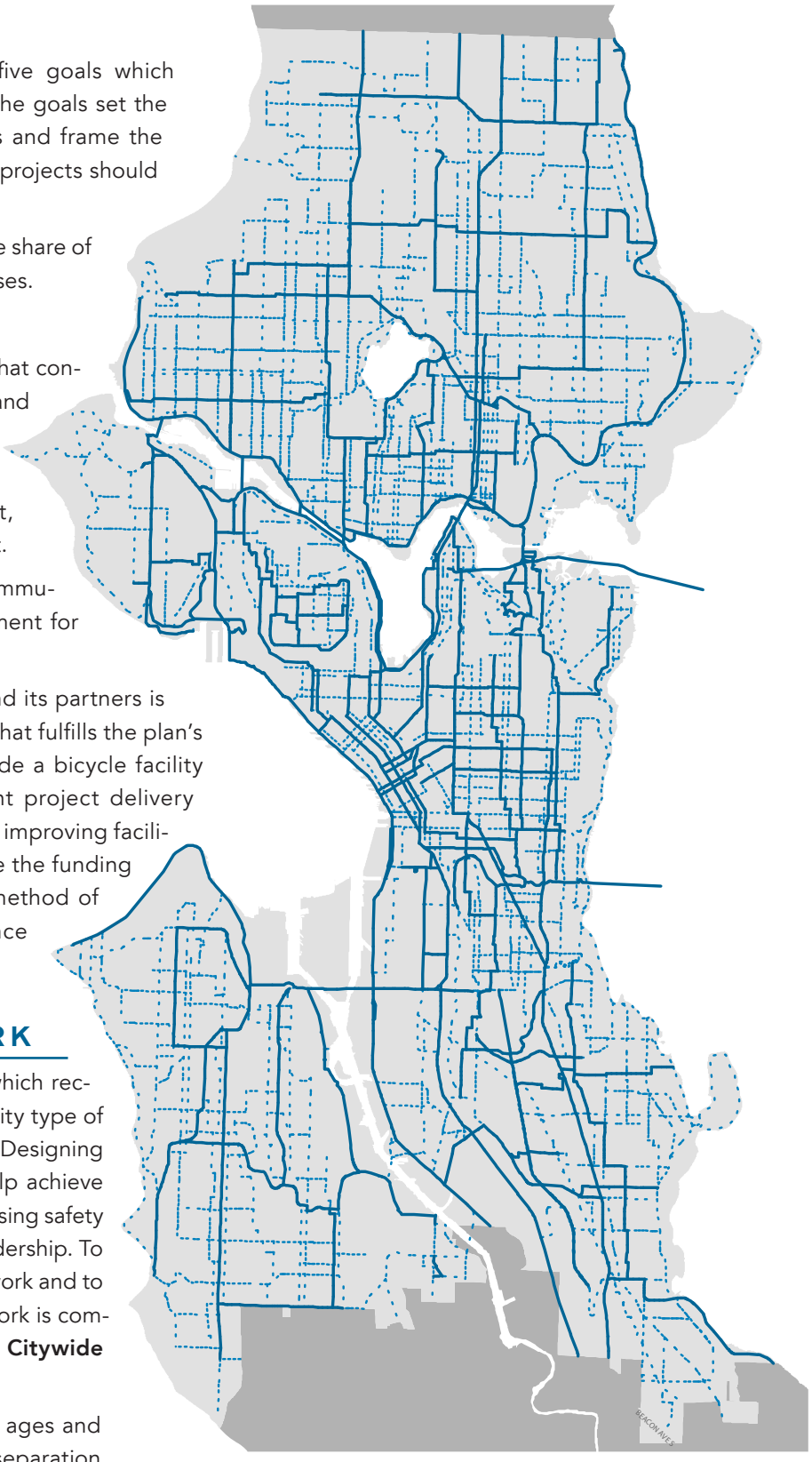
- **Ridership** Increase the amount and mode share of bicycle riding in Seattle for all trip purposes.
- **Safety** Improve safety for bicycle riders.
- **Connectivity** Create a bicycle network that connects to places that people want to go, and provides a time-efficient travel option.
- **Equity** Provide equal bicycling access for all; through public engagement, program delivery, and capital investment.
- **Livability** Build vibrant and healthy communities by creating a welcoming environment for bicycle riding.

Data-driven decision-making by the city and its partners is critical to implement the BMP in a manner that fulfills the plan's goals. Key implementation elements include a bicycle facility project prioritization process, a consistent project delivery process, clear direction for maintaining and improving facilities, an investment approach that will guide the funding strategy for plan implementation, and a method of measuring success through performance measures.

The Bicycle Network

The plan includes a bicycle network map, which recommends the appropriate location and facility type of bicycle improvements throughout the city. Designing and building this network over time will help achieve some of the major goals of the plan by increasing safety and connectivity, and therefore increasing ridership. To clearly define an "all ages and abilities" network and to increase network legibility, the bicycle network is comprised of two complementary networks: the **Citywide Network** and **Local Connectors**.

The **Citywide Network** is a network of "all ages and abilities" bicycle facilities with comfortable separation from motor vehicles and a focus on intersection safety. The network provides short distance connections to neighborhood destinations, as well as connections to



See Maps 4-3 through 4-8 for the detailed network

destinations throughout the city. People of all ages and abilities should be able to access destinations on this network, which is composed of:

- **Off-street trails** – facilities for two-way, off-street bicycle use that may also be used by pedestrians, skaters, joggers, and other non-motorized users.
- **Cycle tracks (protected bicycle lanes)** – facilities physically separated from motor vehicle traffic and distinct from the sidewalk; they may be one-way or two-way, and may be at street level or raised several inches above.
- **Neighborhood greenways** – residential streets with low motorized traffic volumes and speeds that are designated and designed to give bicycle and pedestrian safe and pleasant travel priority



Elliott Bay Trail

Local Connectors provide access to the Citywide Network, parallels the Citwide Network, and also serves destinations. While Local Connectors may use facility types suitable for all ages and abilities, some segments will be served by conventional bicycle treatments. For people who are comfortable riding a bicycle in or adjacent to traffic with no physical barrier, some Local Connectors may provide more direct routes.

The Local Connectors Network facility types include:

- Off-street trails
- Cycle tracks (protected bicycle lanes)
- Neighborhood greenways
- In-street, minor separation
- Shared streets

All totaled, the BMP identifies over 600 miles of bicycle facilities. This includes nearly 135 miles of existing facilities, 70 miles of upgrades to existing facilities and more than 400 miles of new facilities to be implemented over the next 20 years.

Bicycle Facility Upgrades

Upgrades of existing bicycle facilities are important to recognize, as bicycle facilities have evolved since the 2007 BMP. To meet the goals of this plan, some existing bicycle facilities will either be upgraded to a higher-quality bicycle facility type or decommissioned. Recommended upgrades will be included within the prioritization framework to determine when to install a higher-quality facility type.

Bicycle Facilities in the Recommended Bicycle Network (lengths in miles)

	Existing Network*	Proposed Network Improvements			Total Network	Percent of Total Network
		Upgraded to Existing Bicycle Facilities	*New Facilities*	*Total New or Upgraded Facilities to Build*		
Off Street	46.9	0	32.0	32.0	78.9	13%
Cycle Track (protected bicycle lane)	3.2	52.1	49.5	101.6	104.8	17%
Neighborhood Greenway	10.3	0	238.6	238.6	248.9	41%
In Street, Minor Separation	44.4	17.9	75.6	93.5	137.9	23%
Shared Street	30.0	0	7.8	7.8	37.8	6%
Total	**134.8**	**70.0**	**403.5**	**473.5**	**608.3**	**100%**

*Existing network totals include only existing facilities that meet the bicycle network facility designation guidelines or, in some cases, where right-of-way is limited and a higher-quality facility could not be implemented.

End-of-Trip Facilities

Part of making it easier to decide to bicycle is the reassurance that there is someplace safe, convenient, and accessible to leave the bicycle at the end of a trip. The plan outlines strategies to support development of a range of bicycle parking accommodations for short-term and long-term use, other elements like changing room/shower facilities, and fix it stations. Better aligning bicycle parking with the types of destinations, trip purpose, and length of stay at destinations is an important component of the plan.



On-street bicycle corral

Programs

Education, encouragement, enforcement, and promotional programs will help people of all ages and abilities realize the full potential of Seattle's new and proposed bicycle infrastructure. These types of programs help people know how to use our roads safely, whether traveling as a pedestrian, in a vehicle, or on a bicycle.

The programmatic strategies and actions in the plan aim to improve safety, better educate all users on the rules of the road, strengthen wayfinding, increase access to bicycling, and encourage community and economic development. Together these efforts can help make riding a bicycle in Seattle a safe, easy, and enjoyable experience for more people.



Aki Kurose Bicycle Club

Implementation Approach

How We Do Business

The City of Seattle and partner organizations must work to implement bicycle projects and programs efficiently and comprehensively. Decision making by the city to implement the BMP is supported by a set of activities that include policies, management, and processes.

Maintenance

Bicycle facility maintenance and improvements to existing bicycle facilities are critical to the success of a high-quality network.

Prioritization

Full implementation of the proposed bicycle network will take many years. This makes it important to have a process for prioritizing projects to ensure that the projects that most advance the goals of the plan are implemented in the near term. The prioritization process in the plan will fulfill the plan's goals of increased safety ridership, connectivity, equity, and livability, while simultaneously providing enough flexibility for Seattle to pursue projects based on opportunities.

Funding

Seattle's funding approach should be multi-pronged, covering investments not just in constructing bicycle facilities, but also in offering end-of-trip facilities, encouraging people to use facilities and bicycles in general, educating people about the rules of the road, maintaining bicycle facilities, and tracking the success of bicycle projects and programs.

Planning-Level Bicycle Facility Costs

Planning-level cost estimates to implement the bicycle network ranges from $390 million to $525 million. This includes upgrades to existing facilities and new facilities. The cost estimate does not include end-of-trip facility improvements, programs, maintenance, and catalyst projects.

Plan Strategies

The following strategies are needed to meet the plan's five goals and six objectives. Strategies guide the city on how to achieve progress toward realizing the goals. The plan includes actions associated with these strategies that are specific tasks and duties to pursue for plan implementation. Actions are detailed in Chapters 4 through 7 in the plan.



Fremont Bridge Bicycle Counter

Chapter Topics	Strategies
Chapter 4: The Bicycle Network • Bicycle Facility Design • Multimodal Corridors	**4.1** Implement the off-street (multi-use trail) bicycle facility network
	4.2 Implement cycle tracks (protected bicycle lanes) as part of the bicycle facility network
	4.3 Implement neighborhood greenways as part of the bicycle facility network
	4.4 Implement in street, minor separation bicycle facilities as a part of the bicycle facility network
	4.5 Implement shared street bicycle facilities as part of the bicycle facility network
	4.6 Implement catalyst projects
	4.7 Implement upgrades of existing bicycle facilities
	4.8 Install bicycle detection at traffic signals in every new bicycle facility, as well as with all street replacement projects
	4.9 Coordinate bicycle network implementation with partners
	4.10 Design all bicycle facilities to meet or exceed the latest federal, state and local guidelines
	4.11 Improve bicycle safety and access at railroad and rail transit crossings and parallel facilities
	4.12 Integrate a multimodal decision-making process, into the update of the Comprehensive Plan
	4.13 Implement citywide network bicycle facilities on or parallel to Multimodal Corridors
	4.14 Consider transit mobility improvements that minimize conflicts with people riding bicycles
	4.15 Consider freight mobility and commercial vehicle load zones that minimize conflicts with people riding bicycles
	4.16 Update the curb space allocation priorities in the Comprehensive Plan update

Chapter Topics	Strategies
Chapter 5: End-of-Trip Facilities • Bicycle Parking • Parking Inventory • Abandoned Bicycles • Transit Stations • Event Parking	**5.1** Update the Seattle Municipal Code (SMC) bicycle parking requirements
	5.2 Develop a bicycle parking implementation program
	5.3 Ensure that bicycle parking in the right-of-way is inventoried every five years and provide the data to the public
	5.4 Develop a process for abandoned bicycle removal with repurposing options
	5.5 Provide short- and long-term secure bicycle parking at high-capacity transit stations, transit hubs, and heavily-used bus stops
	5.6 Require attended bicycle parking at large/special events
Chapter 6: Programs • Bicycle Safety Program • Wayfinding and Trip Planning • Access to and Encouragement for Bicycling • Economic and Community Development	**6.1** Develop a bicycle safety program
	6.2 Improve wayfinding and trip-planning opportunities for people on bicycles
	6.3 Support improved access to bicycles and encouragement of bicycling opportunities
	6.4 Support economic and community development through bicycle related activities
Chapter 7: Implementation Approach • Bicycle Project Delivery • Implementation • Partner Roles • Maintenance • Existing Facility Improvements	**7.1** Develop procedures and processes for bicycle project delivery
	7.2 Strengthen bicycle project and program delivery processes
	7.3 Review bicycle-related collisions, collision rates and frequencies over time and identify and implement safety strategies
	7.4 Track development of the bicycle facility network as part of SDOT's asset management system



Best scene from a bike: Seattle skyline and Mt. Rainier from Kerry Park

Chapter Topics	Strategies
Chapter 7: Implementation Approach • Bicycle Project Delivery • Implementation • Partner Roles • Maintenance • Existing Facility Improvements	**7.5** Negotiate maintenance agreements with partners
	7.6 Update the Bicycle Master Plan
	7.7 Seek partnerships for implementation of projects, initiatives, and programs
	7.8 Work with other City of Seattle departments to implement the plan
	7.9 Build and expand upon public partnerships
	7.10 Maintain on-street and off-street bicycle facilities
	7.11 Consider maintenance costs, procedures, and long-term funding mechanisms are a part of all new bicycle facility projects
	7.12 Encourage people riding bicycles to report maintenance complaints and improvement requests to SDOT
	7.13 Improve bicycle facilities as needed, based on performance criteria
	7.14 Create a multi-use trails upgrade and maintenance plan
	7.15 Assess the condition of SDOT-owned bicycle racks
	7.16 Develop 3–5 year implementation plan to summarize near-term priorities to implement the Bicycle Master Plan
	7.17 Establish a broad-based funding approach



Best scene from a bike: Puget Sound in Myrtle Edwards Park

Chapter 1:

INTRODUCTION



"I bike with my kids on board. I'd love to see biking made more family friendly in Seattle. Well marked bike lanes/boxes–especially when buffered–should be all over town. We take the Burke-Gilman whenever we can, but of course it's not complete in Ballard."

CARFREEDAYS.ORG

The Seattle Bicycle Master Plan Vision

"Riding a bicycle is a comfortable and integral part of daily life in Seattle for people of all ages and abilities."

The vision for the 2013 Seattle Bicycle Master Plan (BMP) signifies an important shift in the way Seattle will accommodate people riding a bicycle for any trip purpose. There are several important themes embedded in this vision statement. First, the idea that bicycling is "comfortable" suggests it is a safe, convenient, and attractive travel option for a large number of people. "Integral to daily life in Seattle" means that bicycling is not a niche activity only for experienced and confident riders, but is part of the overall urban framework and built environment of the city. Finally, "all ages and abilities" is a key theme for the entire plan, meaning that the emphasis is on planning, designing, and building a bicycle transportation network that will be used by a broad range of people throughout the city.

The updated BMP includes best practices and the latest thinking about bicycle facilities, which will result in planned investments to serve a broader range of people who already ride bicycles, and those who are considering it.

The updated plan will help Seattle continue its national leadership in bicycling. Thousands of people already bicycle daily to work, to play, and to run errands in their neighborhoods and across the city. The increase in bicycling in the city over the past several years makes Seattle third in the country for the percentage of people who commute to work by bicycle (see Figure 1-1).

IN THIS CHAPTER:

Plan Purpose 2
The focus of the Seattle BMP is to improve bicycling throughout the city.

Who Rides (or Doesn't) and Why 3
A survey of national studies shows the various types of bicycle riders and the potential for making more trips by bicycle.

Making the Case for Investing in Bicycling 4
There are many economic, social, environmental and health benefits of investing in bicycling.

Planning Process 8
The planning process involved extensive public engagement, briefings with the Seattle Bicycle Advisory Board, coordination among city staff and other agencies, and an extensive review of previous plans and data.

Public Engagement Process 9
Three phases of public engagement sought to gather information, to provide an opportunity to the public to review preliminary work and to receive public comments on the draft plan.

Plan Updates 10
The Seattle BMP will need to be updated as Seattle continues to grow and change.

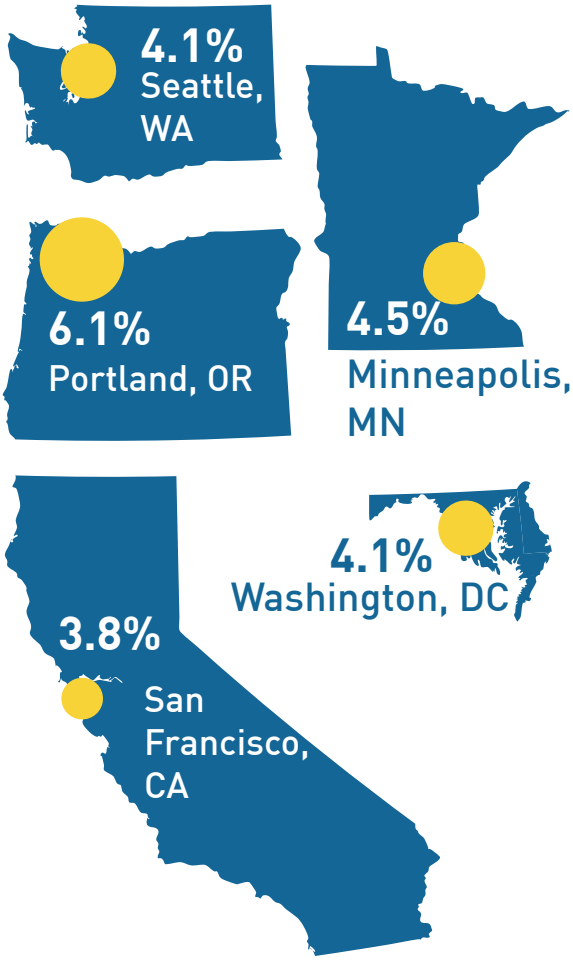
The strategies and actions identified in this plan will not only make bicycling a viable form of transportation for more Seattle residents, workers, and visitors, but also will help the city achieve its goals relating to mobility, climate change, economic vitality, and community livability.

BICYCLE FRIENDLY COMMUNITY 2013-2017 GOLD THE LEAGUE OF AMERICAN BICYCLISTS

Seattle is a good city for cycling by US standards, but to truly compete for and attract the top international talent these days, cities like Seattle have to be world-class cycling cities.

– Andy Clarke, President, League of American Bicyclists

Figure 1-1: Top 5 Bicycle Commute Rates for Large US Cities



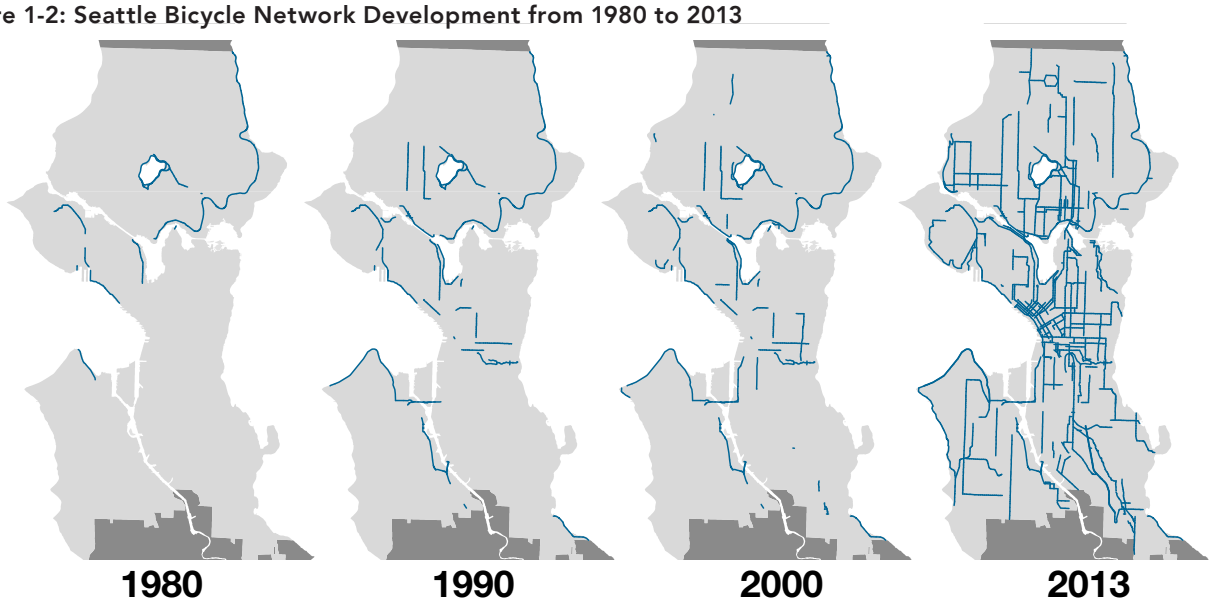
LEAGUE OF AMERICAN BICYCLISTS. 70 LARGEST CITIES RANKED BY BIKE COMMUTING. 2013. (BASED ON 2012 CENSUS DATA).

Plan Purpose

The purpose of the Seattle BMP is to provide a framework for improving the bicycling environment throughout the city. The actions and investments identified in the plan will advance the vision through new bicycle infrastructure (off-street trails and on-street bicycle facilities); maintenance; bicycle parking spaces and other end-of-trip facilities; and programs to enhance safety for all roadway users and encourage more people to ride bicycles.

A central focus of this plan is to design and implement bicycle facilities that are safe and appropriate for riders of all ages and abilities. New bicycle facility types are introduced, including cycle tracks (protected bicycle lanes), to physically separate people riding bicycles from motor vehicle traffic on arterials, and neighborhood greenways, in which low volume and low speed streets are optimized for walking and bicycling. While the bicycle network will be designed for all, riders should always use their own judgment in selecting routes that suit their experience and comfort level. The plan also provides guidance on how bicycle investments will be prioritized in the future, and contains performance measures that establish how the city will track progress made in accomplishing the goals of the plan over time. The plan outlines a number of other actions the city and its partners can take to support bicycling in the future.

Figure 1-2: Seattle Bicycle Network Development from 1980 to 2013





Burke-Gilman Trail.

Who Rides (or Doesn't) and Why?

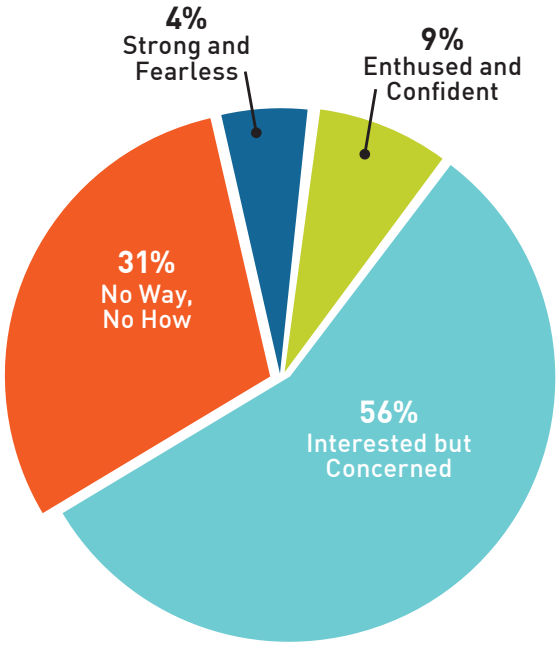
A 2012 Portland State University working paper explored the concept of "Four Type of Bicyclists"[1] put forth by the Portland Bureau of Transportation[2] in order to understand the potential for city residents to ride a bicycle. The study found that four percent of the population is made up of hardy riders who will ride regardless of the extent and quality of bicycle facilities. The study also classified nine percent of people as confident riders who will ride with basic bicycle facilities, such as bicycle lanes. These two categories presumably make up the majority of riders in Seattle today. Another 31 percent will not or cannot consider riding a bicycle under any circumstance. However, 56 percent were classified as "interested but concerned," meaning that they would be willing to ride a bicycle, or ride more often, if conditions were improved. This large portion of the population provides the greatest opportunity to increase bicycle use.

Another way of identifying the potential market for increased bicycle ridership is to consider trips that are short. According to the 2009 National Household Travel Survey, 41 percent of trips Americans make each day are less than 3 miles, a distance which could be traversed in 18 minutes by bicycle. As shown in Figure 1-4, there is great potential to increase the number of these trips made by bicycle. Longer trips, too can be made more practical, by improving bicycle connectivity to transit.

1 J, Dill., N McNeil. *Four Types of Cyclists?* 2012. http://web.pdx.edu/~jdill/Types_of_Cyclists_PSUWorkingPaper.pdf.

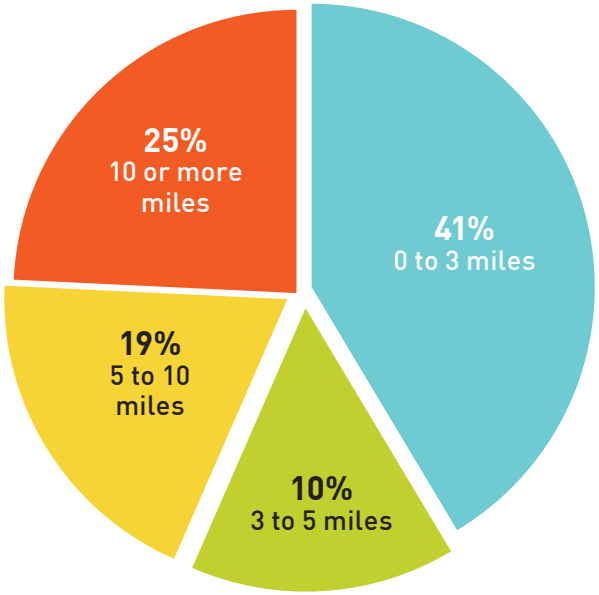
2 Roger Geller. Portland Bureau of Transportation. *Four Types of Cyclists*. 2006. www.portlandoregon.gov/transportation/44597?a=237507.

Figure 1-3: The Four Types of Transportation Bicyclists in Portland by Proportion of the Total Population



SOURCE: ADAPTED FROM J, DILL., N MCNEIL. *FOUR TYPES OF CYCLISTS?*. 2012.

Figure 1-4: National Averages of Personal Trip Lengths



TODD LITMAN. SHORT AND SWEET: ANALYSIS OF SHORTER TRIPS USING NATIONAL PERSONAL TRAVEL SURVEY DATA. VICTORIA TRANSPORT POLICY INSTITUTE. 2012.



Waiting to cross the street at NE 45th Street and Wallingford Avenue.

Addressing the reasons willing and able people choose not to ride is a focus of this plan. Admittedly, some conditions cannot be mitigated by public intervention: the weather of the Pacific Northwest, the hills throughout the city, and early winter darkness. While the city cannot change these conditions, individuals can address many of them with different types of bicycles (e-bicycles), appropriate bicycle clothing, and lights.

The city, however, can create an inviting environment, a sense of safety, thoughtful accommodation, and the reward of convenience for people who travel by bicycle. This plan proposes a network of bicycle facilities throughout the city that provides a way for people of all ages and abilities to travel by bicycle within their neighborhoods, from one neighborhood to the next, and across the city. This plan also proposes approaches to end-of-trip facilities that will make trips by bicycle more convenient and combining modes more practical. Finally, this plan includes recommendations for programs to enable all roadway users to understand the rules of the road and how to travel safely and predictably within the city, and to encourage people to ride a bicycle more often.

Making the Case for Investing in Bicycling

The case for improving the bicycling environment for people of all ages and abilities is growing. Academic and popular literature is expanding America's understanding of the relationships between bicycling and health, economic, and environmental benefits, safety, time competitiveness, space efficiency, and equity. There is evidence that bicycling is good for individuals, businesses, cities, and society as a whole.

Safe Streets for All Users

Safety concerns are another reason to improve bicycling conditions. Although the incidence of crashes involving bicycles may be low, concerns about safety have historically been the single greatest reason people do not commute by bicycle, as captured in polls as early as 1991.[3] A Safe Routes to School survey in 2004 found that 30 percent of parents consider traffic-related danger to be a barrier to allowing their children to walk or bicycle to school.[4] This plan addresses safety concerns through physical and programmatic improvements.

Planning for safety requires accommodating pedestrians, bicyclists, and motorists as they share space on the street. Studies have shown slower motor vehicle speeds exponentially increase survival rates for both pedestrians and people riding bicycles involved in collisions with motorists. At 20 mph, a pedestrian or bicyclist has a 98% survival rate, compared with survival rates of 80% and 30% at 30 mph and 40 mph respectively.[5]

Studies from across the world also suggest that the risk of injury or death in a collision with motor vehicles declines as more people walk or bicycle. Policies that increase the numbers of people walking and bicycling appear to be an effective route to improving the safety for all roadway users.[6] A study of improved safety records in bicycle-friendly cities concludes that while bicycle infrastructure, the design of the street, and the street network help slow traffic, it may be the presence of large numbers of bicyclists that changes the dynamics of the street enough to lower vehicle speeds. Safety for all road users may result from reaching a threshold of bicyclist volumes that compels motorists to drive more carefully. Strategies that attract bicycle riders are the same ones that improve safety for all road users. Cities should strive

3 Lou Harris Poll. 1991.

4 U.S. Centers for Disease Control and Prevention. *Barriers to Children Walking to or from School United States 2004*. 2005.

5 Petro, J. Ganson, L. *Vision Zero: How Safer Streets in New York City Can Save more than 100 Lives a Year*. 2011.

6 Jacobsen PL. *Safety in numbers: more walkers and bicyclists, safer walking and bicycling*. 2003.

for "safety in numbers" but before they can get to that point, they need to create bicycle friendly streets that will make it comfortable for the average person to ride a bicycle.[7]

Affordability

Bicycling is one of the most affordable means of transportation available to Seattle residents. Nationally, the average annual operating cost of a bicycle is $308, compared to $8,220 for the average car.[8]

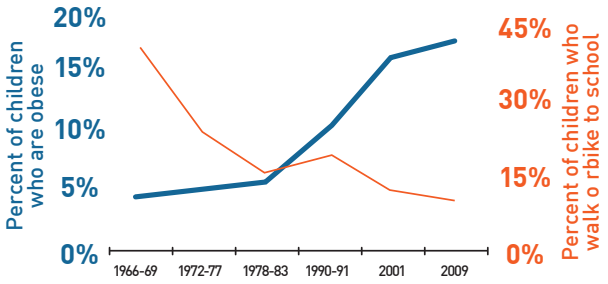
The cost of gasoline alone places a growing burden on household budgets. Gasoline expenditures as a portion of the average household budget are increasing, going from 3.4% in 1996 to 5.3% in 2011.[9]

Replacing vehicle trips with bicycling offers immediate financial benefit for households, and providing bicycle facilities appropriate for people of all ages and abilities can help make that choice a reality.

Health Benefits

Physical activity is indisputably effective in the primary and secondary prevention of cardiovascular disease, diabetes, cancer, and other related chronic diseases. Public health professionals support active transportation as a means of improving these and other health outcomes related to the obesity epidemic. The rapid rise in childhood obesity is particularly alarming and correlates with the nationwide drop in bicycling and walking to school over the last half century (see Figure 1-5). Creating a bicycle network appropriate for all ages and abilities and a built environment that encourages bicycling will support efforts to improve healthy lifestyles.

Figure 1-5: National Rates of Walking and Bicycling to School and Childhood Obesity



SOURCE: CDC, NHANES, MCDONALD 2007, OGDEN AND CARROL 2010, NHTS 2009.

Children who bicycle or walk to school learn better:

- More attentive and able to concentrate
- Advanced mental alertness by half a school year
- More benefit for mental development than having breakfast and lunch

SOURCE: EGELUND ET AL. *STUDY OF OVER 20,000 SCHOOL CHILDREN*. 2012.

Mental health and academic achievement are also improved by bicycling and walking. Children who walk or bicycle to school learn better as they are more attentive and better able to concentrate. A study of more than 20,000 school-aged children found that by walking or bicycling to school, children's mental alertness was advanced by half a school year. Walking and riding a bicycle to school has more benefit for mental development than eating breakfast or lunch. This plan supports safe routes to school and training students, parents and school administrators to understand traffic laws for safe walking and bicycling as a means of supporting Seattle students' learning.

Economic Benefits

There are many ways to consider the economic benefits of increased levels of bicycling. The direct dollars earned in bicycle-related businesses—manufacturing, wholesale, retail, service, and accessories—have an obvious positive impact on Seattle. Nationally, bicycling makes up $133 billion of the US economy, funding 1.1 million jobs, and bicycle-related trips generate $47 billion nationally in tourism activity.[10] In a number of cities, realtors report that good walking and bicycling access to neighborhood destinations and good bicycling facilities in general are important home selection criteria.[11] Major employers—and young, talented employees—seek communities with good opportunities for active lifestyles and attractive

7 Marshall and Garrick. *Evidence on Why Bike-Friendly Cities Are Safer for All Road Users*. 2011.

8 Bureau of Transportation Statistics. *Pocket Guide to Transportation*. 2009.

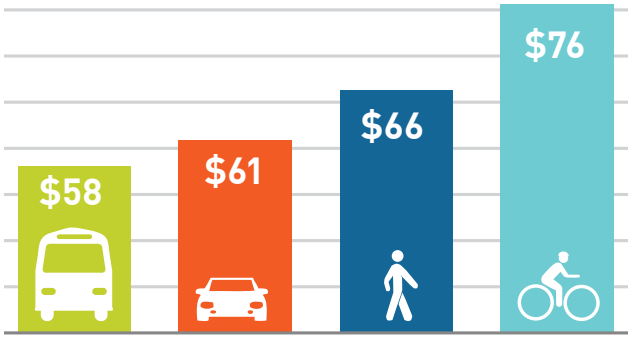
9 Bureau of Labor Statistics. *Consumer Expenditure Survey*. 2012.

10 Flusche, Darren, for the League of American Bicyclists. *The Economic Benefits of Bicycle Infrastructure Investments*. 2009.

11 Cortright, Joe, for CEOs for Cities. *Walking the Walk: How Walkability Raises Home Values in U.S. Cities*. 2009.

"Develop and implement a comprehensive land use and multimodal corridor plan in a high priority transit and bicycle corridor with the goal of shifting more trips to travel modes that generate fewer, or no, greenhouse gases." – *Seattle Climate Action Plan*

Figure 1-6: Average Monthly Customer Expenditures by Travel Mode in Portland, OR



CLIFTON, K.J., MORRISSEY, S., RITTER, C. *BUSINESS CYCLES: CATERING TO THE BICYCLING MARKET*. TR NEWS 280. 2012.

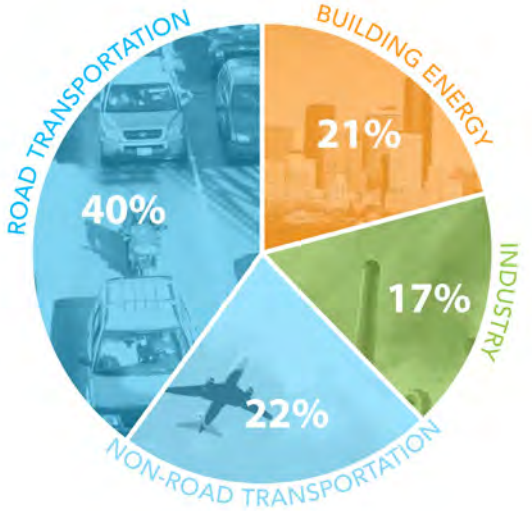
urban amenities.[12] Intercept surveys in Portland, OR found that people arriving to retail stores on foot or by bicycle visit more frequently than those who drive, and spend more money over the course of a month (see Figure 1-6).[13]

Bike sharing systems have also been shown to create economic benefits for cities. In Washington, DC, a survey by Capital Bikeshare found that its members save an average of $800 per year on transportation costs.[14] Bike share stations may also help stimulate retail sales. More than four in five Capital Bikeshare members surveyed in 2011 said they were more likely to patronize an establishment accessible by bike share. Bike share can also induce additional trips by making new destinations accessible when other modes are inconvenient or unavailable. Three in ten Capital Bikeshare members reported making an unplanned trip to a restaurant, and a quarter reported making an unplanned shopping trip made easier because they were on a bicycle.[15]

Environmental Benefits

Transportation is a significant source of air, water, and carbon pollution. Reducing vehicle miles

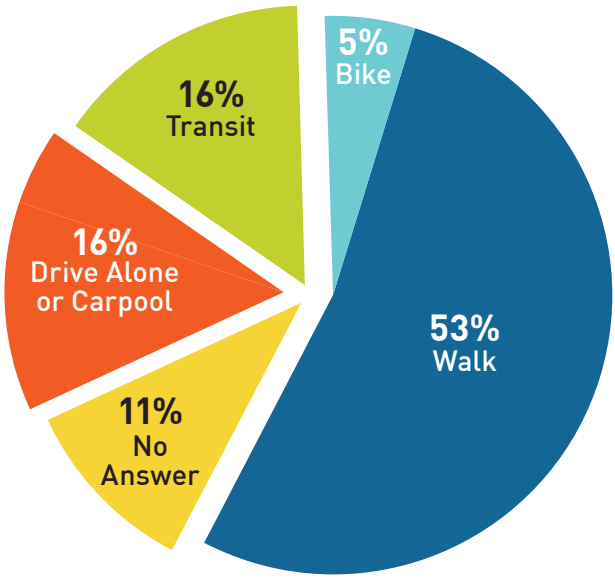
Figure 1-7: GHG Emissions Sources in Seattle



SOURCE: CITY OF SEATTLE. *CLIMATE ACTION PLAN*. 2013.

travelled (VMT) in fossil fuel burning vehicles and reducing greenhouse gas (GHG) emissions intensity per mile travelled, will improve and protect Seattle's natural environment while reducing carbon emissions. Expanding and enhancing active transportation opportunities are a highly cost-effective approach to meeting the goals of Seattle's Climate Action Plan and protecting Seattle's unique natural environment (see Figure 1-7).

Figure 1-8: Travel Survey of Visitors to Six Seattle Neighborhood Business Districts



SOURCE: SDOT. *NEIGHBORHOOD BUSINESS DISTRICT ACCESS SURVEY*. FEBRUARY 2012.

12 Cortright, Joe, for CEOs for Cities. *Portland's Green Dividend*. 2007.

13 *Neighborhood Business District Access Survey. Intercept survey of neighborhood visitors*. Seattle Department of Economic Development. 2012.

14 LDA Consulting for Capital Bikeshare. *2013 Capital Bikeshare Member Survey Report*. 2013.

15 LDA Consulting for Capital Bikeshare. *2011 Capital Bikeshare Member Survey Report*. 2011.

Time Competitiveness

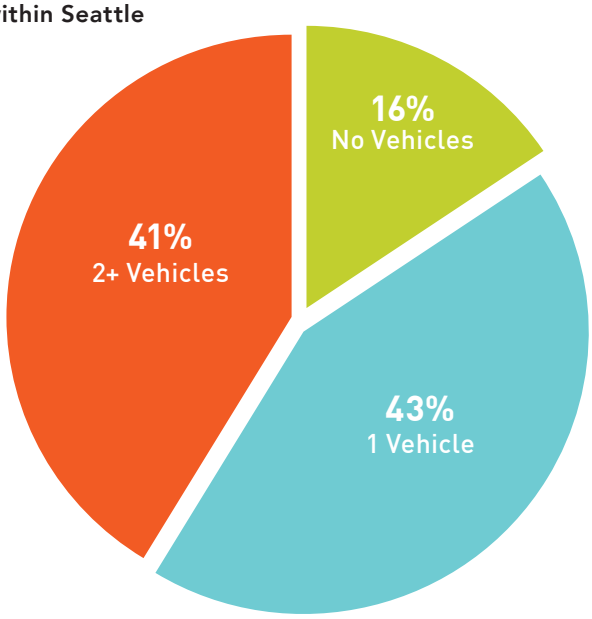
People in the urban core and throughout denser neighborhoods in Seattle are finding it more convenient to walk or bicycle for short trips they once would have driven (see Figure 1-8). Not only are the direct costs of owning and operating a car becoming more onerous, but also congestion and parking cause delays that make riding a bicycle time-competitive and more convenient.

Space Efficiency

There simply is very limited space to add traffic lanes to meet increasing travel demands, reduce congestion, or increase parking in the public right-of-way. Both vehicles and bicycles usually carry a single person, but bicycles take up much less space. Planning for bicycles may permit a better use of the resources available to accommodate additional trips. To take advantage of this it will require a realignment of priorities in how space is allocated and resources are invested (see Figure 1-9).

The BMP identifies strategies to coordinate transit and pedestrian priorities with bicycle improvements to encourage increased use of bicycles as a practical and desirable form of urban transportation in the limited roadway space available. Increasing the number of people riding bicycles will help optimize the use of limited urban space and create safer streets for all.

Figure 1-10: Household Vehicle Availability Rates within Seattle

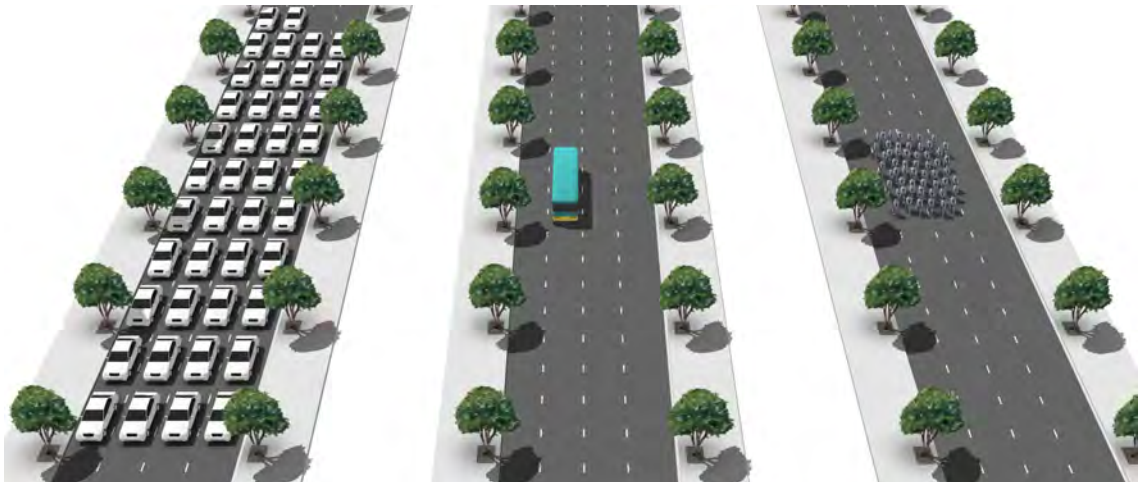


SOURCE: 2007-2011 AMERICAN COMMUNITY SURVEY 5-YEAR ESTIMATES.

Equity

According to the Census Bureau's 2007-2011 American Community Survey, 16 percent of Seattle households have no motor vehicle available for use (see Figure 1-10). Furthermore, many residents are too young to drive; are incapable due to age, illness, or disability; are unable or unwilling to afford the costs of owning and operating a car; or for other reasons are simply unfit or unwilling to drive. Transportation choices for these residents may include walking, riding a bicycle, taking transit, or carpooling. This plan strives to provide access

Figure 1-9: Moving 55 People by Car, Bus, and Bicycle

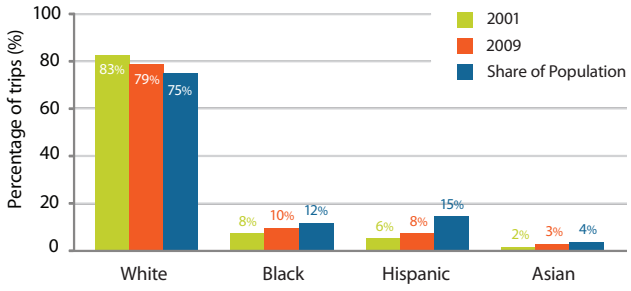


FHWA. SUMMARY OF TRAVEL TRENDS: 2009 NATIONAL HOUSEHOLD TRAVEL SURVEY. 2011.

to good bicycling infrastructure in parts of the city with lower car ownership.

Nationally, as well as in Seattle, the majority of trips made by bicycle are by white people. Between 2001 and 2009, the percentage of trips made by bicycle has shifted to more closely match the ratios of racial populations (see Figure 1-11).

Figure 1-11: Percent of all US Bicycle Trips by Race/Ethnicity



SOURCE: PUCHER, J., BUEHLER, R. *BICYCLING TRENDS AND POLICIES IN LARGE NORTH AMERICAN CITIES*. 2011.

Changes in Transportation Behavior

Auto ownership and use is dropping in the United States, particularly among young people who are becoming drivers later in life and owning fewer vehicles per household. This seems to be in part due to costs of ownership and operation, trip convenience, concern for the environment, personal health concerns, or for the pure joy and fun that it is to ride a bicycle. This is often a lifestyle choice, made possible by home and employment location decisions. Existing and future active and shared travel options, such as transit, car sharing, walking, and bicycling, provide viable travel alternatives to the car. Puget Sound Bike Share, a non-profit bike-sharing organization, will launch a program in Spring 2014, providing another travel option for the public that will increase the number of people riding bicycles, and will likely draw new, less experienced bicycle riders to the city's street system.

Planning Process

The 2013 Bicycle Master Plan (BMP) was a public and technical endeavor. The process included extensive public input, regular briefings with the Seattle Bicycle Advisory Board (SBAB), and coordination with city staff and other local agencies. Data relating to past bicycle plans, the city's land use pattern, topography, traffic speeds and volumes, and a number of other factors were reviewed. Both geographic information systems (GIS) and field analysis of Seattle's transportation network were extensively used to determine locations where bicycle facilities can be integrated into the existing street network.

Staff reviewed documents adopted over the last several years, including the 2007 Bicycle Master Plan, the Pedestrian Master Plan (2009), the Transit Master Plan (2012), and the Climate Action Plan (2013 update). The Transit Master Plan was particularly important, since it identified a number of priority transit corridors, many of which are arterials that serve as important destinations and desirable bicycle corridors. Another important document was the map of Major Truck Streets in the city's Transportation Strategic Plan, which highlights arterial streets that accommodate significant freight movement through the city. SDOT uses the Major Truck Street designation on an on-going basis as an important factor for street design, traffic management decisions, and pavement design and repair.

The BMP uses a multimodal approach to consider appropriate locations for bicycle facilities, based in large part on these earlier plans, recognizing that in some cases there will be arterial streets that will accommodate bicycles, transit, and/or freight within the same right-of-way. In other cases, parallel routes can be developed to provide better service for all modes in a particular corridor.

Public Engagement Process

Public engagement is an important element of any successful planning process. To be considered successful, the BMP planning process needed to reach beyond the current bicycling community, encouraging infrequent bicyclists or potential new users of the bicycle network to provide their input on what it would take to make the bicycling environment in Seattle work better for them. The purpose of the strategy was to broaden the conversation about how people riding bicycles can help build and

create vibrant, livable communities and produce safer streets. One important purpose of the BMP is to develop strategies to transform bicycling from a niche activity for a small portion of users to one that a majority of people view as a viable form of transportation for all trip purposes.

Public Engagement Goals and Objectives

The public engagement process for the BMP was organized around two main goals:

Goal 1 *Engage broad and diverse segments of Seattle residents, businesses, employees, and property owners.*

Goal 2 *Update the BMP to reflect the priorities and interests of infrequent and potential riders, as well as avid users of the system.*

With City Council's endorsement, the Seattle Bicycle Advisory Board (SBAB) was selected to act as the primary advisory committee for the 2013 BMP. The SBAB met monthly with the SDOT project team through the course of the project. All SBAB meetings are open to the public, and include opportunities to comment on topics concerning the BMP and bicycling issues in general.

There were three primary phases during the planning process that encouraged the public to provide input and feedback on project materials. Information summarizing the results of each phase can be found online in the plan appendices (http://www.seattle.gov/transportation/bikemaster_materials.htm).

Phase I

The first phase of public engagement was intended to **gather information**. Importantly, a wide variety of people participated—those who ride bicycles, those who may only occasionally ride a bicycle, and those who may never be inclined to ride a bicycle for any purpose. Through survey tools and attending community meetings, SDOT learned why some people choose to ride bicycles, what may encourage others to begin bicycling, what some barriers to bicycling are, and what people would like the city to invest in to encourage more bicycling in the future. This phase utilized an innovative web mapping tool. Seattle Neighborhood Greenways provided SDOT with their suggestions for neighborhood greenways that connect community members to neighborhood destinations. Data and route recommendations were also provided from other stakeholders, such as the Seattle Bicycle Advisory Board, Cascade Bicycle Club, and the University of Washington.

Phase II

The second phase of broad public involvement began in November 2012 and included the **review of the policy framework, the draft bicycle network map, and early thoughts around implementation strategies.**

Phase III

The final phase of public engagement in spring and summer 2013 consisted of public meetings designed to **gather comments on the entire draft plan, which was released for review in June 2013.**

During both Phase II and Phase III, SDOT conducted a number of community meetings across the city as well as two online "lunch and learn" events. SDOT staff also attended a large number of district council, community council, and various community and employee-based meetings to discuss the BMP and gather input. Staff also briefed a number of City Commissions and Advisory Boards, including the Freight Advisory Board, the Pedestrian Advisory Board, Planning Commission, Design Commission, and the Bridging the Gap Oversight Committee.



Public Engagement Phase II, Gould Hall, University of Washington.





During the first phase of public engagement, SDOT wanted to engage with families to learn about why they do or do not ride a bicycle. Pedal Powered was created to get kids to ride a stationary bicycle with the Seattle skyline behind them so they could act like Superheroes flying through the air. Having the ability to fly through the air like a Superhero excited the kids and helped engage families with the launch of the BMP update.

Plan Updates

This plan is, by its nature, a work in progress. Updates to the full BMP should occur every five to seven years. These future updates will be necessary to assess progress, take advantage of emerging opportunities, and re-evaluate priorities.

As new sections of the bicycle facility network are developed and new technologies are adopted, bicycling mode share will likely increase and travel patterns will change. Priorities will shift and new opportunities will become apparent. These changes will be reflected in regular updates to the implementation plan.

In addition to updating the plan, SDOT and other city departments will be accountable for implementing the plan in a strategic manner that will involve on-going review by the Seattle Bicycle Advisory Board and City Council. This is addressed in more detail in Chapter 7 of this plan.



BMP public engagement process "flat bike" participants.







During the BMP public engagement process, SDOT encouraged all types of bicycle riders to take photos with either the "I bike" sign or "flat bike" cut-out to show all the different types of people on bicycles riding in Seattle.


NO
STOPS

Chapter 2: State of the Seattle Bicycling

ENVIRONMENT



"Great work. Keep it up. Educate more people about the ease of bicycling and provide more education for businesses and residents about how biking really works well to make stronger people and communities."

Bicycling in Seattle is evolving, and this plan is part of that process. In 2007 the City Council adopted a BMP that provided the framework for investments that have occurred since that time to improve conditions for bicyclists in the city. The plan was a focused ten-year horizon (covering the timeframe between 2007 and 2017), and significant progress has been made on building the envisioned bicycling network and elevating the profile of bicycling as a viable part of Seattle's multimodal transportation system.

The following chapter provides a snapshot of the state of bicycling in Seattle today, so that we can identify the needs for the future. For more detail, see the State of Seattle Bicycling Environment Report in Appendix 1B.

IN THIS CHAPTER:

Existing Bicycle Network 14
A discussion of the existing bicycle network includes a summary of facility lengths and types and the results of a gap analysis.

Equity Analysis 18
An equity analysis highlights the uneven distribution of bicycle facilities throughout the city

Who's Bicycling, When, and Where? 22
An analysis of SDOT 's 20 years of bicycle count data shows where people are bicycling and graphs trends over the past 2 decades.

Tracking and Performance Measures 23
The 2007 Seattle BMP goals and performance measures are discussed and summarized.



An on-street bicycle corral in front of a local business in the Wallingford neighborhood.



Seattle's newest bicycle infrastructure is a two way cycle track on Broadway. This is a way for bicyclists to travel with less conflict alongside cars or pedestrians.

Existing Bicycle Network

As of 2013, the bicycle network in Seattle is over 300 miles, including 78 miles of bicycle and climbing lanes, 92 miles of shared lane pavement markings, 6 miles of neighborhood greenways, 47 miles of multi-use trails, 128 miles of signed routes, and over 2 miles of other on- and off-street bicycle facilities.

Maps 2-1 and 2-2 on the following pages show the evolution of Seattle's bicycle network over time.

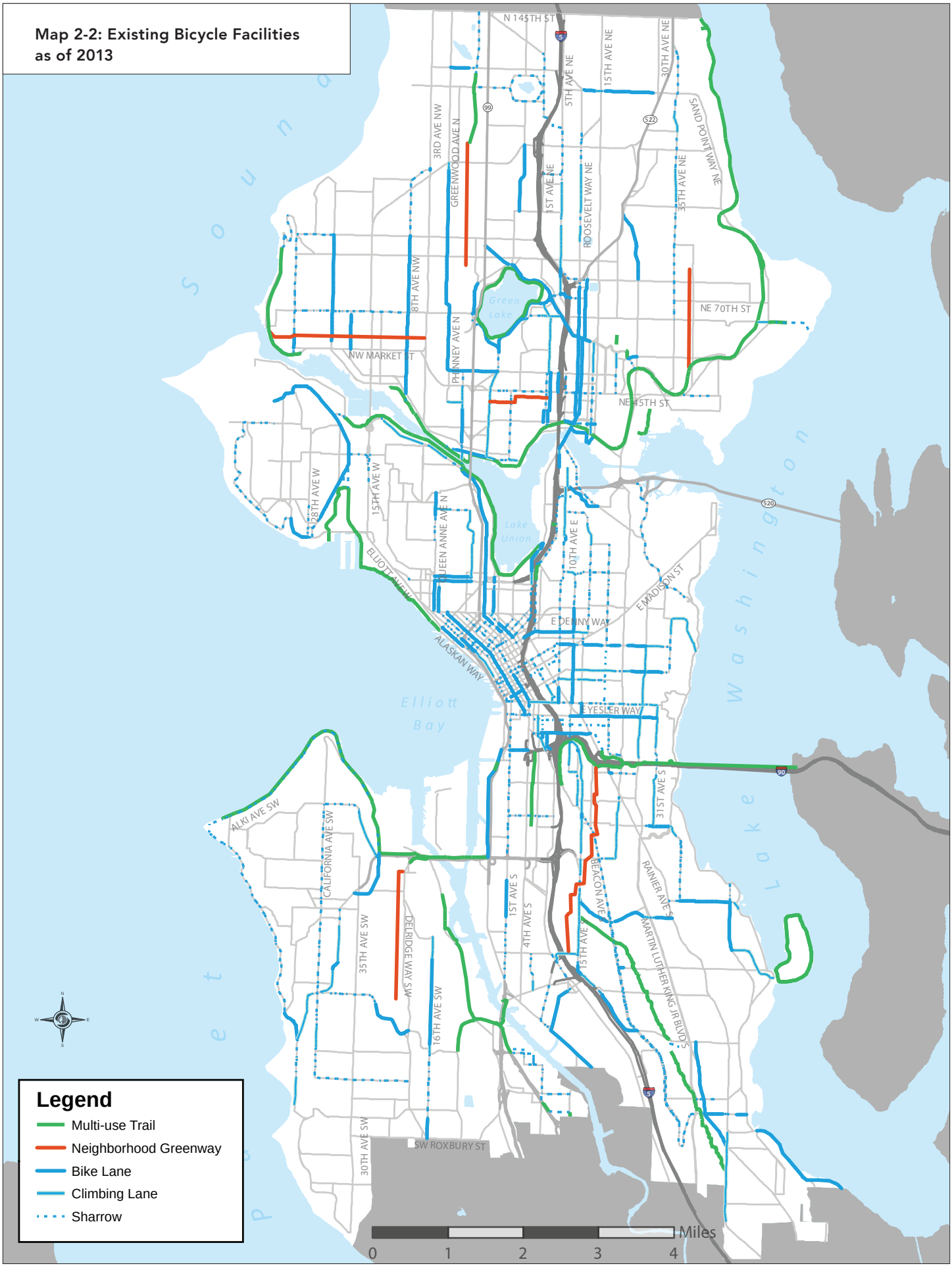
Bicycle System Gaps

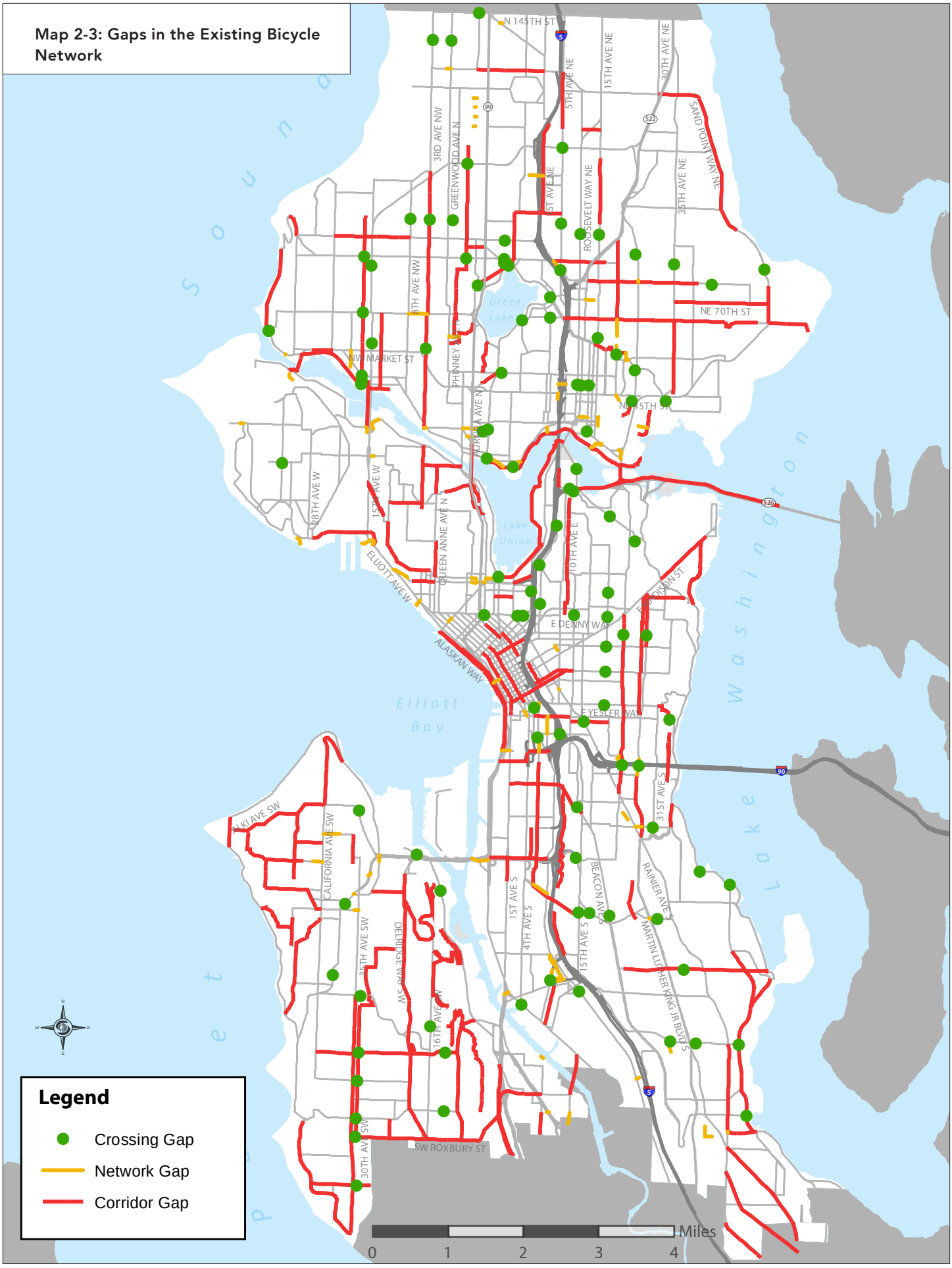
Despite implementation progress made between 2007 and 2013, there are still major gaps in the city's planned bicycle network. These gaps exist in various forms, ranging from short "missing links" on a street or trail to large geographic areas lacking connected bicycle facilities. Map 2-3 shows gaps in the existing bicycle network.

- **Crossing gaps** are bicycle-related intersection improvements recommended in the 2007 BMP.
- **Network gaps** are missing links in the network recommended in the 2007 BMP that are less than ¼ mile in length and were recommended as either bicycle lanes, climbing lanes, shared lane markings, neighborhood greenways (known as bicycle boulevards in the 2007 BMP), or multi-use trails.
- **Corridor gaps** are larger voids in the network (greater than one-quarter mile in length). These gaps are most often corridors needed to connect neighborhoods to destinations, giving people who ride bicycles a variety of travel route options.

Map 2-1: Bicycle Facilities Completed between 2007 and 2012




Map 2-2: Existing Bicycle Facilities as of 2013
N 145TH ST
5TH AVE NE
15TH AVE NE
30TH AVE NE
SAND POINT WAY NE
3RD AVE NW
GREENWOOD AVE N
1ST AVE NE
ROOSEVELT WAY NE
35TH AVE NE
8TH AVE NW
Green Lake
NE 70TH ST
NW MARKET ST
PHINNEY AVE N
NE 45TH ST
28TH AVE W
15TH AVE W
QUEEN ANNE AVE N
Lake Union
10TH AVE E
ELLIOTT AVE W
E MADISON ST
E DENNY WAY
ALASKAN WAY
Elliott Bay
EYESLER WAY
31ST AVE S
ALKI AVE SW
CALIFORNIA AVE SW
35TH AVE SW
DELRIDGE WAY SW
1ST AVE S
4TH AVE S
BEACON AVE S
15TH AVE S
RAINIER AVE S
MARTIN LUTHER KING JR BLVD S
16TH AVE SW
30TH AVE SW
SW ROXBURY ST
Legend
Multi-use Trail
Neighborhood Greenway
Bike Lane
Climbing Lane
Sharrow
Miles
0
1
2
3
4


Map 2-3: Gaps in the Existing Bicycle Network
N 145TH ST
15TH AVE NE
30TH AVE NE
5TH AVE NE
3RD AVE NW
GREENWOOD AVE N
ROOSEVELT WAY NE
35TH AVE NE
SAND POINT WAY NE
NE 70TH ST
NW MARKET ST
PHINNEY AVE N
AURORA AVE N
NE 45TH ST
28TH AVE W
15TH AVE W
QUEEN ANNE AVE N
ELLIOTT AVE W
10TH AVE E
E DENNY WAY
ALASKAN WAY
E YESLER WAY
31ST AVE S
ALKI AVE SW
CALIFORNIA AVE SW
35TH AVE SW
DELRIDGE WAY SW
1ST AVE S
4TH AVE S
BEACON AVE S
15TH AVE S
RAINIER AVE S
MARTIN LUTHER KING JR BLVD S
16TH AVE SW
30TH AVE SW
SW ROXBURY ST
Green Lake
Lake Union
Elliott Bay
Puget Sound
Lake Washington
Legend
Crossing Gap
Network Gap
Corridor Gap
Miles
0
1
2
3
4

Equity Analysis

This plan develops a connected bicycle network that serves all areas of Seattle, including areas that have a high density of historically underserved populations and relatively low levels of bicycle facilities. An equity analysis examined the existing distribution of bicycle facilities compared to the distribution of these populations.

For purposes of analysis, the following socio-economic indicators define underserved populations, as shown on Maps 2-4 to 2-8:

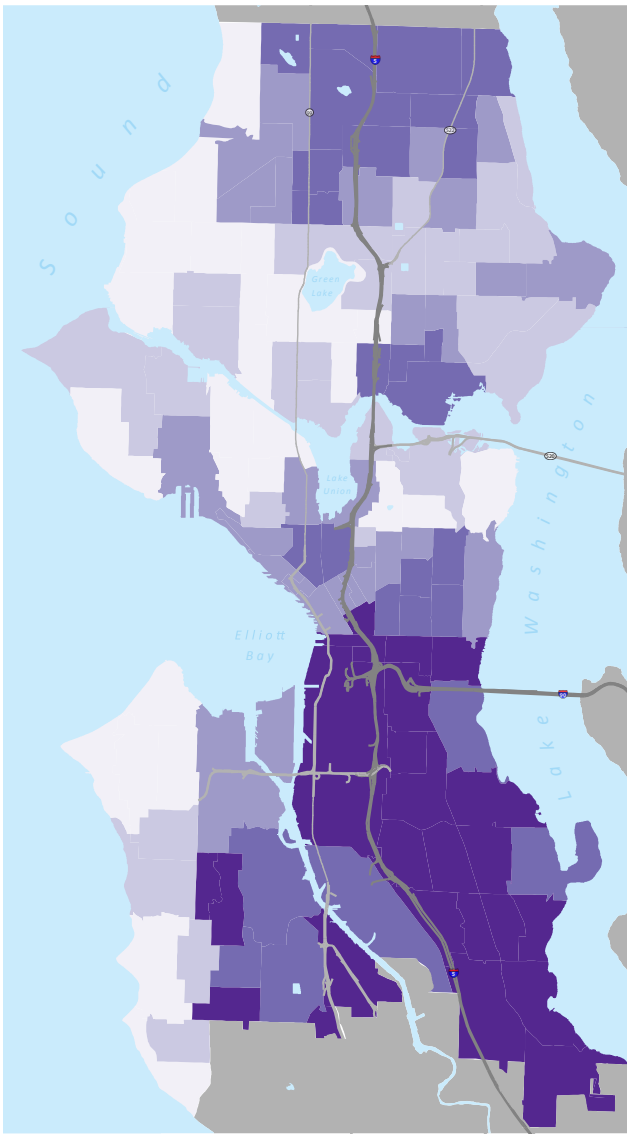
- Percentage of population that are people of color
- Percentage of households below 200% of poverty level (defined by the U.S. Census Bureau)
- Percentage of households within the census tract with no automobile available for daily use
- Population of people under 18 years of age
- Population of people over 64 years of age

The analysis used a threshold for each of the above indicators, so that those census tracts that had a greater value than the mean value for any given indicator was given a score of one (1). For example, if a census tract had an above average number of people of color and an above average number of people 65 years of age or older, the census tract was given a score of two (2). The high equity score has a maximum possible score of five and a low equity score has a minimum possible score of zero.

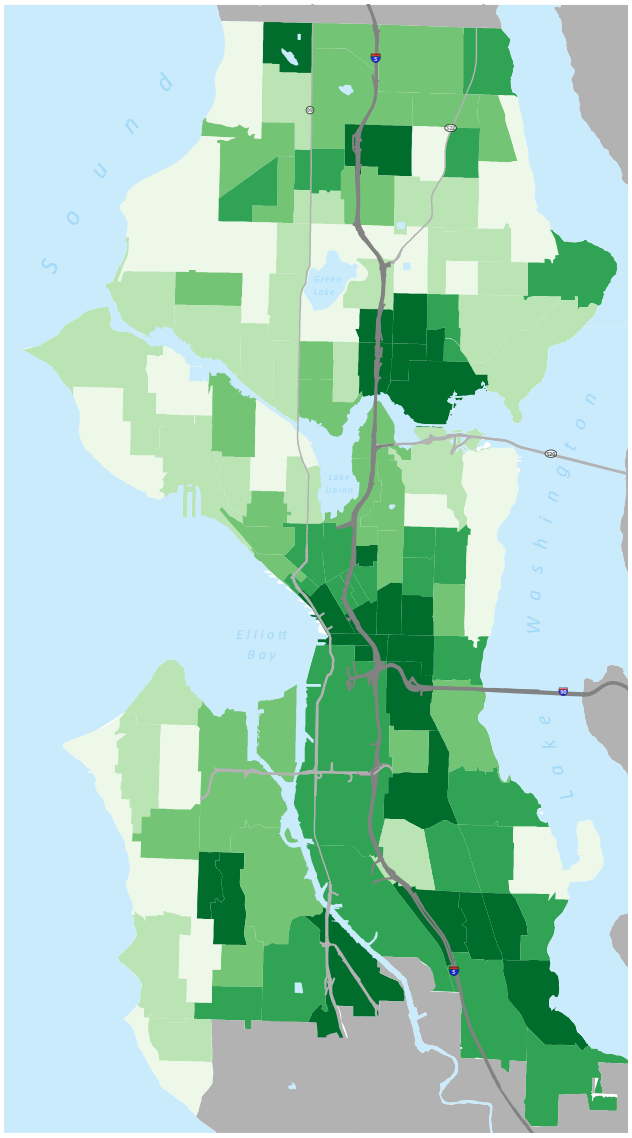
The distribution of bicycle facilities or "level of bicycle service" was calculated by dividing the total mileage of bicycle facilities in a census tract by the number of square miles in the census tract (bicycle facility miles/square miles). Census tracts in the lowest quartile (lowest 25 percent) were considered to be "low service areas." The red outlines on Map 2-9 show census blocks with low bicycle service.

The results of the demographic analysis combined with the assessment of existing facilities highlight several areas of Seattle where improvements to the bicycle system would benefit underserved populations. As new segments of the system are completed, the gap analyses can be easily updated, providing the opportunity to understand which areas of the city merit additional focus and investment.

Map 2-4: Percent of Population that are People of Color

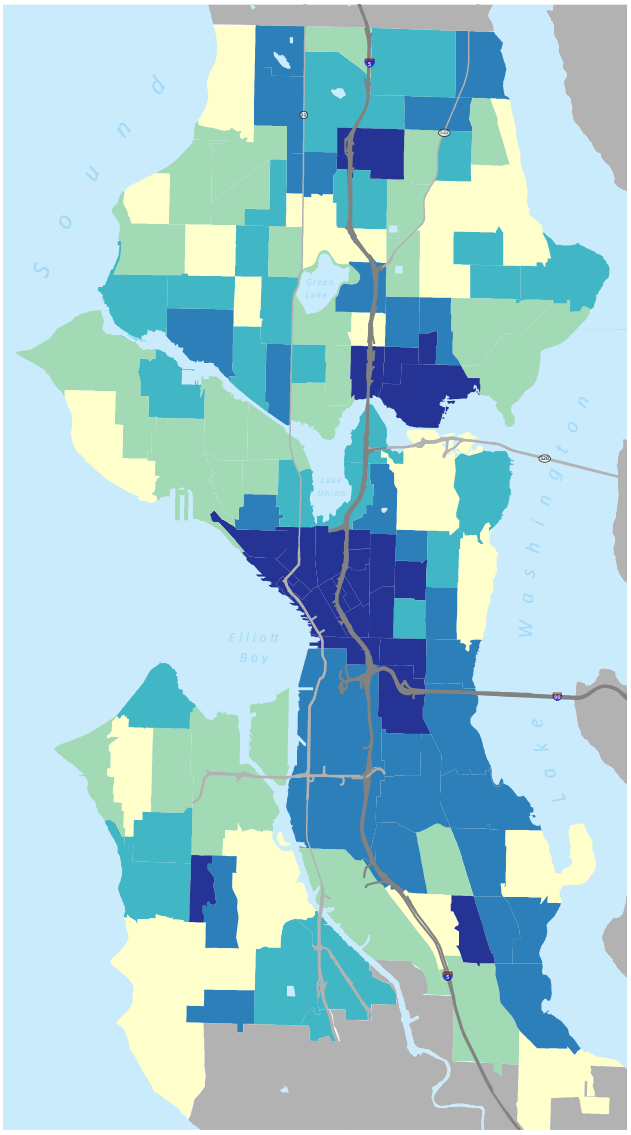


Map 2-5: Percent of Population Under 200% of Poverty Level



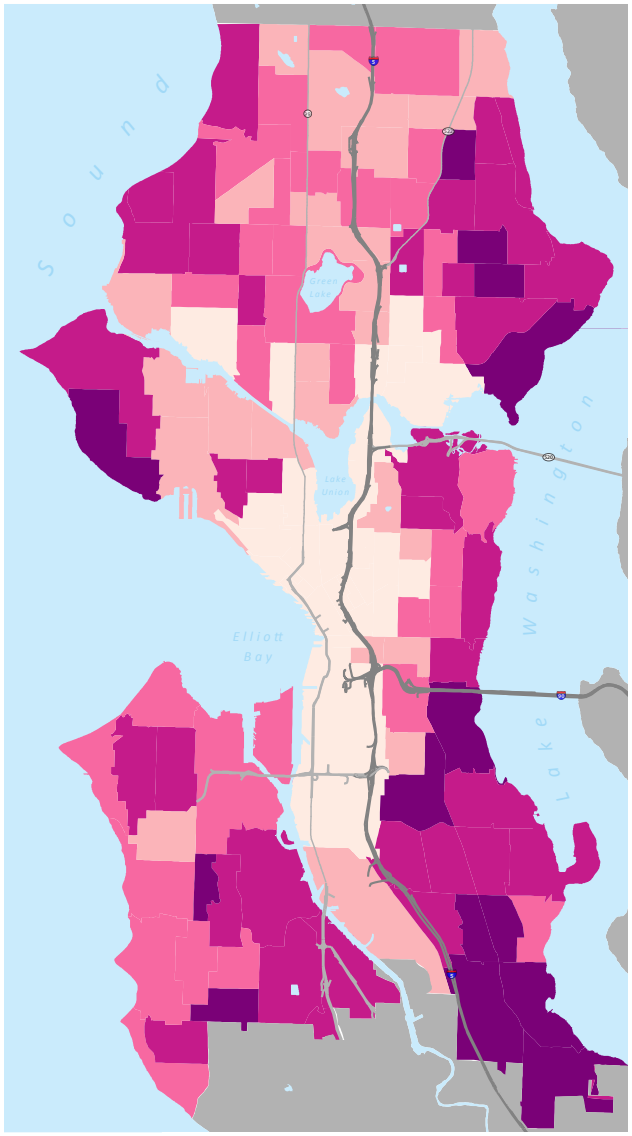
Legend
Households
Below 200% of poverty
- 7% - 14%
- 15% - 19%
- 20% - 27%
- 28% - 40%
- 41% - 82%

Map 2-6: Percent of Households Without Access to a Car



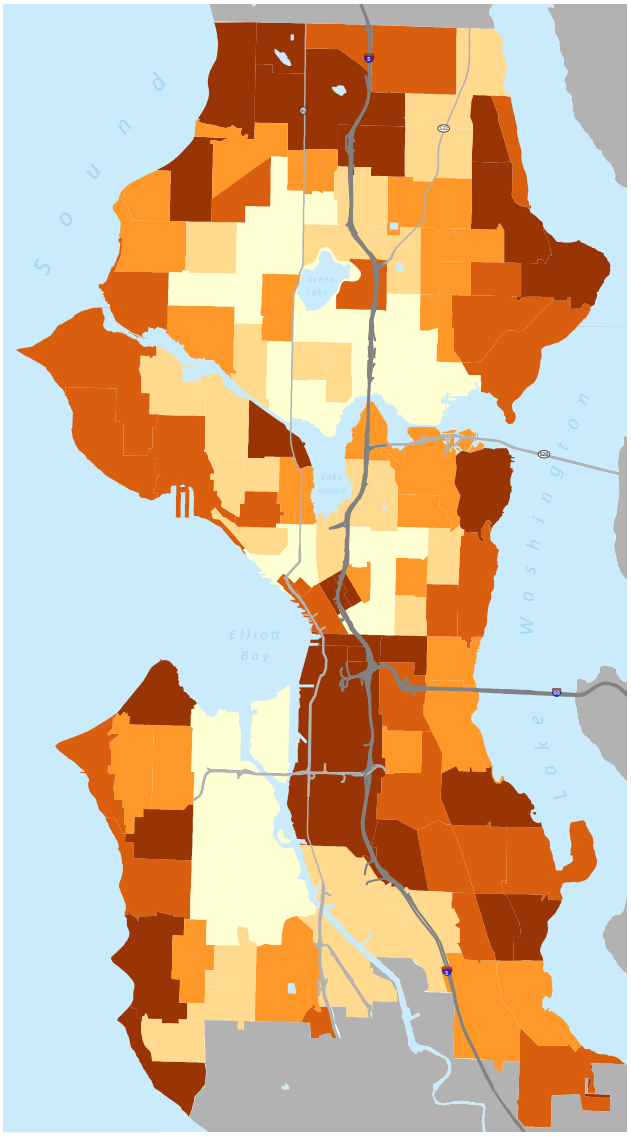
Legend
Households with
Zero Cars Available
- 0% - 4%
- 5% - 7%
- 8% - 12%
- 13% - 24%
- 25% - 67%

Map 2-7: Percent of Population Under 18



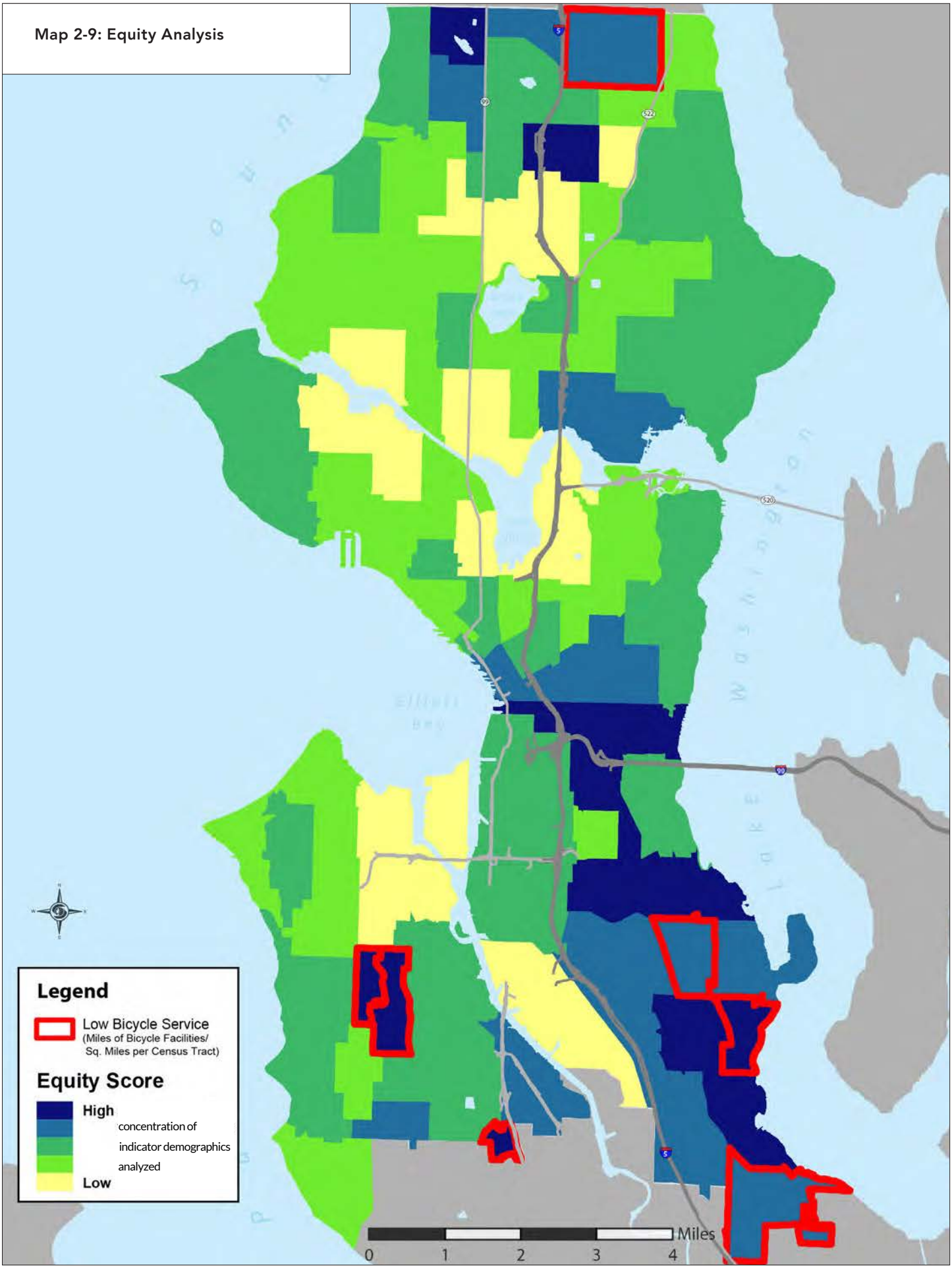
Legend
Population Under 18
- 0% - 8%
- 9% - 14%
- 15% - 18%
- 19% - 23%
- 24% - 31%

Map 2-8: Percent of Population Over 64



Legend
Population Over 64
- 0% - 7%
- 8% - 9%
- 10% - 11%
- 12% - 15%
- 16% - 28%

Map 2-9: Equity Analysis



SEATTLEBIKEBLOG.COM



This buffered bicycle lane on Dexter Ave N offers increased space and more comfortable separation from moving vehicles than a conventional bicycle lane.

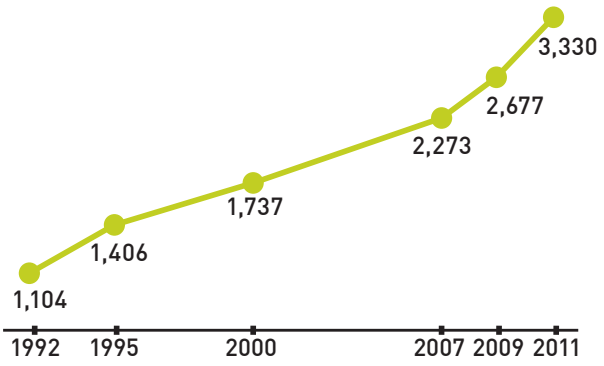
Who's Bicycling, Where, and When?

Bicycle counts from a variety of sources provide a snapshot of cycling activity in Seattle. SDOT has been counting bicycles at access points to Downtown since 1992. In 2008, SDOT began conducting counts at other locations around the city as well. These two count programs were replaced in 2011 by a quarterly count program at 50 locations using the methodology recommended by the National Bicycle and Pedestrian Documentation Project. The downtown count will be conducted once more in 2017 to gauge the 2007 BMP ten-year goal of tripling the number of bicycle riders.

Additional count data has been collected since 2009 at 25 Seattle locations in coordination with the annual Washington State Bicycle and Pedestrian Documentation Project. Periodic counts of bicycles on transit have been conducted by Sound Transit and include bicycles observed on Sound Transit trains and buses, as well as bicycles observed on King County Metro and Community Transit buses. As noted in Map 2-10, the number of riders based on counts taken to date varies throughout the city. The highest counts are located at crossings of the ship canal and in South Lake Union, Capitol Hill, and Downtown, while bicycling activity is lower south of I-90, on Beacon Hill, and in Rainier Valley.

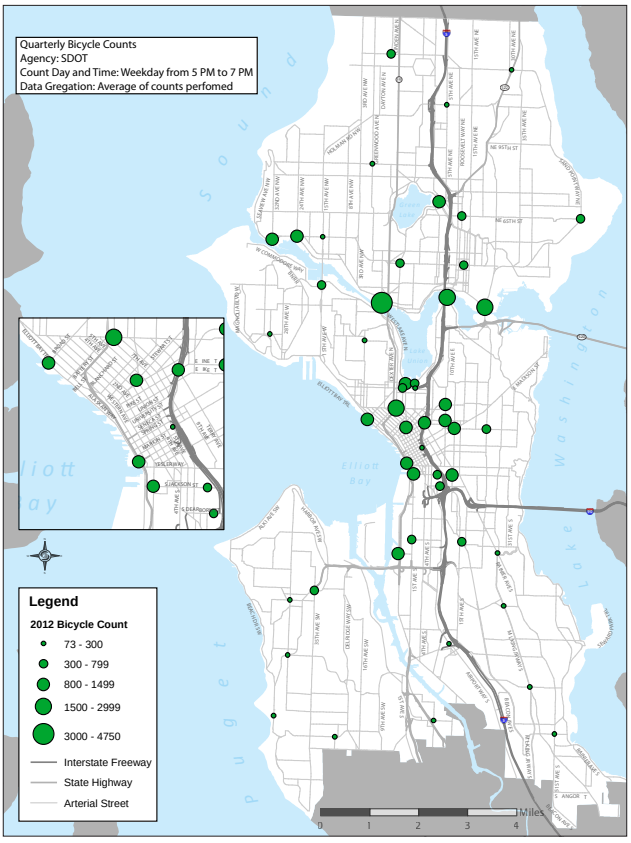
As shown in Figure 2-1, Seattle has seen an overall increase in bicycling since the city started its Downtown count program in 1992. However, bicycling activity varies throughout the city.

Figure 2-1: Downtown Bicycling Trends in the City



SOURCE: SDOT. 1992-2011 DOWNTOWN SEATTLE BICYCLE COUNTS.

Map 2-10: 2012 Bicycle Counts Map



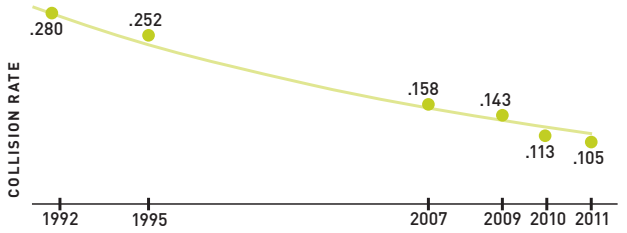
SOURCE: SDOT. QUARTERLY BICYCLE COUNTS. 2012. AVERAGE OF WEEKDAY COUNTS FROM 5PM TO 7PM.

2007 BMP Tracking and Performance Measures

The 2007 Seattle BMP provided the framework for investments that have occurred since that time to improve conditions for bicyclists in the city. The ten-year plan focused on making progress between 2007 and 2017 on building the envisioned bicycling network and elevating the profile of bicycling as a viable part of the multimodal transportation system in Seattle.

The 2007 Seattle BMP had two broad goals: increase bicycling ridership and increase the safety of bicycling in Seattle. The plan identified four objectives to achieve these goals that focused on improving bicycle infrastructure, securing funding for infrastructure improvements, and implementing programs for education, enforcement, and encouragement. Figure 2-2 shows the relationship of bicycling and collision rates in Seattle over the past 20 years.

Figure 2-2: Correlation of Increase in Bicycling Rate and Decrease in Collision Rate



SOURCE: SDOT. 1992-2011 *DOWNTOWN SEATTLE BICYCLE COUNTS*. 2011. 2011 RATE BASED ON PARTIAL COUNT.

Additional Bicycle Facility Accomplishments:

- New signals installed specifically for bicycles
- Improved trail crossings
- Improved pavement along the Burke-Gilman Trail, the Duwamish Trail, and the Ship Canal Trail
- Completed innovative pilot projects including buffered bicycle lanes, green bicycle boxes and lanes, contraflow bicycle lanes, staircase runnels, and cycle tracks

Table 2-1: Scorecard of Current Bicycle Facilities

	Total Network Miles Recommended in 2007 BMP	Pre-2007 Network	Implemented 2007-2012	Current Miles in Network	% of BMP Network Complete
Bicycle lanes	143	26	53	78	55%
Sharrows	111	0	91	92	83%
Trails	58	39	8	47	81%
Other On-Street	46	2	0	2	5%
Other Off-Street	3	0	0	0.2	8%
Total Network	361	68	152	221	60%
Signed Routes*	234	0	128	128	55%

*Some signed routes (but not all) overlap with other bicycle facilities.

Eight performance measures were recommended to gauge Seattle's progress in meeting goals and objectives in the 2007 BMP (see Figure 2-3). Between 2007 and 2012 there was notable progress on meeting the targets identified for the plan. Progress toward that plan's network goals is described in Table 2-1. This table focuses on the network plan that was identified in the 2007 plan, and provides a good snapshot of status of the overall bicycle network as of 2013. Many of the facility-type recommendations along specific corridors, however, have been updated in this plan.



Bicycling near Seattle's downtown waterfront.

Figure 2-3: Status of the 2007 Performance Measures



Key: × = not on track; ✓ = on track; ? = unsure, have not tracked.


U District 3.7
Kenmore 7
Burke Gilman Trail
Lake Washington Loop

Chapter 3: Policy

FRAMEWORK



"In my view, the city can't make people ride a bike, nor can they make them ride safely, so the best the city can do is provide facilities which promote safe riding, which I think the plan does."

The BMP exists on a foundation of citywide planning policy, while its policy framework enhances the details and intent of past city plans. The city's primary policy document is the Seattle Comprehensive Plan. This document, in conjunction with an adopted Complete Streets policy and Climate Action Plan, provides the policy context for the BMP.

IN THIS CHAPTER:

The Plan Vision, Goals, and Objectives 27
The organizing framework of the BMP is the Vision, Goals and Objectives.

Seattle Comprehensive Plan 30
The Seattle Comprehensive Plan provides policy guidance on how the city will accommodate the expected growth and future demands on transportation infrastructure.

Complete Streets 31
Seattle has a policy on complete streets that requires all new city transportation improvements to provide appropriate accommodation to all roadway users.

Climate Action Plan 32
Active transportation will play a role in helping to achieve Seattle's goal to become carbon neutral by 2050.

The Plan Vision, Goals and Objectives

The BMP is organized around an overall vision statement and five goals. Six objectives summarize how the goals will be achieved.

Vision

"Riding a bicycle is a comfortable and integral part of daily life in Seattle for people of all ages and abilities."

The vision statement for the plan expresses the desired "end state," or result, of implementing the plan. Riding a bicycle in Seattle will be safe, convenient and an attractive travel option for a large number of people. Bicycle infrastructure will be part of the overall urban framework and built environment of the city. Emphasis is placed on planning, designing and building bicycle facilities that will be used by a broad range of people throughout the city.

Goals

The vision statement is supported by five main goals that articulate what the plan seeks to achieve over time in order to meet the vision. The goals also set the basis for the plan's performance measures and prioritization criteria, which are outlined in Chapter 7. The performance measures will help track progress in meeting the goals of the plan as it is implemented over time, and the prioritization framework will guide which projects and programs are implemented in the near-term, mid-term, and long-term.

Ridership: Increase the amount and mode share of bicycling in Seattle for all trip purposes.
Getting more people to use a particular travel mode is one of the main purposes of this modal master plan. The BMP seeks to increase both the total number of bicycle riders in the city and the total percentage of all trips made using a bicycle. This means increasing not only commuting and recreational rides, but all trips around the city, including short trips to the local store, neighborhood business district, schools or other community facilities, and for connections to transit.

Safety: Improve safety for bicycle riders.
Safety is SDOT's most important responsibility. Bicyclists and pedestrians are particularly vulnerable users of the street system. Many of the types of facilities and design standards outlined in this plan enhance safety and increase predictability, not only for people riding bicycles, but also pedestrians and drivers of cars, trucks, and transit.

Connectivity: Create a bicycle network that connects to places that people want to go, and provides for a time-efficient travel option.
In order for a bicycle system to be heavily used, it has to be connected and get people conveniently to their destinations: work, shopping, school, transit stations, etc. This plan guides the creation of a bicycle network that is connected with safe, all ages and abilities bicycle facilities that are focused on relatively flat routes where possible, and that link to key destinations around the city.



Bicycle commuter on 4th Avenue and Spring Street.

Equity: Provide equal bicycling access for all through public engagement, program delivery, and capital investment.

This goal emphasizes the importance of making investments throughout the city and connecting every neighborhood. It also promotes the idea that people in every neighborhood should have a voice in helping to design their communities' best bicycle facilities.

Livability: Build vibrant and healthy communities by creating a welcoming environment for bicycle riding.

This goal highlights the broader benefits of building a connected, safe bicycling network, which include increasing public health and community vitality.

Objectives

The plan identifies six principle objectives that summarize how the goals of the plan will be achieved. Chapters 4–7 go into more detail identifying specific strategies and actions for advancing these objectives.

Objective 1: Complete and maintain a safe, high-quality bicycle network of on-street and trail facilities throughout the city.

One of the most important outcomes of this plan is developing a safe, connected network of bicycle facilities. Chapter 4 outlines a future bicycle network that connects destinations within the city. The prioritization of the plan network is laid out in more detail in Chapter 7. Projects will generally be prioritized based on how they meet the goals of the plan (increasing ridership, safety, connectivity, etc.).

Objective 2: Integrate planning for bicycle facilities with all travel modes and complete streets principles.

Planning for bicycles cannot happen in a vacuum. The city's arterial street system has many modal demands: transit, freight, pedestrians, bicyclists, general-purpose traffic capacity, and on-street parking. All of these compete for space within the city's limited street right-of-way. As the city grows in the future, the city's streets will need to accommodate all users of the roadway to improve the mobility of people and goods in the safest and most efficient way possible.

Objective 3: Employ best practices and context sensitivity to design facilities for optimum levels of bicycling comfort.

This objective directs SDOT to stay current on changes in bicycle standards, design, programs, and other actions. It enables the city to use new bicycle design standards and facility types as they evolve. While the plan contains a glossary of bicycle facilities, this plan intentionally does not contain a full list of detailed design standards. These are better contained in the Seattle Right-of-Way Improvements Manual, where they can be more easily updated as best practices evolve. As the city updates the Right-of-Way Improvement Manual it should consider design standards incorporated in NACTO's Urban Bikeway Design Guide. Context sensitivity is important to ensure that bicycle facilities are designed and built taking into consideration the overall characteristics of the street, the adjoining land use types, and



Bicycle lane on 9th Avenue North.

other factors. This applies not only to bicycle corridor improvements, but end-of-trip facilities such as on-street bicycle corrals or other bicycle parking, storage, or maintenance needs.

Objective 4: Build leading-edge bicycle facilities, including on-street separated facilities, multi-use trails, and neighborhood greenways.

This plan focuses on neighborhood greenways (residential streets that are prioritized for bicycles and pedestrians) and facilities on arterials that are separated from traffic (cycle tracks and buffered bicycle lanes), as well as completing the city's multi-use trail system. These facilities will help develop a connected citywide network for people of all ages and abilities.

Objective 5: Update and apply a prioritization framework for bicycle investments throughout the city.

One of the most important aspects of each city modal plan is to develop a clear framework for how to prioritize investments. This plan has a 20-year time horizon, and will be implemented incrementally using a clear prioritization framework that is based on the overall goals of the plan. The specific criteria within the framework can be adjusted over time, but the plan provides the overall direction. Programmatic elements that focus on safety, educating all roadway users on the rules of the road, and encouraging people to ride bicycles will also be prioritized.

Objective 6: Identify and implement actions to support and promote bicycle riding.

In addition to developing bicycle facilities in streets and on trails, other actions are needed to support bicycling. These include designing and implementing end-of-trip facilities; ensuring that bicycling is well-coordinated with transit; implementing programs to enhance bicycle safety, use, and education; and developing a robust funding strategy. The Puget Sound Bike Share launch in 2014 will be a key program to help promote bicycle riding.

"Puget Sound Bike Share is a *partnership* of public and private organizations working to bring bike sharing to King County. Bike sharing is an *innovative* approach to urban mobility, combining the *convenience* and *flexibility* of a bicycle with the *accessibility* of public transportation.

puget sound bike share



A recently renovated segment of the Burke-Gilman Trail on the University of Washington Campus provides separate space for bicyclists and pedestrians.

Seattle Comprehensive Plan

The Seattle Comprehensive Plan, Toward a Sustainable Seattle, establishes the city's vision for land use, transportation, and growth management policy issues. The Plan is organized around a set of four core values:

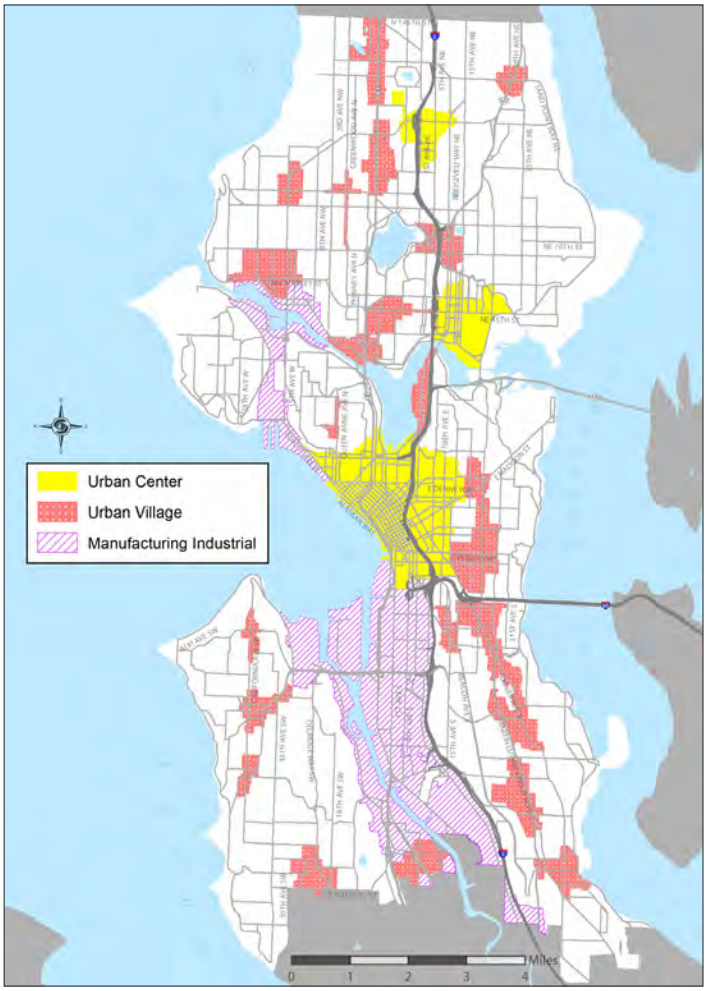
- Community
- Environmental Stewardship
- Economic Opportunity and Security
- Social Equity

With these core values in mind, one of the primary methods for accommodating expected growth is the plan's Urban Village Strategy, which identifies locations for increased residential and commercial density in parts of the city characterized by neighborhood business districts. The plan also includes six regional growth centers (also known as urban centers): Downtown, First Hill/Capitol Hill, Uptown/Queen Anne, South Lake Union, the University District, and Northgate. These areas are a focus of growth within the city and the region. Additionally, Seattle has two manufacturing/industrial centers. All of these centers are recognized in Vision 2040, the Puget Sound Regional Council's (PSRC) adopted regional growth plan. Map 3-1 shows the location of urban centers, urban villages, and manufacturing/industrial centers within Seattle.

Much of the policy direction in the Transportation Element of the Comprehensive Plan is designed to promote multimodal transportation options within and between urban centers and villages.

The overall policy direction in the Transportation Element of the Comprehensive Plan helps frame the more specific goals, policies, and strategies in other documents, including the BMP. The Transportation

Map 3-1: Seattle's Urban Centers, Urban Villages, and Manufacturing Industrial Centers



Element of the plan and the Transportation Strategic Plan contain the following goals and policies pertaining to bicycling:

TG15 Increase walking and bicycling to help achieve city transportation, environmental, community and public health goals.

TG16 Create and enhance safe, accessible, attractive and convenient street and trail networks that are desirable for walking and bicycling.

T34 Provide and maintain a direct and comprehensive bicycle network connecting urban centers, urban villages and other key locations. Provide continuous bicycle facilities and work to eliminate system gaps.

Other applicable goals and policies in the Comprehensive Plan Transportation Element include:

TG18 Recognize that the primary transportation purpose of the arterial street system is to move people and goods, when making on-street parking decisions.

T39 Restrict on-street parking when necessary to address safety, operational or mobility problems. In urban centers and urban villages where such restrictions are being considered, the pedestrian environment and transit operations are of primary concern, but decisions should also balance the use of the street by high-occupancy vehicles; access to local businesses; control of parking spillover into residential areas; and truck access and loading.

Complete Streets

In addition to the Comprehensive Plan, in 2007 the City Council adopted a "complete streets" policy, which states in part that:

- The city will plan for, design and construct all new city transportation improvement projects to provide appropriate accommodation for pedestrians, bicyclists, transit riders, and persons of all abilities, as well as freight and other motorists, while promoting the safe operation for all users; and
- The city will incorporate complete streets principles into SDOT's Strategic Plan; Seattle Transit Plan; Pedestrian and Bicycle Master Plans; Intelligent Transportation System Strategic Plan; and other SDOT plans, manual, rules, regulations and programs, as appropriate. Complete street improvements that are consistent with freight mobility, but also support other modes, may be considered on these streets

Climate Action Plan

The Climate Action Plan, 2013 update adopted by the City Council, provides a framework for meeting Seattle's climate protection goals including the overarching goal of becoming carbon neutral by 2050. Road transportation is a critical focus of the Climate Action Plan as Seattle's largest source of greenhouse gas (GHG) emissions, comprising approximately 40% of 2008 community emissions. These emissions come from fossil fuels burned by vehicles as they travel through the city moving people and goods. Passenger transportation represents over a third of all road emissions and is the transportation source where city action can have the greatest impact.

The city's 2030 goal is to reduce GHG emissions from passenger vehicles by 82% and vehicle miles traveled by 20%, with a specific target of tripling the amount of bicycling. A key strategy in the plan to meet these goals is to implement new on- and off-street bicycle facilities and services to accommodate riders of all ages and abilities in order to increase the share of trips made by bicycle and thereby reducing vehicle miles traveled and GHG emissions. The technical report prepared in support of the Climate Action Plan noted that investments in bicycle facilities and services are highly cost effective opportunities to reduce GHG emissions.

The Climate Action Plan is implemented through related plans developed and executed across multiple departments, including the BMP. Consistent with the BMP, the Climate Action Plan's vision for transportation infrastructure and service includes:

- There is a bicycle facility within ¼ mile of every home in Seattle.
- Protected/buffered on-street bicycle lanes and greenways connect Urban Centers and Villages.

To realize the goals and vision, the Climate Action Plan highlights the importance of funding and implementing the city's modal plans, including the BMP, and highlights the following actions pertaining to bicycling:

Actions to be implemented by 2015

- Build bicycle lanes that are physically separated from traffic in the Center City.
- Expand on-street bicycle racks and facilitate provision of off-street bicycle parking and bike sharing.
- Implement bicycle intersection safety improvements on heavily traveled bicycle corridors.
- Consider a transportation modal hierarchy as part of the 2015 Comprehensive Plan update in order to address greenhouse gas reductions, safety, mobility and funding priorities.

Actions to be implemented by 2030

- Develop a comprehensive, connected network of safe and comfortable bicycle facilities to, from and within the Center City and Urban Villages.
- Develop a citywide network of neighborhood greenways that prioritize walking and bicycling on residential streets.



Workers installing a cycle track (protected bicycle lane).


MARKET ST
NO TURN ON
CHASE

NETWORK



"When thinking about bicycle facilities, think about making it easy and safe for people to go where they go most: schools, grocery stores, neighborhood commercial districts and transit hubs. That means not only making it safe to get there, but making it easy to lock up your bike once you're there, find the appropriate bike route (way-finding) and connect to transit."

City Council funded the update to the BMP and provided specific policy direction to SDOT, including:

- incorporate best practices, including the National Association of City Transportation Officials (NACTO) bicycle design guidelines
- integrate neighborhood greenways and cycle tracks into the bicycle network, and
- identify routes for cycle tracks and neighborhood greenways

The current best practices for creating safe streets for the broadest range of people riding bicycles are cycle tracks, neighborhood greenways, and off-street facilities. By coordinating with the recently completed pedestrian and transit plans and identifying the best routes to employ the cycle tracks and greenways, the resulting plan is a bicycle facility network where people feel safe and comfortable riding their bicycle from their neighborhood to any destination within the city.

IN THIS CHAPTER:

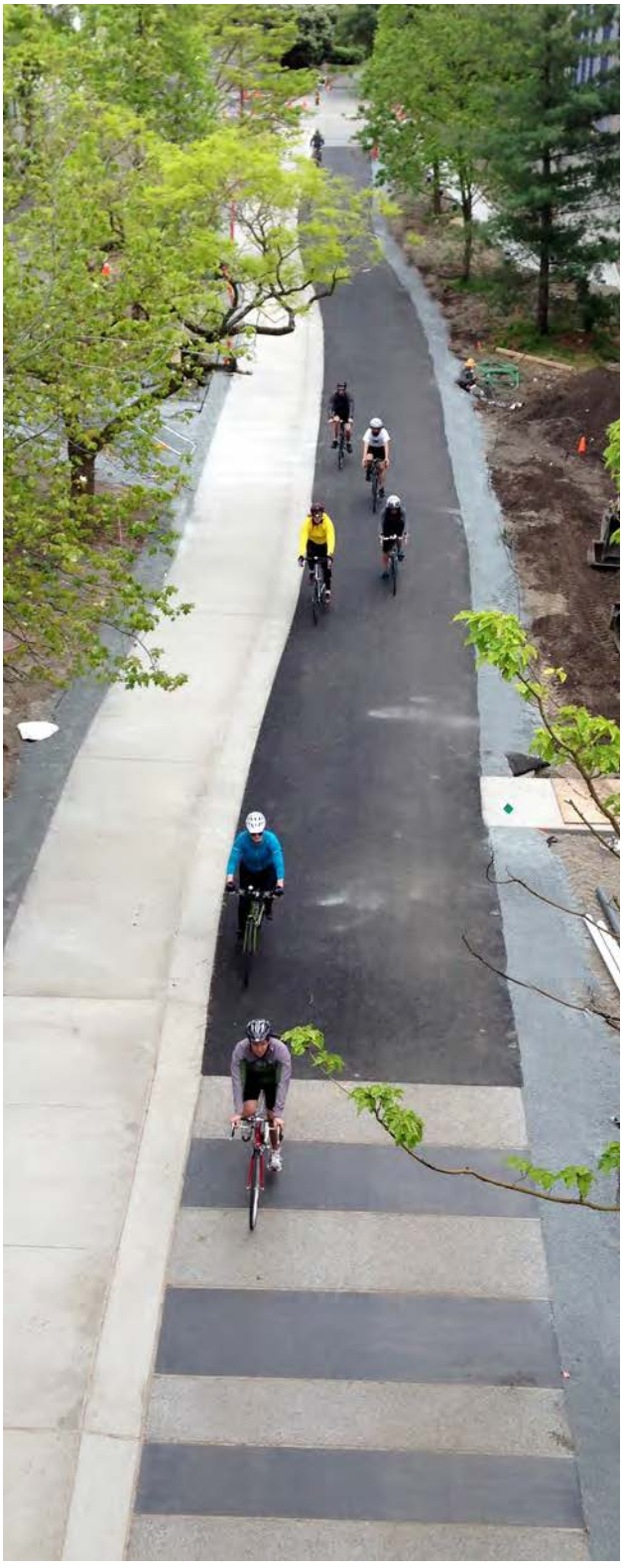
Bicycle Network Development 36
Extensive public outreach and a collaborative planning process led to the proposed bicycle network.

The Bicycle Network Map 41
The proposed bicycle network of a citywide network and local connectors is shown in a series of sector maps.

Bicycle Facility Design 54
Developing an all ages and abilities network requires a planned approach to match intersection treatments with the surrounding context as well as to increase the predictability of people riding bicycles at conflict points.

Bicycle Facilities Visual Glossary 56
Bicycle facility types and terms used throughout the plan are described and shown in a visual glossary.

Multimodal Corridors 70
A process developed for accommodating bicyclists on parallel to multimodal corridors, which are arterials identified for bicycle improvements that have also been identified to serve transit and freight needs.



This section of the Burke-Gilman Trail is a bicycle facility that riders of all ages and abilities can comfortably use.

Bicycle Network Development

The proposed bicycle network map is the result of a collaborative planning process involving both extensive public input and technical analysis. The overall purpose of the proposed network map contained in the plan is to recommend the appropriate facility type and location in order to plan, design, and ultimately build a bicycle network that implements the goals of the BMP: provide a safe and connected bicycle network throughout the city, thereby increasing the livability of Seattle's neighborhoods as more people ride their bicycles for all trip purposes

The proposed bicycle network map was designed in two distinct phases. For development of the first draft network map, SDOT considered public comments received in the spring and summer of 2012, during the first phase of public engagement (find the summary report in Appendix 1A). People were clear that they wanted facilities that increase safety for all road users. They also suggested specific locations for improvements. The project team considered this input and other data, including:

- The location of existing bicycle facilities and system gaps based on the 2007 BMP map.
- Connections between key destinations (or land uses) that have been ranked high, medium, and low (see Table 4-1) and groupings of those destinations to create destination clusters (see Map 4-1) that are likely to generate high bicycle ridership.[1] These connections are known as travel sheds, which are defined as the area that can be accessed by riding a defined distance on connected bicycle facilities from key destinations. For more information about the specific types of land uses considered and the relative ranking used to describe demand, see Appendix 7.
- The topography of Seattle. Hills are a major feature of the city's overall landscape, as well as a barrier to riding a bicycle for many people (see Map 4-2). The creation of the all ages and abilities network attempted to recommend flat routes to destinations, but this was not always possible due to the grades of Seattle's hills.

1 One specific item that was included in the key destinations is food providers. In October 2012, the City of Seattle finalized the Food Action Plan that contains four goals. Goal 1 is "Healthy Food for All" and includes a strategy to "promote the location of healthy food access points that can be reached by walking, bike, or transit by all residents."

Map 4-1: Destination Clusters Map

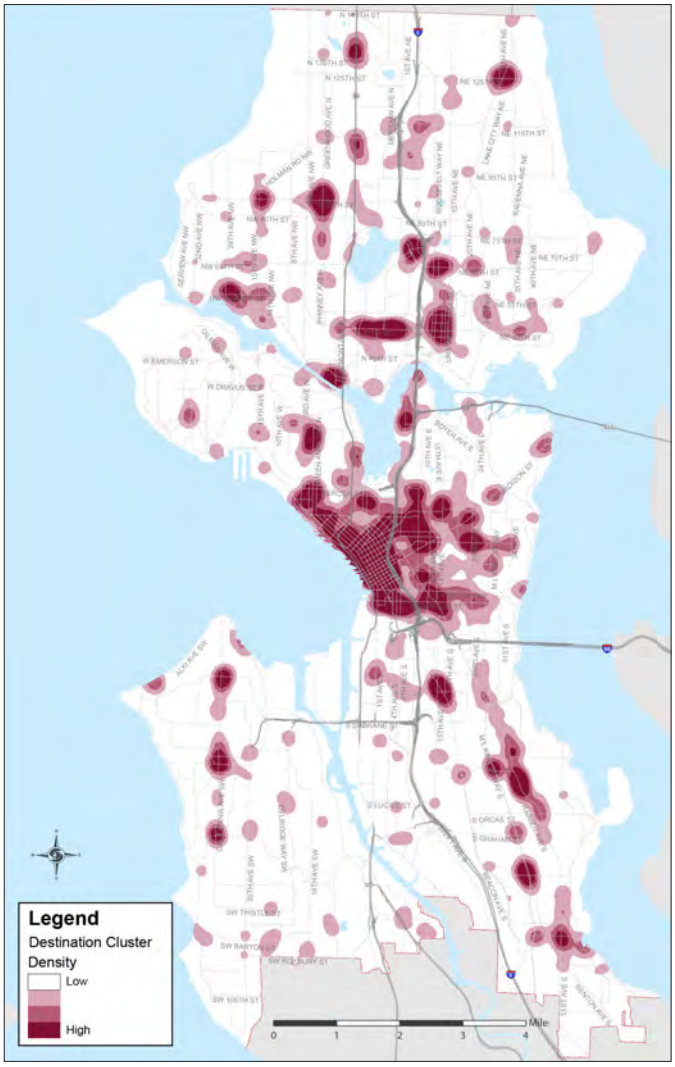
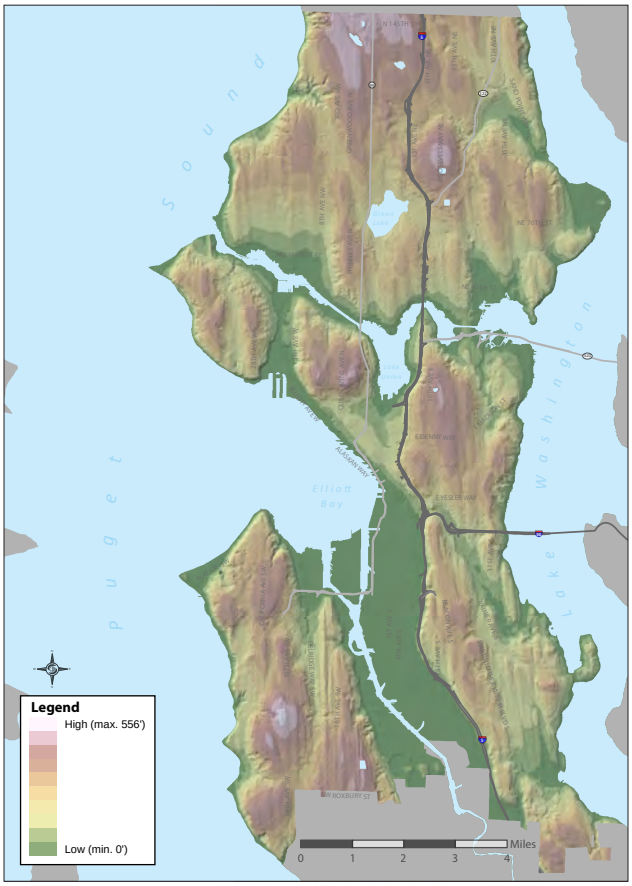


Table 4-1: Ranking of Destinations

Ranking	Destinations
High	University or college, large employers, major transit stations, neighborhood businesses, schools, neighborhood parks
Medium	Transit hubs, community centers and libraries, minor destinations, large parks, food providers (grocery store, farmer's market, p-patch gardens, produce stand, food banks)
Low	Large retail centers, other major entertainment destinations

Map 4-2: Seattle Area Topography



Seattle is a city of hills, and the bicycle facility network must reflect that. Appropriate facilities must provide both the space needed to slowly weave uphill and the accommodations to safely descend.

- Existing street characteristics. On-street bicycle facilities are highly influenced by the overall street character, such as posted speed limits, the amount of daily traffic, and the street classification.
- Designations in other modal plans. The city has adopted a number of other plans, including a Transit Master Plan and Pedestrian Master Plan, which also highlight desired improvements for these modes, and the Transportation Strategic Plan, which includes Major Truck Streets.

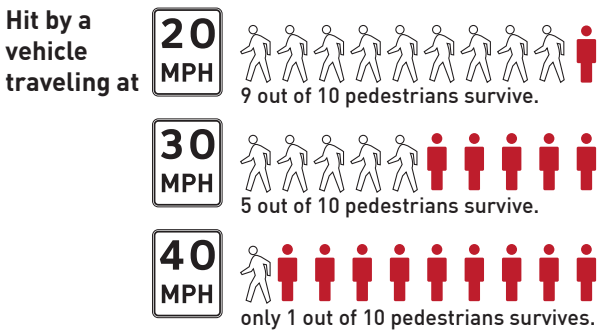
Bicycle Facility Designations

SDOT developed a set of guidelines to help determine what type of bicycle facility would generally work best on a street based on its characteristics (see Table 4-2). Recommended bicycle facilities include a range of options from shared streets to cycle tracks (protected bicycle lanes) with the goal of making riding a bicycle accessible to people of all ages and abilities. The guidelines were developed from international and US principles that reflect the need for greater bicycle separation on streets that have high motor vehicle volumes and speeds. While every facility type recommended in the plan does not follow these specific facility guidelines in Table 4-2, the criteria helped in determing the overall network. Some deviation of the guidelines occurred in order to create a connected all ages and abilities bicycle network.

Higher speeds increase the probability of fatal injury when a person driving a vehicle collides with a pedestrian.[2] While much of the research completed to date applies to pedestrians, it is likely that a person riding a bicycle would experience the similar outcome if in a collision with a fast moving motorist. Figure 4-1 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. As SDOT's number one priority is safety for all road users, it is important to focus on the impact that motorist speed has on both pedestrians and people riding bicycles. Lower travel speeds for vehicles make bicycling safer and more attractive and streets safer as a whole.

The Washington Neighborhood Safe Streets Bill, enacted by the Washington State Legislature and signed by Governor Inslee in spring 2013, allows SDOT to design all neighborhood greenways to a maximum of 20 miles per hour (mph), which greatly

Figure 4-1: Pedestrian Survival Rate by Vehicle Impact Speed



SOURCE: FHWA. *PEDESTRIAN SAFETY STRATEGIC PLAN: BACKGROUND REPORT.* 2010.

2 World Health Organization, 2008, and OECD Transport Research Centre, 2006

A New Tool, the Washington Neighborhood Safe Streets Bill:

The bill is a simple way to improve safety by allowing municipalities to lower the speed limit on non-arterial, mostly residential streets without the need for a cost-prohibitive transportation study.

Enacted by the Washington State Legislature and signed into law by Governor Inslee in spring 2013.

influences the safety for all users of non-arterial streets. A result will be streets that more people will be comfortable using as a means of transportation while enhancing neighborhood livability.

The Recommended Bicycle Network

The bicycle network was divided into two categories to increase legibility of the network and to clearly define an all ages and abilities network. The two categories are a **Citywide Network** and **Local Connectors**.

The **Citywide Network** is a network of "all ages and abilities" bicycle facilities with comfortable separation from motor vehicles. This network is composed of cycle tracks (protected bicycle lanes), neighborhood greenways and multi-use trails connecting destination clusters. Streets on the **Citywide Network** provide short distance connections to neighborhood destinations, as well as connections to destination clusters across neighborhoods and throughout the city (see Map 4-1). People of all ages and abilities should be able to access all major destination clusters on this network. While the **Citywide Network** will be designed for all, bicyclists should always use their judgment in selecting routes that suit their experience and comfort level.

Table 4-2: Facility Designation Guidelines

Generalized Bicycle Facility Designation	Bicycle Facility Types	Posted Speed Limit (mph)	Average Daily Traffic (ADT) per day	Street Classification
Neighborhood greenway	Neighborhood Greenway	20	1,500 or less	Non-arterial
Shared street	Shared lane pavement marking (sharrow)	25 - 30	To be used due to ROW constraints or topography	Non-arterial and Collector/Minor arterials
In street, minor separation	Bicycle lane; Climbing Lane	30	8,000 or less	Collector arterial
	Buffered bicycle lane	30	15,000 or less	Collector/Minor arterials
Cycle tracks (protected bicycle lanes)	Physically separated (raised or with barrier on-street facility)	30 and greater	15,000 and above	Minor/Principal arterials
Off-street*	Multi-use trail	N/A	N/A	N/A

This chart illustrates a process to determine bicycle facility designations based on street designations as well as safety aspects. Other factors that affect bicycle facility selection beyond posted speed limit, street classification and volume include: topography, traffic mix of transit and freight vehicles, presence of on-street parking, intersection and driveway density, surrounding land use, and roadway width. These factors are not included in the facility designation chart above, but should always be a consideration in the project development and design process. Facilities may be designed to provide a higher level of safety and comfort than the minimums recommended here.

*Off-Street Trails may be developed opportunistically on corridors where there is available adjacent land, or on corridors with a special transportation function (e.g., sections of Alaskan Way)

A key objective for the **Citywide Network** was to address intersection safety. Intersection safety is an area of focus that the BMP addresses to provide more clarity for positioning of bicyclists and motorists, especially within the all ages and abilities network. Cycle tracks (protected bicycle lanes) provide greater predictability of people on bicycles, incorporates safer intersection treatments (potential conflict locations between bicyclists, pedestrians, and motor vehicle drivers), and allow for greater separation from motor vehicles.

Neighborhood greenways are a shared street environment on streets with low speeds and volumes of motorists that are safer and more pleasant for both people riding bicycles and walking. Arterial street crossings are crucial to improve so that people traveling on the neighborhood greenway can feel safe crossing the arterial intersection. Applicable intersection treatments are described further in this chapter, as well as within Appendix 4.

The **Local Connectors** network provides access to the **Citywide Network**, parallels the **Citywide Network**, and also serves destinations. While **Local Connectors** are composed of bicycle facility types appropriate for people of all ages and abilities, some segments will be served with conventional bicycle treatments, such as bicycle lanes or buffered bicycle lanes (In street, minor separation) and shared streets. **Local Connectors** are segments focused on connections within neighborhoods, to the **Citywide Network, and across the city**. Some of the bicycle facilities in the **Local Connectors** network help make connections to destinations and to the rest of the network for bicycle riders who are comfortable bicycling in or adjacent to traffic with no physical barrier. **Local Connectors** may provide more direct routes than routes suitable for bicycle riders of all ages and abilities.

Neighborhood greenways play a prominent role in both the **Citywide Network** and as a **Local Connector** facility type. The design elements of a neighborhood greenway (whether it be a part of the **Citywide Network** or a **Local Connector**) will be the same, as described further in the bicycle facilities visual glossary. The only difference is how



Biking to school on a future neighborhood greenway.

SDOT may split up the projects within the prioritization framework, as described in Chapter 7.

Upgrades of existing bicycle facilities are important to recognize as bicycle facility separation principles (the facility designation guidelines) have evolved since the 2007 BMP. There are examples of shared street bicycle facilities and bicycle lanes that have been implemented on streets that potential bicycle riders may not feel comfortable riding. Through a data-driven process, SDOT has identified existing bicycle facilities that should, over time, either be upgraded to a higher-quality bicycle facility type or decommissioned. The recommended upgrades will be included within the prioritization framework to determine when to pursue the installation of the higher-quality facility type. The existing facility still provides a connection to destinations and will remain as a part of the user map and maintained by SDOT until, as determined by the project development and design process, whether the facility should be removed with the implementation of the new, adjacent bicycle facility. Table 4-3 shows the breakdown of miles of existing bicycle facilities, recommended network improvements by facility type, and total network miles.

Table 4-3: Bicycle Facilities in the Recommended Bicycle Network (lengths in miles)

	Existing Network*	Proposed Network Improvements			Total Network	Percent of Total Network
		Upgraded to Existing Bicycle Facilities	*New Facilities*	*Total New or Upgraded Facilities to Build*		
Off Street	46.9	0	32.0	32.0	78.9	13%
Cycle Track (protected bicycle lane)	3.2	52.1	49.5	101.6	104.8	17%
Neighborhood Greenway	10.3	0	238.6	238.6	248.9	41%
In Street, Minor Separation	44.4	17.9	75.6	93.5	137.9	23%
Shared Street	30.0	0	7.8	7.8	37.8	6%
Total	**134.8**	**70.0**	**403.5**	**473.5**	**608.3**	**100%**

*Existing network totals include only existing facilities that meet the bicycle network facility designation guidelines or, in some cases, where right-of-way is limited and a higher-quality facility could not be implemented.

A small sub-set of the bicycle network are identified as catalyst projects. Catalyst projects are located at choke points in the network that pose significant challenges to implementation due to physical constraints. Catalyst projects, like the Burke-Gilman Trail missing link, also reduce critical barriers to bicycling by closing network gaps and increase safety by building all ages and abilities friendly bicycle facilities to the maximum feasible extent. The projects range from complicated intersections that serve all modes of transportation, including transit and freight, to new off-street connections and more out-of-the box ideas that help to overcome numerous topography and physical barriers that currently separate neighborhoods. The full bicycle network project list, including catalyst projects and associated project descriptions, are in Appendix 8.



Burke-Gilman Trail and trail etiquette signage.

Table 4-4: Recommended Citywide Network

Facility Designation	Length (in miles)
Cycle Track (protected bicycle lane)	102.4
Neighborhood Greenway	71.0
Off Street	52.8
Total	**226.2**

Table 4-5: Recommended Local Connectors

Facility Designation	Length (in miles)
Cycle Track (protected bicycle lane)	2.4
Neighborhood Greenway	177.9
Off Street	26.1
In Street, Minor Separation	137.9
Shared Streets	37.8
Total	**382.1**

The Bicycle Network Map

The recommended bicycle network map is shown by sector on Maps 4-3 through 4-8. There is also a full-sized map of all bicycle facilities in the city in the back pocket of the final plan. The map legend contains the following bicycle facility types within each category:

Citywide Network

- Off-Street
- Cycle Tracks (protected bicycle lanes)
- Neighborhood Greenways

Local Connectors

- Off-Street
- Cycle Tracks (protected bicycle lanes)
- Neighborhood Greenways
- In Street, Minor Separation
- Shared Streets

Catalyst Projects

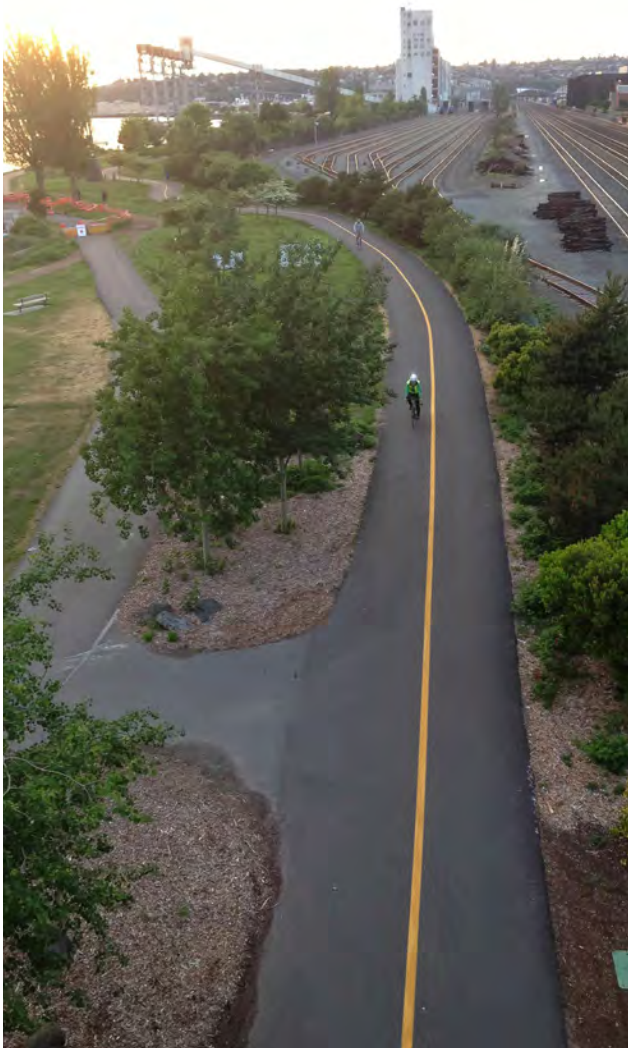
Catalyst projects are critical pieces of the future bicycle network, and their implementation will often be part of a larger regional infrastructure project. They are part of both network categories. There are 27 catalyst projects identified in the bicycle network shown in Map 4-9 and described in Appendix 8.

Building for Bicycle Riders of All Ages and Abilities

Bicycling needs to be a safe, pleasant, and convenient transportation option for the broadest array of people. Map 4-10 shows the proposed network of bicycle facilities most appropriate for riders of all ages and abilities, consisting of 432.2 miles of multi-use trails, cycle tracks (protected bicycle lanes), and neighborhood greenways.

Connecting to the Region

Connections to neighboring jurisdictions and other regional destinations will support the goal of increased bicycle ridership by providing for seamless regional bicycle travel. Map 4-11 shows how the City of Seattle recommended bicycle network connects to the regional bicycle system.

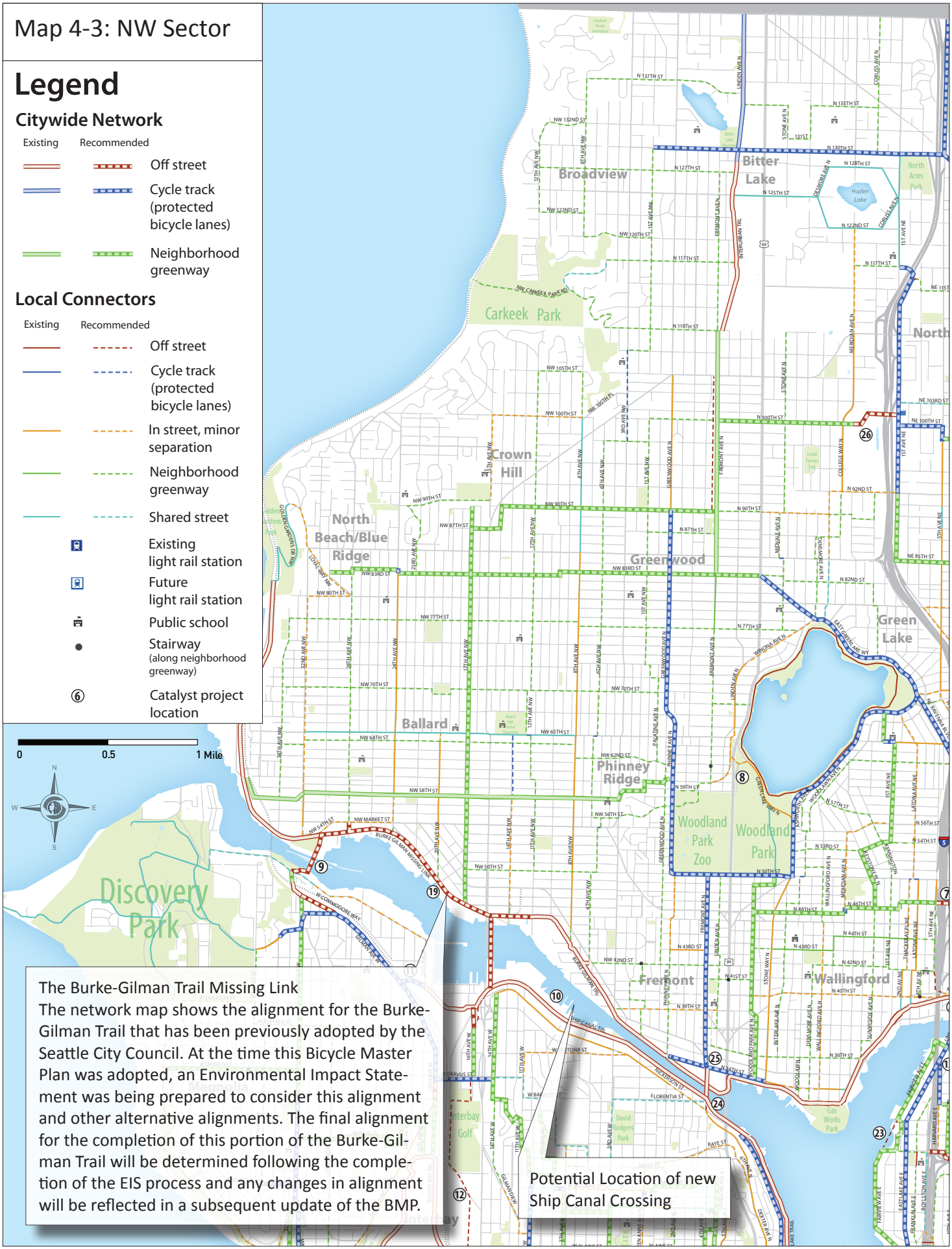


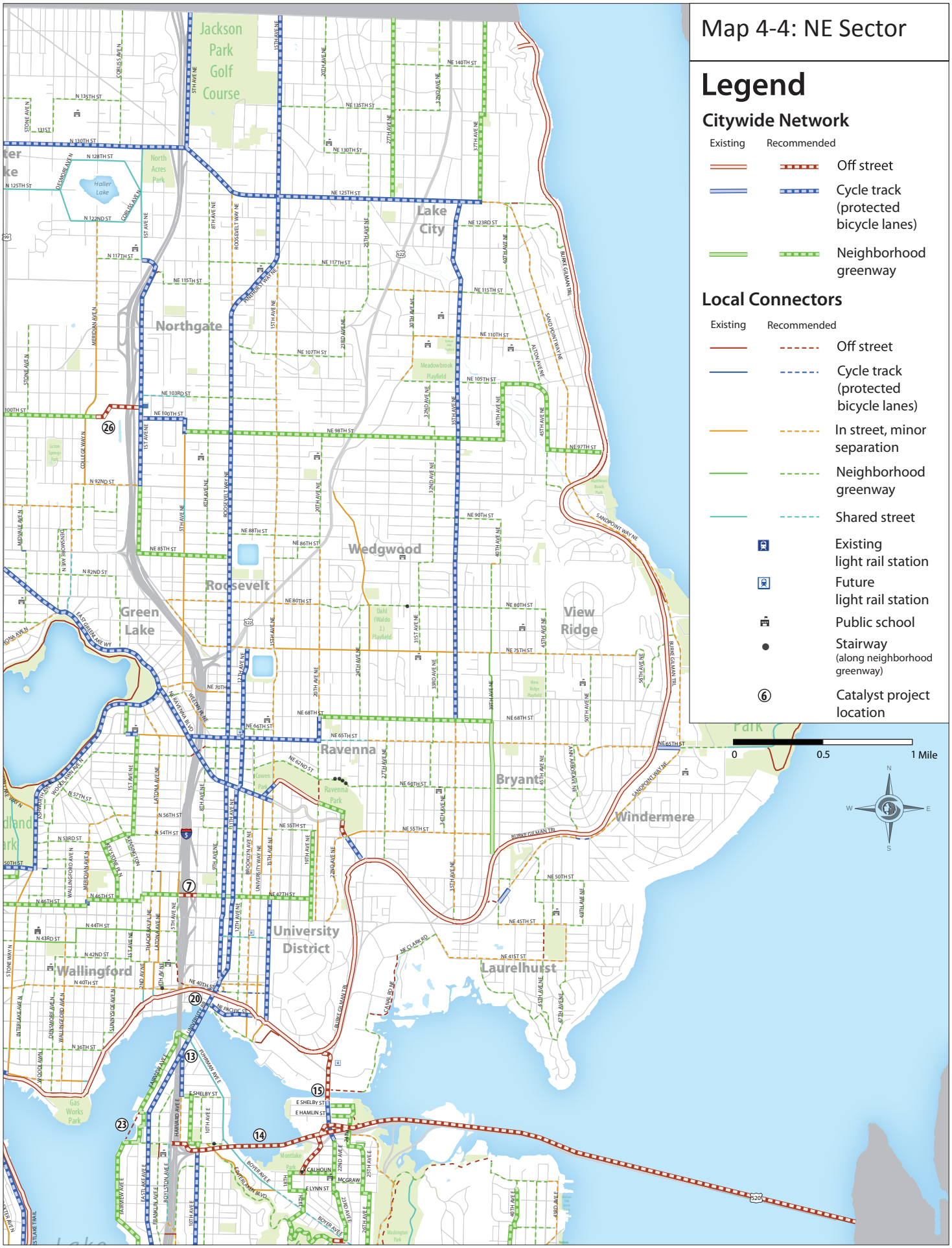
An overhead view of the Elliott Bay trail along the waterfront.



Rainier Valley Summer Streets Parade.

Map 4-3: NW Sector




Map 4-4: NE Sector
Legend
Citywide Network
Existing
Recommended
Off street
Cycle track (protected bicycle lanes)
Neighborhood greenway
Local Connectors
Existing
Recommended
Off street
Cycle track (protected bicycle lanes)
In street, minor separation
Neighborhood greenway
Shared street
Existing light rail station
Future light rail station
Public school
Stairway (along neighborhood greenway)
Catalyst project location
0
0.5
1 Mile
N
S
E
W
Jackson Park Golf Course
North Acres Park
Haller Lake
Lake City
Northgate
Meadowbrook Playfield
Wedgwood
Roosevelt
Green Lake
Dahl (Waldo J.) Playfield
View Ridge
Ravenna
Ravenna Park
Bryant
Windermere
University District
Wallingford
Laurelhurst
Gas Works Park
Montlake
Washington Park
Meridian Park
Matthews Beach Park
Licton Springs Park
Cowen Park
View Ridge Playfield
Aurora Ave N
Interlake Ave N
Stone Way N
Meridian Ave N
College Way N
Midvale Ave N
Greenwood Ave N
Phinney Ave N
Wallingford Ave N
Fremont Ave N
Latona Ave NE
Brooklyn Ave NE
University Way NE
Roosevelt Way NE
8th Ave NE
15th Ave NE
25th Ave NE
35th Ave NE
45th Ave NE
Sand Point Way NE
Burke Gilman Trl
Ravenna Blvd
NE 125th St
NE 130th St
NE 135th St
NE 145th St
N 128th St
N 122nd St
N 117th St
NE 115th St
NE 110th St
NE 107th St
NE 105th St
NE 103rd St
NE 100th St
NE 98th St
NE 97th St
N 92nd St
NE 90th St
NE 88th St
NE 86th St
NE 85th St
N 82nd St
NE 80th St
NE 75th St
NE 70th St
NE 68th St
NE 66th St
NE 65th St
NE 62nd St
NE 60th St
N 57th St
N 56th St
N 54th St
NE 55th St
N 53rd St
N 50th St
N 46th St
NE 47th St
N 44th St
N 43rd St
N 42nd St
N 40th St
NE 40th St
NE 50th St
NE 45th St
NE 41st St
N 36th St
E Shelby St
E Hamlin St
E Lynn St
Boyer Ave E
Calhoun
McGraw
Lauderdale Blvd
NE Clark Rd
NE Pacific St
Roanoke St
Harvard Ave E
Broadway Ave E
Boston St
Fairview Ave E
Yesler Way
Lake Washington Blvd
Interstate 5
State Route 520
State Route 522
State Route 99
Burke Gilman Trail
Sandpoint Way NE
Ann Arbor Ave NE
Latona Ave NE
Stone Way N
Aurora Ave N
Interlake Ave N
Meridian Ave N
Greenwood Ave N
Phinney Ave N
Wallingford Ave N
Fremont Ave N
Latona Ave NE
Brooklyn Ave NE
University Way NE
Roosevelt Way NE
8th Ave NE
15th Ave NE
25th Ave NE
35th Ave NE
45th Ave NE
Sand Point Way NE
Burke Gilman Trl
Ravenna Blvd
NE 125th St
NE 130th St
NE 135th St
NE 145th St
N 128th St
N 122nd St
N 117th St
NE 115th St
NE 110th St
NE 107th St
NE 105th St
NE 103rd St
NE 100th St
NE 98th St
NE 97th St
N 92nd St
NE 90th St
NE 88th St
NE 86th St
NE 85th St
N 82nd St
NE 80th St
NE 75th St
NE 70th St
NE 68th St
NE 66th St
NE 65th St
NE 62nd St
NE 60th St
N 57th St
N 56th St
N 54th St
NE 55th St
N 53rd St
N 50th St
N 46th St
NE 47th St
N 44th St
N 43rd St
N 42nd St
N 40th St
NE 40th St
NE 50th St
NE 45th St
NE 41st St
N 36th St
E Shelby St
E Hamlin St
E Lynn St
Boyer Ave E
Calhoun
McGraw
Lauderdale Blvd
NE Clark Rd
NE Pacific St
Roanoke St
Harvard Ave E
Broadway Ave E
Boston St
Fairview Ave E
Yesler Way
Lake Washington Blvd
Interstate 5
State Route 520
State Route 522
State Route 99
Burke Gilman Trail
Sandpoint Way NE
Ann Arbor Ave NE
26
7
20
13
15
14
23



Map 4-5: W Sector

Legend

Citywide Network

Existing	Recommended	
		Off street
		Cycle track (protected bicycle lanes)
		Neighborhood greenway

Local Connectors

Existing	Recommended	
		Off street
		Cycle track (protected bicycle lanes)
		In street, minor separation
		Neighborhood greenway
		Shared street
		Existing light rail station
		Future light rail station
		Public school
		Stairway (along neighborhood greenway)
		⑥ Catalyst project location



Map 4-6: E Sector

Legend

Citywide Network

Existing	Recommended	
		Off street
		Cycle track (protected bicycle lanes)
		Neighborhood greenway

Local Connectors

Existing	Recommended	
		Off street
		Cycle track (protected bicycle lanes)
		In street, minor separation
		Neighborhood greenway
		Shared street

- Existing light rail station
- Future light rail station
- Public school
- Stairway (along neighborhood greenway)
- ⑥ Catalyst project location



Map 4-7: SW Sector

Legend

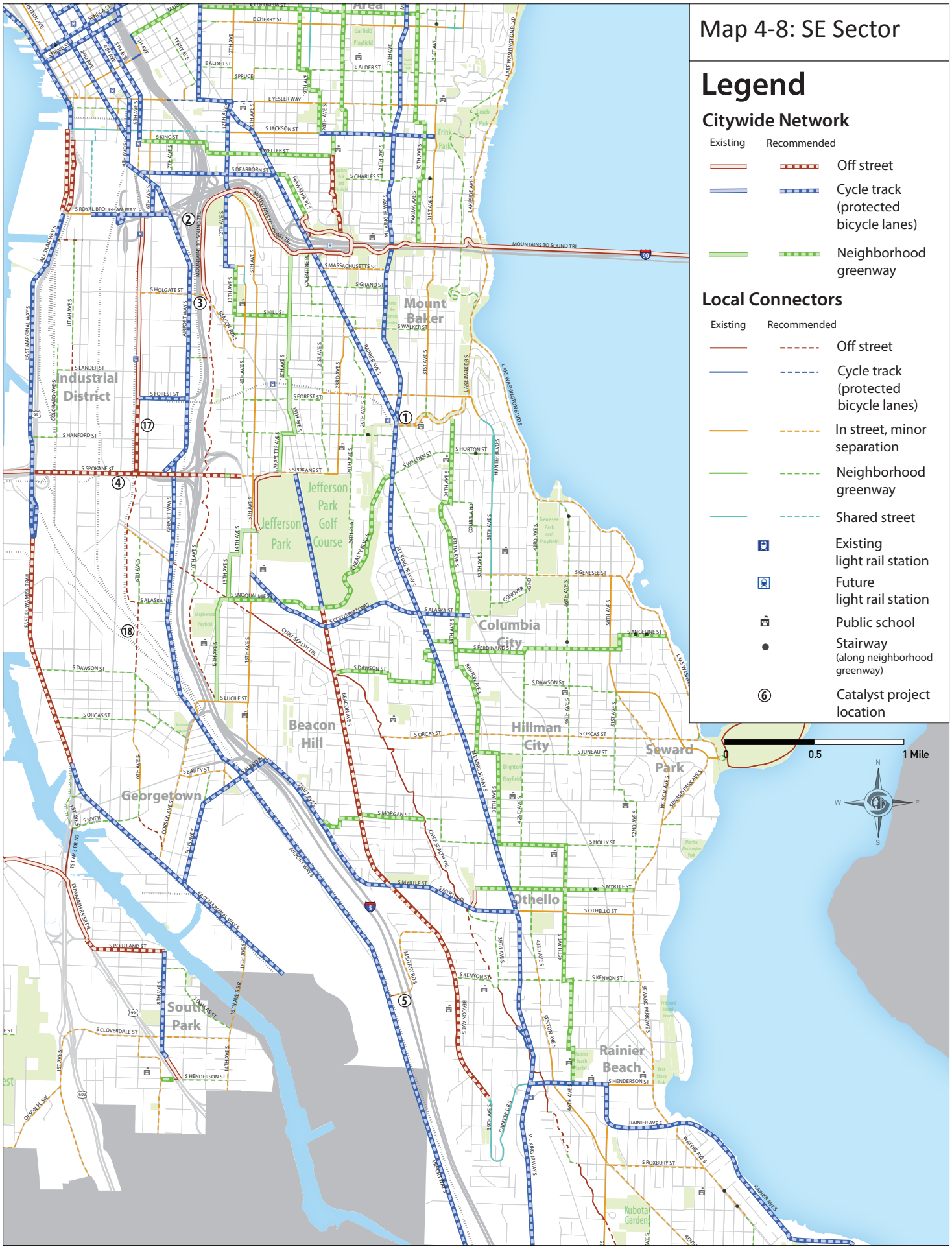
Citywide Network

Existing	Recommended	
		Off street
		Cycle track (protected bicycle lanes)
		Neighborhood greenway

Local Connectors

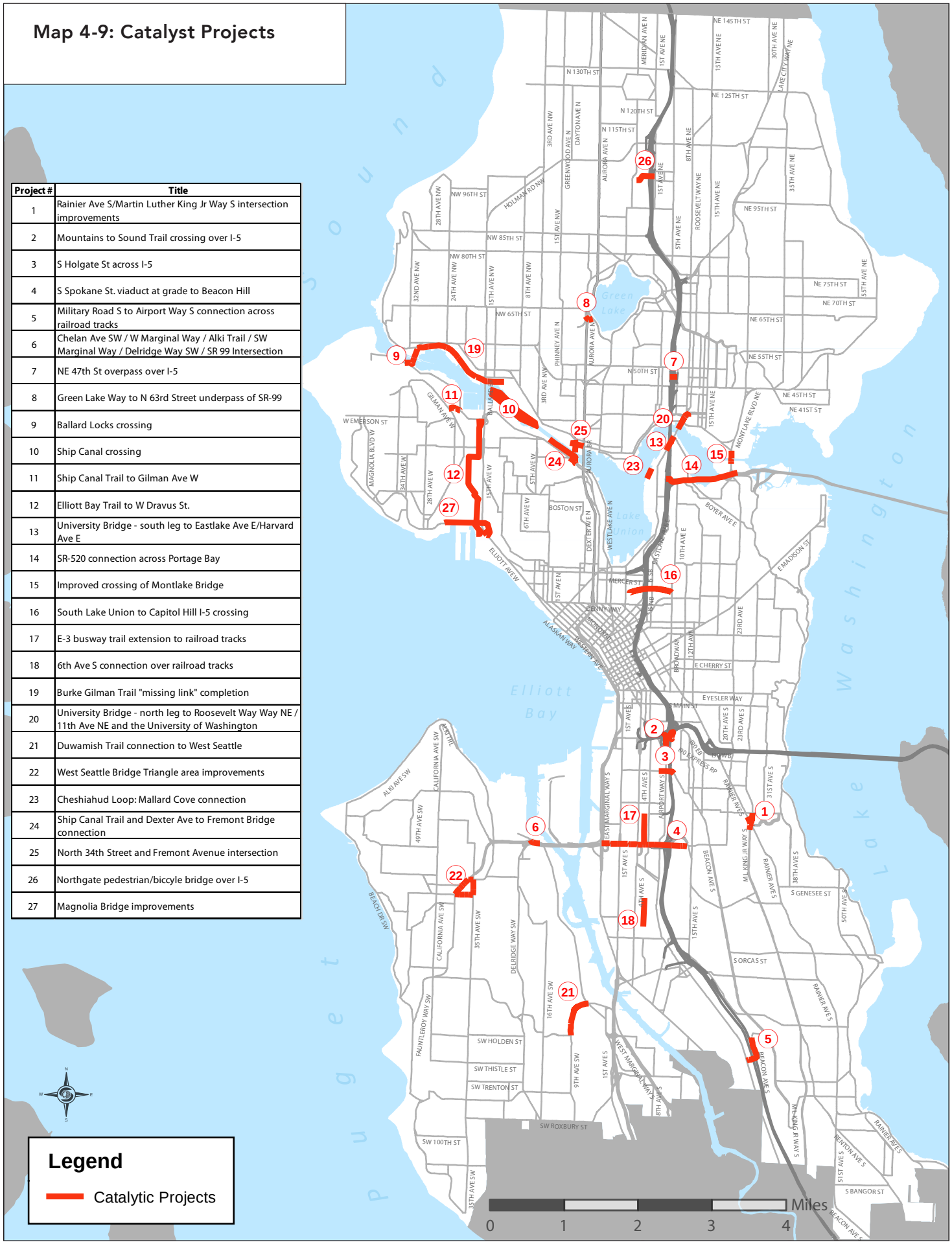
Existing	Recommended	
		Off street
		Cycle track (protected bicycle lanes)
		In street, minor separation
		Neighborhood greenway
		Shared street

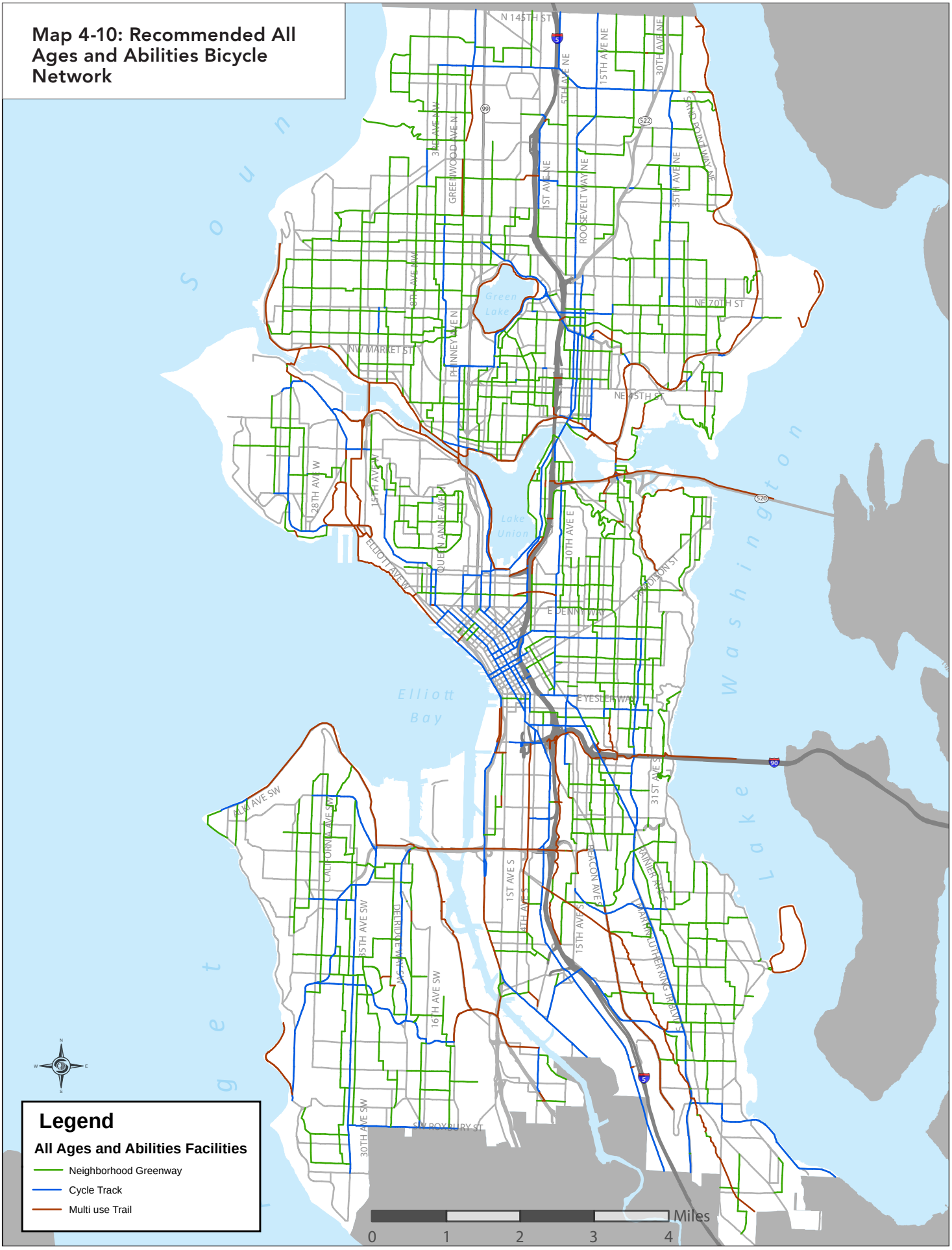
- Existing light rail station
- Future light rail station
- Public school
- Stairway (along neighborhood greenway)
- ⑥ Catalyst project location

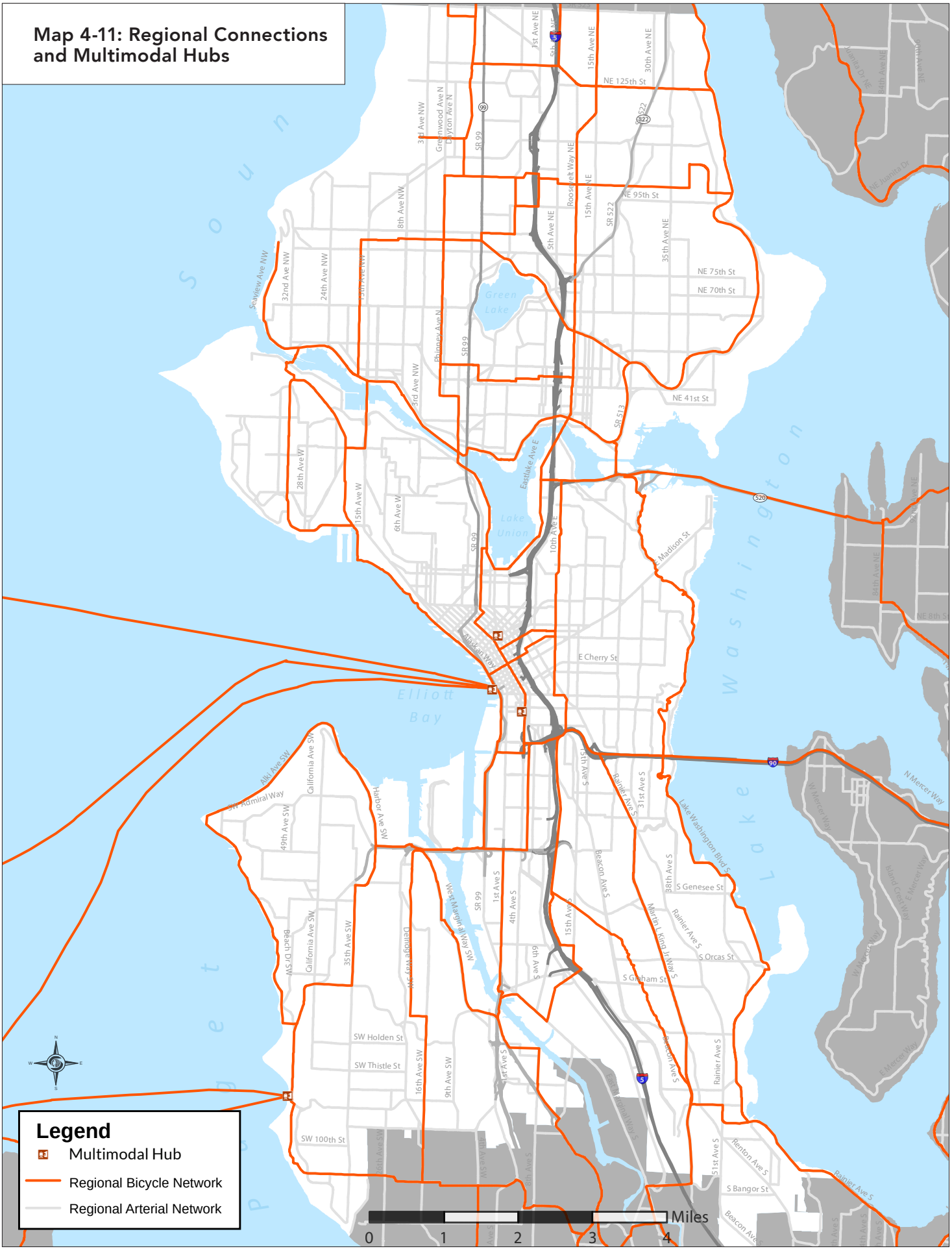

Map 4-8: SE Sector
Legend
Citywide Network
Existing
Recommended
Off street
Cycle track (protected bicycle lanes)
Neighborhood greenway
Local Connectors
Existing
Recommended
Off street
Cycle track (protected bicycle lanes)
In street, minor separation
Neighborhood greenway
Shared street
Existing light rail station
Future light rail station
Public school
Stairway (along neighborhood greenway)
Catalyst project location
0
0.5
1 Mile
N
W
E
S
Mount Baker
Industrial District
Jefferson Park
Jefferson Park Golf Course
Columbia City
Beacon Hill
Hillman City
Seward Park
Georgetown
Othello
South Park
Rainier Beach
Kubota Garden

Map 4-9: Catalyst Projects

Project #	Title
1	Rainier Ave S/Martin Luther King Jr Way S intersection improvements
2	Mountains to Sound Trail crossing over I-5
3	S Holgate St across I-5
4	S Spokane St. viaduct at grade to Beacon Hill
5	Military Road S to Airport Way S connection across railroad tracks
6	Chelan Ave SW / W Marginal Way / Alki Trail / SW Marginal Way / Delridge Way SW / SR 99 Intersection
7	NE 47th St overpass over I-5
8	Green Lake Way to N 63rd Street underpass of SR-99
9	Ballard Locks crossing
10	Ship Canal crossing
11	Ship Canal Trail to Gilman Ave W
12	Elliott Bay Trail to W Dravus St.
13	University Bridge - south leg to Eastlake Ave E/Harvard Ave E
14	SR-520 connection across Portage Bay
15	Improved crossing of Montlake Bridge
16	South Lake Union to Capitol Hill I-5 crossing
17	E-3 busway trail extension to railroad tracks
18	6th Ave S connection over railroad tracks
19	Burke Gilman Trail "missing link" completion
20	University Bridge - north leg to Roosevelt Way Way NE / 11th Ave NE and the University of Washington
21	Duwamish Trail connection to West Seattle
22	West Seattle Bridge Triangle area improvements
23	Cheshiahud Loop: Mallard Cove connection
24	Ship Canal Trail and Dexter Ave to Fremont Bridge connection
25	North 34th Street and Fremont Avenue intersection
26	Northgate pedestrian/biccyle bridge over I-5
27	Magnolia Bridge improvements




Map 4-10: Recommended All Ages and Abilities Bicycle Network
N 145TH ST
15TH AVE NE
30TH AVE NE
5TH AVE NE
35TH AVE NE
ROOSEVELT WAY NE
1ST AVE NE
GREENWOOD AVE N
3RD AVE NW
8TH AVE NW
PHINNEY AVE N
NW MARKET ST
NE 70TH ST
NE 45TH ST
28TH AVE W
15TH AVE W
QUEEN ANNE AVE N
ELLIOTT AVE W
10TH AVE E
LYNDON ST
E DENNY WAY
EYESLER WAY
Elliott Bay
Lake Washington
31ST AVE S
ALKI AVE SW
CALIFORNIA AVE SW
1ST AVE S
4TH AVE S
15TH AVE S
BEACON AVE S
RAINIER AVE S
MARTIN LUTHER KING JR WAY S
DELRIDGE WAY SW
35TH AVE SW
16TH AVE SW
30TH AVE SW
SW ROXBURY ST
Legend
All Ages and Abilities Facilities
Neighborhood Greenway
Cycle Track
Multi use Trail
Miles
0
1
2
3
4


Map 4-11: Regional Connections and Multimodal Hubs
Legend
Multimodal Hub
Regional Bicycle Network
Regional Arterial Network
Miles
0
1
2
3
4
Puget Sound
Lake Washington
Elliott Bay
Lake Union
Green Lake
NE 125th St
NE 95th St
NE 75th St
NE 70th St
NE 41st St
E Madison St
E Cherry St
Aurora Ave N
SR 99
SR 522
SR 513
SR 520
I-5
I-90
Seaview Ave NW
32nd Ave NW
24th Ave NW
20th Ave NW
8th Ave NW
3rd Ave NW
Phinney Ave N
Greenwood Ave N
Dayton Ave N
28th Ave W
15th Ave W
6th Ave W
Eastlake Ave E
10th Ave E
Roosevelt Way NE
15th Ave NE
5th Ave NE
35th Ave NE
30th Ave NE
Alki Ave SW
SW Admiral Way
California Ave SW
49th Ave SW
Harbor Ave SW
35th Ave SW
Beach Dr SW
Fauntleroy Way SW
SW Holden St
SW Thistle St
16th Ave SW
9th Ave SW
SW 100th St
West Marginal Way SW
1st Ave S
4th Ave S
6th Ave S
15th Ave S
Beacon Ave S
Rainier Ave S
31st Ave S
38th Ave S
Martin L King Jr Way S
Lake Washington Blvd S
S Genesee St
S Orcas St
S Graham St
S Bangor St
51st Ave S
Renton Ave S
Airport Way S
E Marginal Way S
Alaskan Way
N Mercer Way
E Mercer Way
W Mercer Way
Island Crest Way
NE 8th St
Yesler Way

Strategies and Actions For the Bicycle Network

This chapter and those that follow provide detailed recommendations on strategies and implementation actions needed to meet the plan's five goals and six objectives.

Strategies guide the city on how to achieve progress toward realizing the plan's goals. Actions are specific tasks and duties to pursue for plan implementation.

The strategies and actions below provide direct, clear steps the city can take to implement the proposed bicycle network. As a project on the proposed bicycle network map is prioritized, it will move into the project development and design process. The bicycle improvements identified in the plan will require additional evaluation and analysis prior to implementation. This process could include public engagement, data collection and analysis, technical analysis, conceptual design alternatives, and preferred design. Through the project development and design process, facility types and locations of neighborhood greenways will be confirmed or may be modified based on feasibility analysis. Intersection analysis and appropriate intersection design treatments will be a part of every bicycle facility project. For more details regarding the project development and design process, go to Chapter 7: Implementation Approach.

Chapter 4 Strategies and Actions: Bicycle Network

Strategies	Actions
4.1 Implement the off-street (multi-use trail) bicycle facility network	**4.1.1 Develop new multi-use trails.** Developing off-street bicycle facilities outside the public right-of-way will require additional feasibility analysis and agreements with land owners.
	4.1.2 Incorporate best practice crossing design treatments into every new multi-use trail project.
	4.1.3 Develop multi-use trails "etiquette" signs, and other creative means, to educate users traveling along the trail.
	4.1.4 Assess multi-use trail lighting needs and work with Seattle City Light (SCL) to provide adequate trail lighting.
	4.1.5 Install wayfinding with all off-street bicycle facility projects.



Walking and biking along the Burke-Gilman Trail.

Strategies	Actions
4.2 Implement cycle tracks (protected bicycle lanes) as part of the bicycle facility network	**4.2.1 Research best practices for cycle track design** and create standards. Standards needed include: • Pedestrian needs, implementing the Americans with Disabilities Act, to configure cycle track designs at intersections that are understandable for all people crossing the cycle track, as well as placement of push buttons and tactile warning strips • Emergency vehicle access needs and ways to design the cycle track that allows vehicles to either mount or enter into the cycle track • Snow removal, sweeping and other maintenance activities • Commercial load zones and driveways to encourage business vitality and access • Traffic signals
	4.2.2 Develop cycle tracks. Implementation of a cycle track may be a multi-year process. Determine the feasibility of constructing a proposed cycle track during the project development and design process. If through the process SDOT determines that a proposed cycle track is not feasible, implement a neighborhood greenway on a parallel street to provide an all ages and abilities bicycle connection to destinations and assess the feasibility of a buffered bicycle lane or bicycle lane on the arterial. When a neighborhood greenway is developed, focus on the user experience by: • installing signage directing people bicycling to destinations on the arterial • installing on-street bicycle corrals prior to the arterial provides a place for people on bicycles to park their bicycles and walk to their destination along the arterial (if they are not comfortable bicycling on the arterial without a bicycle facility)
	4.2.3 Coordinate private development projects and other agency infrastructure projects as they arise to be opportunistic about preserving the right-of-way space along a corridor where a cycle track is proposed. Use the street/alley vacation process, when applicable, to encourage a private developer to achieve public benefit requirements by designing and constructing a cycle track along the building frontage.
	4.2.4 Partner with transit agencies during project development and design to implement cycle tracks along transit corridors to allow for a continuous lane for people riding bicycles. Possible design strategies include transit bus islands or bringing bicycle riders to the sidewalk level. Consider the needs of both people on bicycles and pedestrians/transit users.
	4.2.5 Work with the freight advisory board during project development and design to implement cycle tracks along Major Truck Streets.
	4.2.6 Design downhill cycle tracks with a focus on potential bicycle travel speed and use separation methods that will not become a safety concern for people on bicycles or for other users of the roadway.
	4.2.7 Develop educational tools that teach all users of the roadway (bicyclists, pedestrians, and motorists) about cycle tracks.
	4.2.8 Install wayfinding with all cycle track bicycle facility projects.
4.3 Implement neighborhood greenways as part of the bicycle facility network	**4.3.1 Develop neighborhood greenways.** Implementation may not follow the exact non-arterial street identified in the plan, but rather the final route will be determined during the project development and design process. Focus on arterial street crossing improvements.
	4.3.2 Focus on the user experience. Improve connections to arterial streets by installing destination signage and on-street bicycle corrals that allow people to park their bicycles and walk to destinations on arterial streets. Work with partners/adjacent land owners to incorporate resting locations with benches.
	4.3.3 Assess pedestrian infrastructure and amenities during the design of each project to identify priority locations, and refer to the Pedestrian Master Plan.
	4.3.4 Add staircase runnels to all SDOT-owned staircases where a neighborhood greenway route utilizes a staircase for connectivity.
	4.3.5 Install wayfinding with all neighborhood greenway bicycle facility projects.

Strategies		Actions
4.4	Implement in street, minor separation bicycle facilities as a part of the bicycle facility network	**4.4.1 Develop in street, minor separation bicycle facilities.** Bicycle lanes or buffered bicycle lanes help make connections between destinations and to the citywide all ages and abilities network.
		4.4.2 Design in street, minor separation bicycle facilities with adequate width from adjacent on-street parking to help prevent door zone conflicts.
		4.4.3 Install wayfinding with all in street, minor separation bicycle facility projects.
4.5	Implement shared street bicycle facilities as part of the bicycle facility network	**4.5.1 Develop shared street bicycle facilities.** Shared streets help provide important connections to destinations and to the rest of the network for people riding bicycles where it is not possible to implement a bicycle lane or buffered bicycle lane.
		4.5.2 Promote visibility of the person on the bicycle. Place shared lane markings in the center of the travel lane on streets with driveways and on-street parking to encourage bicycling outside of the door zone or in potentially low visibility conflict points.
		4.5.3 Install wayfinding with all shared street bicycle facility projects.
4.6	Implement catalyst projects	**4.6.1 Develop catalyst projects.** These projects are located at significant choke points in the network and are critical to providing network connectivity for people of all ages and abilities.
		4.6.2 Seek partnerships with other agencies and land owners to implement catalyst projects.
4.7	Implement upgrades of existing bicycle facilities	**4.7.1 Upgrade existing bicycle facilities** based on analysis of evaluation criteria.
		4.7.2 Determine if and when an existing bicycle facility should be decommissioned if an upgrade is not feasible or an adjacent corridor is implemented.
		4.7.3 Install wayfinding with all catalyst projects.
4.8	Install bicycle detection at traffic signals in every new bicycle facility, as well as with all street replacement projects	**4.8.1 Develop bicycle detection standards.** Standardize (technology, placement, leading detection needs, and confirmation tools) by bicycle facility type.
		4.8.2 Continue to experiment and test new bicycle detection technology to incorporate higher-quality detection and enhanced data collection tools.
		4.8.3 Develop educational tools that teach bicycle riders about bicycle detection, bicycle placement, and visual cues that confirm detection.
4.9	Coordinate bicycle network implementation with partners	**4.9.1 Develop regional wayfinding standards** to enhance bicycle system legibility and coherence.
		4.9.2 Coordinate with neighbor jurisdictions to create network connectivity.
		4.9.3 Coordinate with transit agencies for last-mile bicycle connections.
		4.9.4 Coordinate with Puget Sound Bike Share to integrate the bicycle network alignment with station locations. Having a high-quality bicycle network will be important for bike share users.
		4.9.5 Coordinate with partners to install staircase runnels on staircases not owned by the Seattle Department of Transportation that allow bicycle accessibility to various destinations.

Bicycle Facility Design

The following **Intersection Treatment Selection** and **Bicycle Facilities Visual Glossary** sections provide brief descriptions and clear graphics to illustrate the "what" and "why" of the facilities recommended in the Plan. This section covers a range of facilities and intersection treatments. A more comprehensive glossary of bicycle facilities including end-of-trip facilities is presented in Appendix 3.

This glossary is not intended to represent detailed design standards. SDOT will develop more detailed design standards for these facilities as revisions to the Right-of-Way Improvements Manual, where they can readily be updated over time with current best practices and new design innovations. The glossary illustrates what the terms in the network map mean to help community members better understand these facilities, why they are important, and what they might mean for the future. This information will be used in educational materials for all roadway users.

Intersection Treatment Selection

The incorporation of bicycle-appropriate intersection design is important to create a safe and connected network, as well as to provide predictability for all modes. Better intersection design increases the awareness and visibility of people riding bicycles, helps bicyclists make safer intersection crossings, and encourages all modes to make more predictable approaches to and through an intersection.

The Intersection Treatment Selection Table will be used on a case-by-case basis to determine suitable intersection designs. Intersection treatments are categorized based on the type of street being crossed (arterial or non-arterial), as well as the type of bicycle facility. By using engineering judgement to select from this menu of intersection treatments, SDOT will practice more consistent design throughout the city. As intersection treatments continue to evolve, SDOT will keep up with best practices and update the table accordingly to improve intersection safety for all modes. A sample of the Intersection Treatment Selection Table is shown in Figure 4-2.; the full table is included in Appendix 4.

Figure 4-2: Sample Section of the Intersection Treatment Selection Table

Roadway Type:	**Collector Arterial**	
Auto Volumes:	<15,000 ADT	
Bicycle Facility Types	 (in street, minor separation) **Conventional Bike Lane** **Buffered Bike Lane**	
Cross Street Type:	**Non-arterial Crossings**	**Arterial Crossings**
Cross-Street Approach		• **Two-Stage Turn Box**
Intersection Treatment Options	• **Intersection Crossing Markings**	• **Intersection Crossing Markings** • **Median Diverter Island** • **Active Warning Beacons** • **Half Signal** • **Bicycle Signal** • **Full Signal** • **Green Bike Box** • **Combined Bike Lane/Turn Lane** • **Two-Stage Turn Box** • **Through Bike Lanes** • **Signal Detection** • **Forward Stop Bar** • **Offset Street Connection**

Strategies and Actions for Bicycle Facility Design

The following strategies will help Seattle achieve its safety and ridership goals by designing all bicycle facilities to the highest standards that currently exist. Additionally, the strategies encourage trying new designs that may achieve greater safety outcomes, thus encouraging more people to ride a bicycle for any trip purpose.

Chapter 4 Strategies and Actions: Bicycle Facility Design

Strategies	Actions
4.10 Design all bicycle facilities to meet or exceed the latest federal, state and local guidelines	**4.10.1 Supplement recommendations from the Bicycle Facilities Visual Glossary with engineering studies**, where necessary, and guidance from other nationally recognized guides. Resources include the Manual on Uniform Traffic Control Devices (MUTCD), National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide, American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities, the Americans with Disabilities Act (ADA) guidelines and Universal Design recommendations, Institute of Transportation Engineers (ITE) publications, and other nationally and internationally recognized guides.
	4.10.2 Establish and update bicycle facility designs and the intersection treatment selection table in the Seattle Right-of-Way Improvements Manual to reflect the Bicycle Facilities Visual Glossary.
	4.10.3 Provide ongoing education opportunities to SDOT planning and engineering staff on new and innovative bicycle facility design.
	4.10.4 Use innovative designs and study their effects. Request "experimental status" from appropriate government entities for bicycle facility designs that may not yet be recognized as standard.
	4.10.5 Work with the Washington State Department of Transportation (WSDOT) to update state bicycle facility standards.
	4.10.6 Provide bicycle detection at all signalized intersections, per Washington state law, and experiment with innovative detection technology.
	4.10.7 Work with transit agencies, freight entities, and the Seattle Fire Department to design bicycle facilities on arterials streets that provide adequate width for large vehicles, including emergency vehicles.
4.11 Improve bicycle safety and access at railroad and rail transit crossings and parallel facilities	**4.11.1 Assess all railroad and rail transit crossings that intersect bicycle facilities** and install appropriate bicycle-supportive infrastructure. Use signage and pavement markings to facilitate crossing at 90 degrees to the maximum extent feasible.
	4.11.2 Assess all railroad and rail transit lines that run parallel with existing bicycle facilities and install signage to facilitate safe travel behavior and enhance parallel bicycle facilities when possible.

Bicycle Facilities Visual Glossary

Neighborhood Greenways

Neighborhood Greenways use signs, pavement markings, and traffic calming measures to discourage through trips by motor vehicles, while accommodating local access. Intersection crossing treatments (particularly at arterial crossings) are used to create safer, more comfortable, and convenient bicycle and pedestrian-optimized streets.



Neighborhood Greenways

Neighborhood greenways are non-arterial streets with low motorized traffic volumes and speeds, designated and designed to give bicycle and pedestrian travel priority. A critical component of a neighborhood greenway is to provide arterial street crossing improvements for safer and more comfortable travel for both bicyclists and pedestrians. They provide people of all ages and abilities with comfortable and attractive places to walk and ride a bicycle. People riding bicycles should feel comfortable bicycling two abreast or "conversation riding" while traveling on a neighborhood greenway.



Pedestrian Amenities

A variety of streetscape elements can define the pedestrian realm, offer protection from moving vehicles, and enhance the walking experience. This include street trees, street furniture such as benches, and pedestrian-scale street lighting. These features should be included in the design and construction of neighborhood greenways whenever possible.



Conversation Riding

Because the full street width, minus adjacent car parking, is available for use on neighborhood greenways, bicyclists traveling together will often take a side-by-side formation to allow for social interaction. This behavior should be considered acceptable on neighborhood greenways.



Universal Design

Implementing neighborhood greenways may be an opportunity to enhance streets to meet accessibility standards. ADA-compliant curb ramps should be included in the design and construction of neighborhood greenways, especially at arterial streets, and as appropriate in other locations. Universal design principles will be assessed and incorporated when implementing all bicycle facility projects.



Traffic Calming

Traffic calming is an important tool for creating safe and effective neighborhood greenways. Traffic calming measures for neighborhood greenways bring motor vehicle speeds closer to those of bicyclists. Reducing speeds along the neighborhood greenway improves the bicycling and walking environment by reducing overtaking events, enhancing drivers' ability to see and react, and reducing the severity of crashes if they occur. Common traffic calming techniques include speed bumps, neighborhood traffic circles, stop signs and chokers. Other aspects of traffic calming may occur as green features of the street such as green stormwater infrastructure (bioswales) and other natural elements such as planters, street trees, or rain gardens.

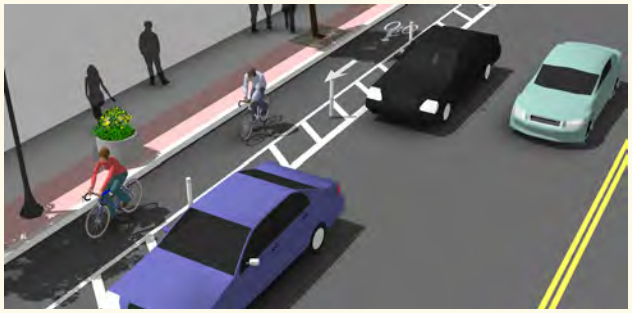


Traffic calming measures can reduce or discourage through traffic on designated neighborhood greenways by managing access to the route by motor vehicles. Common techniques include partial closures, median islands, and turn restrictions.

Cycle Tracks (Protected Bicycle Lanes)

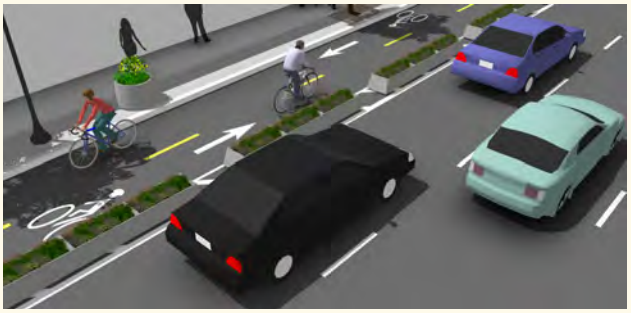
Of all on-street bicycle facilities, cycle tracks, also known as protected bicycle lanes, offer the most protection and separation from adjacent motor vehicle traffic. It is important to consider all users when designing a cycle track. Considerations include pedestrians crossing the cycle track from a parked car, access to and from transit or at the intersection, universal design/American with Disabilities Act (ADA) guidelines, commercial vehicle loading zones, trash pick-up, and motor vehicles crossing the cycle track at driveways and intersections.

Cycle tracks may be one-way or two-way, and may be at street level, or raised to the sidewalk or an intermediate level.



One-Way Cycle Track (protected bicycle lane)

One-way cycle tracks are physically separated from motor vehicle traffic and typically provide bicycle travel in the same direction as motor vehicle traffic. They may be at street level, or distinct from the sidewalk, as a raised cycle track. In situations where on-street parking is allowed, cycle tracks are located adjacent to the curb and sidewalk, with on-street parking repositioned to buffer people on bicycles from moving vehicles.



Two-Way Cycle Track (protected bicycle lane)

A two-way cycle track is an on-street bicycle facility that allows bicycle movement in both directions on one side of the street. Two-way cycle tracks must provide clear and understandable bicycle movements at intersections and driveways. Education is important to inform people how to travel in a safe manner.

A two-way cycle track may be configured as a street level cycle track with a parking lane or other barrier or as a raised cycle track to provide vertical separation from the adjacent motor vehicle lane.



Raised Cycle Track (protected bicycle lane)

Raised cycle tracks are elevated above the street, to sidewalk level or an intermediate height. If at sidewalk level, a raised or mountable curb separates the cycle track from the roadway, while different pavement color or texture distinguishes the cycle track from the sidewalk.

A raised cycle track may be designed for one-way or two-way travel by bicyclists.



Street-Level Cycle Track (protected bicycle lane)

Street level cycle tracks are configured at the same elevation as general travel lanes. They must be protected from traffic with a physical barrier, such as bollards, planters, raised medians, or on-street parking.

A street-level cycle track may be designed for one-way or two-way travel by bicyclists.



Cycle Tracks (protected bicycle lanes) at Transit Stops with a Transit Island

Designs for cycle tracks at transit stops are meant to prioritize both bicycling and transit efficiency by reducing conflicts within the roadway. When space permits, the preferred design places a raised transit island in the buffer area between the cycle track and general travel lanes. Transit passengers should wait at a transit shelter on the island, and board and alight from there.

To access the sidewalk, passengers should cross the cycle track at a specified crossing location. These crossing locations may either be at sidewalk grade, ramping the bicyclist up to the sidewalk level (providing some bicycle traffic calming to better ensure yielding to pedestrians), or at the street grade. This reduces conflict, and increases predictability for all users. Bicyclists are expected to yield to passengers crossing the cycle track.



Cycle Tracks (protected bicycle lanes) at Curbside Transit Stops

When space is constrained there may not be room for a dedicated transit island. In these cases the sidewalk, cycle track and boarding zone share the same height and more mixing of user types is expected. In this configuration, passengers wait at a stop or shelter in the sidewalk area and may cross the cycle track only when boarding or alighting the transit vehicle. Pavement markings and differences in surface materials can differentiate the sidewalk, cycle track, and boarding zones. Bicyclists are expected to yield to passengers crossing the cycle track.



Cycle Tracks (protected bicycle lanes) on Downhill Descents

Downhill bicycling may be at high-speed, potentially equal to that of motor vehicles. In some cases, it may be more appropriate to provide an alternate route for more experienced bicyclists to use so the all ages and abilities riders can travel at a slower speed within the cycle track. Bicyclists are expected to travel in a safe manner and with reasonable downhill speed in a cycle track. Signage may be installed to remind riders to slow down when approaching intersections for safety for all users. If a bicyclist wants to travel at the speed of motorists, then they may want to take the travel lane.

In the downhill direction, the cycle track should permit bicyclists to leave the cycle track prior to the descent and travel in the adjacent general purpose travel lane if they desire.

If bicyclists are expected to descend within the cycle track, adequate width should be provided clear of obstacles to reduce the likelihood of high-speed collisions with fixed objects. Adequate sight distances should also be provided to reduce the likelihood of high-speed collisions with turning motorists.



Cycle Tracks (protected bicycle lanes) on Uphill Climbs

Bicycle travel uphill is often at slow speed and may result in a wide weaving path. In the uphill direction, adequate clearance should be provided to allow for both slow weaving and parallel passing, similar to an uphill bicycle passing lane.

Off-Street Bicycle Facilities

Off-street facilities are typically distanced from the roadway, are at sidewalk grade, or exist in an independent corridor not adjacent to any road.



Multi-Use Trail

A multi-use trail allows for two-way, off-street bicycle use and may be used by pedestrians, skaters, wheelchair users, joggers and other non-motorized users. These facilities are frequently found in parks, along rivers, beaches, and in greenbelts or utility corridors where there are few conflicts with motorized vehicles.



Overpass

Overpasses provide critical non-motorized system links by joining areas separated by barriers such as deep ravines, waterways or major streets or freeways. Crime Prevention Through Environmental Design (CPTED) principles should be followed when designing the overpass.



Underpass

Underpasses provide critical non-motorized system links by joining areas separated by barriers such as railroads and highway corridors. In most cases, these structures are built in response to user demand for crossings where they previously did not exist. Crime Prevention Through Environmental Design (CPTED) principles should be followed when designing the underpass.

In Street, Minor Separation

In street, minor separation facility types are appropriate when the prevailing motor vehicle travel speeds and volumes are too high for a shared lane, and when traffic calming techniques are not available or appropriate.



Bicycle Lane

Bicycle lanes designate an exclusive space for bicyclists with pavement markings and signage. The bicycle lane is located adjacent to motor vehicle travel lanes and bicyclists ride in the same direction as motor vehicle traffic. Bicycle lanes are typically on the right side of the street (on a two-way street), between the adjacent travel lane and curb, road edge or parking lane.



Buffered Bicycle Lane

Buffered bicycle lanes are conventional bicycle lanes paired with a designated buffer space, separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane. A buffered bicycle lane could potentially be converted to a cycle track.



Colored Treatment

Colored treatment within a bicycle lane increases the visibility of the bicycle facility. Colored pavement may be installed to identify conflict areas along enhanced facilities such as contra-flow bicycle lanes, cycle tracks, and neighborhood greenways. Colored pavement may also be used in areas where illegal parking or encroachments are an issue.



Contra-Flow Bicycle Lane

Contra-flow bicycle lanes provide bidirectional bicycle access on a roadway that is one-way for motor vehicle traffic. This treatment can provide direct access and connectivity for bicyclists and reduce travel distances.



Left-Side Bicycle Lane

Left-side bicycle lanes are conventional bicycle lanes placed on the left side of one-way streets or two-way median divided streets.

Left-side bicycle lanes offer advantages on streets with heavy delivery or transit use, frequent parking turnover on the right side or other potential conflicts that could be associated with right-side bicycle lanes.



Uphill Climbing Lane

On streets where only one bicycle lane can be implemented, uphill climbing lanes enable motorists space to pass bicyclists, improving conditions for both travel modes. For uphill travel, where bicyclists are slow and likely to weave widely, a dedicated separated space is provided. Downhill travel, where bicycle speeds are similar to that of motor vehicle speeds, bicyclists are expected to travel in the general purpose travel lane, marked with shared lane markings.



Uphill Bicycle Passing Lane

An uphill bicycle passing lane is a second bicycle lane providing ample space for passing on steep hills.

Shared Street

On shared streets, bicyclists and motor vehicles use the same roadway space. To provide information to bicyclists, shared streets employ basic treatments such as signage and shared lane markings. Shared streets, in accordance with the Facility Designation Guidelines on page 38, are to be used due to right-of-way constraints, on arterial streets with a posted speed limit of 30 mph or less, on either collector or minor arterials or to fill a gap in the Local Connectors network.



Shared Lane Marking

Shared Lane Markings (sharrows), are road markings used to indicate a shared lane environment for bicycles and automobiles. Sharrows remind drivers of bicycle traffic on the street and recommend proper bicyclist positioning. The shared lane marking is not a facility type; it is a pavement marking with a variety of uses to support a complete bicycle facility network.



Advisory Bicycle Lane

Advisory bicycle lanes are bicycle priority areas delineated by dotted white lines and marked with sharrows. A road with advisory bicycle lanes operates as two-way street with no painted center lane to separate automobile travel lanes. A painted dotted line and sharrows (bicycle symbols to guide people riding bicycles and remind drivers to share the road) are used to highlight the bicycle lanes. Because the line is dotted, motorists can enter the bicycle lane to overtake other vehicles when no people riding bicycles are present. Advisory bicycle lanes may be considered as upgrades to streets that currently have sharrows to further define bicycle and motor vehicle separation.



BAT Lanes

"Business Access and Transit" lanes are reserved for exclusive use by buses and bicyclists. They may also be used for general-purpose traffic right-turn movements onto cross streets and for access to adjacent properties. BAT lanes should inlude appropriate signage acknowledging that bicyclists are permitted. All BAT lanes should have consistent signage throughout the city so all users understand how they are to be used and that people riding bicycles are allowed to use them.

Intersection Treatments

Intersection treatments are designed to help people riding bicycles make more predictable movements and cross intersections more easily.



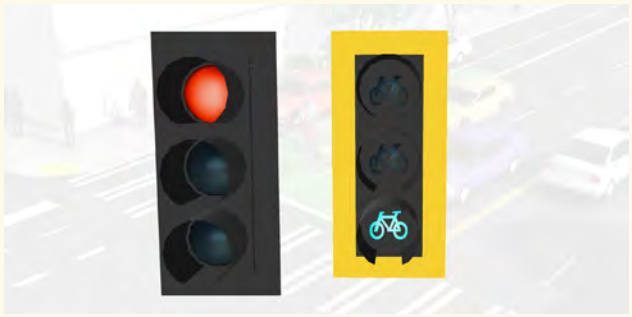
Active Warning Beacon

Active warning beacons are amber flashing lights that supplement warning signs at unsignalized intersections or mid-block crosswalks. Beacons can be actuated either manually by a push-button or passively through detection. Rectangular Rapid Flash Beacons (RRFBs), a type of active warning beacon, use an irregular flash pattern similar to emergency flashers on police vehicles. Active warning beacons can be used to enhance driver yielding for bicyclists and pedestrians in the crosswalk.



Bicycle Detection and Actuation

Bicycle detection is used at actuated signals (signals that are user activated by sensor/loops, video, or push buttons) to alert the signal controller of bicycle crossing demand on a particular approach. Bicycle detection occurs either through the use of push-buttons or by automated means (e.g., in-pavement loops, video, microwave, etc.). Detectors are identified with a pavement marking to inform bicyclists of proper positioning to trigger the detector. All bicycle detection should have consistent pavement markings.



Bicycle Signal

A bicycle signal is a bicycle-specific traffic signal used to improve operations for bicyclists using the intersection. Bicycle signal heads may be used to indicate an exclusive bicycle phase, separate bicycle movements from conflicting automobile turn movements, or to provide a leading bicycle interval.



Leading Bicycle and Pedestrian Interval

A leading bicycle interval is a condition where a Bicycle Signal is used to display a green signal for bicyclists a few seconds before displaying a green signal for adjacent motor vehicle traffic. Early display on a bicycle signal and pedestrian signal gives bicyclists and pedestrians a head start to increase visibility and compliance by drivers.



Bicycle Center Turn Lane

Bicycle center turn lanes allow bicyclists to cross an intersection that is offset to the right, or when making a left turn from a bicycle lane. Bicyclists cross one direction of traffic and wait in a separated center lane for a gap in the other direction.



Bicycle Forward Stop Bar

A bicycle forward stop bar is a second stop bar placed beyond the crosswalk. After stopping at the first stop bar, bicyclists may advance to this forward stop bar while waiting at an intersection. This increases the visibility of bicyclists waiting to cross the street and improves their ability to see approaching traffic. Bicycle forward stop bars are often paired with curb bulbs.



Combined Bicycle Lane/Turn Lane

A combined bicycle lane/turn lane places dotted bicycle lane lines or sharrows within the inside portion of a turn-only lane to guide bicyclists to the intersection. This configuration helps reduce conditions that lead to "right-hook" collisions.

When configured on a cycle track, the combined lane is commonly called a cycle track mixing zone, and is intended to minimize conflicts with turning vehicles at intersections as an alternative to an exclusive bicycle signal phase.



Cycle Track Mixing Zone

A cycle track mixing zone is a shared lane for use by bicyclists and turning automobiles. The facility is intended to minimize conflicts with turning vehicles by requiring users to negotiate use of the lane in advance of the intersection. The narrow lane discourages side-by-side operation of bicycles and automobiles, reducing potential "right hook" collisions.

Motorists are to yield to people riding bicycles priot to entering into the mixing zone, thereby reducing potential conflicts.

When configured on a bicycle lane facility, this is called a combined bicycle lane/turn lane.



Green Bicycle Box

A green bicycle box is a designated area at the head of a traffic lane at a signalized intersection that provides bicyclists with a more predictable and visible way to get ahead of queuing traffic during the red signal phase. Motor vehicles must wait behind the white stop bar line at the rear of the bicycle box, and right turn on red is not permitted. This treatment reduces "right hook" collisions.



"Green Wave" Signal Timing

Green wave is a signal timing progression scheme coordinated over a series of traffic signals to allow for continuously flowing bicycle traffic over a long distance. Users traveling at the green wave design speed will encounter a cascade of green lights and not have to stop at intersections.



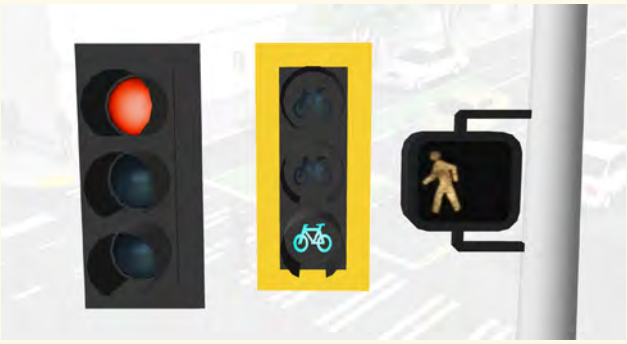
Half Signal (Pedestrian and Bicycle Signals)

Half signals are traffic control signals configured to control traffic along the main arterial street at an intersection. These are most commonly used to stop traffic along a major street to permit crossing by pedestrians or bicyclists. Motorists on the side street are stop-controlled.



Crossbicycle Intersection Markings

Intersection markings indicate the intended path of bicyclists through an intersection or across a driveway or ramp. They guide bicyclists on a direct path through the intersection and provide a clear boundary between the paths of bicyclists and through or turning motor vehicles in the adjacent lane. colored treatment may be used for added visibility of the facility.



All-way Green for Bicycles and Pedestrians

All-way pedestrian and bicycle signal phase allows bicyclists and pedestrians to cross in any direction within their own signal phase. Commonly called an all-way walk, but with bicycles added to the mix. Bicyclists must yield to pedestrians and move at an appropriate speed through the intersection.



Median Diverter Island

Median diverter islands are protected spaces placed in the center of the street to facilitate bicycle and pedestrian crossings. Crossings of two-way streets are simplified by allowing bicyclists and pedestrians to navigate only one direction of traffic at a time. This also functions as a traffic calming technique as part of a neighborhood greenway.



No Turn On Red

No turn on red restrictions prevent turns during the red signal indication to reduce motor vehicle conflicts with bicyclists and pedestrians. This restriction is commonly established at bicycle box installations, cycle tracks, and where bicycle signals are used to separate bicycle traffic from motor vehicle traffic.



Offset Street Connection

Offset intersections can be challenging for bicyclists to navigate, particularly on major streets. Specific configurations to connect offset streets vary based on the direction of the offset, the presence of signalization and the amount of adjacent traffic. Common configurations include bicycle lane offset street connection, cycle track offset street connection, bicycle center turn lane and two-stage turn boxes.



Protected Bicycle Signal Phase

Providing a protected bicycle signal phase is one way to reduce conflict between right turning vehicles and people on bicycles. Separate traffic signals control the conflicting maneuvers, increasing predictability for all users through the intersection. This treatment is combined with no right on red signs.



Through Bicycle Lanes at Right Turn Only Lanes

At right-turn only lanes the bicycle lane should transition bicyclists to the left of the right-turn only lane. Dotted bicycle lane lines or shared lane markings direct bicyclists through the merging area into the bicycle lane at the intersection.

If there is inadequate space for a dedicated through bicycle lane, a combined bicycle lane/turn lane may serve the same purpose.



Two-Stage Turn Box

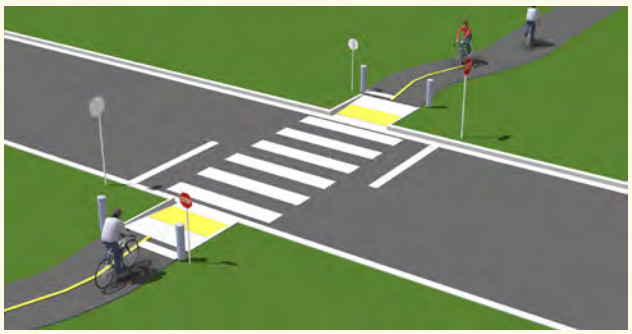
Two-stage turn queue boxes offer bicyclists a safer way to make turns at multi-lane signalized intersections from a right or left side cycle track or bicycle lane by separating the turn movement into two stages. Signage will accompany the installation to help educate bicyclists and motorists of the new intersection treatment. This intersection treatment makes turning bicyclist movements more predictable for all modes. Two-stage turn boxes require "no turn on red" signs and enforcement and create a safer overall intersection for all users of the roadway. Bicyclists wishing to make a left turn will travel straight in the bicycle facility across the intersection, then stop in a green turn box which points in the new direction they wish to travel. Bicyclists will wait to proceed straight until the signal turns green for the new direction of travel.

Turn boxes may also be used at offset street connections that jog to the right to orient bicyclists directly across the offset street.



Enhanced Trail Crossings

See Active Warning Beacons and Half Signals (Pedestrian and Bicycle Signal) for techniques to increase motorists yielding of drivers to trail users.



Marked Crossings

A marked crossing typically consists of a marked crossing area, Warning Signs and other markings to slow or stop traffic.

When space is available, a median diverter island can improve user safety by providing pedestrians and bicyclists space to cross one half of the street at a time. Bicyclists must yield to pedestrians and move at an appropriate speed through the intersection.



Raised Crosswalk

Raised crosswalks are crossings elevated to the same grade as the multi-use trail. Raised crosswalks may be designed as speed tables, and have a slowing effect on crossing traffic.



Signalized Crossings

Where practical, multi-use trail alignments may route users to existing signalized intersections using barriers and signing. Bicycle signals may be used to assist in bicyclist crossing.



Curb Bulbs

Curb bulbs (also called curb extensions) are areas of the sidewalk extended into the roadway, most commonly where a parking lane is located. Curb bulbs help position bicyclists closer to the cross street centerline to improve visibility and encourage motorists to yield at crossings. They also reduce pedestrian crossing distances. This treatment may be combined with a bicycle forward stop bar.

Multimodal Corridors

Some streets will accommodate bicycle facilities easily; others may be more challenging due to limited street right-of-way. It is important to establish a process to consider the mobility of all modes when implementing the recommended bicycle network on corridors with competing needs.

Multimodal Corridors are the city's main travel corridors serving all trip types and all modes. They are the streets prioritized as transit corridors by the Seattle Transit Master Plan, are a part of the frequent transit network, are designated as Major Truck Streets, and coincide with either an existing or recommended bicycle facility. These overlaps are largely due to:

- The nature of Seattle's topography
- The streets' ability to provide direct connections to destinations and between urban villages/ urban centers

These corridors serve a variety of demands from competing modes of transportation, and the needs of large freight and transit vehicles often constrain bicycle facility development on existing roadways.

The bicycle network overlaps includes 46.1 miles of bicycle facilities that overlap with transit priority corridors and 33.7 miles of bicycle facilities that overlap with Major Truck Streets. Map 4-12 shows all of the transit priority corridors and Major Truck Streets. Note that the frequent transit network is not included on the map as it constantly evolves and was not explicitly considered when developing the bicycle facility network. Map 4-13 shows the overlap of transit priority corridors and Major Truck Streets with bicycle facilities.

As each corridor is analyzed in more detail (through additional corridor studies and alternatives analysis, the project development and design process, or within other modal plans), it is important that either (a) all modes be accommodated along the same street or (b) bicycle facilities be accommodated using a parallel route. Efforts will be made to provide standard transit and freight travel lane widths on multimodal corridors. It is not preferable for transit and freight to travel on non-arterial streets. While all efforts will be made to implement the recommended bicycle network on the multimodal corridors, people riding bicycles can more easily be accommodated on parallel non-arterial streets than the other modes.



Some corridors will need to serve the needs of bicyclists and freight vehicles.

Figure 4-3: Multimodal Corridor Example



Multimodal Corridor Decision Making Process

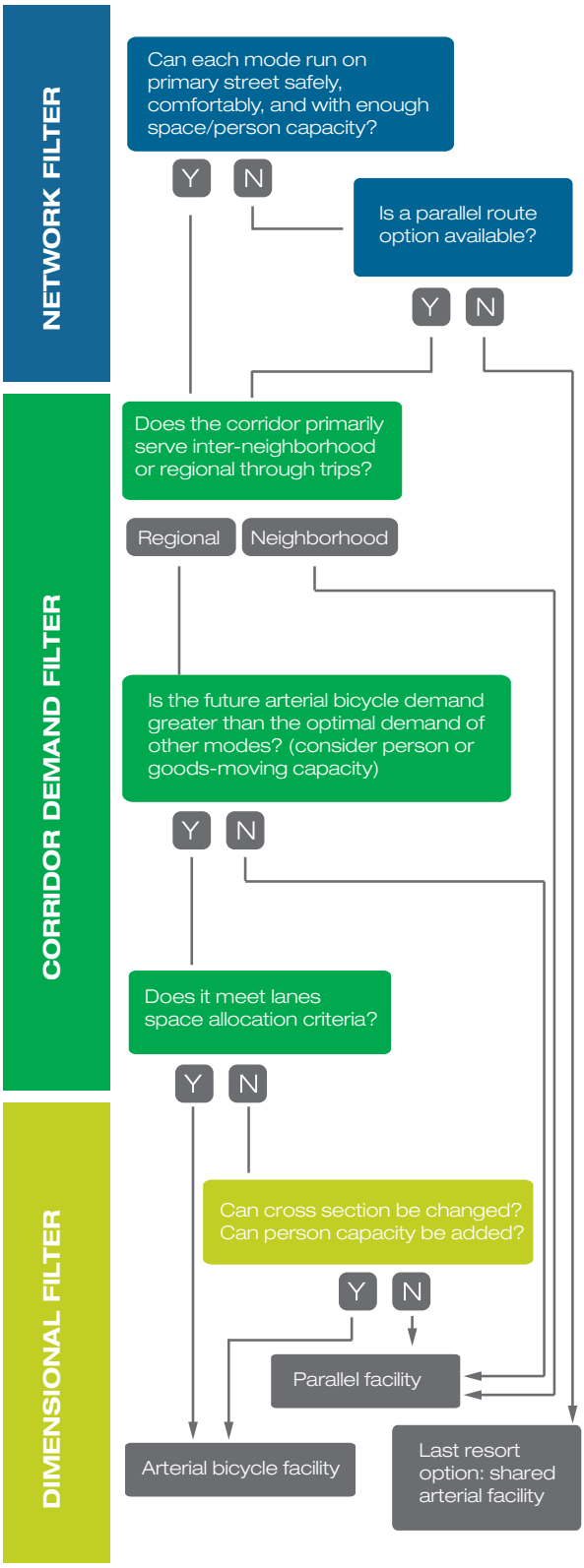
Multimodal corridors serve transit, freight, bicycles, pedestrians and other motorists and represent the most direct, and, in some cases, the only network connections to key neighborhood and regional destinations in Seattle. Decisions about how to allocate the right-of-way on these streets are made difficult by the limited number of direct connections coupled with issues of topography, differences in travel speed, and the desire for on-street parking. Mobility needs for people and safety of all modes is the number one priority when making decisions about right-of-way allocation. As mentioned earlier in this chapter, motor vehicle volumes and travel speeds and addressing how to ensure people travel the speed limit are important considerations when evaluating street design alternatives. Separation of users (either physically separated from traffic or on a parallel neighborhood greenway) and understanding the rules of the road can improve safety, efficiency, and attractiveness for people riding a bicycle, using transit, or walking; however, in dense urban areas, sometimes every mode cannot share the same street.

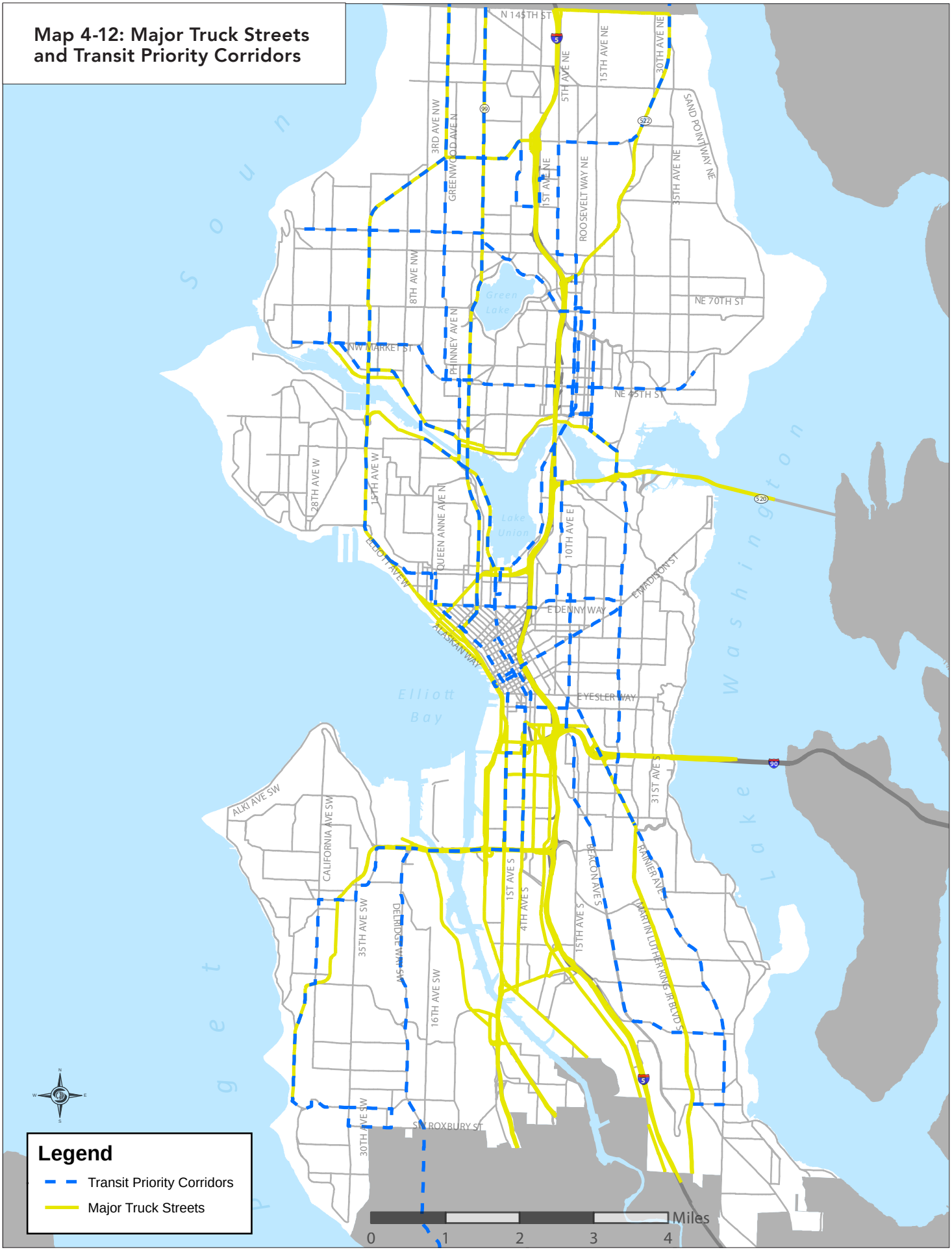
Seattle lacks a policy for determining which mode gets priority when bicycling and freight or transit modal plans designate the same corridor as a priority with limited right-of-way. A clear set of tools for making these decisions is needed.

The following strategies will guide design and operations decisions on designated Multimodal corridors. An example decision making process diagram is illustrated in Figure 4-4.

The Complete Streets policy (adopted in 2007) directs the city to "design, operate, and maintain Seattle's streets to promote safe and convenient access and travel for all users—pedestrians, bicyclists, transit riders, and people of all abilities, as well as freight and motor vehicle drivers."

Figure 4-4: Example Multimodal Corridor Decision Making Process




Map 4-12: Major Truck Streets and Transit Priority Corridors
N 145TH ST
5TH AVE NE
15TH AVE NE
30TH AVE NE
SAND POINT WAY NE
3RD AVE NW
GREENWOOD AVE N
1ST AVE NE
ROOSEVELT WAY NE
35TH AVE NE
8TH AVE NW
NE 70TH ST
NW MARKET ST
PHINNEY AVE N
NE 45TH ST
28TH AVE W
15TH AVE W
QUEEN ANNE AVE N
10TH AVE E
ELLIOTT AVE W
E MADISON ST
E DENNY WAY
ALASKAN WAY
EYESLER WAY
31ST AVE S
ALKI AVE SW
CALIFORNIA AVE SW
35TH AVE SW
DELRIDGE WAY SW
1ST AVE S
4TH AVE S
BEACON AVE S
15TH AVE S
RAINIER AVE S
MARTIN LUTHER KING JR BLVD S
16TH AVE SW
30TH AVE SW
S ROXBURY ST
Elliott Bay
Lake Washington
Green Lake
Lake Union
Legend
Transit Priority Corridors
Major Truck Streets
Miles
0
1
2
3
4


Map 4-13: Multimodal Corridors
Legend
Proposed Network
Areas of Overlap w/ Multimodal Corridors
Miles
0
1
2
3
4
Puget Sound
Lake Washington
Elliott Bay
Green Lake
Lake Union
NE 80TH ST
NE 65TH ST
N 34TH ST
NICKERSON ST
S HOLGATE ST
S SPOKANE ST
SW BARTON ST
S MYRTLE ST
S OTHELLO ST
GREENWOOD AVE N
COLLEGE WAY N
1ST AVE NE
5TH AVE NE
24TH AVE NW
FREMONT AVE N
11TH AVE NE
15TH AVE NE
WESTLAKE AVE N
EASTLAKE AVE E
10TH AVE E
1ST AVE N
12TH AVE
35TH AVE SW
EAST MARGINAL WAY S
AIRPORT WAY S
BEACON AVE S
MLK JR WAY S
16TH AVE S
RAINIER AVE S
THOMAS ST
1ST AVE
BROAD ST
WESTERN AVE
ALASKAN WAY
4TH AVE
7TH AVE
12TH AVE
S JACKSON ST
S DEARBORN ST
S ROYAL BROUGHAM WAY

Strategies	Actions
4.12 Integrate a multimodal decision-making process into the update of the Comprehensive Plan	**4.12.1 Determine primary and secondary modal priorities** on arterials, including designated Multimodal Corridors, establishing a complete system focused on moving people and goods as safely as possible.
4.13 Implement citywide network bicycle facilities on or parallel to Multimodal Corridors	**4.13.1 Determine citywide network bicycle facility suitability** when developing priority transit projects or Major Truck Street improvements by the Multimodal Corridor decision-making process and/or the project development and design process. Route design and facility selection will consider whether alternative routes are convenient and permit direct access to services and destinations located throughout the Multimodal Corridor.
	4.13.2 Design bicycle priority features at intersections along Multimodal Corridors.
	4.13.3 Provide clear wayfinding to guide people bicycling between neighborhood greenways and local destinations on parallel arterial streets.
	4.13.4 Provide end-of-trip facilities at, or prior to, arterial street destinations.
4.14 Consider transit mobility improvements that minimize conflicts with people riding bicycles	**4.14.1 Integrate the needs of transit and people riding bicycles** on Multimodal Corridors as part of the project development and design or other arterial street design processes. Include all transit agencies in the design process as appropriate.
	4.14.2 Design transit passenger waiting and boarding facilities to minimize conflicts and pinch points with people riding bicycles. Consider design alternatives that avoid bicycle and bus conflict zones at the transit stop. Install signage and other visual cues or infrastructure to encourage people on bicycles to yield to pedestrians. Provide protection and visibility for pedestrians in zones where people riding bicycles and people walking may intermix at transit stops. (refer to Strategy 4.2 about implementation of cycle tracks).
	4.14.3 Discourage new bus layover facilities on the citywide bicycle network streets. Instead locate them on intersecting streets or integrate into new development (with developer incentives) or existing off-street locations, unless no other options are available. Include transit agencies in the design process. Consider relocating existing bus layover facilities on the Citywide Network.
	4.14.4 Design new bus layover facilities on local connector streets in conjunction with bicycle facility implementation. Include transit agencies in the design process.
	4.14.5 Recognize that Multimodal Corridor development is also a transit access – last mile – strategy. Enhance connections to and end-of-trip facilities at light rail stations, major transit hubs, major bus stops and park-and-ride lots.
4.15 Consider freight mobility and commercial vehicle load zones that minimize conflicts with people riding bicycles.	**4.15.1 Integrate the needs of freight mobility and commercial vehicle load zones and people riding bicycles** on Multimodal Corridors as a part of the project development and design or other arterial street design processes. Include the Freight Advisory Board in the design process as appropriate.

Strategies	Actions
4.16 Update curb space allocation priorities in the Comprehensive Plan update	**4.16.1 Explore re-purposing curb space allocation for mobility purposes** on arterials to include features such as expanded sidewalks, bicycle facilities, bicycle share kiosks, commercial vehicle load zones, and dedicated transit lanes or transit priority features.
	4.16.2 Explore re-purposing curb space allocation on streets with sufficient right-of-way width for uses other than mobility needs, such as parklets and other pedestrian buffer features, on-street bicycle parking corrals, and on-street vehicle parking.
	4.16.3 Use on-street parking as a buffer for cycle tracks where appropriate.
	4.16.4 Discourage new curb cuts and remove redundant curb cuts adjacent to cycle track alignments to decrease potential motor vehicle/bicycle conflict. Move car and commercial vehicle access to alleys or side streets to provide continuous bicycle travel flow.



Buffered bicycle lane and transit island cycle track (protected bicycle lanes) on Dexter Avenue.

Chapter 5: End-of-Trip

FACILITIES



"We would like to see some thought given to the importance of creating bicycle facilities that also are beneficial for people who walk, use a wheel-chair, walker, or push a stroller."

The journey is not complete when a person riding a bicycle pulls off the road. Without safe, accessible, and convenient bicycle parking and other support services, people are less likely to choose to ride a bicycle. Changing rooms, showers, secure bicycle rooms, lockers, and self repair services or spaces for minor maintenance are part of a bicycle-friendly community. Sheltered parking is also integral to increasing mode share in Seattle due to the weather. Providing wayfinding to locate various types of end-of-trip facilities is necessary when installing facilities to ensure users can easily access and locate a place to secure their bicycle.

Providing context-appropriate facilities to enhance Seattle's bicycling network could be as simple as providing short-term bicycle parking outside a grocery store and secure bicycle parking at transit stops. Policies requiring secure long-term bicycle parking in new residential and commercial buildings, or the retrofit of older buildings with secure bicycle parking and shower/changing rooms in large employment centers, will make it easier to make bicycling a habit for future building users. Recognizing that the plan focuses on people of all ages and abilities, bicycle parking should be designed to accommodate a wide variety of bicycle types. Table 5-1 shows the general characteristics of short- and long-term bicycle parking.

IN THIS CHAPTER:

Visual Guide to Bicycle Parking 78
The types of bicycle parking discussed in this chapter are described and shown in a visual guide.

Seattle Municipal Code Requirements for Bicycle Parking 80
A review of regulations relating to bicycle parking includes a synopsis of requirements for new developments and various types of land uses.

Bicycle Parking in the Public Right-of-way 81
A review of bicycle parking in the right-of-way includes a summary of proactive approaches for increasing the supply of bicycle parking in the public right-of-way through the city program and encouragement of private-sector contributions.

Bicycle Parking Inventory 82
Tracking, describing and maintaining the public bicycle parking supply are critical to providing adequate bicycle parking.

Abandoned Bicycles and Locks 83
Prompt removal of abandoned bicycles and locks improves the usability of bicycle racks.

Bicycle Parking at Transit Stations 83
Adequate bicycle parking at transit stations is essential for increasing access to transit.

Temporary (Event) Bicycle Parking 84
Temporary bicycle parking makes it convenient and attractive to attend events by bicycle.

Table 5-1: Characteristics of Short- and Long-Term Bicycle Parking

Criteria	Short-Term Bicycle Parking	Long-Term Bicycle Parking
Parking Duration	Less than two hours	More than two hours
Typical Fixture Types	Bicycle racks and on-street corrals	Lockers or secure bicycle parking (racks provided in a secured area)
Weather Protection	Unsheltered or sheltered	Sheltered or enclosed
Security	High reliance on personal locking devices and passive surveillance (e.g., eyes on the street)	Restricted access and/or active supervision
		Unsupervised: "Individual-secure," e.g., bicycle lockers "Shared-secure," e.g., bicycle room or locked enclosure
		Supervised: Valet bicycle parking Video, closed circuit television, or other surveillance
Typical Land Uses	Commercial or retail, medical/ healthcare, parks and recreation areas, community centers, libraries	Multi-family residential, workplace, transit, schools

Visual Guide to Bicycle Parking

Short-Term Parking

Short term bicycle parking is generally intended to be used for two hours or less by customers, patrons, or visitors to an establishment. Bicycle parking should be located as close to destinations as possible in convenient locations and highly visible for users.



Sidewalk Parking

Typical sidewalk parking frequently includes staple racks, which allow multiple bicycles to be locked to both sides of the rack.



Shelters

Short- and long-term bicycle parking can be accommodated with shelters, or weather protection, which allows the bicycles to stay relatively dry when parked outside in the Seattle winter months. Sheltered bicycle parking can be on public or privately-owned land.



On-street Bicycle Corral

On-street bicycle corrals minimize sidewalk clutter, free up space for pedestrians and other uses (such as sidewalk cafes), and increase bicycle parking at locations with high demand, such as neighborhood business districts. On-street bicycle corrals are a more efficient use of right-of-way space than a car parking space, as nearly 10-12 bicycles can park in 1 car parking space. This allows more people to access the business district and support local businesses. There will be more demand for bicycle parking as higher-quality bicycle facilities are installed and bicycle ridership grows.



Temporary (Event) Parking

Temporary (event) parking typically consists of portable racks that meet the demand for an event. Racks are clustered together, providing a higher level of security than if people were to park the bicycles on their own. Event staff can monitor the area, providing people with peace of mind while they are away from their bicycle.

Long-Term Parking

Long-term bicycle parking areas are intended to be used all day and/or night. Prime users are employees, residents, students, or travelers leaving their bicycles at airports, bus stops or rail stations.



Bicycle Lockers

Bicycle lockers provide the most secure type of parking, available either by subscription or upon demand, and are frequently found at transit stations.



Wayfinding for Parking

Long-term bicycle parking is often sited in locations not visible from the front door. Wayfinding signs provide clear direction and help people locate bicycle parking facilities.



Secure Bicycle Parking facilities

Secure bicycle parking facilities are free-standing buildings, or enclosed areas within a larger structure (for example, an enclosed portion of a parking garage). Secure bicycle parking facilities are particularly useful at major destinations that attract all-day users, such as transit centers or employment centers. Some secure bicycle parking facilities offer access to bicycle repair tools, pumps, showers, or other amenities. Consideration for secure bicycle parking facilities are also desirable at long-distance transportation hubs such as airports, bus transfer facilities, and passenger train stations.

Seattle Municipal Code Requirements for Bicycle Parking

Seattle's practice of requiring short- and long-term parking for new construction and redevelopment is established in the municipal code. Minimum bicycle parking requirements hold developers accountable to provide necessary end-of-trip facilities for specific land uses. Off-street bicycle parking requirements for Downtown Seattle are listed in the Seattle Municipal Code SMC 23.49.019, and requirements for areas beyond the downtown area are detailed in SMC 23.54.015.

SMC 23.49.019 does not specify whether the parking provided must be short-term, long-term, or a combination of the two. The code requires that bicycle parking be provided in "a safe, accessible and convenient location," and that it be installed according to the manufacturer's directions and SDOT design criteria. If covered auto parking is provided, required long-term bicycle parking must also be covered. A sample of the minimums, shown below, is consistent with practices used in many other US cities:

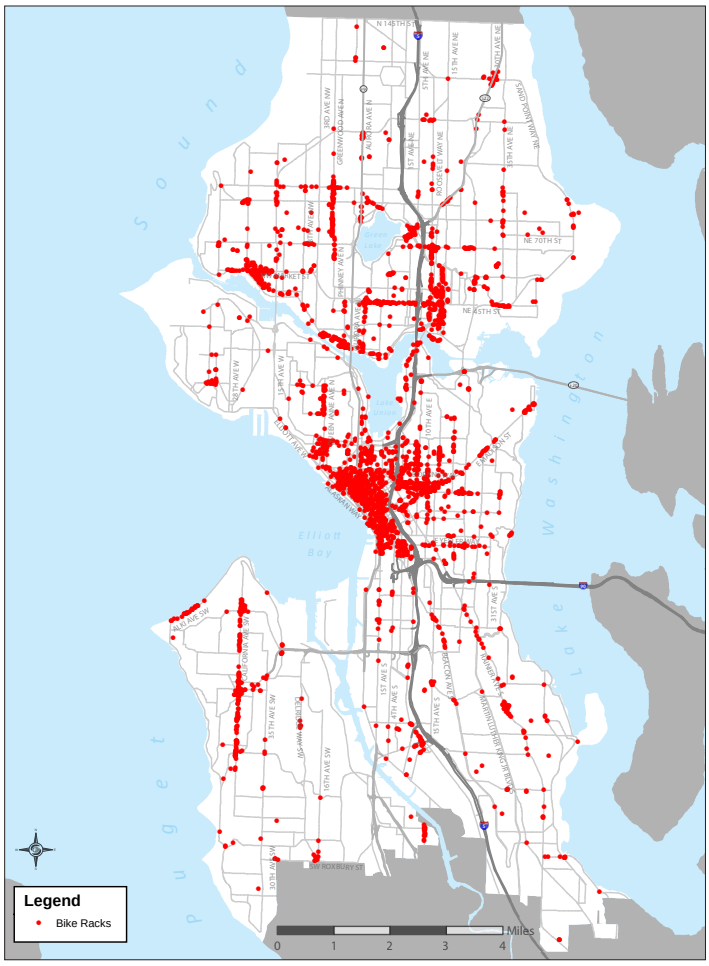
- **Office:** 1 space per 5,000 square feet of gross floor area of office use
- **Retail:** 1 space per 5,000 square feet of retail use (applies for uses exceeding 10,000 square feet of gross floor area)
- **Residential:** 1 space per 2 dwelling units
- **Buildings with 250,000 square feet of gross office floor area or greater** are required to provide shower facilities and clothing storage areas for bicycle commuters at a ratio of one shower per gender for each 250,000 square feet of office use. These facilities must be easily accessible to and from the bicycle parking facility.

A detailed code review is found in Appendix 5A.



Inadequate bicycle parking facilities often results in bicycles locked in inappropriate places.

Map 5-1: Public Bicycle Parking



Strategies	Actions
5.1 Update the Seattle Municipal Code (SMC) bicycle parking requirements	**5.1.1 Mandate minimum bicycle parking requirements** for short- and long-term use. Consider requiring secure bicycle parking for all new buildings, at or above, the minimum bicycle parking requirements. Prohibit property owners to forgo minimum bicycle parking requirements for non-residential uses. Differentiate and clarify short- and long-term bicycle parking requirements and add information about bicycle rack type, design, placement, security, wayfinding, and access.
	5.1.2 Revise the residential bicycle parking requirement. The new requirement should specify applications, including multi-family residences, a minimum number of units, apart-pods (or any other Department of Planning and Development multi-family terminology in the future) or a combination thereof. Require a mix of bicycle parking types that accommodate a variety of family-friendly bicycles for all ages and abilities and wayfinging signage to locate it..
	5.1.3 Allow secure bicycle parking to substitute for a portion of required automobile parking.
	5.1.4 Develop illustrated design guidelines for developers and building managers to facilitate the installation of well-designed sheltered bicycle parking, secure bicycle parking, and wayfinding signage.
	5.1.5 Include a provision for 24/7 bicycle parking access in requirements for long-term bicycle parking located in parking garages.
	5.1.6 Require self-service bicycle repair facilities as part of long-term bicycle parking.
	5.1.7 Develop standards for electric bicycles (e-bicycles) in reference to long-term parking and charging stations within new multi-family residential and commercial development and include wayfinding signage guideline.

Bicycle Parking in the Public Right-of-way

Bicycle racks on sidewalks and on-street bicycle corrals are types of bicycling parking that bicycle riders may find in the public right-of-way. A current inventory of public bicycle parking is shown in Map 5-1.

The Seattle Bicycle Spot Improvement Program is the primary method for installing public bicycle parking. This is a program for bicycle racks in the public right-of-way to serve commercial buildings, schools, and multi-family residential developments. The racks are maintained by SDOT.

The Seattle Bicycle Spot Improvement Program takes a proactive approach to installation of bicycle parking at community centers and libraries, and emphasizes rack placement in neighborhood business districts and in traditionally underserved areas.



On-street bicycle racks in the public right-of-way.

Chapter 5 Strategies and Actions: Bicycle Parking

Strategies	Actions
5.2 Develop a bicycle parking implementation program	**5.2.1 Develop a bicycle parking demand estimation methodology** that utilizes land uses and densities for Urban Villages and evaluate with the Race and Social Justice Equity Toolkit. Provide for a variety of bicycle types, including those for all ages and abilities.
	5.2.2 Prioritize the installation of bicycle racks and on-street bicycle corrals in high-demand locations. High-demand locations include, but are not limited to, neighborhood business districts, community centers, libraries, universities and colleges, employment centers, parks, and schools. Determine when bicycle parking should be sheltered bicycle parking, such as at schools where students/staff will park their bicycles for extended periods of time. Ensure installation is distributed equitably throughout the city by reviewing annual progress with a Race and Social Justice lens.
	5.2.3 Create a process that allows the city to use curb space for on-street bicycle corrals. Work with neighborhood business districts to identify locations that will replace on-street parking with on-street bicycle corrals. Install on-street bicycle corrals at strategic intersection locations where vehicle parking is not allowed.
	5.2.4 Create a Client Assistance Memo (CAM) to define how private entities can install bicycle parking in the right-of-way. The CAM should address installation guidance, permitting fees, responsibilities for maintenance, replacement, abandoned bicycles, and/or liability insurance. Consider a policy to increase implementation of public bicycle racks similar to SDOT's "Plant a Tree in the Right-of-Way" program where permit fees are waived and informational brochures are created to encourage the public to participate.
	5.2.5 Develop a graphic identity and citywide branding and wayfinding strategy for Seattle's bicycle parking.
	5.2.6 Continue to research, experiment with, and update the bicycle rack standards, types of racks, and installation details in the Right-of-Way Improvements Manual, and add standards for on-street bicycle corrals.

Bicycle Parking Inventory

SDOT maintains an inventory of short-term bicycle parking within the right-of-way, which by definition does not include parking on private property.

New installations are included in the inventory, but currently SDOT does not report on the condition of existing racks, the need to replace parking, or racks missed in the initial inventory.



Bicycle lockers are one strategy for weatherproof, secure bicycle parking.

Chapter 5 Strategies and Actions: Parking Inventory

Strategies	Actions
5.3 Ensure that bicycle parking in the right-of-way is inventoried every five years and provide the data to the public	**5.3.1 Maintain and continually update a digital inventory** of public bicycle parking locations on the city website.
	5.3.2 Integrate bicycle parking data into city-sponsored mapping and digital applications that depict the bicycle network as it grows.

Abandoned Bicycles and Locks

Abandoned bicycles are bicycles that have been locked to a public bicycle rack and left there. Abandoned locks could be those that are attached to the abandoned bicycle or locks attached to the bicycle rack. Currently the Seattle Police Department (SPD) manages and collects abandoned bicycles after a notice has been attached to the bicycle for 72 hours. SPD then holds the abandoned bicycles until the SPD Quartermaster provides them to be sold at auction.



Abandoned bicycles, or in some cases wheels, inhibit convenient and safe usage of bicycle racks.

Chapter 5 Strategies and Actions: Abandoned Bicycles

Strategies	Actions
5.4 Develop a process for abandoned bicycle removal with re-purposing options	**5.4.1 Work with SPD to establish partnerships with non-profit bicycle groups or bicycle shops** to create a program to store, repair, and redistribute abandoned bicycles.

Bicycle Parking at Transit Stations

Improving bicycle access to transit increases urban mobility and encourages multimodal travel, extending the reach of public transit. Bicycling can expand the service areas of light rail stations and bus stops. Light rail and buses, in turn, can increase the reach of a bicycle trip.

Seattle recognizes that trips are increasingly becoming multimodal in the region. SDOT and its transit partners are using a number of methods to meet the transportation needs of a growing region, including improving bicycle access to transit. Adequate secure bicycle parking at transit stations, transit hubs, and heavily-use bus stops plays a crucial role. Because no single agency has authority over a cross region commute, it is essential that transit agency partners are involved in efforts to provide, maintain, and operate secure bicycle parking in Seattle.

Secure bicycle parking should not be viewed as an amenity, but rather as a necessary and a vital part of the city's transportation infrastructure. Secure bicycle parking has the potential to increase both bicycle and transit ridership. If secure bicycle parking is strategically located, it is possible for other user groups (e.g. area commuters) to also utilize the bicycle parking. As SDOT and its transit partners strive to meet the transportation needs of a growing region, recognizing that trips are becoming increasingly multimodal, improving bicycle access to transit is critical as is adequate secure bicycle parking at transit stations, transit hubs, and heavily-use bus stops. Transit agency partner involvement is crucial to the success of providing secure bicycle parking.

The 2007 BMP advised using a parking demand estimating methodology developed by the PSRC in 2001 to determine the appropriate number of bicycle parking spaces at light rail stations. This method takes into account a variety of factors, including the number of jobs within a quarter-mile radius of the station area, bicycle commute mode share, long-haul and short-haul transit boardings accessed by bicycle, and forecasted demand of average daily boardings. The approach does not account for other factors

Chapter 5 Strategies and Actions: Transit Stations

Strategies	Actions
5.5 Provide short- and long-term secure bicycle parking at high-capacity transit stations, transit hubs, and heavily-used bus stops.	**5.5.1 Coordinate with transit agencies and large institutions** to develop clear, comprehensive, and consistent bicycle parking demand estimation and documentation methodologies.
	5.5.2 Support transit agency partners in their efforts to track quality and quantity of bicycle parking at transit stations.
	5.5.3 Partner with local and regional transit agencies and large institutions to coordinate funding, construction, operations and maintenance of long-term, secure bicycle parking facilities. Develop a universal on-demand bicycle parking access and fee system, as well as wayfinding, for future secure bicycle parking facilities.
	5.5.4 Integrate bicycle parking into the development of all new high-capacity transit stops, such as RapidRide stops and Bus Rapid Transit stops.

known to influence bicycle parking demand, such as on-board bicycle capacity, quality of bicycle parking at a transit station, or Seattle's increasing bicycle mode share for commute-to-work and access-to-transit trips. Providing the correct amount of secure bicycle parking at Link light rail stations and at other high-capacity transit stops is part of providing a welcoming bicycle environment.

Temporary (Event) Bicycle Parking

Currently, there is no requirement or guiding policy to provide additional bicycle parking at events in Seattle. Temporary bicycle parking may be provided at vendor discretion. Seattle provides temporary bicycle parking at city events, public meetings, and upon request for partners events.



Temporary bicycle parking at a UW Huskies game.

Chapter 5 Strategies and Actions: Event Parking

Strategies	Actions
5.6 Require attended bicycle parking at large/special events	**5.6.1 Define thresholds determining what large/special events will require attended bicycle parking.**
	5.6.2 Develop event parking guidelines for organizers. Events can be accommodated by potential partners for bicycle valet services using a variety of temporary event parking strategies.
	5.6.3 Require vendors to obtain a permit for temporary event bicycle parking. The application for the permit would stipulate a certain percentage of bicycle parking per the estimated number of attendees and standard arrangement of bicycle parking.


SODO Station

Chapter 6:

PROGRAMS



"I think the most important thing at this point would be to try to identify future potential cyclists, and see what barriers they perceive."

Education, encouragement, enforcement, and promotional programs will help people of all ages and abilities realize the full potential of Seattle's new and proposed bicycle infrastructure. These types of programs help people learn how to use our roads safely, whether traveling as a pedestrian, in a vehicle, or on a bicycle.

A range of strategies and actions, from broad policy and outreach efforts to more directed support for people new to bicycling, will help the city meet the goals and objectives of this plan. The programmatic strategies in the plan aim to improve safety, strengthen wayfinding, increase access to bicycling, and encourage community and economic development. Together these efforts can help make riding a bicycle in Seattle a safe, easy, and enjoyable experience for more people. The actions will increase the visibility of people who ride bicycles, communicate that all road users are expected to look out for each other no matter how they travel, create safer streets, and develop a common understanding of traffic safety. The actions will also reach out to new audiences to help people understand the rules of the road and share a vision of riding a bicycle as a fun, healthy, community-building activity.

Research shows that adopting and maintaining new behaviors related to bicycling is a process that involves changing the way we relate to each other on our streets and how we choose to travel. This process depends on policies that support comfortable and safe bicycling, provide access to basic information about bicycle riding opportunities, and teach people about new travel options.

The following strategies will help Seattle achieve its safety and equity goals by educating the public about the new and recommended bicycle infrastructure and encouraging people of all ages and abilities to ride a bicycle for any trip purpose.

IN THIS CHAPTER:

Bicycle Safety Programs 88
Bicycle safety programs are an essential part of the plan, especially for people of all ages and abilities to realize the full potential of the bicycle network.

Wayfinding and Trip-Planning 89
Wayfinding and trip planning tools help make the bicycle network much easier to navigate.

Access to and Encouragement for Bicycles 89
Providing access to and encouragement for bicycle riding to help people of all ages and abilities experience traveling by bicycle for any trip purpose.

Economic and Community Development 90
A bicycle-friendly reputation can be advantageous for a city. Supporting economic and community development through bicycle-related activities will increase the vitality of Seattle.



DON BRUBECK

Bicycle skills courses at summer festivals, like this one at Alki Summer Streets, are a great way to increase the confidence of young riders.

Bicycle Safety Programs

Safety education for all primary, middle, and high school-aged youth in Seattle focused on bicycle and general traffic offers a unique opportunity to reach this demographic in the formative moments when they create lifelong transportation habits. It is also important to continue to educate adults about new bicycle facilities and how to interact with them regardless of which travel mode they prefer to ensure safe streets for all users of the roadway. Targeting wider audiences will build broad community knowledge about safety and bicycle riding opportunities. Changing individual behaviors is critical to accomplish the vision of the plan. The city will lead and support partners through tailored direct outreach to people of all ages and abilities that encourages them to start and continue to ride a bicycle. Each program should be analyzed the Race and Social Justice lens to ensure equitable interaction and outreach with a broad spectrum of the public.

Chapter 6 Strategies and Actions: Bicycle Safety Programs

Strategies	Actions
6.1 Develop a bicycle safety program	**6.1.1 Provide bicycle education for primary school children.** Work with schools to continue and expand the Safe Routes to School program to teach children to safely walk and ride a bicycle to school.
	6.1.2 Assess the feasibility and cost of including middle school and high school roadway safety education in Seattle schools.
	6.1.3 Promote bicycle safety and multimodal trip knowledge through Seattle driver education programs at licensing centers. Support partners in updates to the statewide system regulating driver training and licensing. Consider creating a professional development training course for driver education instructors.
	6.1.4 Research and assess the feasibility of laws requiring that all driver training and driver's license renewal processes cover bicycle safety, traffic laws and the consequences of unsafe travel behavior. Work with state legislature on implementation.
	6.1.5 Develop educational materials and programs that explain how to safely drive and bicycle on or near streets with bicycle facilities. This information will help people understand how to use new and existing facilities for all modes of travel. Work with the Seattle Police Department (SPD) to help share materials promoting all users' responsibilities for safe streets.
	6.1.6 Collaborate with partners to develop, strengthen and distribute existing "Bike 101" materials to assist a wide range of current and new riders. Make materials accessible to non-English speakers and include information about e-bicycles (electric bicycles) to help overcome topography barriers.
	6.1.7 Support information sharing and communication between the freight, professional driver, and bicycling communities. Utilize direct communication channels to facilitate safer and more considerate behaviors by all roadway users.
	6.1.8 Develop targeted marketing campaigns to encourage people to try bicycling and follow the rules of the road when traveling by bicycle. Integrate evaluation metrics into campaign design. Collaborate with the Seattle Police Department (SPD) on community outreach, safety education, and enforcement of traffic laws. Develop marketing campaigns aimed at the following: • The general population throughout the city to encourage motorists and people riding bicycles to be aware of and respect all travel laws, such as for Bike to Work Month or Bike to Work Day. • Specific populations to encourage more people to try bicycling by identifying groups that are interested, but have not yet tried bicycling. • Evaluate all marketing campaigns to determine whether goals are being accomplished.

Wayfinding and Trip-Planning

Wayfinding tools (signs, pavement markings, and maps) and online trip planning tools do not replace the need for high-quality bicycle facilities; however, these tools can make the existing bicycle network much easier to navigate. Ensuring information is easy to find for people of all ages and abilities is important to ensure equitable access to the benefits of riding a bicycle for any trip purpose.



Wayfinding signs can promote bicycle facilities to potential riders and help people on bicycles get to their destination

Chapter 6 Strategies and Actions: Wayfinding and Trip-Planning

Strategies	Actions
6.2 Improve wayfinding and trip-planning opportunities for people on bicycles	**6.2.1 Enhance the existing wayfinding system** to incorporate new destinations and include wayfinding signs as a component of all projects.
	6.2.2 Coordinate with major institutions to encourage cohesive signage and information sharing.
	6.2.3 Update the annual printed bicycle map. Design the map to be accessible to people for whom English is not a primary language and to people who might need larger text. Include bicycle traffic laws on the map.
	6.2.4 Make all bicycle-related GIS data available through the Seattle.gov GISWEB portal and publish other bicycle data (such as collision analysis) to allow development of third-party applications.

Access to and Encouragement for Bicycles

One important goal of this plan is to serve groups who may not currently ride a bicycle and for whom riding a bicycle might provide great health, financial, and time benefits. Puget Sound Bike Share will provide the city with a powerful resource to lower the barrier to entry for bicycling. Working with partners and neighborhood groups to promote and improve safety of all users of the roadway will encourage more people to view bicycling as a way to get around to their local destinations.



Bicycle training courses help bicycle riders gain a better understanding of how to safely navigate city streets.

Chapter 6 Strategies and Actions: Access to and Encouragement for Bicycles

Strategies	Actions
6.3 Support improved access to bicycles and encouragement of bicycling opportunities	**6.3.1 Partner with other departments and organizations to develop education and encouragement programs for populations historically underrepresented in bicycling, including youth older adults, women, economically disadvantaged, and people of color.**
	6.3.2 Support and advertise events and programs that provide helmets and other safety equipment at free or reduced rates.
	6.3.3 Partner with Puget Sound Bike Share to promote the system and focus on safety for new riders, encouragement programs and wayfinding.
	6.3.4 Work with neighborhood groups and other partners who want to promote and improve bicycling.

Economic and Community Development

Cities around North America are seeing that a bicycle-friendly reputation can be advantageous in attracting tourists. Puget Sound Bike Share and new, high-quality bicycle facilities will make riding a bicycle more appealing proposition for both visitors and residents alike. Bicycle-friendly business district programs can help neighborhood business districts "brand" themselves as welcoming to customers who arrive by bicycle, creating more livable and vibrant communities.

Bicycle Benefits is a program designed to *reward* individuals and businesses for their *commitment* to cleaner air, personal health, and the use of pedaling energy in order to create a more *sustainable community*.

Chapter 6 Strategies and Actions: Economic and Community Development

Strategies	Actions
6.4 Support economic and community development through bicycle related activities	**6.4.1 Support strong bicycling elements in Transportation Management Programs (TMP) and Commute Trip Reduction (CTR) sites.** Work with the Department of Planning and Development (DPD) to develop an information packet that outlines code requirements for bicycle parking needs and other amenities and distribute to TMP- and CTR-affected sites. Support Employee Transportation Coordinators (ETC) in promoting bicycling at CTR sites.
	6.4.2 Assist neighborhood business districts and other groups that want to begin a Bicycle-Friendly Business District. Bicycle-Friendly Business Districts can vary in their specifics, but they all allow a business district to "brand" itself as welcoming to customers who arrive by bicycle. Collaborate with the Office of Economic Development (OED) and/or neighborhood chambers of commerce.
	6.4.3 Support the development of a bicycle tourism program. Facilitate communication and education between tourism agencies and other partners about bicycling in Seattle. A bicycle-friendly reputation can be an advantage in attracting tourists.
	6.4.4 Support events that encourage neighborhood-level active transportation. These events include Summer Streets, Bicycle Sundays, Kidical Mass and others.
	6.4.5 Partner with and support Puget Sound Bike Share to encourage expansion to bicycle-friendly neighborhood business districts and identify more opportunities to support bike share in more neighborhoods throughout Seattle.



Chapter 7: Implementation

APPROACH



"I'd prefer to see traffic calming strategies, including lane reductions on multi-modal corridors, provided this is accompanied by more robust transit service and bicycle network improvements to provide alternatives to driving."

The BMP provides a long-range vision for improving conditions for bicycling in Seattle. This plan will be implemented incrementally over the coming years.

How We Do Business

In addition to guiding the location, type, and extent of bicycle infrastructure, end-of-trip facilities, and programmatic investments, this plan identifies opportunities for the City of Seattle to expand partnerships that support bicycling. These opportunities will leverage resources with other city departments and with partner organizations to implement bicycle projects and programs comprehensively and efficiently.

The plan identifies actions to better integrate bicycling throughout Seattle Department of Transportation (SDOT) operations. Currently, SDOT's approach is one of shared responsibility to create a culture that focuses on all modes of transportation and integrates bicycle implementation throughout the department. However, SDOT also recognizes that, like many great bicycling cities across the US, a dedicated bicycle coordinator position may increase accountability and project, program and maintenance implementation.

Decision making by the city to implement the BMP is supported by a set of activities that includes policies, management practices, and processes. The sections in this chapter describe current governance practices and provide actions needed to implement the vision of the plan through changes in the way the city does business, including:

- Bicycle Project Delivery that includes a project development and design process, creating public engagement strategies
- New and enhanced activities to ensure BMP implementation success
- Partnerships that will be essential for sustaining increased bicycling

IN THIS CHAPTER:

How We Do Business 93
Coordination between SDOT and other city departments, public agencies, and partner organizations is essential to successful implementation of the plan.

Bicycle Facility Maintenance 101
SDOT will need to continue to maintain and upgrade existing bicycle facilities. As more facilities are developed, the maintenance needs will grow over time.

Prioritization Framework 104
The plan sets a long-term vision for bicycle facilities and programs. How the city decides what to implement over time should be based on a robust and data-driven prioritization framework.

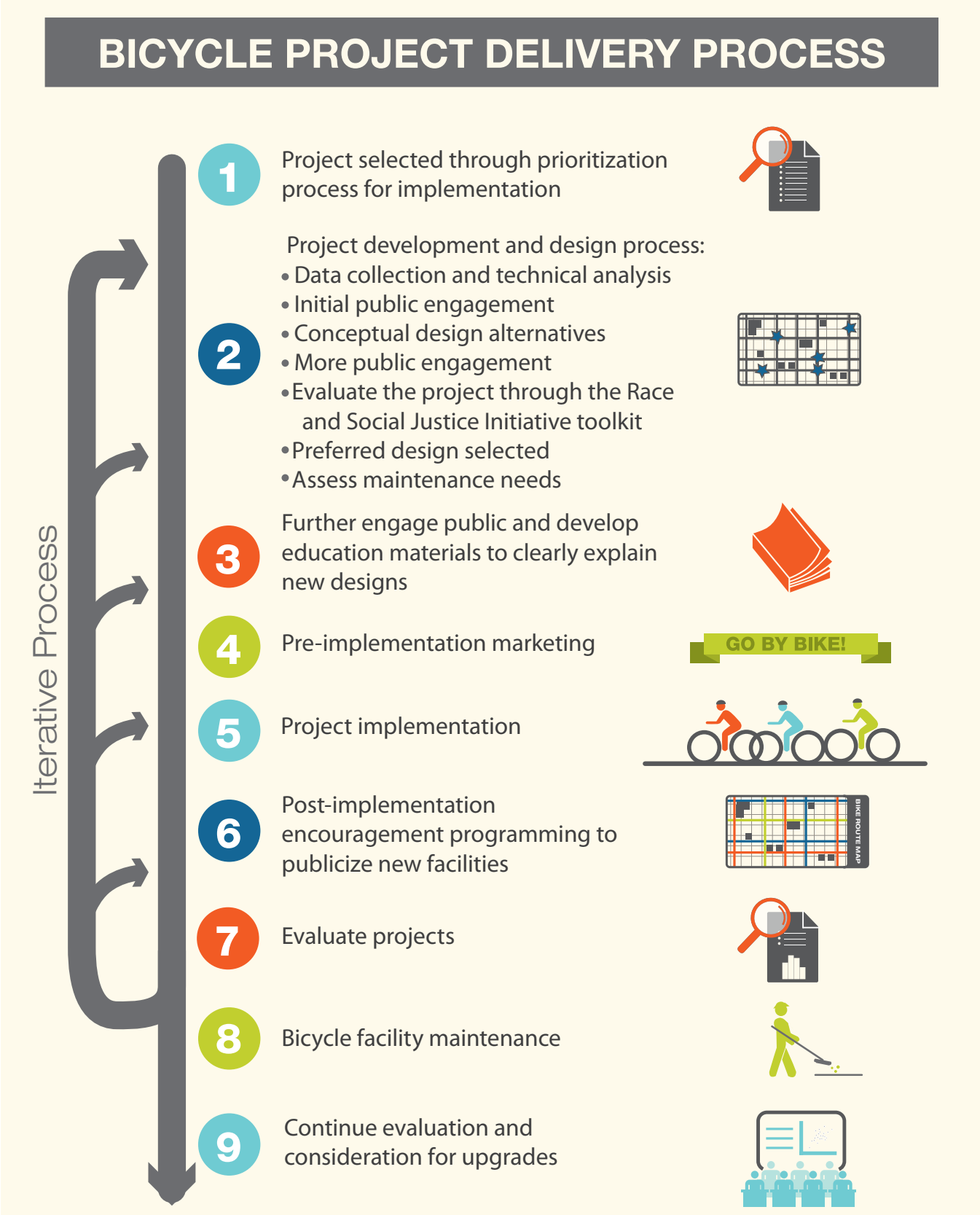
Investment Approach 108
A summary of strategies the city and SDOT will pursue to fund the plan over time.

Performance Measures 112
To measure progress towards achieving the goals of the plans, SDOT will track performance measures over time.



Climbing lanes provide a space for bicyclists on hills while allowing motor vehicles to pass.

Figure 7-1: Bicycle Project Delivery Process



Bicycle Project Delivery Process

The plan strives to create a more integrated and strategic Bicycle Project Delivery Process to be used by SDOT, especially in regards to public engagement. Consistency is critical to provide the public a general understanding of how a project will be developed, designed, and implemented. Each project should also be evaluated using the City of Seattle Race and Social Justice Initiative Equity Toolkit.

The BMP is a system-wide plan that lays out a future vision of where bicycle facilities should be developed and what kind of facility is appropriate. As described in Chapter 4, the bicycle network map was defined based on a robust methodology. However, as bicycle projects are developed in the future (through the project development and design process), more work will be done to assess the feasibility of projects, and more detailed design and community engagement may lead to a project being developed in a different way or location than envisioned in the plan.

As noted in Figure 7-1, the project development and design process includes data collection, technical analysis, and more defined public engagement, as well as additional identification and analysis of alternatives, or alternative street cross-sections, and a preferred design to implement bicycle improvements. The process also consists of education about and promotion of the bicycle facility, ongoing maintenance, and further evaluation and potential evolution of design.



Public engagement at the University of Washington during the development of the draft BMP.

Chapter 7 Strategies and Actions: Bicycle Project Delivery Process

Strategies	Actions
7.1 Develop procedures and processes for bicycle project delivery	**7.1.1 Include public engagement, data collection and technical analysis, conceptual design alternatives and preferred design in the project delivery process.** • **Public engagement:** Work with the community to understand their priorities and develop solutions that balance local community and system-wide needs to implement safe bicycle facilities. Public engagement policies and strategies will be developed and then conducted during the project development and design process and will include numerous stakeholders; the surrounding community (residents and businesses), transit agencies, freight entities, other city departments, advisory boards and committees, etc. • **Data collection and technical analysis:** Parking utilization studies, traffic volumes, pedestrian and bicycle counts, traffic speed studies, assessment of transit and freight needs, adjacent land uses and potential future land use changes, driveways, emergency access etc. will be considered. • **Conceptual design alternatives:** Alternative street cross-sections, including facility types and locations. • **Preferred design:** Upon completion of the project development and design phase for the project, if it has been determined that a recommended cycle track (protected bicycle lane) is not feasible on the arterial street, then the project team would incorporate an adjacent neighborhood greenway to ensure people of all ages and abilities can ride to their destinations on an all ages and abilities bicycle facility.

New and enhanced activities to ensure Bicycle Master Plan Implementation Success

The implementation of the BMP will result in an expanded set of responsibilities for SDOT.

Chapter 7 Strategies and Actions: Implementation

Strategies		Actions
7.2	Strengthen bicycle project and program delivery processes	**7.2.1 By the 2015 budget cycle, evaluate the need for a bicycle coordinator position(s)** to oversee all bicycle plan implementation activities.
		7.2.2 Develop an implementation matrix for all strategies and actions within the BMP to help define an organizational structure and assignment of new roles to SDOT and potential partners.
		7.2.3 Evaluate and monitor projects by conducting before and after counts, including incorporating new technology and perception surveys.
		7.2.4 Develop public engagement policies and strategies for use by SDOT and make any webpage, mobile apps, blogs, Twitter feeds, etc. fully integrated, complementary, user-friendly, and consistent with the Race and Social Justice Initiative principles..
		7.2.5 Develop a pilot program for temporary implementation of bicycle facilities. Experiment and test improvements of a bicycle facility in order to determine traffic operation pros and cons and/or modal trade-offs associated with the incorporation of the bicycle facility prior to final design and implementation.
		7.2.6 Explore innovative bicycle facility solutions that may work to overcome Seattle's topography barriers. Research and experiment with hill climb assistance technology to facilitate bicycle travel on steep grades where there is not a feasible flat route alternative.
		7.2.7 Explore the implementation and siting of bicycle "fix it" stations along high bicycle ridership corridors.
		7.2.8 Update the Traffic Control Manual to include requirements for bicycle detour plans. Review street closures and detours due to construction with the Seattle Bicycle Advisory Board.
		7.2.9 Test, evaluate, and implement appropriate innovative design treatments and technology that improve operating conditions and safety for people riding bicycles. These may include new technologies for bicycle detection and counting people bicycling, more durable pavement marking materials, and new products, and materials that extend the life cycle of facilities.
		7.2.10 Provide training of city staff, including SDOT and Seattle Police Department (SPD). Training can include best practice bicycle facility design, safety countermeasures, maintenance/new materials capabilities, and bicycle detection and count technology. Include training that pertains to bicycle-related research and studies such as, economic, safety, perception surveys, etc. Also provide SPD with educational tools and materials to share with the general public.
		7.2.11 Evaluate bicycle facility projects and programs with the Race and Social Justice Initiative Equity Toolkit.

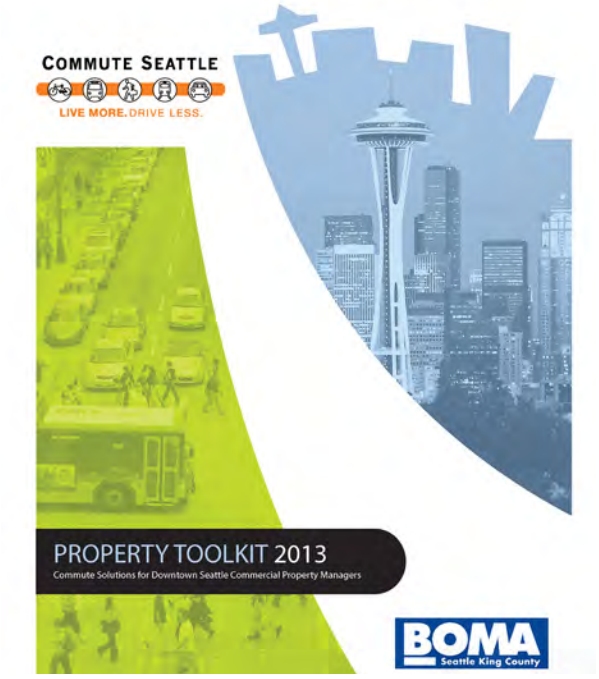


Strategies		Actions
7.2	Strengthen bicycle project and program delivery processes	**7.2.12 Enhance the data collection program** to include a variety of sources. • Conduct an annual phone survey and increase sample size when possible. • Investigate opportunities to supplement the Puget Sound Regional Council travel survey to increase the City of Seattle sample size. • Ensure data analysis and reporting on an annual basis for performance measure targets and trends. • Update count data collection and technology as new bicycle detection allows for counting as well as detection of bicycle riders. • Ensure collision data collection includes both police (SPD) reported and fire department (SFD) reported collisions. • Develop a process for analyzing police reports to document where a bicycle collision occurred on the street within the specific bicycle facility or in an adjacent travel lane.
		7.2.13 Conduct regular reviews of the Seattle Municipal Code (SMC) sections that pertain to the rules of the road and to new development to identify changes that would facilitate better bicycling conditions. Pursue any identified local legislative changes to facilitate better bicycling conditions in Seattle. Partner with the Seattle Police Department and the Law Department to review and advocate for SMC changes that promote safe and lawful use of all transportation modes on city streets.
		7.2.14 - Continually monitor, evaluate, and improve bicycle facility infrastructure. A bicycle network is always evolving and the city can evaluate and modify its bicycle facilities to best meet the needs of people of all ages and abilities. (see action 7.13.1)
7.3	Review bicycle-related collisions, collision rates and frequencies over time and identify and implement safety strategies	**7.3.1 Analyze bicycle-involved collisions to identify trends, behaviors, engineering solutions, and policy/institutional issues** that can be changed to reduce the likelihood of future collisions.
		7.3.2 Track bicycle-involved collisions per type of bicycle facility. Review and compare collision rates across a variety of facility types over time to determine whether new facilities are having the intended effect of increasing safety by reducing collisions.
		7.3.3 Work with the Seattle Police Department (SPD) to analyze the collision data and, when applicable, determine locations for targeted and enhanced enforcement of all users of the roadway.
7.4	Track development of the bicycle facility network as part of SDOT's asset management system	**7.4.1 Develop a formal process for updating the bicycle facility network database.** Continue to track the bicycle facility information, such as lane miles per facility type and signage, and consider tracking new information.
7.5	Negotiate maintenance agreements with partners	**7.5.1 Unify multi-use trail standards, including maintenance, among all trails within the City of Seattle, regardless of land ownership.**
7.6	Update the Bicycle Master Plan	**7.6.1 Update the Bicycle Master Plan every 5-7 years** to take advantage of emerging opportunities, re-evaluate priorities, address network gaps, and respond to changes in mode share and travel patterns.

Partner Roles

The City acknowledges the critical role of various nongovernmental, public, and private partners as it looks to implement the BMP. While SDOT is the primary implementer of bicycle infrastructure improvements in Seattle, coordination with other city departments is critical to success. Working with all city departments to effectively achieve the goals of the BMP is a key and necessary part of the plan. All city departments should strive to understand how they play a role in helping to achieve safer streets for all while providing people options for getting around the city.

To help partners deliver programs, SDOT should provide support where possible. This includes providing grant funding, technical assistance, coordination on bicycle messaging, sponsor and logistical support for events, and event or meeting space. There are a variety of bicycle-related partners that SDOT already works closely with: at a statewide level – The Bicycle Alliance of Washington and Cascade Bicycle Club; at a city scale – Commute Seattle and Seattle Neighborhood Greenways; and at a neighborhood level – Bike Works, West Seattle Bicycle Connections and other neighborhood groups and bicycle shops. Developing relationships with a large variety of bicycle-specific, safer streets advocates, and other organizations will help expand the knowledge about why bicycling is important to the future of Seattle.



Commute Seattle is a not-for-profit organization working to provide alternatives to drive-alone commuter trips in downtown Seattle. One of its initiatives is to help building owners and managers identify amenities, such as bicycle end-of-trip facilities, that encourage their tenants to commute by means other than driving.



Rainier Ave Summer Streets parade.

Chapter 7 Strategies and Actions: Partner Roles

Strategies		Actions
7.7	Seek partnerships for implementation of projects, initiatives, and programs	**7.7.1 Work with partners to deliver education and encouragement programs.**
		7.7.2 Work with partners to administer bicycle-related events.
		7.7.3 Document bicycle facility maintenance roles.
		7.7.4 Gather expertise and input from local bicycling organizations for project planning, design, and construction impacts.
		7.7.5 Work with partners to increase the supply of end-of-trip facilities.



Strategies	Actions
7.8 Work with other City of Seattle departments to implement the plan	**7.8.1 Coordinate with Seattle Public Utilities (SPU) during project development and design** to maximize transportation and stormwater benefits. An ideal coordination outcome would be to construct a project with both departments' elements at the same time to improve construction efficiency and reduce repeat construction impacts to one street. Incorporation of greener infrastructure on all streets is important for livability, sustainability, and the environment.
	7.8.2 Work with Seattle Police Department (SPD) to increase safety for all roadway users. Analyze collision data as a team to determine enforcement and/or engineering design treatments, educate the officers about operations of new bicycle facilities, and support proactive enforcement of the rules of the road for all modes. Invite community police officers to all new bicycle facility celebrations and opening ceremonies.
	7.8.3 Include Seattle Fire Department (SFD) staff in the project development and design phase of project implementation to maintain emergency access. Educate the fire fighters and emergency responders of the safety aspects of new bicycle facility and intersection designs.
	7.8.4 Work with Seattle Department of Planning and Development (DPD) to modify any Seattle Municipal Code regulations that will impact bicycling and the bicycling environment. Educate staff about new bicycle facility treatments and other aspects of this plan for use during streetscape concept plans, neighborhood zoning changes, and future planning studies. Include SDOT staff in Early Design Guidance (EDG) development meetings to alert private developers of proposed bicycle facilities along their property frontage for opportunistic implementation, as well as for access management needs.
	7.8.5 Partner with Seattle City Light (SCL) to provide lighting in critical locations so that bicycle facilities, especially off-street facilities, remain safe to use during all hours of the day and throughout the year.
	7.8.6 Work with Seattle Parks and Recreation Department (Parks) to provide bicycle access to and, where appropriate, through parks. Explore opportunities to expand existing multi-use trails or build new all ages and abilities bicycle facilities through Parks land. Assist Parks in updating their bicycle policy to reflect the desire of new riders to travel through parks. Promote bike share and bicycle parking near or within parks.
	7.8.7 Assist Seattle Center to update its bicycle policy to address the desire of new riders to safely travel through the Center to access destinations. Promote bike share locations near and within Seattle Center.
	7.8.8 Educate Seattle Department of Neighborhoods (DoN) staff about new bicycle facilities and the role they have in creating safer streets for all users. Share information about upcoming bicycle project outreach and engagement and provide SDOT project manager contact information for all projects.

Strategies	Actions
7.8 Work with other City of Seattle departments to implement the plan	**7.8.10 Work with Seattle Office of Economic Development (OED) staff on bicycle programmatic actions that enhance the economy.** Encourage OED to conduct before and after economic analyses and studies to communicate the benefits that new bicycle facilities have on a neighborhood and city-wide scale, including tourism. Continue to work with OED on intercept surveys to better understand how people access neighborhood business districts.
	7.8.11 Work with Seattle's Office of Sustainability and Environment (OSE) to incorporate implementation strategies and complementary programs that help to achieve the goals of the Climate Action Plan.
	7.8.12 Work with the Office of Intergovernmental Relations (OIR) to promote Seattle's interests with other agencies and state and federal government policy to advance the goals and objectives of the BMP.
	7.8.13 Engage with the Seattle Law Department to assist with Seattle Municipal Code recommendations and creation of new enforcement policies as necessary.
7.9 Build and expand upon public partnerships	**7.9.1 Engage transit operators at the bicycle facility project development stage when there is an overlap with transit service.** Design of the bicycle facility should allow safe operations of both modes, ideally through separation of the modes where possible. It will be important to acknowledge bus layover zones, bus stop/bulb locations, crosswalks, traffic signals, and right-of-way allocation.
	7.9.2 Engage King County Public Health to understand public health trends as they relate to bicycling. Continue to measure health impacts related to safety, obesity, respiratory health, other active lifestyle health benefits and equity.
	7.9.3 Engage with the Puget Sound Regional Council (RSRC) via membership in its numerous boards and committees so SDOT can remain a leading partner for regional transportation success. PSRC funding opportunities may enhance non-motorized projects.
	7.9.4 Engage and coordinate with neighboring jurisdictions for the continuity of bicycle networks when city boundaries are crossed. Coordination regarding signage, facility type, and design can help to create a cohesive regional bicycle network for people riding bicycles.
	7.9.5 - Engage with the Seattle Public Schools to continue to partner with Safe Routes to School, on traffic safety education, and encouragement of walking and biking to school.



Linden Ave Complete Street, including a cycle track (protected bicycle lane) opening day celebration event.



Bicycle Facility Maintenance

People riding bicycles are particularly sensitive to the condition of the roadway or multi-use trail surface, because maintenance-related issues like potholes, irregular surfaces, and debris can be uncomfortable and may lead to collisions. Maintenance affects the comfort and appeal of facilities, and lack of well-maintained facilities may reduce bicycling rates.

Maintaining the Bicycle Network

Improving maintenance for bicycle facilities requires action on several fronts:

- designers should be expected to think about maintenance (materials and labor costs) when they begin project development
- low-maintenance and high-quality techniques and materials should be the rule rather than the exception
- maintenance policies should be shared and agreed upon by all relevant agencies
- bicycle facilities and pavement conditions should be assessed
- the public should be involved in identifying maintenance needs.

On-street bicycle facilities should be maintained as part of other routine roadway maintenance, but with greater attention to detail to ensure smooth travel for more vulnerable street users. Maintenance activities should be funded at a level that allows SDOT to meet the maintenance performance outcomes described in Table 7-1.

Table 7-1: Maintenance Activities

Maintenance Activity	Current Maintenance Activity	Desired Maintenance Activity
Permanent utility cut restoration	Within one year	Within one year
Replace drain grates with new bicycle-friendly grates	As needed	As needed and with all new bicycle projects
Repair and replace pavement	Arterials: 50–100 years Non-arterials: limited to no action	Arterials: 25–65 years Non-arterials: as needed
Fill concrete joints within bicycle facilities	Upon improvement request	Upon improvement request and within corridor improvements assessment
Repair potholes	Within 72 hours of report	Within 72 hours of report
Replace signs	As needed	As needed
Replace pavement markings and striping on bicycle facilities	Multi-year basis	Multi-year basis
Trim vegetation	Upon request for off-street facilities and yearly on multi-use trails by SDOT, Parks, and Port of Seattle	Same as current
Review visibility at intersections	Upon request	Upon request and as part of corridor projects
Complete safety improvements at railroad crossings	None	As prioritized
Remove graffiti	As needed	As needed
Clean leaves, debris, trash, snow, and sand	As needed; upon request	As needed
Repair or replace lighting	Upon request	Upon request
Maintain bicycle racks/furniture	Upon request	As needed
Sweep streets with bicycle facilities	Arterials: monthly Non-arterials: none	Arterials: monthly Non-arterials: as needed
Inspect bridge structures	Annual	Annual
Repair fencing adjacent to multi-use trails	None	As needed
Bicycle counters	None	As needed

Chapter 7 Strategies and Actions: Facility Maintenance

Strategies	Actions
7.10 Maintain on-street and off-street bicycle facilities	**7.10.1 Develop maintenance standards and schedules.**
	7.10.1 Plan for and adequately fund maintenance activities and needs, including equipment and labor.
7.11 Consider maintenance costs, procedures, and long-term funding mechanisms as a part of all new bicycle facility projects	**7.11.1 Gather life-cycle information and cost estimates based on facility type** to better gauge current and future maintenance needs. Update costs projections as needed to remain current.
	7.11.2 Identify maintenance costs in the project development and design stage of all bicycle facility projects.
	7.11.3 Establish clear maintenance responsibilities in advance of construction.
	7.11.4 Identify new maintenance needs (e.g. sweepers of cycle tracks).
7.12 Encourage people riding bicycles to report maintenance complaints and improvement requests to SDOT	**7.12.1 Distribute the street maintenance request form and phone number for surface improvements** like pavement, striping, signing and vegetation, and access improvements. Include this information in the bicycle program portion of the SDOT website and annual user map.
	7.12.2 Respond to requests in a timely manner.
	7.12.3 Expand the program to identify problems that need immediate attention, to identify recurring problems at particular locations, and to set major maintenance priorities.
	7.12.4 Add non-arterials (where neighborhood greenways are implemented) to the Bike Spot Improvement Program and pavement repair programs, where necessary.

Many North American cities develop policy statements that ***integrate bicycle facility maintenance*** *into project development. In most cases, the intent of maintenance funding policy is to preserve the network in* ***"a state of good repair."*** *Yet, few cities develop actionable funding plans or mechanisms that dedicate adequate city funds to this purpose.* ***Two cities break this mold:*** *Minneapolis and Santa Monica. Each city has committed* ***8 to 10 percent of its total bicycle capital investment*** *program toward maintaining new capital improvements. Minneapolis estimates $2 per linear foot to maintain its network of trails, bicycle boulevards, and bicycle lanes.*



Improving the Bicycle Network

In addition to maintaining existing bicycle facilities, SDOT will also work to improve facilities as needed. An improvement of an existing facility could involve improving the condition of a bicycle facility, modifying operations for all modes, or other engineering elements that provide a safer street for everyone.

Chapter 7 Strategies and Actions: Improving Existing Bicycle Facilities

Strategies	Actions
7.13 Improve bicycle facilities as needed, based on performance criteria	**7.13.1 Develop a data-driven process to identify and prioritize existing bicycle facility corridors** to be considered for improvements. A bicycle network is always evolving. The city must continually evaluate and modify its bicycle facilities to best meet the needs of all bicycle riders. Data to be considered may include the following: • High collision locations • Collision history and trends • Bicycle facility pavement condition assessment • Bike Spot Improvement Program requests • Bicycle counts • Signal timing • Bicycle detection functionality
	7.13.2 Conduct a follow-up study to evaluate the effectiveness of new treatments. Factors that may be considered: • Does the treatment reduce conflicts between people riding bicycles and other roadway or trail users? • Does the treatment improve the behavior of people bicycling? • Does the treatment improve the behavior of people driving? • Do people riding bicycles perceive that they are safer?
7.14 Create a multi-use trails upgrade and maintenance plan	**7.14.1 Assess existing multi-use trail conditions and develop recommendations to improve the multi-use trail environment.** Include pavement and shoulder condition, vegetation control, adjacent buffers and/or barrier treatments, intersection and/or railroad crossings, etiquette signage, and wayfinding signage.
	7.14.2 Conduct multi-use trail capacity studies to evaluate trail expansion needs. If a trail expansion cannot be achieved (for example, adjacency to an environmentally-sensitive area), assess if a parallel street may help serve people riding bicycles. Install alternate route wayfinding signage along the trail when a parallel street bicycle facility is installed.
	7.14.3 Remove unused bollards and bollard receptacles on multi-use trails where they are no longer needed.
	7.14.4 Conduct counts at intersections to assess assignment of right of way at trail crossings.
7.15 Assess the condition of SDOT-owned bicycle racks	**7.15.1 Develop a process to access bicycle rack and on-street bicycle corral conditions and replace as needed.**
	7.15.2 Replace bicycle racks when non-standard racks are determined to be non-functioning or a safety issue.

Prioritization Framework

Bicycle Facility Prioritization

Full implementation of the proposed bicycle network (including new facilities and upgrades to existing facilities) will take many years. This makes it important to develop a process for selecting an equitable and realistic set of prioritized projects to complete over time. This process should fulfill the plan's goals of increased safety, ridership, connectivity, equity, and livability, while simultaneously providing enough flexibility for Seattle to pursue projects based on specific opportunities.

Primary Evaluation Process

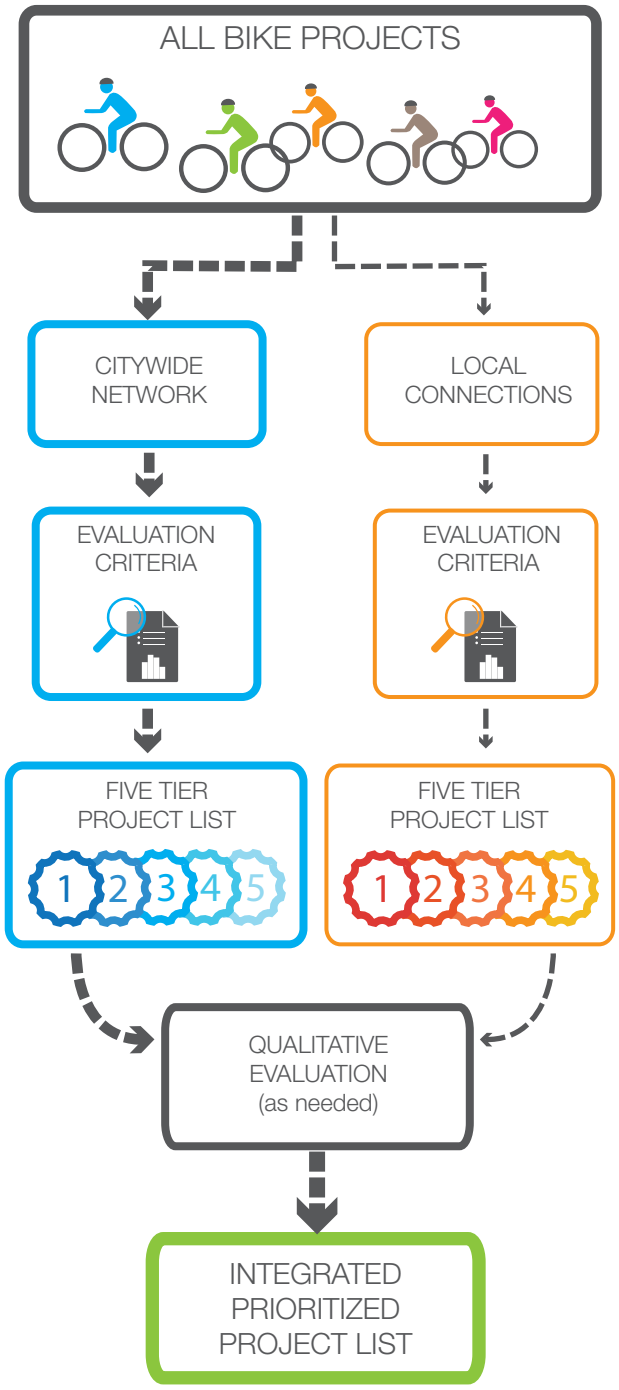
Step one in the prioritization framework recognizes two categories for project prioritization based on their role in the bicycle network:

- **Citywide network**
- **Local connectors**

Completing high-demand segments of the **Citywide Network** should be a near-term priority. The area in the city with the highest overall demand, based on residential and employment densities, is the Center City area (Downtown Seattle and surrounding neighborhoods such as South Lake Union and Capitol Hill). Much of the Downtown core currently lacks high-quality bicycle facilities. A near-term priority for the arterial cycle track (protected bicycle lane) network should be to implement facilities within Downtown, and the creation of safe, high-quality connections to the Center City.

Other near-term Citywide Network implementation priorities should be neighborhood greenways within all neighborhoods throughout the city to provide better pedestrian and bicycle access to local destinations (especially to schools), safer arterial street crossings, and slower moving motorists, which, ultimately, encourages more people to try riding a bicycle, thus creating safer streets for all users of the roadway and more livable communities.

Figure 7-2: Prioritization Process





The city may decide over time to vary future funding allocations between the **Citywide Network** and **Local Connectors** facilities two major categories based on changing priority needs. For instance, a higher percentage of funding could be allocated to bicycle facilities that contribute to the citywide network or funding could be allocated based on project type. Figure 7-2 portrays how the bicycle facility prioritization process will work, using both a quantitative and qualitative evaluation process to ensure the highest scoring projectsare built first.

Quantitative Evaluation Process

Step two in the prioritization process evaluates proposed projects in Seattle's bicycle network based on detailed evaluation criteria related to the plan's five goals as outlined in Table 7-2. While all of the major goals of the plan are important and does factor into project prioritization, safety and connectivity will be scored higher than other criteria. If safety and connectivity are improved across the city, then the other plan goals (increasing ridership, for example) will also be enhanced. Equity is also an important criterion to ensure that facilities are prioritized and implemented across the city, including in historically under-represented communities.

All projects in the networks will be scored against each other, regardless of facility type. The citywide and local connectors networks will be grouped into five tiers based on the number of points scored or the number of projects falling into each tier. Projects in the highest tier would be top priority; the second tier would be moderate priority, and the third would be lower, and so on.

Table 7-2: Prioritization Evaluation Criteria

Theme	Criteria Definition
Improve SAFETY	Addresses location with bicycle collision history and emphasis on vulnerable roadway users
	Enhances bicyclist safety by promoting travel on streets with low motorist speeds and low volumes
	Addresses locations or streets that are associated with greater bicyclist stress and more severe collision potential due to high motor vehicle volumes (ADT) and high speeds
Enhance CONNECTIVITY	Removes a barrier or closes a system gap in the bicycling network
	Makes a connection that will immediately extend the bicycle network
Address EQUITY	Serves populations that are historically underserved, including areas with a higher percentage of minority populations, households below poverty, people under 18, people over 65, and households without access to an automobile
	Provides a health benefit for people in areas with the greatest reported health needs, represented by obesity rates, physical activity rates (self-reported), and diabetes rates
Increase RIDERSHIP	Provides a connection to destination clusters
	Provides a connection to areas with high population density
Enhance LIVABILITY	Reaches the greatest number of riders, but recognizes that all bicycle facilities provide a measurable benefit to at least some bicyclists
	Distribute bicycle facilities across the city so people riding bicycles can reach all destinations

Qualitative Evaluation Process

A third step to guide annual project prioritization is a set of criteria that focuses on more qualitative factors as opposed to quantifiable criteria. The qualitative evaluation criteria outlined in Table 7-3 are useful and important when considering other projects that may not have scored highly during quantitative analysis, but may be opportunity driven, or have some other compelling reason for moving forward.

Catalyst Projects

While large-scale or challenging projects are a part of both the citywide and local connectors bicycling networks and may be prioritized within this framework, it is likely that alternative funding sources (e.g., grant funding) will be necessary to successfully complete many of the catalyst projects.

Program Prioritization

Programmatic actions are also broken down by priority tiers, with Tier 1 representing the most immediate actions, as shown in Table 7-4. Actions are prioritized primarily based on their potential to improve safety; programs believed to contribute directly to increased safety (through increased awareness and understanding about traffic laws) are included in Tier 1. Other factors in the prioritization include community input received throughout the BMP update process and SDOT's estimation of which can be undertaken more immediately, given resource availability.

Each action is also cross-referenced against the plan goals that it serves. Goals shaded in dark directly address that goal; lighter shading indicates that an activity addresses the goal less directly.

Table 7-3: Qualitative Evaluation Criteria

Criteria	Comments
Potential to leverage other funding	Initiating projects will help secure funding.
Policy directive	Project specified by policy or City Council.
Community interest	Local community has expressed interest in bicycle infrastructure improvements.
Geographic balance	Project improves the balance of bicycle funding to be spent among geographic sectors of the city. Project expands the percentage of Seattle residents living within ¼ mile of a bicycle facility.



The cycle track on Broadway provides a physical separation between motorized and bicycle traffic.



Table 7-4: Program Prioritization

Priority Tier	Action	Ridership	Safety	Connectivity	Equity	Livability
1	Provide bicycle education for primary-aged children.	◻	■		◻	
1	Assess the feasibility and cost of including middle school and high school-aged safety roadway education in Seattle schools.	◻	■		◻	
1	Promote bicycle safety and multimodal trip knowledge at Seattle driver education programs and licensing centers.		■		◻	
1	Research and assess the feasibility of new laws		■			◻
1	Collaborate with partners to develop and strengthen existing "Bike 101" materials.	◻	■		◻	◻
1	Support and advertise events and programs that provide helmets, and other safety equipment at free or reduced rates.	◻	■		◻	
1	Develop educational materials and programs that explain how to safely drive and bicycle on or near streets with bicycle facilities.		■			◻
1	Support information sharing and communication between the freight, professional driver, and bicycling communities.		■			◻
1	Develop targeted marketing campaigns to encourage people to try bicycling and follow the rules of the road when traveling by bicycle.	■	■			◻
1	Partner with Puget Sound Bike Share to promote the system and focus on safety for new riders and other programmatic activities.	◻	■			◻
2	Partner with and support Puget Sound Bike Share to encourage expansion to bicycle-friendly business districts and neighbohroods throughout Seattle.		◻			■
2	Partner with other departments and organizations to develop education and encouragement programs for populations underrepresented in bicycling.	◻			■	◻
2	Update the annual printed bicycle map.			■		◻
2	Enhance the existing wayfinding system to incorporate new destinations and include wayfinding signs as a component of all projects			■		◻
2	Work with neighborhood groups and other partners who want to promote and improve bicycling.	◻				■
3	Support events that encourage neighborhood level active transportation.	◻		◻	◻	■
3	Assist neighborhood business districts, or other groups, that want to begin a Bicycle-Friendly Business District.	■			◻	◻
3	Coordinate with major institutions to ensure cohesive signage and information sharing.			■		◻
3	Make all bicycle-related GIS data available through the Seattle.gov GIS WEB portal.			■		
3	Support the development of a bicycle tourism program.	◻				■
3	Support strong bicycling elements in Transportation Management Programs (TMP) and Commute Trip Reduction (CTR) sites.	■				◻

Directly addresses each goal	■
Indirectly addresses each goal	◻

Strategies	Actions
7.16 Develop 3–5 year implementation plan to summarize near-term priorities to implement the Bicycle Master Plan	**7.16.1 Develop a 3-5 year implementation work program to define specific actions to implement the BMP.** The work plan should include information on projects, programs, end-of-trip facilities, maintenance, and other activities. The work plan should be reviewed by the Seattle Bicycle Advisory Board (SBAB) and City Council.
	7.16.2 Update the 3–5 year work plan on an annual basis.

Investment Approach

Other top cycling cities have shown that a broad-based approach to bicycle investment that funds bicycle infrastructure, marketing, education, maintenance, and transit access improvements can simultaneously realize marked increases in bicycle use and bicycling safety. A balanced investment approach, informed by the information in Table 7-5, will be important for SDOT to effectively reach the plans five goals.

The Changing Nature of Bicycle Projects

Seattle residents expect safe, comfortable, and convenient bicycle facilities as a way to improve quality of life and help achieve community livability and economic goals. The layering of the all ages and abilities network onto the existing network of sharrows and arterial bicycle lanes will come at a greater cost than current funding levels, in part because the designs are more complex. Even so, these more attractive facilities are typically less expensive than other modal investments, such as high-capacity transit projects, and require less maintenance, such as roadway paving projects.

Funding Strategy

Federal and state grant funding sources are important, but are becoming a less reliable option for local governments. Federal support for active transportation grants is stagnating, and competition for funding is increasing as more communities around the country and in the state of Washington commit to livable streets and communities strategies. Local long-term revenue streams have successfully funded bicycle projects and programs, yet are not sufficient for widespread expansion of bicycling numbers and safety.

The funding strategy will help the city secure continual financial support for bicycle transportation and recreation, position itself for successful grant applications, and prioritize bicycle projects in strategic planning and budget development to ensure funding in the city's Capital Improvement Program (CIP).

Table 7-5: Summary of Bicycle Strategy Investment Ranges - Portland, Minneapolis, New York City, and Copenhagen

Strategy	Total Cycling Investment (%) per Year	Investment ($) per Capita per Year Based on Peers
Network improvements	72%–98%	$25.00–$50.00
Parking & end of-trip facilities	0.25%–5%	$0.15–$2.00
Bicycle-transit integration	0.40%–4%	$0.20–$1.50
Education	0.50%–17%*	$0.25–$6.00
Encouragement	0.50%–3.61%	$0.25–$1.25

*Note: The broad range in education funding levels displayed above relates to some cities' propensity to boost funding for cycling education once some level of network "maturity" has been achieved.

SOURCE: TRANSLINK REGIONAL CYCLING STRATEGY IMPLEMENTATION PLAN

SDOT should employ a funding allocation strategy that is flexible and allows for opportunistic spending. Seattle's funding approach should be multi-pronged, covering investments not just in constructing new bicycle facilities, but also in offering bicycle parking, encouraging people to use facilities and bicycles in general, educating people about the rules of the road, maintaining bicycle facilities, and tracking the success of bicycle projects and programs.



Bridging the Gap funding levy is a substantial funding source for bicycle projects over nine years (2007-2015).

Chapter 7 Strategies and Actions: Funding and Investment

Strategies	Actions
7.17 Establish a broad-based funding approach	**7.17.1 Fund bicycle projects and programming commensurate to US Census "commute by bike" mode share percentage**. In 2012, 4.1 percent of Seattle residents commuted by bicycle, supported by a bicycle project funding level of approximately 2 percent of SDOT's budget. Mode share-based funding should ultimately take the form of a "stepped" funding program, where funding increases as the bicycle mode share increases and the percentage of transportation funds allocated for bicycle transportation increases gradually over time using scheduled increases in funding.
	7.17.2 Fund high-priority projects first. The plan includes clear direction to prioritize the types of projects that have the greatest potential impact on the plans five goals.
	7.17.3 Continue to include bicycle projects in the City's six-year Capital Investment Program (CIP). The inclusion of more complex and potentially more expensive bicycle facilities in the CIP is appropriate to ensure annual program budgets are not fully consumed by one or two large projects.
	7.17.4 Continue to integrate bicycle projects into Complete Streets analysis.
	7.17.5 Fund bicycle projects through major multimodal capital projects.
	7.17.6 Fund bicycle facility maintenance.
	7.17.7 Consider bicycle funding in a Bridging the Gap renewal measure and other funding programs.
	7.17.8 Capitalize on the multiple benefits of bicycling to fund neighborhood initiatives out of a variety of fund sources, such as the Safe Routes to School program. The Neighborhood Street Fund, Family and Education Levy, and Neighborhood Park and Street Funds are potential funding opportunities for community-driven projects.
	7.17.9 Prepare plans with conceptual design and planning-level cost estimates for high-priority projects to increase readiness for grant funding.
	7.17.10 Develop a citywide strategic investment approach that integrates bicycle facility development into major capital project, multimodal corridor redesign, and roadway maintenance budgets.
	7.17.11 Fund bicycle programs.
	7.17.12 Fund end-of-trip facilities and partner with agencies, major institutions, and private developers in cost-sharing.
	7.17.13 Fund neighborhood greenways and multi-use trail projects out of the Pedestrian and Bicycle Program funds because multiple modes benefit from these investments.

Local, Regional, State, and Federal Funding Scan

The BMP contains a variety of facility types, maintenance needs, and programs that will require a diverse range of funding sources. Grant funding will continue to be important, and the city should explore private funds or other revenue options. Appendix 6 presents a scan of public and private funding opportunities that SDOT is well positioned to secure for bicycle infrastructure and programs. The scan also provides a summary of how Moving Ahead for Progress in the Twenty-First Century (MAP-21)—the current iteration of federal surface transportation funding—impacts bicycle infrastructure and program funding and how Seattle can capitalize on these changes.

Bicycle Network Planning-Level Cost

Planning-level cost estimates were developed, based on the facility types in the plan. For each facility type, a range of planning-level cost estimates per linear mile was developed using cost information known to date (based on recent experience) and supplemented with current unit prices and an assumed level of additional infrastructure needs. While the cost range was developed to get an overall plan-level cost for the proposed network, each segment cost will vary due to several elements including, but not limited to, existing pavement condition, pavement type, drainage basin, and existing and proposed signals. Detailed costing will be done as part of the implementation of each project during the project development and design phase.

Planning-Level Cost Assumptions

Arterial crossing treatments

Arterial crossing treatments between projects will vary greatly. Some intersections may not require any changes; other intersections might be improved with traffic signals, pedestrian and bicycle half signals, median islands, marked crosswalks, or other treatments. For the purposes of the order-of-magnitude cost estimate, the range reflects the variety of treatment options.



Installing a wheel curb to protect bicyclists in the bicycle lane from sharply turning traffic.

Pavement Type and Condition

Pavement types and conditions vary as do the level of repair and replacement required for each facility segment. For the purposes of the planning-level system wide costs, concrete was assumed for cycle tracks (protected bicycle lanes) and in street, minor separation facilities. Asphalt was assumed for off street facilities and neighborhood greenways. Five percent of facility length was assumed to be replaced during the facility construction. Pavement type data were used in applying percentages of repair costs for each existing pavement type to the system. It should be noted that additional pavement repair costs could be part of the assumed contingency costs.

Drainage Basin/Stormwater Costs

The location of a specific project, as well as the project type, will drive the drainage costs. For example, projects located in drainage basins may trigger stormwater treatment and detention, while a project in another area may not require detention or treatment.

Bicycle Facility Type Costs

The list below correlates to the facility types indicated on the Recommended Bicycle Network Map.

Off-street Facilities (Multi-use Trail)

The base planning-level cost assumes a 16-foot wide asphalt paved trail with 2-foot gravel shoulders on each side, signage every 1/4 mile in both directions, and continuous 6-foot wide seeded lawn



Connection from the Burke-Gilman Trail to the 39th Avenue NE greenway.

along one side of the trail. Typical improvements include curb and gutter, curb ramps, drainage infrastructure, and minimal power pole relocation.

Cycle Tracks (Protected Bicycle Lanes)

The base planning-level cost assumes a 7-foot wide, one-way facility on each side of the street along the curb line. Many protected bike lanes may be implemented instead with a 12-foot wide, two-way facility on one side of the street. Typical improvements include a 3-footwide continuous striped separation with vertical mounted traffic barrier, bike symbol and "bike only" pavement markings, and informational signage every 1/4 mile. This estimate assumes that, on average, a cycle track could require up to two signal per mile.

In Street, Minor Separation

The base planning-level cost assumes a 6-foot wide, one-way facility on each side of street along the curb line. Typical improvements include a 3-footwide continuous striped separation, bike symbol and "bike only" pavement marking, and informational signage every 1/4 mile.

Neighborhood Greenways

The base planning-level cost includes the installation of facilities designed to give priority to non-motorized movement. Typical improvements include signalization at arterial crossings or other intersection treatments, two-way sharrow symbols, traffic refuge areas, speed humps, curb ramps, curb bulbs, sidewalk and/or pavement repair, and informational signage every 1/4 mile.

Additional Cost Assumptions

For planning-level costing, each per linear mile cost estimate includes an additional 35 percent for "soft costs," which need to be accounted for in developing cost estimates. These would include:

- Project management
- Project scheduling
- Engineering and planning
- Permitting
- Bid package preparation
- Cost estimating
- Bidding services
- Construction
- Construction inspections
- Construction engineering services

In addition, each per linear mile cost estimate includes a contingency amount that ranges from 25 percent at the low end to 35 percent at the high end. Elements that could be included as part of contingency costs include:

- Additional median refuge islands at arterial crossings
- Storm drainage improvements
- Additional pavement improvements
- Unforeseen scope items or variability in site conditions

Table 7-6: Summary of Planning-Level Cost Ranges for Bicycle Facilities in the Bicycle Network

	Total Plan Miles	Facilities to Build (miles)	Approximate Cost per Mile (low end)	Facility Cost (low end)	Approximate Cost per Mile (high end)	Facility Cost (high end)
Off Street	78.9	32.0	$1,456,000	$46,590,000	$1,573,000	$50,340,000
Cycle Track	104.8	101.6	$1,546,000	$157,070,000	$1,894,000	$192,430,000
Neighborhood Greenway	248.9	238.6	$659,000	$156,240,000	$952,000	$226,150,000
In Street, Minor Separation	137.9	93.5	$321,000	$30,010,000	$574,000	$53,670,000
Shared Street	37.8	7.8	$48,000	$370,000	$48,000	$370,000
Total	608.3	473.5		$391,280,000		$523,960,000

As shown in Table 7-6. the rough order-of-magnitude planning-level cost range for the facilities listed in Table 7-7 is $390 million to $525 million. The low range cost estimate assumes that cycle track (protected bicycle lanes) projects would not require major drainage structure revisions; in street, minor separation facilities would not include signal upgrades; and that neighborhood greenway arterial crossings would have curb ramps previously upgraded or paid for by a separate funding source. The upper limit range cost estimate assumes some limited signal improvements for in street, minor separation facilities; curb ramps where neighborhood greenways intersect with arterial streets; cycle track storm drainage pavement repair, and increased the contingency to 35 percent. Because not all projects will come in at either the low end or the high end of the cost spectrum or a cost range is appropriate. Detailed costs will be developed for all projects, based on detailed design and the specific characteristics of each corridor. Based on the low-end planning-level cost estimates, approximately $20 million per year would be required to build the bicycle facility network in 20 years.

Other Bicycle System Costs

The planning-level system costs do not include:

- Catalyst projects (see Map 4-9): While these projects are an integral part of the future system, their implementation will likely be either part of a larger regional infrastructure project or will require other agency partners to implement.
- Maintenance: While maintenance is critical to a successful system, the maintenance costs will vary depending on the amount of the current and future system that has been installed.
- End–of-trip facilities: Bike racks, showers, changing facilities, and maintenance stations are all necessary components of a bicycling-friendly environment. Those end-of-trip facilities are provided by a coordination of public and private development and through an ongoing SDOT bicycle program efforts funded annually.
- Programs: Education, enforcement, encouragement, and promotional efforts of new bicycle infrastructure, are complementary to the development of on- and off-street bicycle facilities. Existing SDOT program resources (e.g. safety) can be leveraged to support identified programmatic needs.

Performance Measures

The performance measures in the plan are important for assessing whether the plan is meeting its goals over time. While they are focused on assessing progress over the long-term, data on these measures should be collected on a regular basis to help track interim progress being made. This information will allow for course adjustments to be made to help ensure achievement of plan goals.

The plan performance measures are based on the five goals of the plan (see Tables 7-7 and 7-8). The performance measures are generally outcome-based (focused on achieving policy objectives such as increasing ridership). The intent of outcome-based performance measures is to prioritize investments that do the best job of achieving desired plan outcomes, as opposed to output-based metrics that are more dependent upon available resources, that may fluctuate year to year.



The performance measures for the BMP were selected in part based on SDOT's ability to collect relevant data, both now and in the future. This data can help inform project selection and design, the development and success of education and encouragement programs, measures to improve safety, and other issues. Data and performance measures outlined in the following table represent the way SDOT will track achievement of the BMP plan goals over time; however, SDOT expects to collect an even broader spectrum of data as it implements the plan over time.

While the BMP update includes new performance measure targets, SDOT plans to continue tracking several 2007 plan performance measures (tripling ridership and reducing the number of reported collisions by one-third between 2007 and 2017) to see if these original performance measure targets were met. Since SDOT's ridership-gathering methodology has changed substantially since 2007, the ridership assessment in 2017 will be based specifically on downtown cordon counts; this is the only way to compare ridership statistics going back to 2007. The 2013 plan will measure ridership based on SDOT's updated counts methodology, and data collected by all-day bicycle counters, which have recently been installed.

Table 7-7: 2013 Bicycle Master Plan Performance Measure Targets

Goal	Performance Measure	Baseline Measurement	Performance Target
Ridership	Number of bicyclists counted at locations throughout Seattle	2014 citywide quarterly counts and daily counts at counter locations	Quadruple ridership between 2014 and 2030
Safety	Bicycle collision rate	2014 rate (based on updated 2014 counts)	Reduce bicycle collision rate by half (50%) between 2013 and 2030
	Number of serious injuries and fatalities	2013 number	Zero fatalities by 2030
Connectivity	Percentage of bicycle facility network completed	2013 percentage (calculate number based on final network map)	100 percent of bicycle system constructed by 2035
Equity	Areas lacking bicycle facilities	2012 Existing Conditions report	Zero areas of city lacking bicycle facilities by 2030
Livability	Percentage of households within ¼ mile of an all ages and abilities bicycle facility	2013 percentage (calculate based on latest built network)	100% of households in Seattle within ¼ mile of an all ages and abilities bicycle facility by 2035

Table 7-8: 2013 Bicycle Master Plan Performance Measure Trends

Goal	Performance Measure	Baseline Measurement	Desired Trend
Ridership	Commute mode share	2012 Census data (American Community Survey)	Increase
Safety	Percentage of Seattle residents who identify safety as a major impediment to bicycling	2013 SDOT phone survey percentage	Decrease
Connectivity	Key Travel Sheds Completed	2013 percentage of key travel sheds completed	Increase
Equity	Percentage of females, older adults, and people of color who ride regularly (a few times a month or more)	2013 SDOT phone survey percentage	Increase
Livability	Number of bicycle racks and on-street bicycle corrals	2013 number	Increase
	Self-reported physical activity	2006 King County Public Health report	Increase

APPENDIX



"Education of all road users, enforcement of road laws, and meaningful consequences to dangerous drivers (loss of license, fines, prison) would create a safer city for all of us."

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If you would like to review the information outlined in the Appendix, please go to the following website: http://www.seattle.gov/transportation/bikemaster_materials.htm



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Seattle Bicycle Advisory Board

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