

seattle bicycle master plan ●●●  
Draft June 2013





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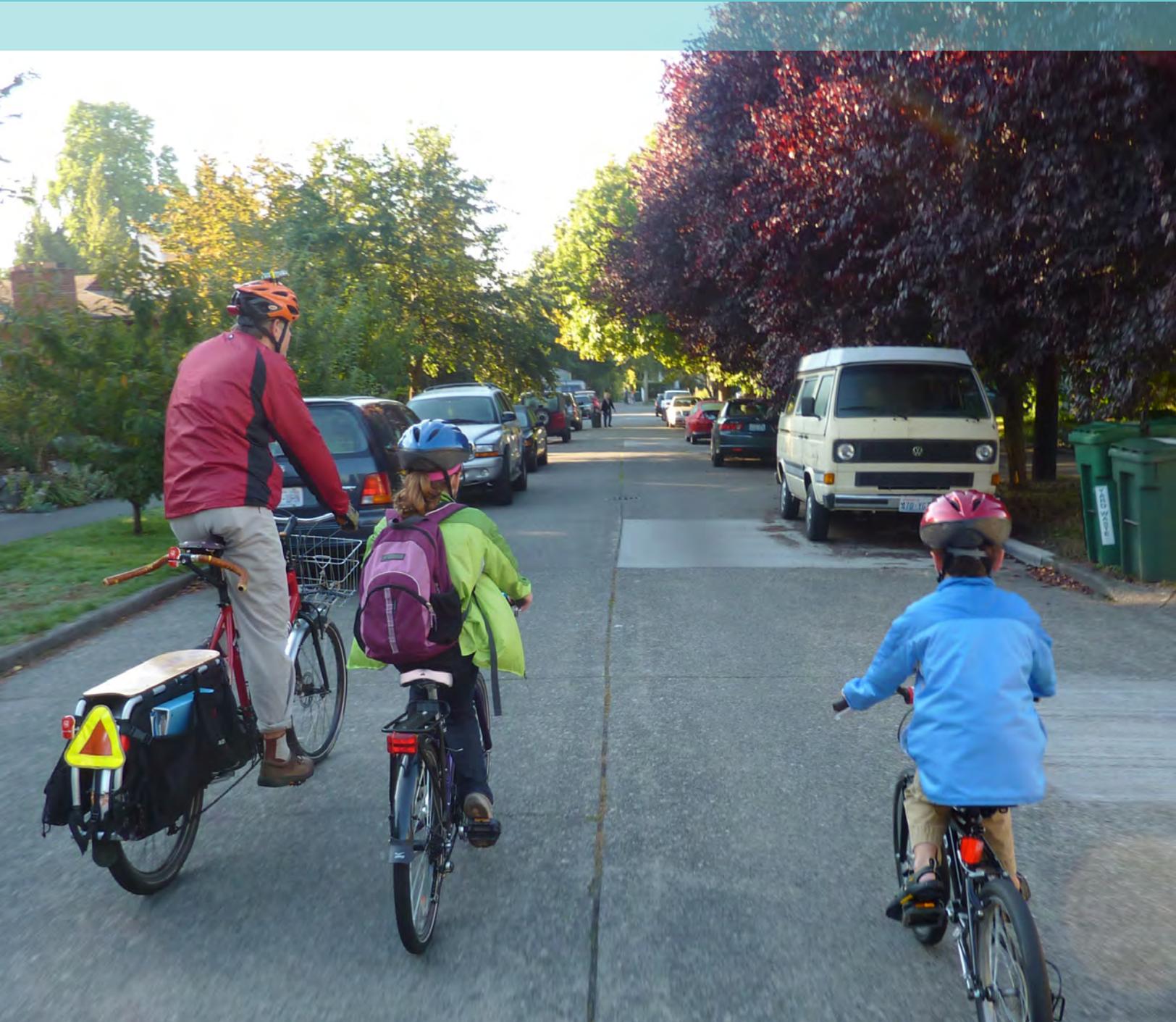
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## Chapter 1:

# 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.”*



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.”*

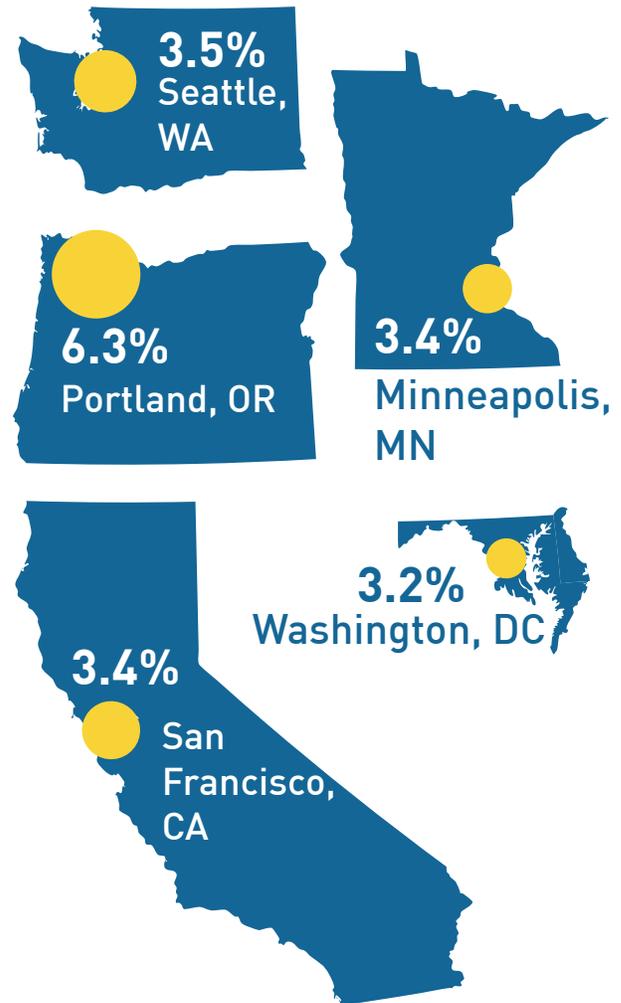
The new vision for the 2013 Seattle Bicycle Master Plan (BMP) signifies an evolution in the way Seattle accommodates people who will be riding a bicycle for any trip purpose. There are several important themes embedded in this vision statement. First, the idea that bicycling is “comfortable” suggests 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 fast and fearless 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 bicycle facilities that will be used by a broad range of people throughout the city.

The 2007 BMP effectively guided a number of improvements to Seattle’s bicycle system, including many investments to the on-street bicycle network and off-street trail system, which helped the city achieve gold level Bicycle Friendly Community status by the League of American Bicyclists. In 2011 the City Council funded this update to the plan, for 2013 completion.

The BMP update provides an opportunity to include fast-evolving best practices and new thinking towards bicycle facilities, resulting in planned investments that will serve a broader range of people who ride bicycles as well as those interested in riding a bike.

The updated plan will help Seattle continue its national leadership in bicycling. Thousands of people already bike daily to work, to play, and to run errands in their

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



LEAGUE OF AMERICAN BICYCLISTS. 70 LARGEST CITIES RANKED BY BIKE COMMUTING.



*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*

neighborhoods and across the city. The increase in bicycling in the city over the past several years makes Seattle second in the country (among large cities) for the percentage of people who commute to work by bicycle (see Figure 1-1).

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

### Plan Purpose

The main purpose of the Seattle Bicycle Master Plan is to provide a framework for the Seattle Department of Transportation's (SDOT's) future actions and investments to improve bicycling throughout the city. These investments will be in the form of new bicycle infrastructure (off-street trails and on-street bicycle facilities); bicycle parking spaces and other end-of-trip facilities; and programs to enhance bicycle safety and encourage more people to ride bikes. All of the actions identified will be done to advance the vision, goals, and objectives of the plan.

This plan is the latest iteration of a long history of improving bicycle facilities. The city adopted its first Bicycle Master Plan in 1972. Railroad downsizing, starting in the 1970s, provided an opportunity for

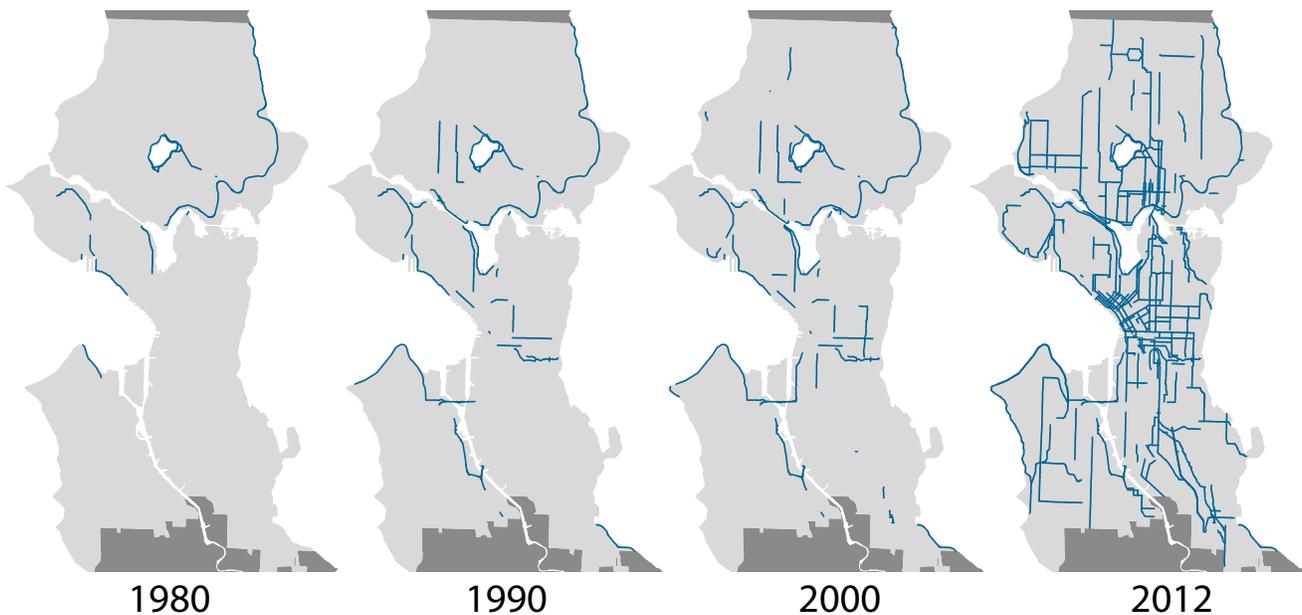


*Burke-Gilman Trail*

the city to develop multi-purpose trails along abandoned railroad corridors. In the late 1970s through the 1990s, the city focused on securing rights of way and constructing this system of trails, which became extremely popular among residents and visitors to the city. This was an area of focus of the 2007 Bicycle Master Plan, identifying streets (mostly arterials) for a variety of bicycle treatments: bike lanes, shared lane markings, signed routes, and others. Figure 1-2 shows the development of the bicycle network in Seattle from 1980 to 2012.

A central focus of this plan is to design and implement bicycle facilities that are safe and appropriate

**Figure 1-2: Seattle Bicycle Network Development from 1980 to 2012**





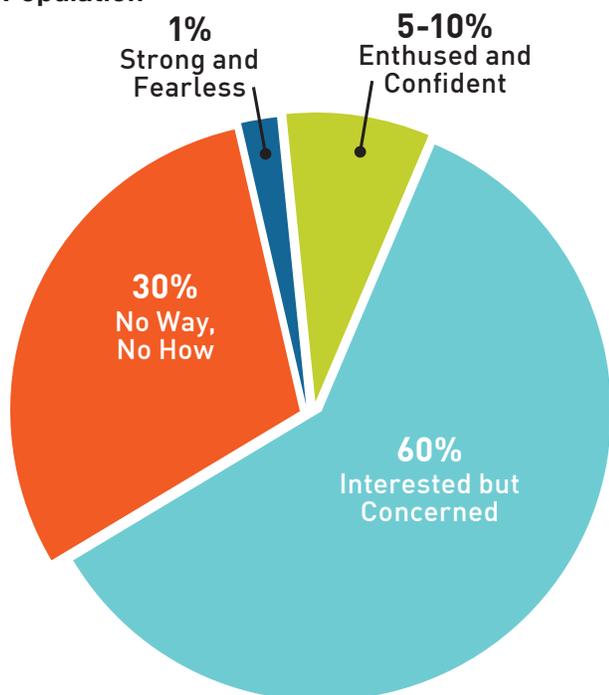
for riders of all ages and abilities. New bicycle facility types are introduced, including cycle tracks to physically separate people riding bikes from vehicle traffic on arterials and neighborhood greenways, in which low volume and low speed streets are optimized for walking and biking.

The plan also provides guidance on how bicycle investments will be prioritized in the future, and contains performance measures that establish how SDOT will track progress made in accomplishing the goals of the plan over time. The plan outlines other actions the city can take to support bicycling in the future.

### Who Rides (or Doesn't) and Why?

In 2004, Portland, Oregon proposed that nearly 60 percent of people in Portland would use a bicycle for at least some trips if there were favorable conditions (see Figure 1-3). The model shows 6 to 7 percent of people as diehard or hardy riders that will ride no matter what, or with minimal accommodations like bike lanes. Another 30 percent will not or cannot ride regardless of the quality of bicycle facilities in the city. Various academic analyses bear out the proposition in

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



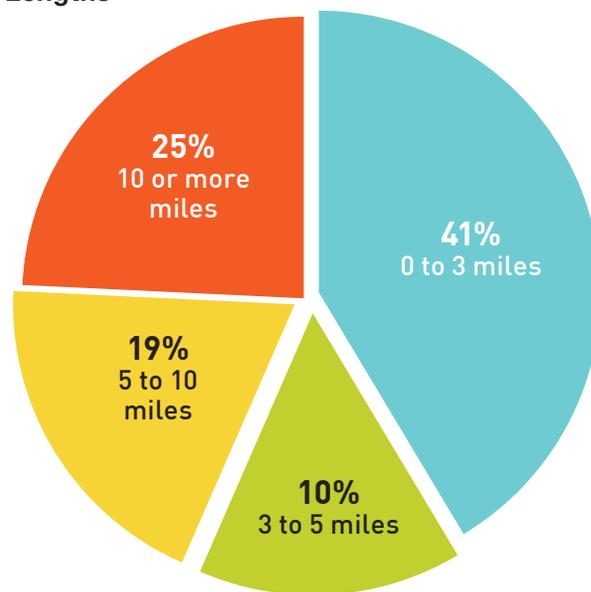
other communities.

Viewed from another perspective, according to the 2009 National Household Travel Survey, 41 percent of trips Americans make each day are less than 3 miles, which could be traversed in 18 minutes by bicycle. As shown in Figure 1-4, there is great potential to increase the number of daily trips that can be made by bicycle. Facilitating trips made by more than one mode, such as bicycling to transit, could make even more active transportation trips practical for residents.

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 mitigate these conditions, individuals can address with appropriate bicycle clothing, a helmet, and lights.

The city, however, can create an inviting environment, a sense of safety, thoughtful accommodation, and

**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.

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

## Making the Case for Investing in Bicycling

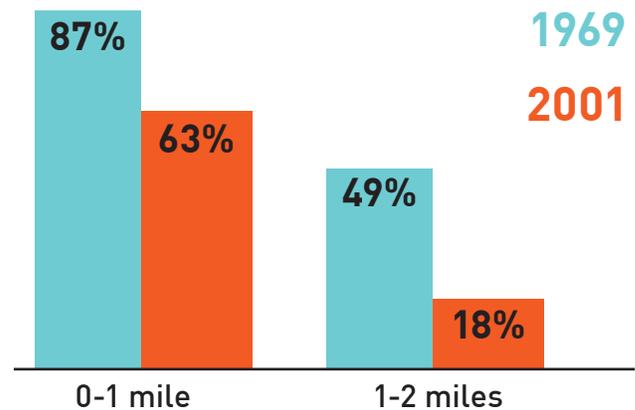
The case for improving the bicycling environment for people of all ages and abilities is growing. Academic and popular literature is expanding America's understanding of the relationships between bicycling and health, economic, and environmental benefits, time competitiveness, space efficiency, and equity.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

### 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**



CENTER FOR DISEASE CONTROL AND PREVENTION. THEN AND NOW - BARRIERS AND SOLUTIONS. 2005. BASED ON USDOT TRAVEL SURVEY DATA.

### Economic Benefits

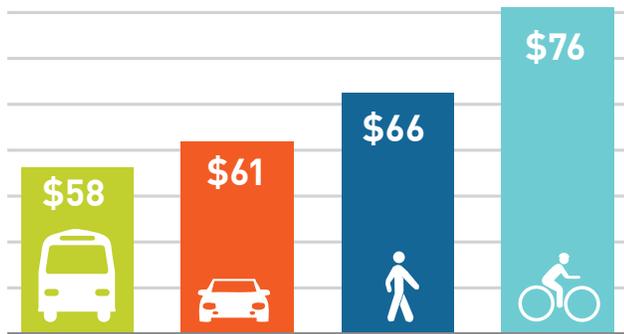
There are many ways to consider the economic benefits of increased levels of bicycling. The direct dollars earned in bicycle-related businesses—manufacturing, wholesale, retail, service, and accessories—have an obvious positive impact on Seattle. Tourism dollars generated by visitors are a significant benefit, as bicycle tourists on average spend more per day on lodging, meals, and retail purchases than non-bicycling tourists. 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. Major employers—and young, talented employees—seek communities with good opportunities for active lifestyles and attractive urban amenities. Retailers report positive sales results and customer loyalty resulting from improved bicycle facilities, even after initial skepticism (see Figure 1-6).

### Environmental Benefits

Transportation is one of Seattle's leading causes of greenhouse gas emissions. Technological solutions



**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.

include cleaner-running vehicles, cleaner fuels, and improving mileage efficiency in automobiles. Reducing vehicle miles traveled (VMT) by improving active transportation opportunities is a cost-effective way to meet the transportation-related goals of Seattle's Climate Action Plan. Creating better bicycle infrastructure and increasing the number of people riding bikes is a key element to reducing VMT and thus greenhouse gas emissions.

### Time Competitiveness

People in the urban core and throughout denser neighborhoods are finding it more convenient to walk or bicycle for short trips they once would have driven (see Figure 1-7). Not only are the direct costs of owning and operating a car becoming more onerous, but also congestion and finding parking cause delays that make riding a bike time-competitive and more convenient.

### Space Efficiency

There simply is very limited space to add traffic lanes or increase parking in the public right of way. Since both vehicles and bicycles usually carry a single person, planning for bicycles may permit a better use of the resources available to accommodate additional trips. This requires a realignment of priorities in how space is allocated.

The 2013 Bicycle Master Plan 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 bikes will help optimize the use of limited urban space.

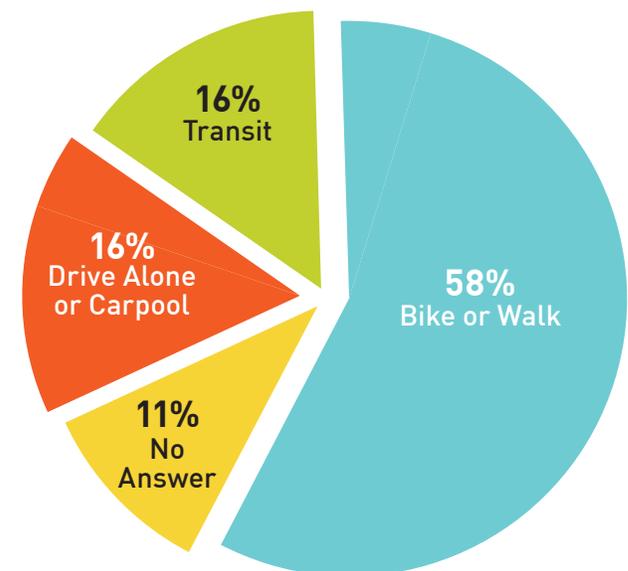
### Equity

According to the Census Bureau's 2007-2011 American Community Survey, 16 percent of Seattle households have no motor vehicle available for use. In addition to lack of access to a vehicle (see Figure 1-8), many citizens are too young to drive; are infirm 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 unable or unwilling to drive. Transportation choices for these residents include walking, riding a bike, taking transit, or sharing rides or cars. This plan strives to provide access to good bicycling infrastructure in parts of the city with lower car ownership.

### Changes in Transportation Behavior

The rate of auto ownership is dropping in the United States, with young people leading the way by becoming drivers later in life and owning fewer vehicles per household. This is in part due to costs of ownership and operation, trip convenience, concern for

**Figure 1-7: Travel Survey of Visitors to Six Seattle Neighborhood Business Districts**



SDOT. NEIGHBORHOOD BUSINESS DISTRICT ACCESS SURVEY. FEBRUARY 2012.

*“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*

the environment, or personal health concerns as described above. This is often a lifestyle choice, or simply an expense that does not seem necessary given home and employment location decisions. Existing and future active and shared travel options such as transit, car and bicycle 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 by Spring 2014, providing another travel option for the public that will increase the number of people riding bikes.

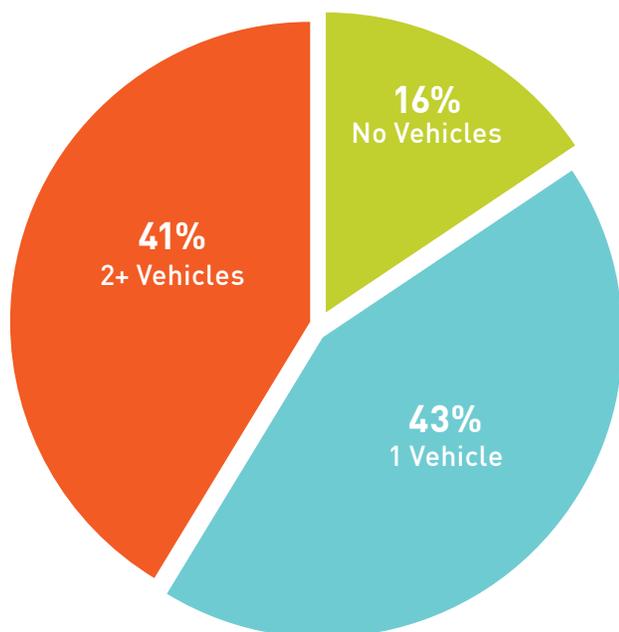
### Planning Process

The 2013 Bicycle Master Plan (BMP) was developed by gathering extensive public input, regular briefings with the Seattle Bicycle Advisory Board (SBAB), coordinating with city staff and other local agencies, and reviewing data relating to past bicycle plans, the



*Bicycle commuters on the Fremont Bridge*

**Figure 1-8: Household Vehicle Availability Rates within Seattle**



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

city’s land use pattern, topography, traffic speeds and volumes, and a number of other factors. The planning process included broad Geographic Information Systems (GIS) and field analysis of Seattle’s transportation network to determine locations where bicycle facilities can be integrated into the existing street network.

The plan consulted a variety of planning documents adopted since 2007, including the Pedestrian Master Plan (2009) and 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 shown in Map 1-1, 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 designation of Major Truck Street on



*Transit islands on Dexter Ave*

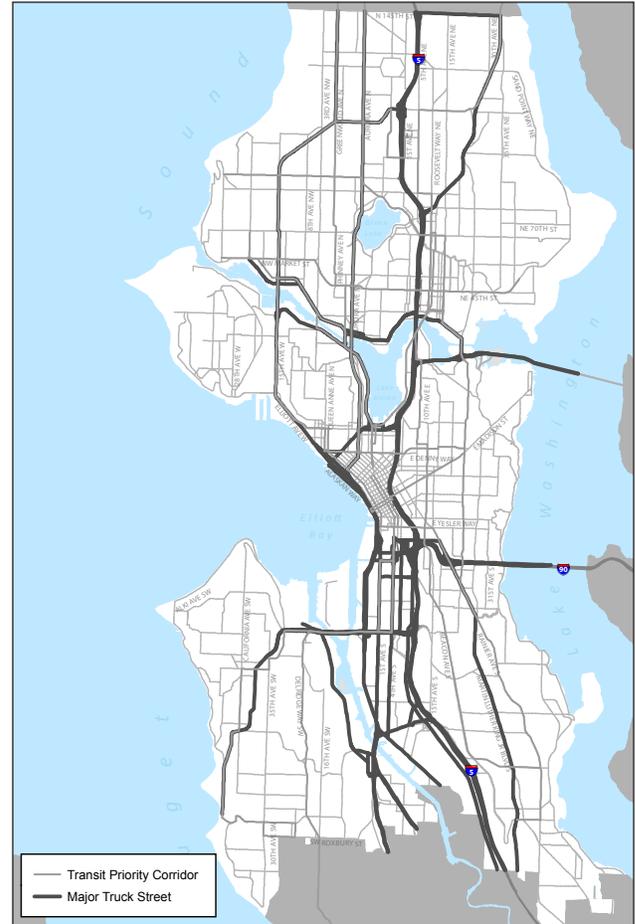
an on-going basis as an important criteria for street design, traffic management decisions, and pavement design and repair.

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 bikes, 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 successful, the BMP 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 strategy strived to broaden the conversation about how people riding bicycles ultimately help build and create vibrant and livable communities. One important purpose of the BMP is 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.

**Map 1-1: Transit Priority Corridors and Major Truck Streets**



*Transit Master Plan priority transit corridors or designated Major Truck Streets*

## Public Engagement Goals and Objectives

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

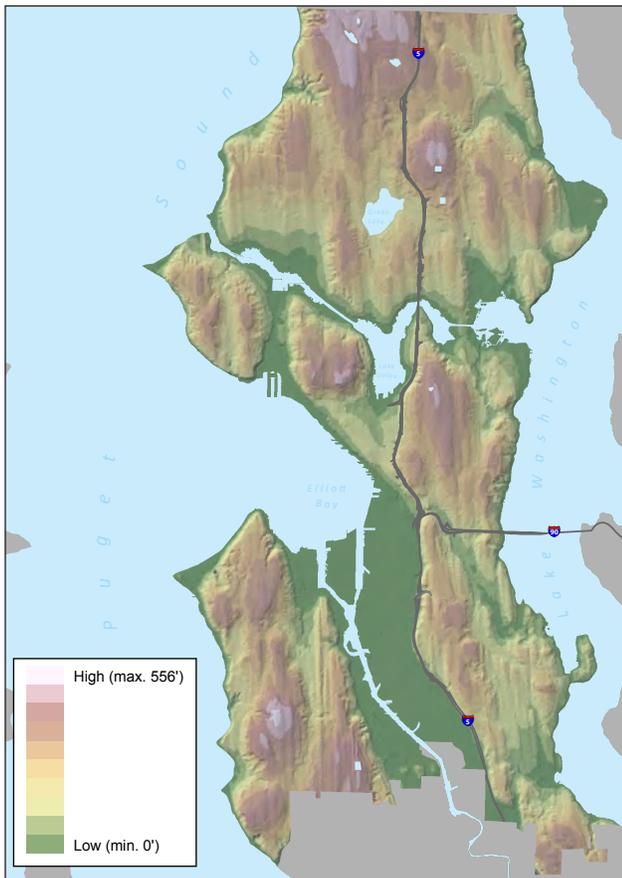
**Goal 1** *Engage broad and diverse segments of Seattle residents, businesses, employees, and property owners.*

**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

## Map 1-2: 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.*

are open to the public, and the public comment period provided an opportunity 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.

### **Phase I**

The first phase of public engagement was intended to **gather information**. Importantly, a wide variety of people participated—those who ride bikes, those who may only occasionally ride a bike, and those who may never be inclined to ride a bike for any purpose. SDOT learned why some people choose to ride bikes, what may encourage others to begin riding, what some barriers to biking are, and what people would like the city



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

to invest in to encourage more bicycling the future. This phase utilized an innovative web mapping tool, which allowed respondents to indicate places they ride now and where they would like to see improvements. The Seattle Neighborhood Greenways group provided SDOT maps of detailed bicycle routes for neighborhood greenways that connect to neighborhood destinations that they rode and talked about with community members.

### **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**.



## Plan Updates

This plan is a living document, and updates will be necessary in the future 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 annual updates to the list of short-term projects. Updates to the full Bicycle Master Plan should occur every five to seven years.



*During the first phase of public engagement, SDOT wanted to engage with families to learn about why they do or do not ride a bike. Pedal Powered was created to get kids to ride a stationary bike 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.*



*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 bikes riding in Seattle.*

## 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. Since the 2007 Bicycle Master Plan (BMP), significant progress has been made on building the bicycling network and elevating the profile of bicycling as a viable part of the multimodal transportation system in Seattle. This chapter of the plan provides a snapshot of the State of Seattle Bicycling Environment Report that appears in Appendix 1B.

## Tracking and Performance Measures

The 2007 Seattle Bicycle Master Plan had two broad goals: increase bicycling ridership and increase the safety of bicycling in Seattle. Figure 2-1 shows the relationship of bicycling and collision rates in Seattle over the past 20 years. 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.

Eight performance measures were recommended to gauge Seattle's progress in meeting goals and objectives in the 2007 Bicycle Master Plan. 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.

The new performance measures in this plan provide a more robust understanding of the status of both plan implementation and the state of bicycling in Seattle. Relevant performance measures will allow the city to track its progress towards reaching the plan's vision.

## Existing Bicycle Network

The current (2013) bicycle network is over 300 miles, including 78 miles of bicycle lanes 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.

The maps on the following pages show the evolution of Seattle's bicycle network over time.

**Table 2-1: Scorecard of Current Facilities**

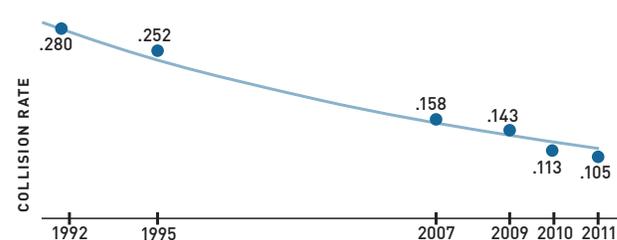
	Total Network Miles Recommended in 2007 BMP	Pre-2007 Network	Implemented 2007-2012	Current Miles in Network	% of BMP Network Complete
Bike lanes	143	26	53	78	55%
Sharrows	111	0	91	92	83%
Greenways	18	0	6	6	30%
Trails	58	39	8	47	81%
Other On-Street	46	2	0	2	5%
Other Off-Street	3	0	0	0.2	8%
Total Network	379	68	158	226	60%
Signed Routes*	234	0	128	128	55%

\*Some signed routes (but not all) overlap with other facility types such as bike lanes, sharrows and greenways.

### 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

**Figure 2-1: Correlation of Increase in Bicycling Rate and Decrease in Collision Rate**



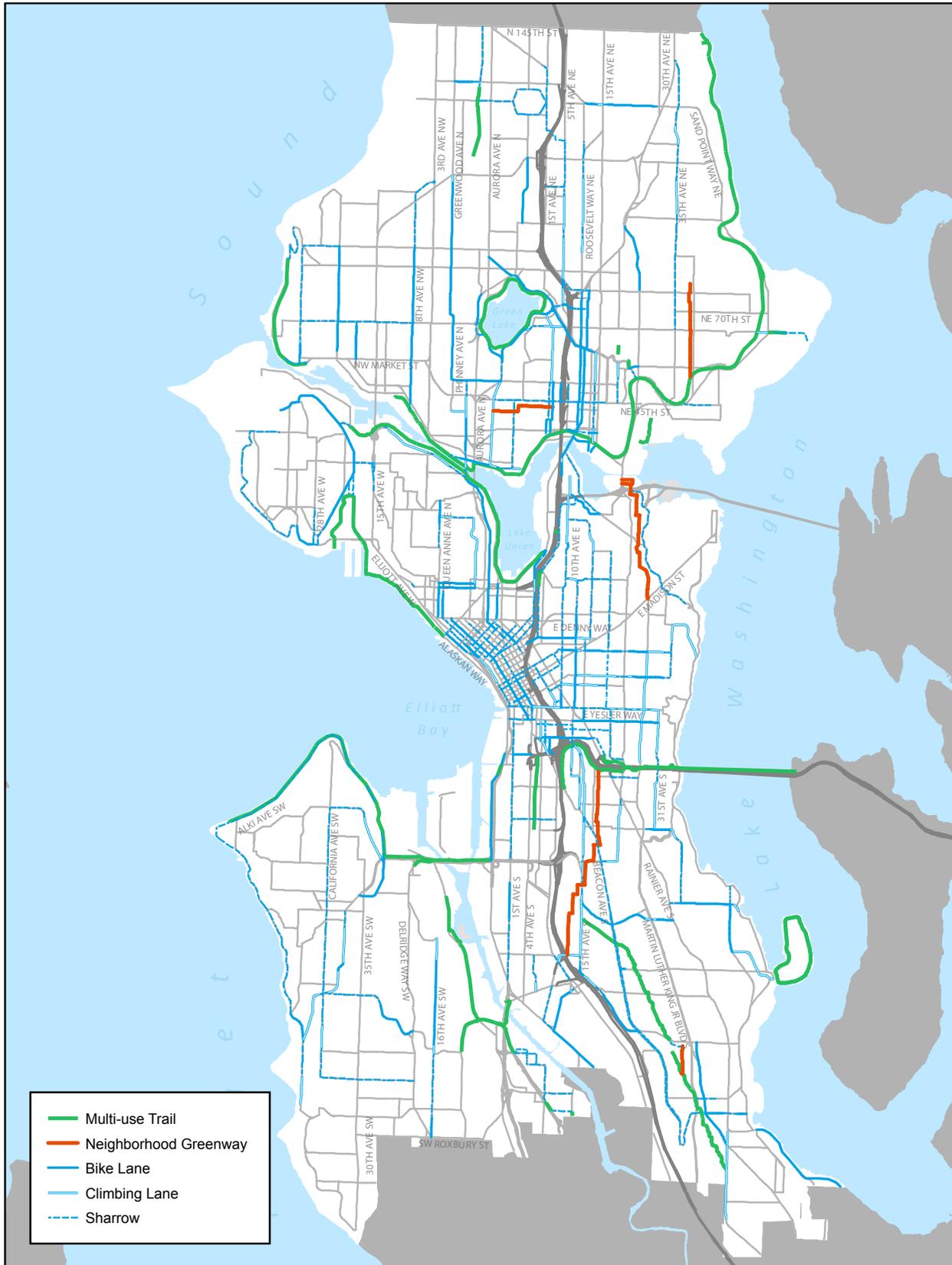
SDOT. 1992-2011 DOWNTOWN SEATTLE BICYCLE COUNTS. 2011. 2011 RATE BASED ON PARTIAL COUNT

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





Map 2-2: Existing Bicycle Facilities as of 2013





*Crossing gaps can include missing left turn boxes for bicycle traffic.*

In striving to create a network that serves all people and places in the city, this plan proposes new links to the bicycle network, while upgrading some of the facility type recommendations found in the 2007 BMP. This plan also makes recommendations for improving some existing facilities.

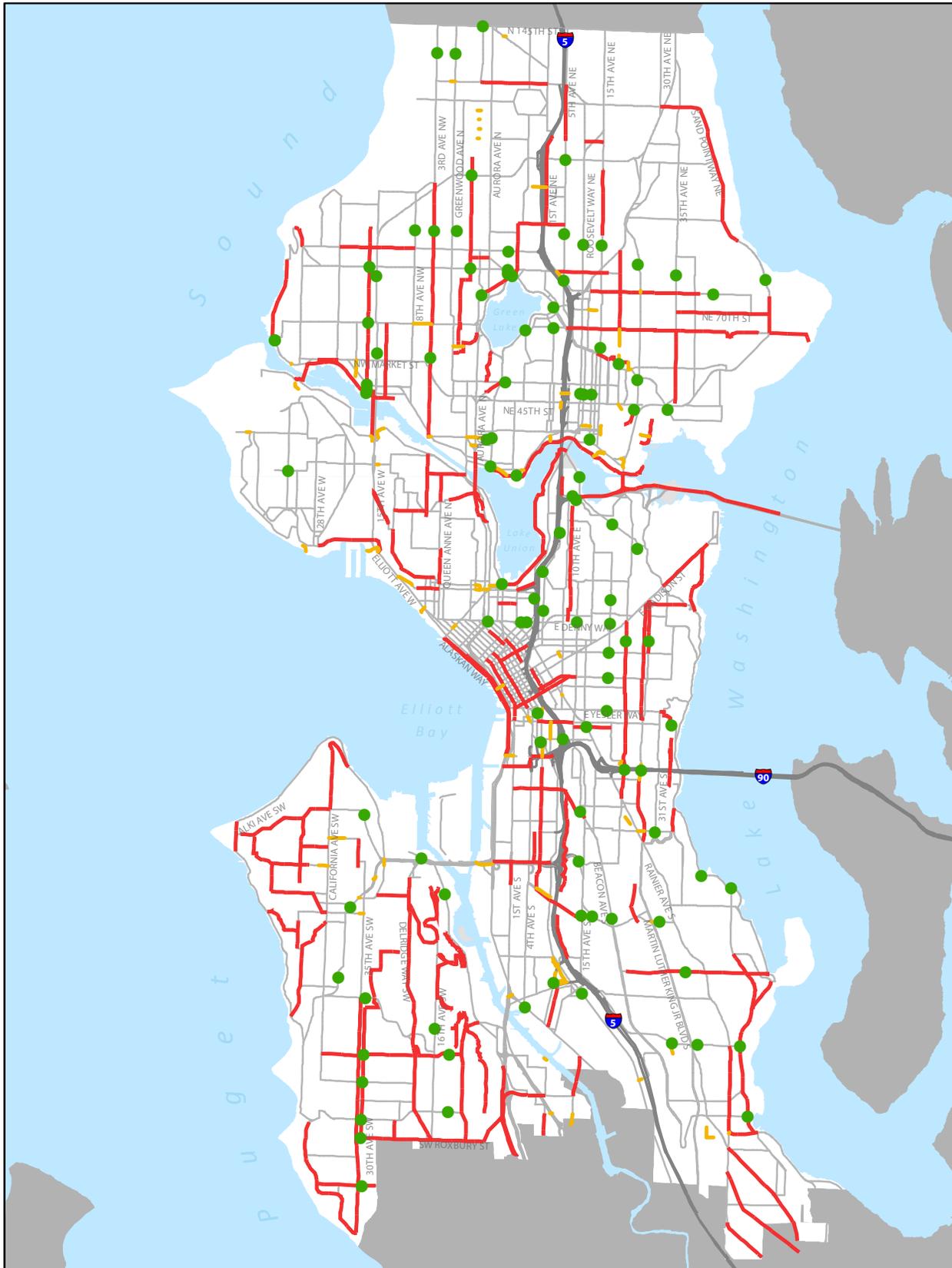
### **Bicycle System Gaps**

Despite implementation progress made between 2007 and 2013, there are still major gaps in the city's 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 bike lanes, climbing lanes, shared lane markings, bicycle boulevards, 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 bikes a variety of travel route options.



Map 2-3: Gaps in the Existing Bicycle Network



## Equity Analysis

There is a clear intent to develop a network that serves all areas of Seattle, including areas that have a high density of traditionally 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.

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). Those census tracts that were in the lowest quartile (lowest 25 percent) were considered to be “low service areas.” The outlined red boxes call out the census blocks with a high equity score and low bicycle service area.

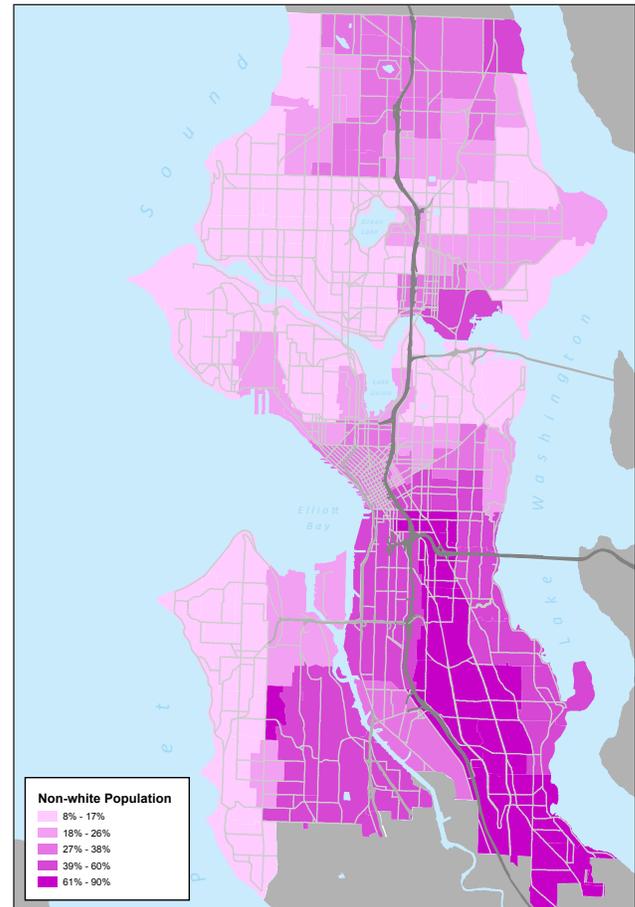
### Analysis factors

For purposes of analysis, traditionally underserved populations were defined as:

- Percentage of non-white population (see Map 2-5)
- Percentage of households within the census tract that are below poverty level (as defined by the U.S. Census Bureau)
- Population distribution of people under 18 years of age
- Population distribution of people 65 years of age and older
- Percentage of households within the census tract with no automobile available for daily use

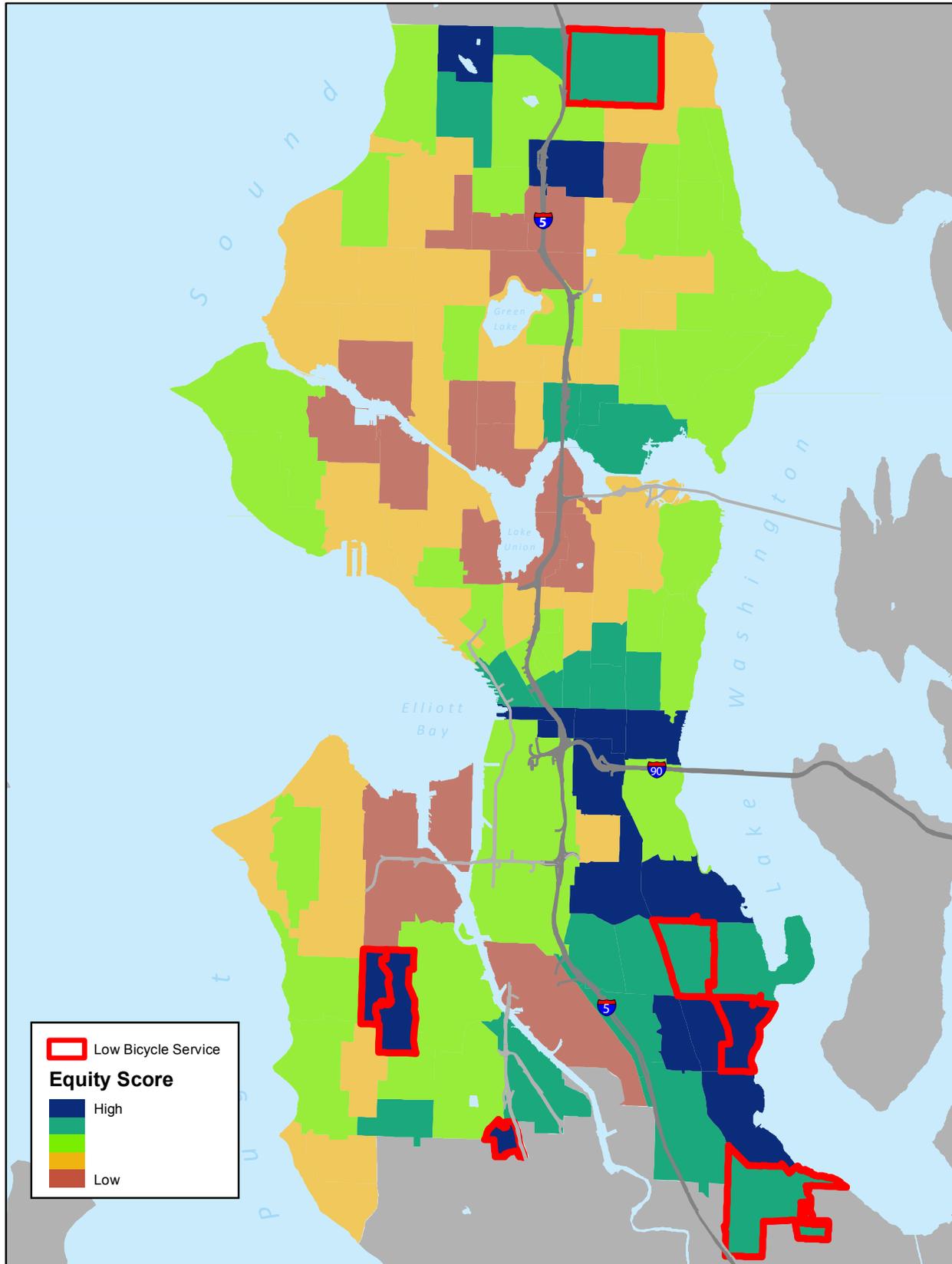
The results of the demographic analysis combined with the assessment of existing facilities highlight several areas of Seattle where improvements to the bicycle system would benefit underserved populations (see Map 2-4). As new segments of the system are completed, the gap analyses can be easily updated, providing the opportunity to understand which areas of the city merit additional focus and investment.

Map 2-5: Non-white Population





Map 2-4: Equity Analysis



## Who's Riding, Where, and When?

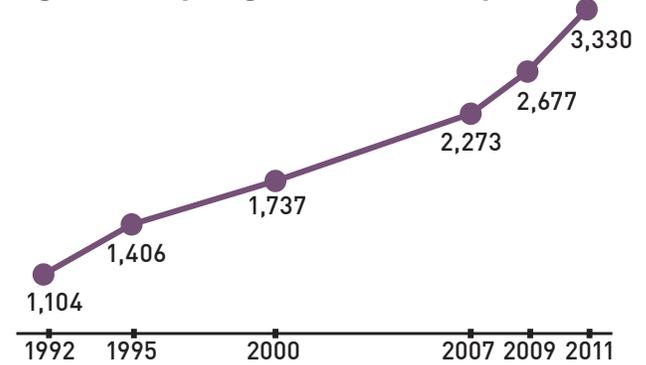
SDOT has been counting bicycles at access points to Downtown since 1992. In 2008, SDOT began conducting counts at other locations around the city as well. These two count programs were replaced in 2011 by a quarterly count program at 50 locations using methodology recommended by the National Bicycle and Pedestrian Documentation Project (NBPD). 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. The counts provide a snapshot of cycling activity in Seattle.



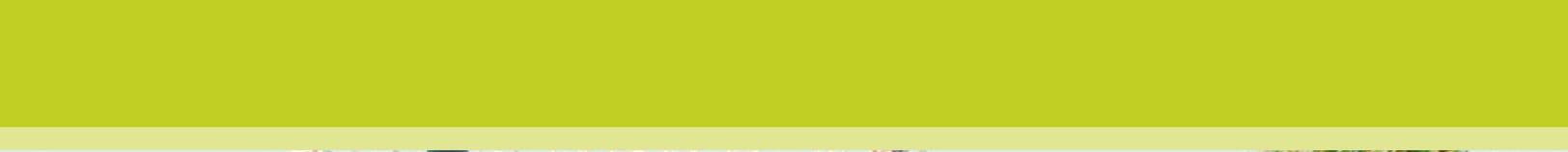
*This buffered bicycle lane on Dexter Ave N offers increased space and more comfortable separation from moving vehicles than a conventional bicycle lane.*

**Figure 2-2: Cycling Trends in the City**



SDOT. 1992-2011 DOWNTOWN SEATTLE BICYCLE COUNTS.

As shown in Figure 2-2, Seattle has seen an overall increase in bicycling citywide since the city started its count program in 1992. However, bicycling activity varies throughout the city. The north end of Seattle (north of the Ship Canal) and Downtown core show the highest recorded count volumes, while bicycling activity is lower south of I-90, on Beacon Hill, and in Rainier Valley.



# 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.”*



## Seattle Comprehensive Plan

There is an established policy framework within which the BMP will nest. The city's primary policy document is the Seattle Comprehensive Plan. This document, coupled with an adopted Complete Streets policy, provides the primary policy context for the BMP.

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:

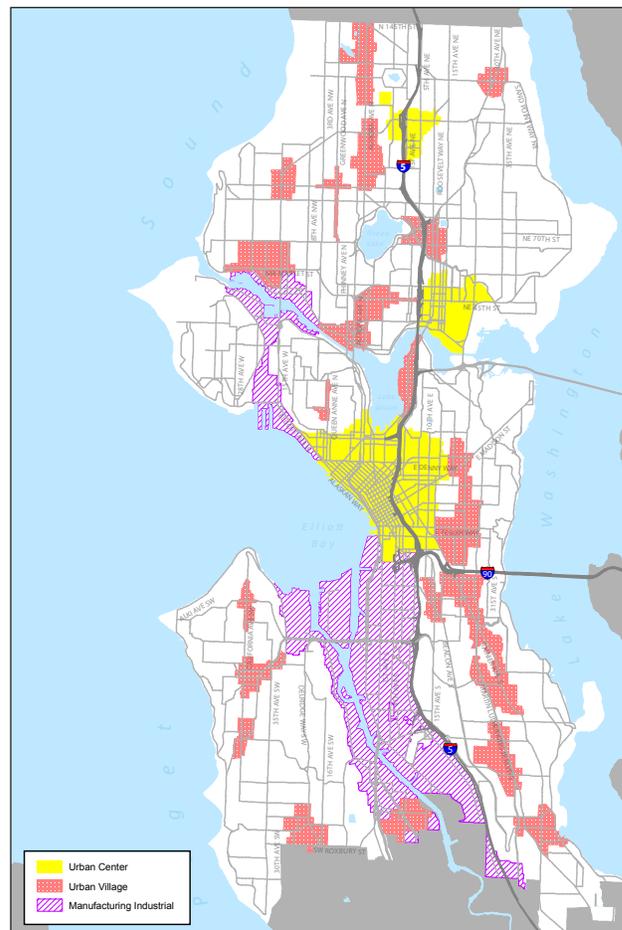
- Community
- Environmental Stewardship
- Economic Opportunity and Security
- Social Equity

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 not only growth within the city, but growth within the region. Additionally, Seattle has two manufacturing/industrial centers. All of these centers are recognized in Vision 2040, the Puget Sound Regional Council's adopted regional growth plan. Map 3-1 shows the location of urban centers and urban villages 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 Bicycle Master Plan. The Transportation Element of the plan contains the following goals and policies pertaining to bicycling:

**Map 3-1: Seattle's Urban Centers and Urban Villages**



- 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.

## Complete Streets

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

- SDOT 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
- SDOT will incorporate complete streets principles into the Department’s Transportation 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.

## Bicycle Master Plan Vision and Goals

Based on the overall policy direction above, the Bicycle Master Plan is organized around an overall vision statement and five goals.

### Vision

The vision statement for the plan expresses the desired “end state,” or result, of implementing the plan. The BMP vision is:

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

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 a not a niche activity only for athletes or fast and fearless 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 bicycle facilities that will be used by a broad range of people throughout the city.



*Bicycle commuter on 4th Avenue and Spring Street.*

### 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.

#### ***Ridership: Increase the amount and mode share of bicycle riding in Seattle for all trip purposes.***

Getting more people to use a particular travel mode is one of the main purposes of any 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 transit.

#### ***Safety: Improve safety for bicycle riders.***

Safety is the most important basic responsibility for SDOT. 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 bicycle riders, but also for transit vehicles, automobiles, pedestrians, and trucks.



**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 it has to get people conveniently to their destinations: work, shopping, school, transit stations, etc. This plan is intended to guide the creation of a bicycle network that is connected with safe, all ages and abilities bicycle facilities, and that links to key destinations around the city.

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

This goal emphasizes the importance of ensuring that bicycle investments are made throughout the city and connect every neighborhood. It also promotes the idea that people in every neighborhood should have a voice in helping to design the best bicycle facilities for their individual communities.

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

This goal highlights the broader benefits to building a connected, safe bicycling network, which include

increasing public health and community vitality.

## **Bicycle Master Plan Objectives**

The plan identifies six principal objectives for achieving the goals of the plan. The individual chapters of the plan will go into more detail identifying specific strategies and actions for advancing these objectives.

**Objective 1: Complete and maintain a 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.

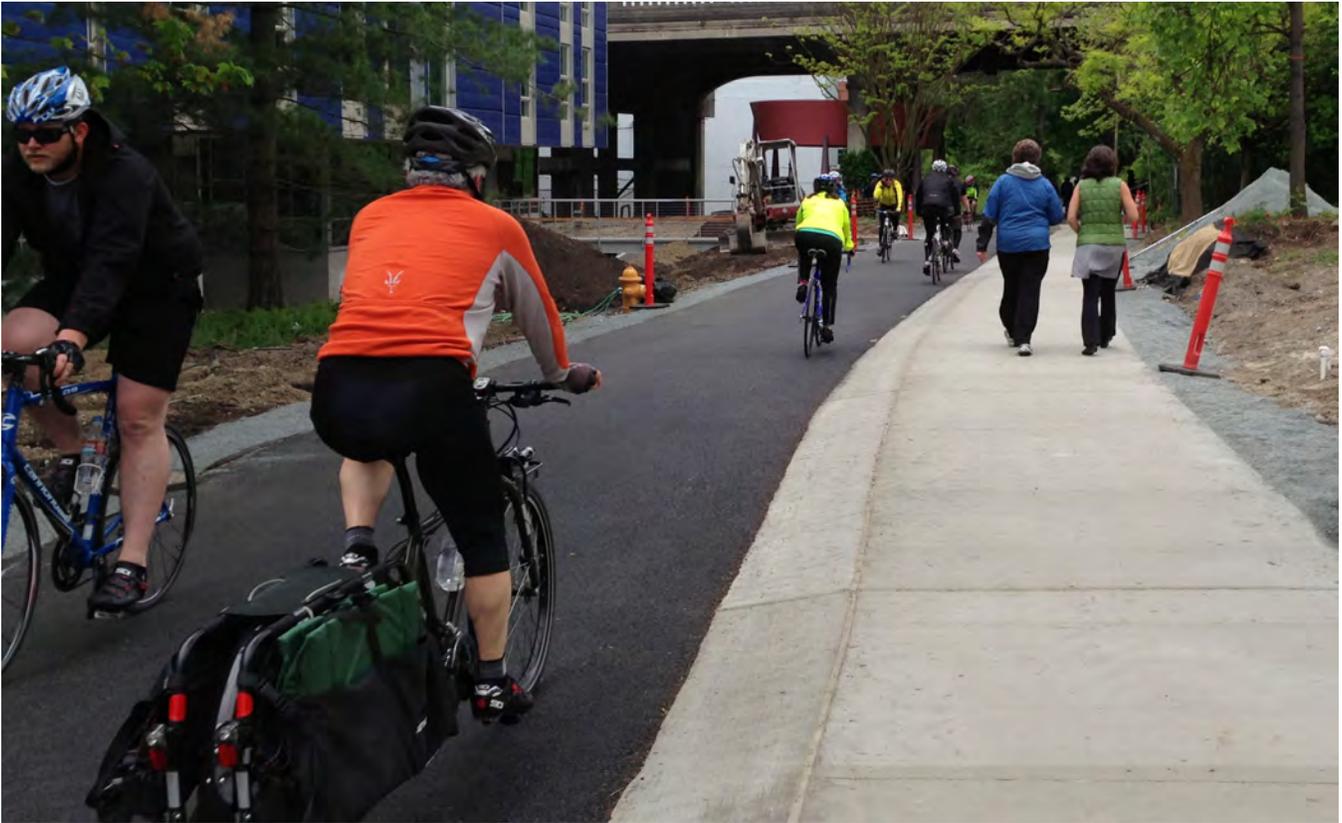
**Objective 2: Integrate planning for bicycle facilities with all travel modes and complete streets principles.**

Planning for bicycles cannot happen in a vacuum. The city's arterial street system has many modal demands: general-purpose traffic capacity, transit, freight, pedestrians, bicyclists, 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, decisions about how to use the city's streets in the most productive and efficient way possible will be an ongoing challenge.



*Bicycle lane on 9th Avenue North.*

CAPFREEDAYS.COM



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

***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. 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 other factors. This applies not only to bicycle corridor improvements, but end-of-trip facilities such as on-street bicycle corrals.

***Objective 4: Build outstanding leading-edge bicycle facilities, including on-street separated facilities 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 bike lanes). These facilities will help develop a connected citywide network of all ages and abilities facilities.

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

One of the most important aspects of each SDOT 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.

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

In addition to implementing bicycle facilities in streets and trails, a whole series of other actions is 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 will be a key program to help promote bicycle riding.

**Bicycle Master Plan Performance Measures**

Performance measures are important for assessing whether the plan is meeting its goals over time.

Even though the 2007 plan is being updated, SDOT plans to continue tracking this data through 2017 to see if the performance measures of that plan are 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.

This plan contains updated performance measures based on the expanded policy framework, which adds goals for connectivity, equity, and livability to existing ridership and safety goals (see Tables 3-1 and 3-2). 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, which 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. Other bicycling data is likely to be collected by SDOT over time. This data can help inform project selection and design, the development and success of education and encouragement programs, measures to improve safety, and

*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. Bike share systems consist of a fleet of bikes provided at a network of stations located throughout a city. Bike are available on demand to provide fast and easy access for short trips.*

other issues. Therefore, the data and performance measures outlined in the following table represent the way SDOT will track achievement of the BMP plan goals over time, but do not represent the entire spectrum of data that SDOT expects to collect as it implements the plan.

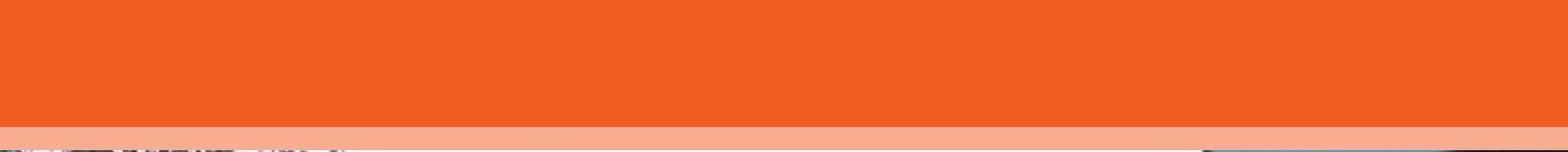
The plan performance measures are organized into desired targets and trends by the five plan goals, and are summarized in Tables 3-1 and 3-2. Additionally, progress on the 2007 plan goals will be measured in 2017.

**Table 3-1: 2013 Bicycle Master Plan Performance Measure Targets**

Goal	Performance Measure	Target
Ridership	Bicycle Counts	Triple ridership between 2013 and 2030
Safety	Collision rate	Reduce collision rate by half (50 percent) between 2013 and 2030
Connectivity	Percent network completion	Full system completion by 2035
Equity	Areas lacking bicycle facilities	No parts of the city lacking bicycle facilities by 2030
Livability	Percentage of households within ¼ mile of a bicycle facility	100 percent of households in Seattle within ¼ mile of a bicycle facility by 2035

**Table 3-2: 2013 Bicycle Master Plan Performance Measure Trends**

Goal	Performance Measure	Desired Trend
Ridership	Mode share	Increase
Safety	Number of serious collisions/fatalities	Decrease
Connectivity	Key travel sheds completed	Increase
Equity	Percentage of females/non-whites who ride regularly	Increase
Livability	Number of bike racks and on-street bike corrals	Increase
	Self-reported physical activity	



# 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.”*

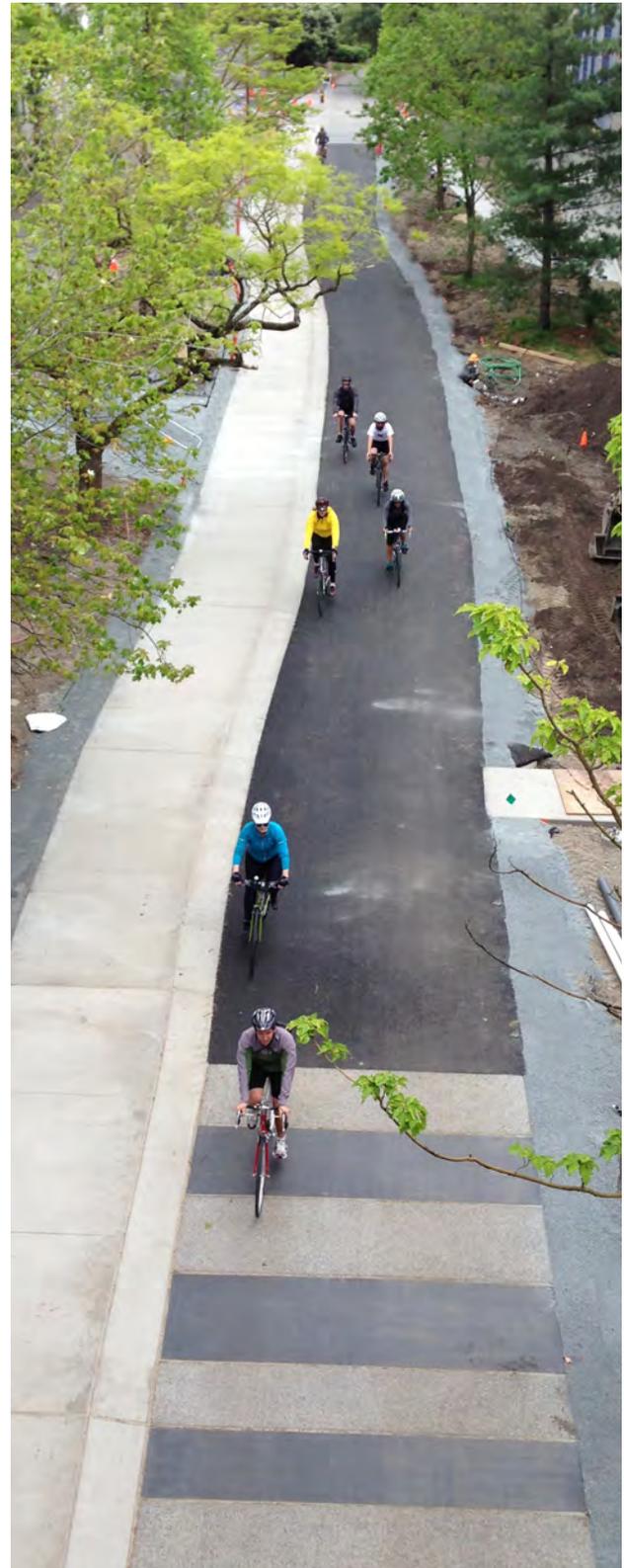


## Bicycle Facilities for All

City Council was explicit in November 2011 when it directed SDOT to prepare an updated Bicycle Master Plan: use best practices, coordinate with the recently completed pedestrian and transit plans, and identify routes for cycle tracks and neighborhood greenways. Throughout the process, the intention has been to create an interconnected citywide network of bicycle facilities that would be attractive to people that are interested in riding a bicycle from their neighborhood to other parts of the city, and are concerned about safety.

The purpose of this chapter is to describe the proposed bicycle network map and to introduce strategies and actions. The bicycle network map lays out where new bicycle facilities will be constructed in the city, and what type of facilities they will be. The chapter includes:

- The process used to develop the proposed bicycle network;
- A summary and description of the bicycle network itself;
- An approach to match intersection treatments with the surrounding context;
- The bicycle facilities visual glossary, which illustrates what the terms on the map (such as cycle tracks and neighborhood greenway) mean; and
- A process for accommodating bicycling on or parallel to multimodal corridors, which are arterials that are identified for bicycle improvements but 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 work. The overall goal of the network map is to plan, design, and ultimately build a bicycle network that implements the goals of the Bicycle Master Plan.

The proposed bicycle network map was designed in two distinct phases. For development of the first draft map, SDOT considered comments received from the public in the spring and summer of 2012, during the first phase of public engagement. Members of the public were very clear about the types of bicycle facilities they wanted, and where they thought improvements should happen. The project team also considered other data, including:

- The location of current bicycle facilities and proposed facilities identified on the 2007 Bicycle Master Plan map.
- Connections between key destinations and clusters of key land uses that are likely to generate high bicycle ridership. These include major employers, schools, transit hubs, and others that were identified as potential high, medium, and low bicycle trip generators (see Table 4-1 and Map 4-1). 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.
- Existing street characteristics. On-street bicycle facilities are highly influenced by the overall street character, such as the speeds at which cars travel, 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.

Map 4-1: Destination Clusters Map

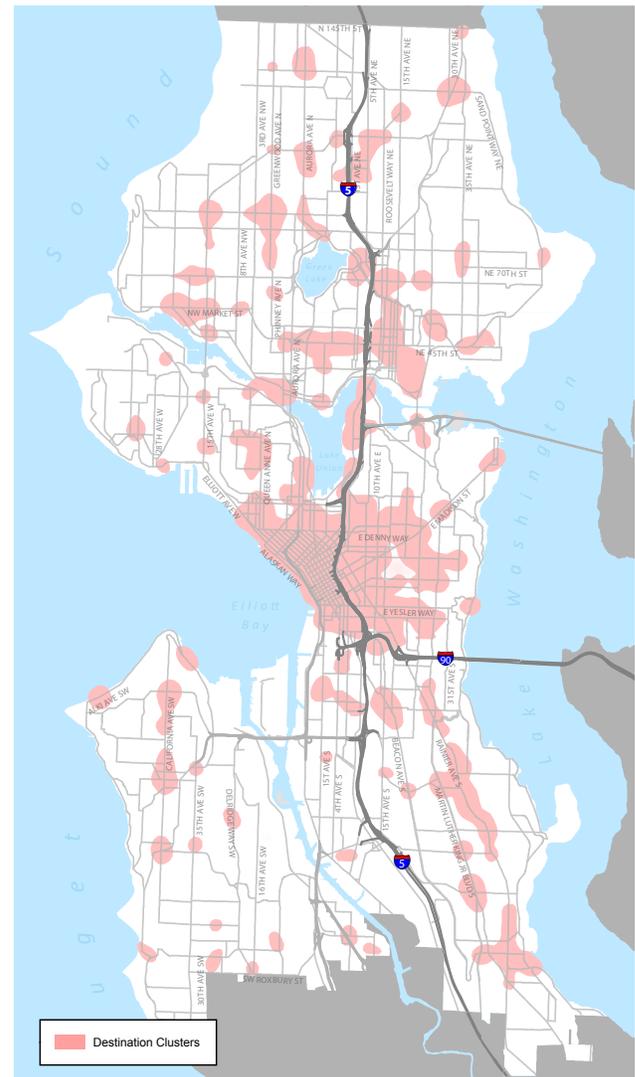


Table 4-1: Categorization of Trip Generators

Category	Trip Generators
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
Low	Large retail centers, other major entertainment destinations



### Bicycle Facility Designations

SDOT developed a set of bicycle facility designation guidelines to aid in determining what type of facility would be most appropriate on a given street based on its characteristics (see Table 4-2). Initially, the criteria were used to aid in incorporating all ages and abilities facility types (including neighborhood greenways and cycle tracks). This approach also allowed for the bicycle network map legend to be simplified.

The draft network map was released for public comment in November, 2012. While there was overall support for having an ambitious plan, there were also concerns expressed about the map, including:

- Not all of the facility types proposed on the map (in particular, bike lanes and buffered bike lanes on arterials) were appropriate for riders of all ages and abilities;
- There were bicycle facilities proposed on certain streets which would be very difficult to implement due to a number of factors (constrained right of way, too steep or too narrow, etc.); and
- The draft map lacked graphic legibility in terms of describing the overall purpose of the network and clear connections to destinations.

***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.***

**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
<b>Neighborhood Greenway</b>	Neighborhood Greenway	25 or less	1,500 or less	Non-arterial
<b>Shared Street</b>	Shared lane pavement marking (sharrow)	25 - 30	To be used due to ROW constraints or topography	Non-arterial and Collector/Minor arterials
<b>In street, minor separation</b>	Bicycle lane; Climbing Lane	30	8,000 or less	Collector arterial
	Buffered bicycle lane	30	15,000 or less	Collector/Minor arterials
<b>In street, major separation</b>	Cycle track (raised or with barrier)	30 and greater	15,000 and above	Minor/Principal arterials
<b>Off-street*</b>	Multi-use trail	N/A	N/A	N/A

*This chart recommends a process to determine bicycle facility designations. 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 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 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., Alaskan Way)*

### Refining the Proposed Bicycle Network

Based on public comments and additional technical work, including more focused investigations of many streets, the network map was revised and refined. As part of this refinement, the network was divided into two categories to increase legibility of the network: the **Citywide Network** and **Local Connections**.

The **Citywide Network** is a network of “all ages and abilities” bicycle facilities with comfortable separation from motor vehicles. This network is comprised of cycle tracks, neighborhood greenways and multi-use trails connecting destination clusters.

- A small sub-set of the Citywide Network is identified as **Catalyst Projects**: portions of the network that pose challenges to implementation due to cost and/or physical constraints yet simultaneously serve to reduce critical barriers to creating an all ages and abilities network to the maximum extent feasible. **Catalyst Projects** will be identified in the final plan.

In some cases, the network designations exceed the facility designation guidelines as described earlier to provide highest-quality bicycle facility connectivity across the city for people of all ages and abilities.

The **Local Connections** network provides access to the Citywide Network, parallels the Citywide Network, or serves local destinations. While Local Connections may use facility types appropriate for people of all ages and abilities, some segments will be served with conventional bicycle facilities, such as bike lanes (in street, minor separation) and shared lane markings (shared streets).

### Proposed Bicycle Network Plan Map

The proposed bicycle network map is shown on Map 4-2a and 4-2b, and in more detail by sector on Maps 4-3 through 4-8. The map legend contains the following facility types within each category:

#### Citywide Network

- Off-Street Trails
- Cycle Tracks
- Neighborhood Greenways

Streets on the **Citywide Network** provide long distance connectivity between neighborhoods and across the city. People of all ages and abilities should be able to access all major destination clusters on this network.

#### Local Connections

- Off-Street Trails
- Cycle Tracks
- Neighborhood Greenways
- In Street, Minor Separation
- Shared Streets

**Local Connections** are shorter-distance segments focused on connections within neighborhoods, or connections to the **Citywide Network**. The map illustrates a future system of connected bicycle facilities throughout the city. Table 4-3 shows the total breakdown of facilities by type within the network.

**Table 4-3: Bicycle Facilities in the Proposed Bicycle Network**

	Existing Network*	Proposed Network Improvements			Total Network	Portion of Proposed Network
		Upgrade to Existing Facilities	New Facilities	Total New or Upgraded Facilities to Build		
Off Street	47.0	0	31.2	31.2	78.2	7%
Cycle Track	1.0	51.7	49.5	101.3	102.3	22%
Neighborhood Greenway	8.7	0	235.8	235.8	244.5	52%
In Street, Minor Separation	51.7	18.9	59.3	78.2	129.9	17%
Shared Street	24.7	0	5.1	5.1	29.8	1%
<b>Total</b>	<b>133.0</b>	<b>70.7</b>	<b>381.0</b>	<b>451.7</b>	<b>584.7</b>	<b>100%</b>

\*Existing network totals include only existing facilities that meet the proposed bicycle network facility designation guidelines.



Maps 4-9 and 4-10 emphasize the concepts of network connectivity for people of all ages and abilities, allowing them to reach destinations across Seattle and the region.

## Strategies and Actions

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 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.

### Strategy: Implement the on-street bicycle facility network.

#### Actions:

- Develop cycle tracks. Implementation may be phased as a buffered bike lane in the near term, with the addition of a physical separation between motorist and people riding bikes at a later stage.
- Develop neighborhood greenways. Implementation may not follow the exact street identified in the plan, but rather the final route will be determined during project design. The intent of showing neighborhood greenways on the network map is to demonstrate that connections to destinations are achievable along low volume and low speed residential streets.
- Develop in street, minor separation bicycle facilities. Assessment of a bicycle lane or a buffered bicycle lane will be part of the project development stage; if determined, after further analysis, that the bicycle facility cannot be accommodated, then a shared street facility type or a parallel neighborhood greenway will be installed.
- Develop shared street bicycle facilities. Shared streets help make connections to destinations and to the rest of the network for bicycle riders that are comfortable riding in traffic, and may provide more direct routes than routes suitable for people of all ages and abilities.

- Develop on-street catalyst projects. These projects, while potentially complex or costly, are critical to ensuring network connectivity for riders of all ages and abilities.
- Incorporate intersection analysis and appropriate design treatments into every bicycle facility project.
- Explore innovative bicycle facility solutions that may work to overcome Seattle's topography barriers.
- Install wayfinding with all bicycle facility network projects.

### Strategy: Implement the off-street (multi-use trail) bicycle facility network.

#### Actions:

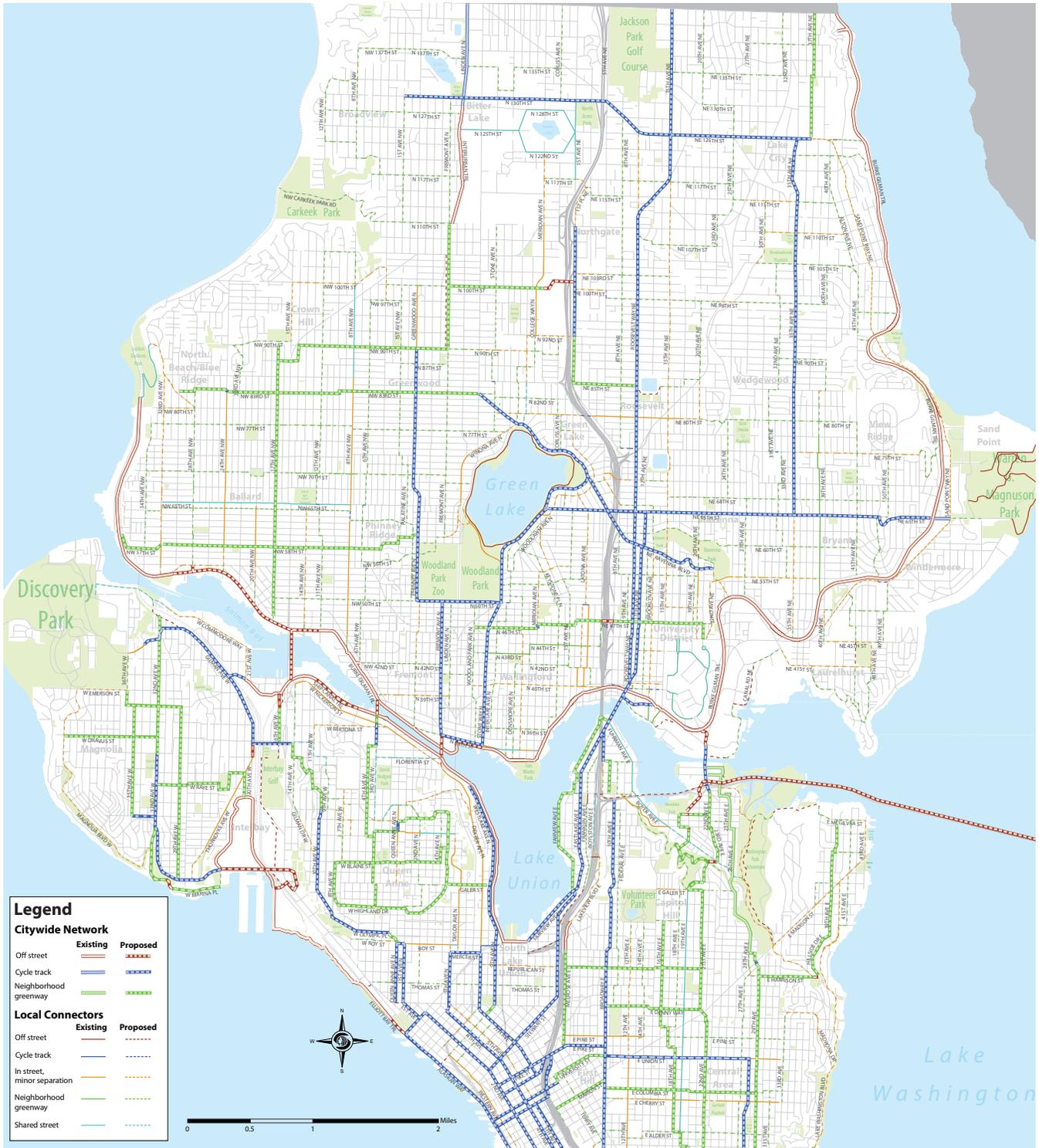
- Develop multi-use trails. Implementation will require additional feasibility analysis and agreements with land owners, if not in the public right of way.
- Conduct multi-use trail capacity studies to evaluate trail expansion needs. If a trail expansion cannot be achieved (for example, adjacency to an environmentally-sensitive area), assess if a parallel street may help serve people riding bicycles. Install alternate route wayfinding signage along the trail when the parallel street bicycle facility is installed.
- Incorporate multi-use trail crossing design treatments into every multi-use trail project.
- Develop off-street catalyst bicycle projects. These projects, while potentially complex or costly, are critical to ensuring network connectivity for riders of all ages and abilities.
- Develop a multi-use trails "etiquette" sign to educate users about the rules of trail travel.

### Strategy: Coordinate bicycle network implementation with potential partners.

#### Action:

- Develop regional wayfinding standards to enhance bicycle system legibility and coherence.

Map 4-2a: Proposed Bicycle Network Map (North)

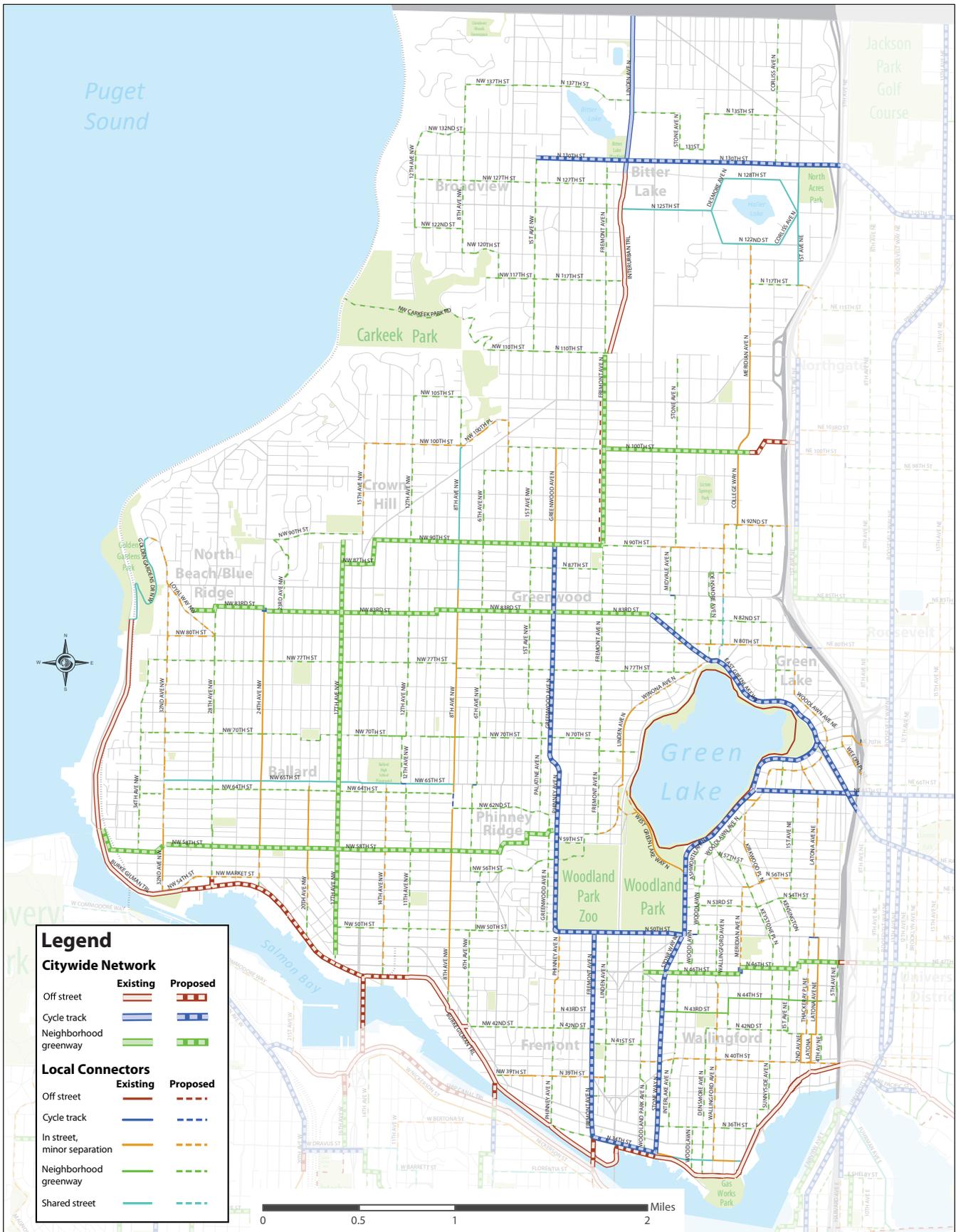




Map 4-2b: Proposed Bicycle Network Map (South)

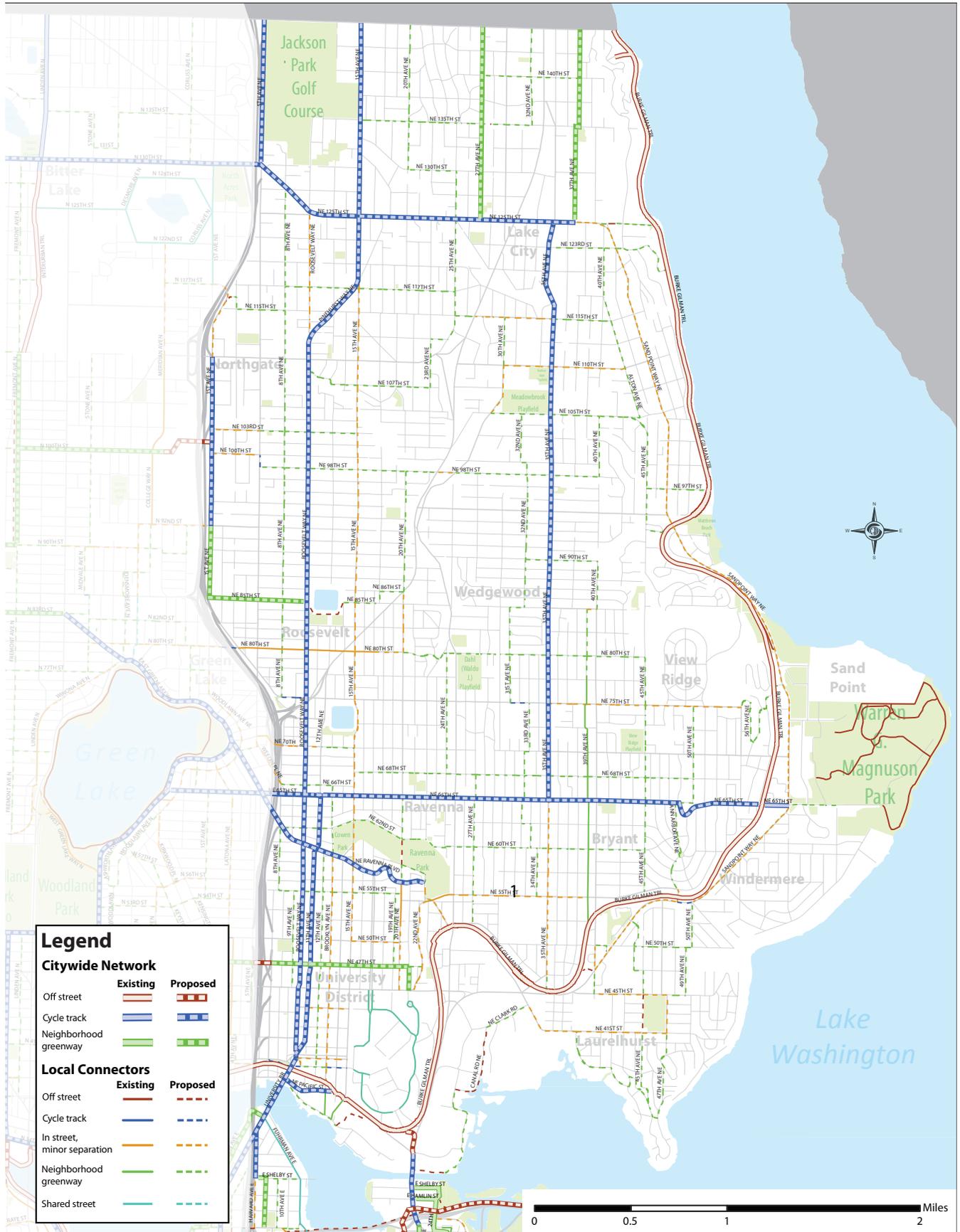


Map 4-3: NW Sector Map

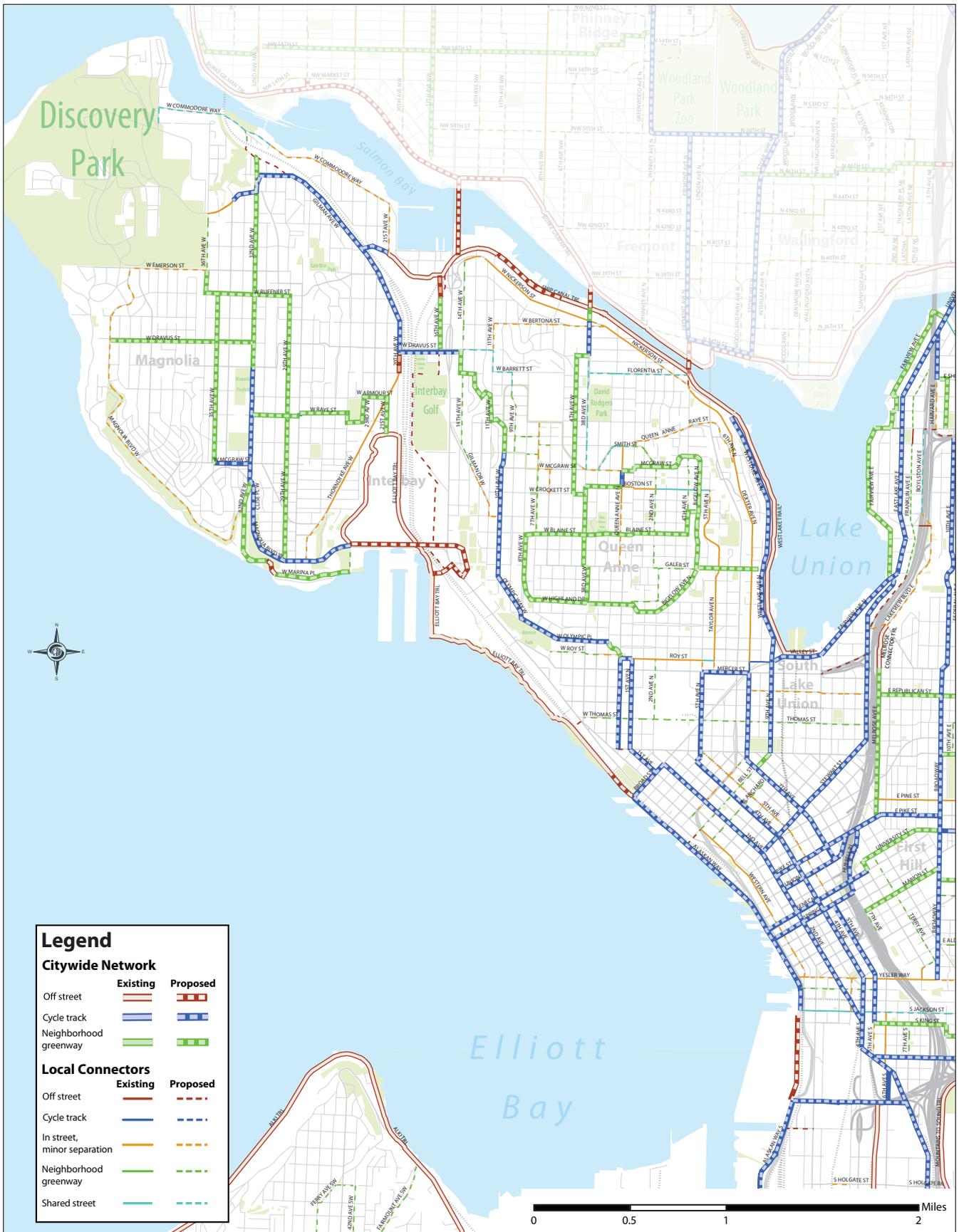




Map 4-4: NE Sector Map



Map 4-5: W Sector Map

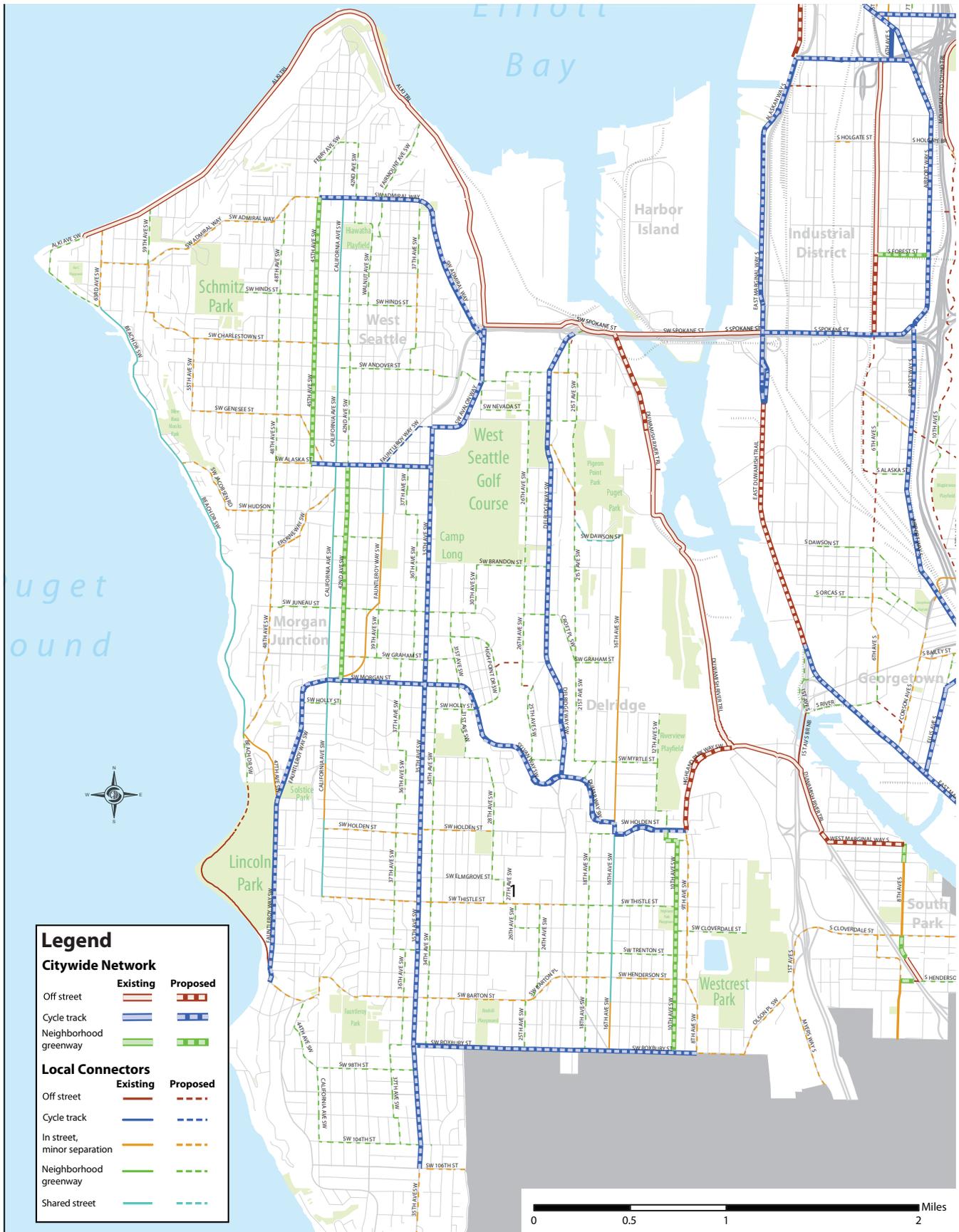




**Map 4-6: E Sector Map**



Map 4-7: SW Sector Map





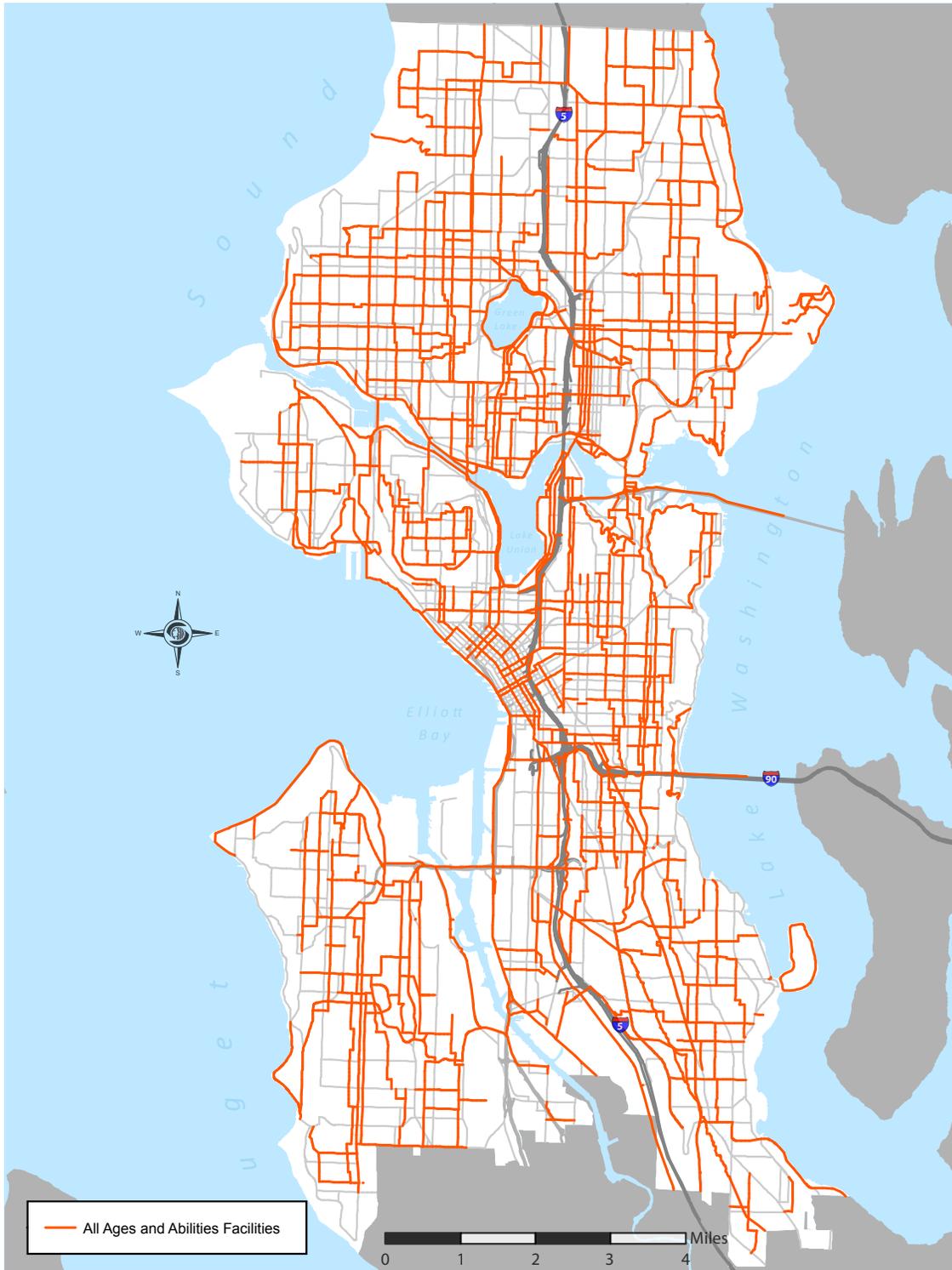
Map 4-8: SE Sector Map



### Building for Riders of All Ages and Abilities

Bicycling needs to be a safe, pleasant, and convenient transportation option for the broadest array of people. Map 4-9 below shows the proposed network of bicycle facilities appropriate for riders of all ages and abilities, consisting of 425 miles of multi-use trails, cycle tracks, and neighborhood greenways.

**Map 4-9: Proposed All Ages and Abilities Bicycle Network**

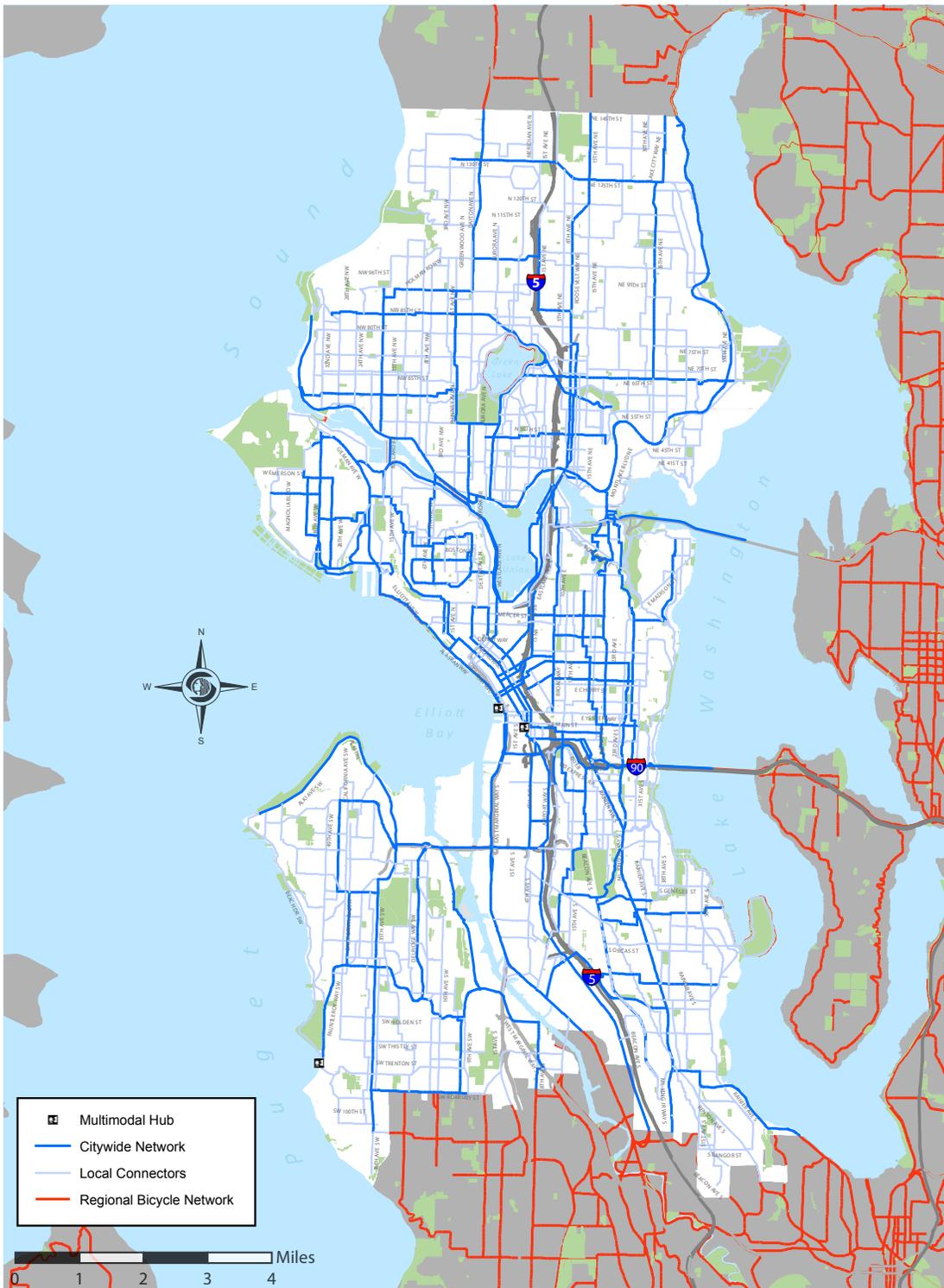




### Connecting to the Region

Connections to neighboring jurisdictions and other regional destinations will support the goal of increased bicycle ridership by providing for seamless regional bicycle travel.

**Map 4-10: Regional Connections and Transit Hubs**



## Bicycle Facility Design

The following **Visual Glossary** and **Intersection Treatment Selection** 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 part of updates 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.

## Intersection Treatment Selection

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

SDOT will use the Intersection Treatment Selection Table, sampled in Figure 4-1 and included in Appendix 3, to determine suitable intersection design based on the bicycle facility and the surrounding context. Intersection treatments are categorized based on the type of street being crossed (arterial or non-arterial). Separate treatments are identified for the bicycle facility itself as well as the cross street. The menu of intersection treatments helps to provide more consistent design practices throughout the city and will be based on context and engineering judgment decisions. Intersection treatments will continue to evolve and SDOT will keep up with best practices to improve intersection safety for all modes.

Figure 4-1: Sample Section of the Intersection Treatment Selection Table

<b>Roadway Type:</b>	<b>Collector Arterial</b>	
<b>Auto Volumes:</b>	<15,000 ADT	
<b>Bicycle Facility Types</b>	 <p>(in street, minor separation)  <b>Conventional Bike Lane</b>  <b>Buffered Bike Lane</b></p>	
<b>Cross Street Type:</b>	<b>Non-arterial Crossings</b>	<b>Arterial Crossings</b>
<b>Cross-Street Approach</b>	<b>Two-Stage Turn Box</b>	<ul style="list-style-type: none"> <li>• <b>Two-Stage Turn Box</b></li> </ul>
<b>Intersection Treatment</b>	<b>Intersection Crossing Markings</b>	<ul style="list-style-type: none"> <li>• <b>Intersection Crossing Markings</b></li> <li>• <b>Median Refuge Island</b></li> <li>• <b>Active Warning Beacons</b></li> <li>• <b>Pedestrian Hybrid Beacon</b></li> <li>• <b>Half Signal</b></li> <li>• <b>Bicycle Signal</b></li> <li>• <b>Full Signal</b></li> <li>• <b>Bike Box</b></li> <li>• <b>Combined Bike Lane/Turn Lane</b></li> <li>• <b>Two-Stage Turn Box</b></li> <li>• <b>Through Bike Lanes</b></li> <li>• <b>Signal Detection</b></li> <li>• <b>Advance Stop Bar</b></li> <li>• <b>Offset Street Connection</b></li> </ul>



The following strategies will help Seattle achieve its ridership and safety goals.

**Strategy: Design all bicycle facilities to meet or exceed the latest federal, state and local guidelines so the system provides universal access for all bicyclists.**

**Actions:**

- Supplement recommendations from the Bicycle Facilities Visual Glossary with engineering studies, where necessary, and guidance from other nationally recognized guides including the Manual on Uniform Traffic Control Devices, NACTO Urban Bikeway Design Guide, AASHTO Guide for the Development of Bicycle Facilities and ITE publications.
- Provide ongoing education opportunities to planning and engineering staff on new and innovative bicycle facility design.
- Request “experimental status” from appropriate government entities for bicycle facility designs that may not yet be recognized as an acceptable design to allow SDOT to use innovative designs and study the effects of the design.
- Follow state law by providing bicycle detection at all signalized intersections.
- Experiment with innovative detection technology.

**Strategy: Improve bicycle safety and access at railroad and rail transit crossings.**

**Actions:**

- Assess all railroad and rail transit crossings that intersect bicycle facilities and install appropriate bicycle supportive infrastructure to facilitate crossing at 90 degrees to the maximum extent feasible.



*“The very worst thing is when you are in a bike lane that all of a sudden ends... Connectivity is important.”*

## Bicycle Facilities Visual Glossary

### Neighborhood Greenways

Neighborhood Greenways use signs, pavement markings, and traffic calming measures to create safe, convenient bicycle facilities.



#### Neighborhood Greenway

Neighborhood Greenways are streets with low motorized traffic volumes and speeds, designated and designed to give bicycle and pedestrian travel priority. Neighborhood Greenways use signs, pavement markings, and traffic calming measures to discourage through trips by motor vehicles and create safe, convenient bicycle and pedestrian crossings of busy arterial streets.



#### Traffic Calming

Traffic calming is critical to 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 diminishing the severity of crashes if they occur. Common traffic calming techniques include speed humps, neighborhood traffic circles, chicanes, stop signs and pinch points.



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 refuge islands, and signal restrictions.

### Cycle Tracks

Of all on-street bicycle facilities, cycle tracks offer the most protection and separation from adjacent motor vehicle traffic.

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

One-way cycle tracks are physically separated from motor vehicle traffic and distinct from the sidewalk. In situations where on-street parking is allowed, cycle tracks are located to the curb-side of the parking (in contrast to bicycle lanes).



### Raised Cycle Track

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/texture separates 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

Street level cycle tracks are configured at the same level 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.



### Two-Way Cycle Track

A Two-way cycle track is an on-street bicycle facility that allows bicycle movement in both directions on one side of the street.

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.



### Cycle Tracks on Hills

Bicycle travel uphill is often at slow speed and may result in a wide weaving path. Downhill bicycling may be high-speed, potentially equal to that of motor vehicles.

Cycle tracks on hills should be designed to accommodate the physical requirements and behavior for both uphill and downhill bicycle travel. *One-Way Cycle Tracks* are more appropriate than *Two-Way Cycle Tracks* under these conditions.

In the uphill direction, adequate lateral clearance should be provided to allow for both slow weaving and parallel passing, similar to an *Uphill Bicycle Passing Lane*. In the downhill direction, the design should permit bicyclist to leave the cycle track and descend in the adjacent general purpose travel lane, similar to the concept of the *Uphill Bicycle Climbing Lane*. Bicyclists should travel in a safe manner and with reasonable downhill speeds.

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.

## Off-Street Bicycle Facilities

Off-street facilities include bicycle facilities that are distanced from the roadway, or that 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. A Crime Prevention Through Environmental Design (CPTED) lens 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 safe crossings where they previously did not exist.

A Crime Prevention Through Environmental Design (CPTED) lens should be followed when designing the underpass.

## Shared Street

On shared streets, bicyclists and motor vehicles use the same roadway space. To provide comfort for bicyclists, shared streets employ basic treatments such as signage and shared lane markings to help improve conditions for bicyclists.



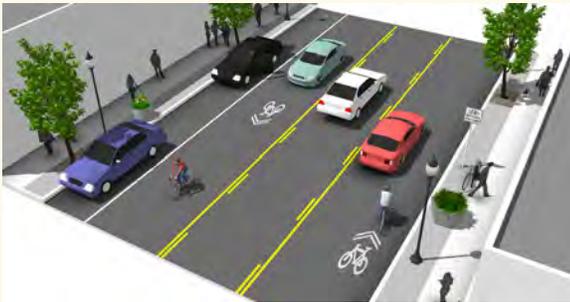
### Advisory Bicycle Lane

Advisory bicycle lanes are bicycle priority areas delineated by dotted white lines and marked with *Shared Lane Markings*. The automobile lanes are not marked with a centerline and should be configured narrowly enough so that cars and bicyclists must negotiate the roadway space when passing is required. Motorists may enter the bicycle zone to overtake other vehicles only when no bicycles are present.



### 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 have appropriate signage acknowledging that bicyclists are permitted.



### Shared Lane Marking

Shared Lane Markings (SLMs), are road markings used to indicate a shared lane environment for bicycles and automobiles. SLMs reinforce the legitimacy 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.

### 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 safe and comfortable operation within a shared lane, and when application of *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.



### Colored Treatment

Colored treatment within a bicycle lane increases the visibility of the bicycle facility. Colored pavement may be applied in areas with pressure for illegal parking, frequent encroachment of motor vehicles, to clarify conflict areas, and along enhanced facilities such as *Contra-Flow Bicycle Lanes* and *Cycle Tracks*.



### 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.



### Contra-Flow Bicycle Lane

Contra-flow bike 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.



### Uphill Climbing Lane

Uphill climbing lanes enable motorists to safely pass slower-speed bicyclists, improving conditions for both travel modes. Uphill travel, where bicyclists are slow and likely to weave widely, are provided a dedicated, separated space. Downhill travel, where speeds are similar to that of motor vehicles, 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 configures a second bicycle lane adjacent to the first to provide ample space for passing on steep hills.

## Intersection Treatments

Intersection treatments are designed to increase comfort and safety or decrease delay for bicyclists. Some treatments are designed to help neighborhood greenways cross busy streets, other treatments are designed to reduce conflicts for cycle tracks or bicycle lanes at major intersections.



### Active Warning Beacon

Active warning beacons are user-actuated 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 should be used to enhance driver yielding for bicyclists and pedestrians.



### Bicycle Detection and Actuation

Bicycle detection is used at actuated signals 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.) Inductive loop detectors are identified with a pavement marking to inform bicyclists of proper positioning to trigger the detector.



### Bicycle Signal

A bicycle signal is a bicycle-specific traffic signal and is 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*.



### 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, closer to the center line of the cross street. 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 is often paired with *Curb Bulbs*.



### Combined Bicycle Lane/Turn Lane

A combined bicycle lane/turn lane places dotted bicycle lane lines or *Shared Lane Markings* 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.



### 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*.



### 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” conditions.

When configured on a bicycle lane facility, this is called a *Combined Bicycle Lane/Turn Lane*.



### Green Bike Box

A green bike box is a designated area at the head of a traffic lane at a signalized intersection that provides bicyclists with a safe 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 bike box, and right turn on red is not permitted.



### “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 only one street at an intersection. These are most commonly used to stop traffic along a major street to permit crossing by pedestrians or bicyclists.



### Crossbike 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 through bicyclists and through or crossing motor vehicles in the adjacent lane. *Colored Treatment* may be used for added visibility of the facility.



### Median Diverter Refuge Island

Median diverter refuge 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*.



### 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 prior to 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 and may increase the percentage of drivers who yield to bicyclists and pedestrians. All-way pedestrian and bicycle signal phase is another intersection treatment that allows bicyclists and pedestrians to cross in any direction within their own signal phase. Commonly called an all-way walk, but with bikes added to the mix.



### 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. Commonly, this restriction is established at all bike box installations, 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 vary based on the direction of the offset, the presence of signalization and the amount of adjacent traffic. Common configurations include *Bike Lane Offset Street Connection*, *Cycle Track Offset Street Connection*, *Bicycle Center Turn Lane* and *Two-Stage Turn Boxes*.



### Protected Bicycle Signal phase

Providing an 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.



### 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 bike lane, a *Combined Bike Lane/Turn Lane* may serve the same purpose.



### Two-Stage Turn Box

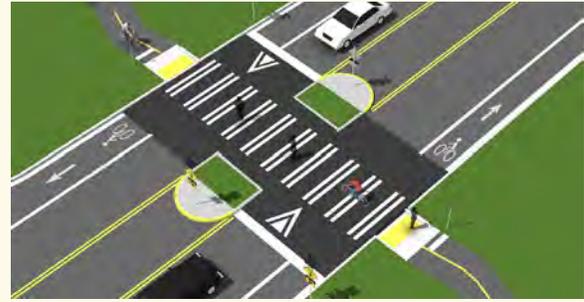
Two-stage turn queue boxes offer bicyclists a safe way to make turns at multi-lane signalized intersections from a right or left side cycle track or bicycle lane by separating the turn movement into two stages. Signage will accompany the installation to help educate bicyclists and motorists of the new intersection treatment.

Turn boxes may also be used at *Offset Street Connections* that jog to the right to orient bicyclists directly across the offset street.



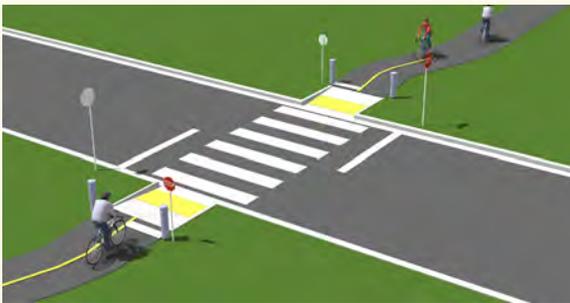
### Enhanced Trail Crossings

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



### 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.



### 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 refuge island can improve user safety by providing pedestrians and bicyclists space to perform the safe crossing of one half of the street at a time.



### Signalized Crossings

Where practical, multi-use trail alignments may use existing signalized intersections by routing trail users to a signalized intersection. Barriers and signing may direct trail users to the signalized crossing. *Bicycle Signals* may be used to assist in bicyclist crossing.



## Multimodal Corridors

Some streets will accommodate bicycle facilities easily, others may be more challenging. It is important to establish a process to consider all modes when implementing the proposed bicycle network on Multimodal Corridors.

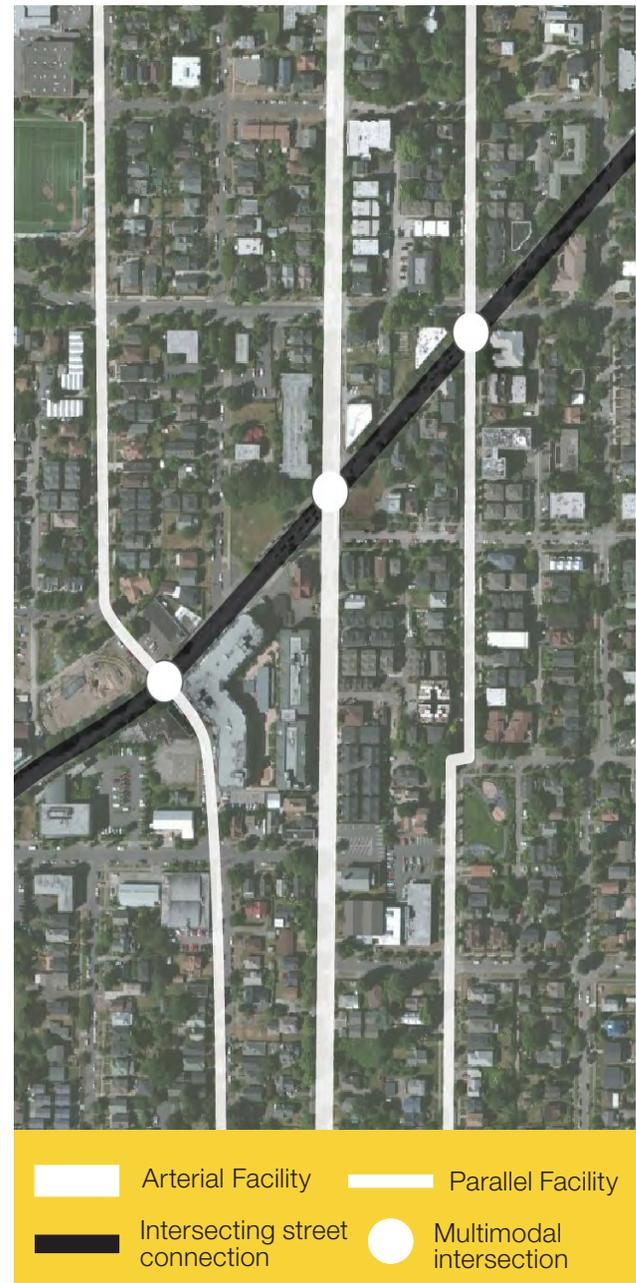
Multimodal Corridors are the city's main travel corridors serving all trip types and all modes. They are the streets prioritized as transit corridors by the Transit Master Plan or designated as Major Truck Streets and coincide with either an existing or proposed bicycle facility. These overlaps are largely 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 several competing modes of transportation, and the needs of large freight and transit vehicles often constrain development on existing roadways. Of the 294 miles of identified transit priority and major truck streets, approximately 22 percent overlap with recommended or existing bicycle facilities in the proposed bicycle network. Map 4-11 on the following page shows the transit and freight networks and the overlap with the proposed bicycle network.

As each corridor is analyzed in more detail (through additional corridor studies, project development activities, and/or further bicycle facility design work), it is important that either (a) all modes be accommodated along the same street or (b) bicycle facilities be accommodated using a street parallel to the priority transit corridor or Major Truck Street.

Figure 4-2: Multimodal Corridor Area of Influence



*“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.”*

**Map 4-11: Multimodal Corridors and the Proposed Bicycle Network**





**Strategy: Integrate a multimodal approach, including a decision-making process, into the update of the Comprehensive Plan.**

**Actions:**

- Conduct a process to determine primary and secondary modal priorities on all arterials, including designated Multimodal Corridors, establishing a complete system focused on moving people as safely as possible.

**Strategy: Build bicycle facilities on the arterial street or on a parallel route when implementing a citywide bicycle network project or priority transit project.**

**Actions:**

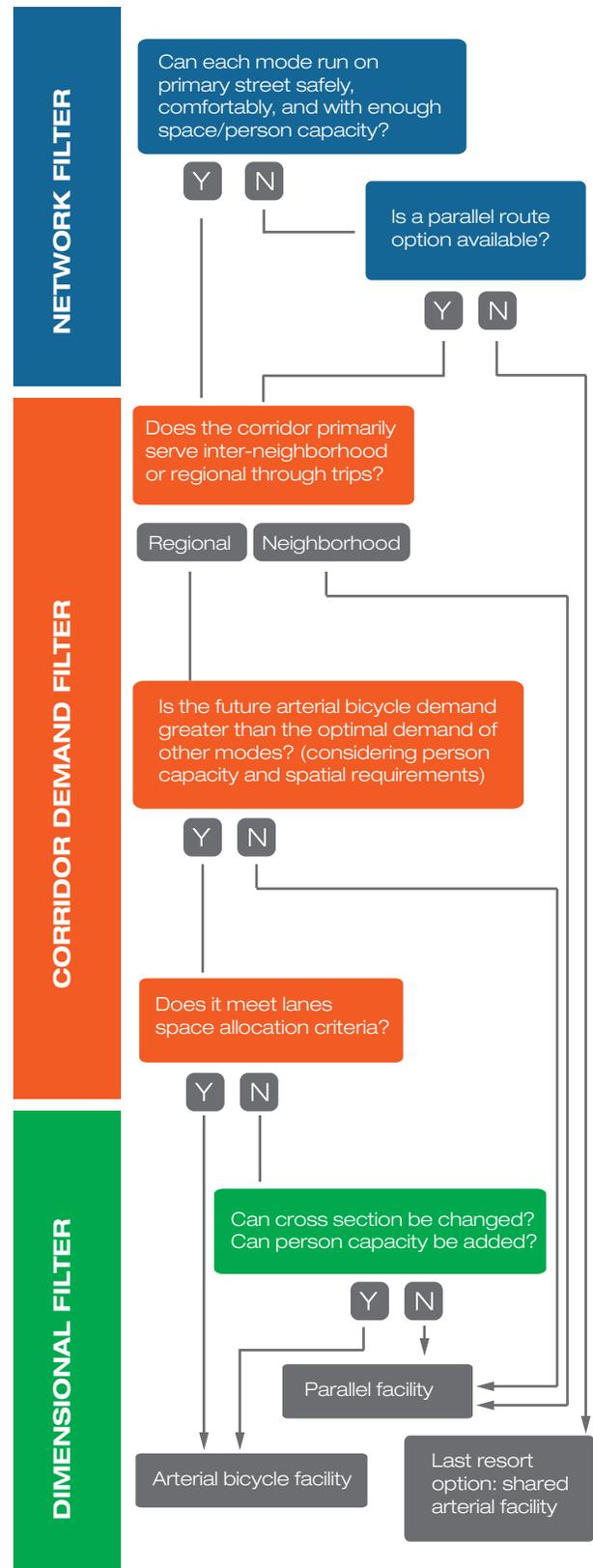
- If cycle tracks are not suitable for arterial development (as determined by the Multimodal Corridor decision-making process), a neighborhood greenway will be identified and implemented in place of the cycle track along parallel streets. Route design and facility selection will consider whether alternative routes are convenient and permit direct access to services and destinations located throughout the Multimodal Corridor.
- Design bicycle priority features at intersections along the Multimodal Corridor.
- Provide clear wayfinding to guide cyclists between neighborhood greenways and local destinations on parallel arterial streets and provide end-of-trip facilities at destinations.

**Strategy: Consider transit improvements that minimize conflict with people riding bicycles.**

**Actions:**

- Integrate the needs of transit and people riding bikes at the beginning of Multimodal Corridor and other arterial street design processes (during the project development phase). Include King County Metro in the design process as appropriate.
- Design transit passenger waiting facilities to minimize conflicts and pinch points with bicycles. Do not build bus bulbs that create bicycle and bus conflict zones at the transit stop.
- Bus layover facilities should be disallowed on the citywide bicycle network streets unless no other

**Figure 4-3: Example Multimodal Corridor Decision Making Process**





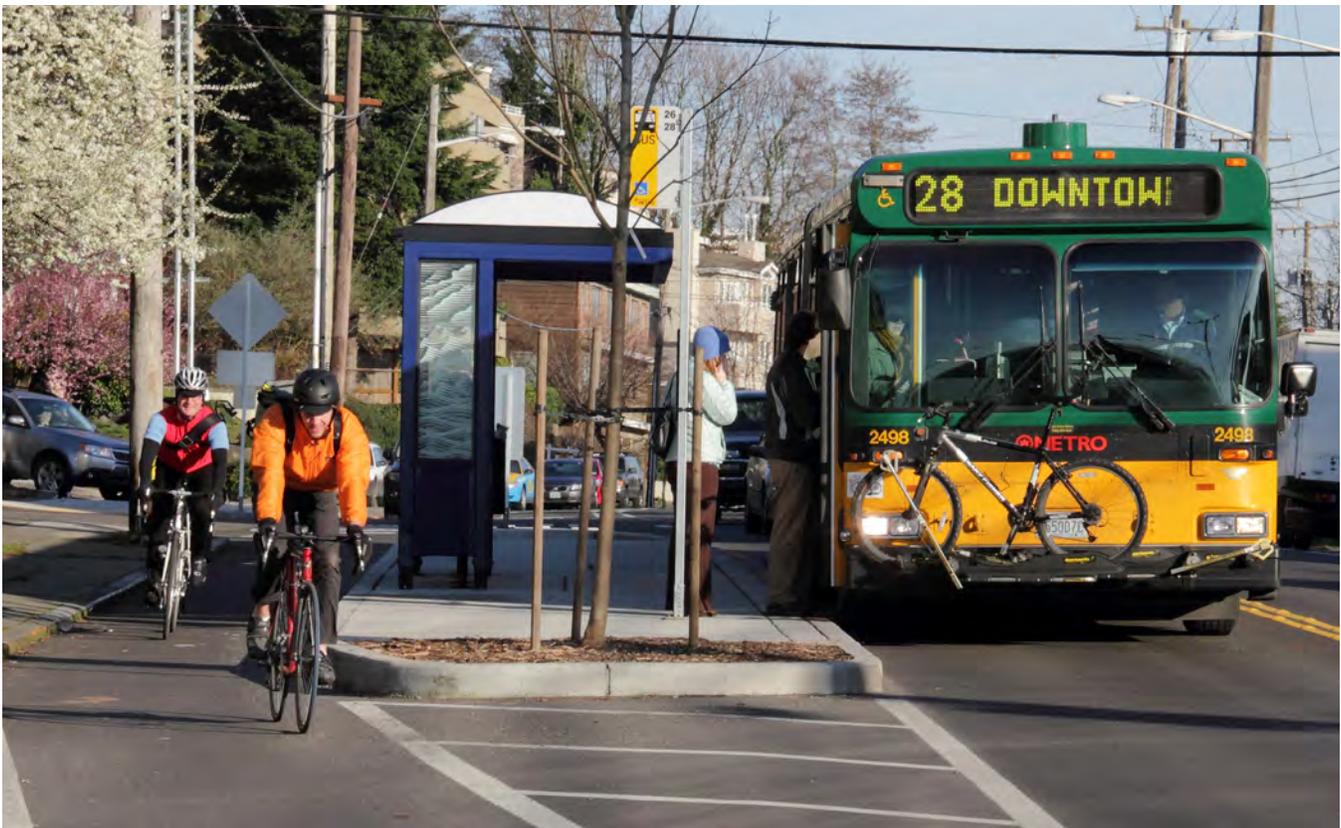
options are available. Instead locate them on intersecting streets or integrated into new development (with developer incentives) or existing off-street locations.

- Bus layover facilities on local connector streets should be designed in conjunction with bicycle facility implementation. Include transit agencies in the design process.
- Recognize that multimodal corridor development is also a transit access strategy, enhancing connections to light rail stations, major transit hubs, major bus stops and park-and-ride lots.
- Provide protection and visibility for pedestrians in zones where bicycles and pedestrians may intermix at transit stops.

**Strategy: Update the curb space allocation needs in the Comprehensive Plan update.**

**Actions:**

- Explore re-purposing streets with low parking demand for expanded sidewalks, bike share kiosks, parklets and other buffer features, bicycle facilities, on-street bicycle parking corrals, and dedicated transit lanes or transit priority features.
- Use a measure of person capacity to make decisions to remove on-street parking supply for use as bicycle facilities.
- Use on-street parking as a buffer for cycle tracks.



*Bus stop islands and buffered bike lanes on Dexter Avenue N help minimize bicycle and transit conflicts along multimodal corridors.*

## Chapter 5: End-of-Trip

# FACILITIES



*“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 journey is not yet complete when a person riding a bicycle pulls off the road. Without safe, accessible, and convenient bicycle parking and other support services, people are simply less likely to choose to ride a bicycle. Changing rooms, showers, lockers, and 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 context-appropriate facilities to enhance Seattle’s bicycling network could be as simple as providing short-term bicycle parking outside a grocery store and covered parking at transit stops. More extensive policies that require secure long-term bicycle parking in new residential and commercial buildings, or support the retrofit of older buildings with secure bicycle parking and 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.

## Current Practices and New Strategies

Seattle can benefit from a range of regulatory and design strategies that will increase the supply of temporary and long-term secure parking. See Table 5-1 for general characteristics of short- and long-term bicycle parking. See the next page for a visual guide to the types of bike parking discussed in this chapter.

The strategies in this chapter will be integrated into land development activities, as well as event and city operations. Together they are intended to provide guidance that will result in well used facilities throughout the city, where people feel confident that their bicycles will not be vulnerable to theft or weather while they are at home, work, or elsewhere.

The sections in this chapter describe current practices in the following areas and provide actions needed to implement the vision of the plan as it relates to ridership, connectivity, livability, and equity:

- **Code Revisions:** Regulatory actions that clarify and expand upon development requirements for a variety of land uses

**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 Bike Parking

## Short-Term Parking



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



On-Street Bike Corrals minimize sidewalk clutter, free up space for pedestrians and others (such as sidewalk cafes), and increase bike parking at locations with high demand, such as neighborhood business districts.

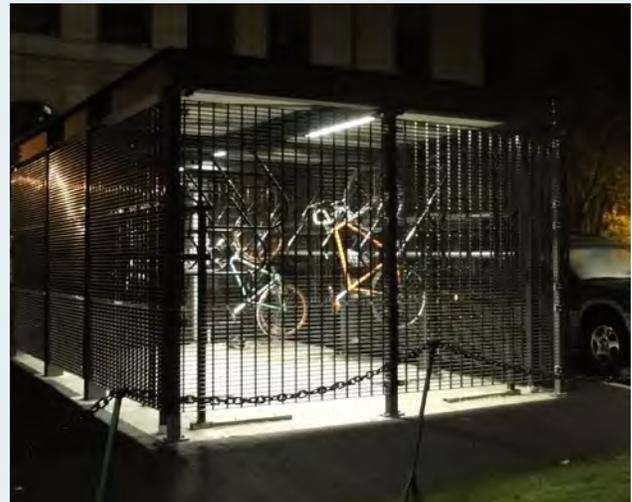


Event (Temporary) Parking typically consists of portable racks that meet the demand for an event. Racks are clustered together, providing a higher level of security than if people were to park the bikes on their own. Event staff can monitor the area.

## Long-Term Parking



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



Bicycle Secure Parking Areas, or Bike SPAs, are free-standing buildings, or enclosed areas within a larger structure (for example, an enclosed portion of a parking garage). SPAs are particularly useful at major destinations that attract all-day users, such as transit centers or employment centers. Some SPAs offer access to bicycle repair tools, pumps or other amenities.



- **Parking in the Public Right of Way:** Proactive approaches for increasing the supply of parking in the public right of way throughout the city through the Bicycle Spot Improvement Program
- **Bicycle Parking Inventory:** Methods for keeping track of and describing the bicycle parking supply in the public right of way
- **Bicycle Parking at Transit Stations:** Routine practices for estimating and providing the appropriate supply of bicycle parking to support transit use
- **Temporary (Event) Bicycle Parking:** Formal bicycle parking requirements to make it convenient and attractive to attend events by bicycle
- **Abandoned Bicycles:** Procedures to remove abandoned bicycles promptly from the right of way

### Seattle Municipal Code Review

Seattle's practice of requiring short- and long-term parking for construction and redevelopment is well established in the municipal code. Minimum bicycle parking requirements in the Seattle Municipal Code (SMC) hold developers accountable to provide these needed 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 also 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



*Bicycle parking is often not in a visible location, so wayfinding signs are a useful addition to help bicyclists locate parking facilities.*

Property owners may forgo these minimum bicycle parking requirements for non-residential uses by paying into the city's bicycle parking fund (for the purpose of providing public bicycle parking in the right of way). 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.

**Strategy: Update the Seattle Municipal Code (SMC) bicycle parking requirements to include regulatory actions that clarify and expand upon development requirements for a variety of land uses.**

**Actions:**

- Differentiate between short- and long-term parking requirements and add information about bicycle rack type, design, placement, security, and access.
- Mandate minimum short-term and long-term bicycle parking requirements.
- Revise the residential bicycle parking requirement to specify applications, including single-family residences, multi-family residences, a minimum number of units, or a combination thereof. Require a mix of bicycle parking types that accommodate a variety of family-friendly bicycles for all ages and abilities.
- Allow bicycle parking to substitute for a portion of automobile parking.
- Require safe and secure bicycle parking for all new office buildings, at or above the minimum parking requirements.
- Develop illustrated design guidelines for developers and building managers to facilitate the installation of well-designed sheltered parking and secure bicycle parking.
- Include a provision for 24/7 bicycle parking access in requirements for long-term bicycle parking located in parking garages.
- Require bicycle repair facilities as part of long-term bicycle parking

**Parking in the Public Right of Way and Bicycle Spot Improvement Program**

Bicycle racks on sidewalks, on-street bicycle corrals, and secured bicycle parking facilities are types of bicycling parking 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 program includes a by-request bicycle rack program for bicycle racks in the public right of way to



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

serve commercial buildings, schools, and multi-family residential developments. The racks are maintained by SDOT. The Seattle Bicycle Spot Improvement Program includes a proactive approach to install bicycle parking at community centers and libraries, and emphasizes rack placement in neighborhood business districts and in traditionally underserved areas.

**Strategy: Develop a bicycle parking implementation program that includes a demand estimation methodology, prioritization process and criteria, guidelines for on-street and private installed racks and a branding and communications approach.**

**Actions:**

- Develop an estimation of bicycle parking demand in Urban Villages that is context sensitive to a variety of bicycle types, including those for all ages and abilities.
- Prioritize the installation of bicycle racks and on-street corrals in historically underserved neighborhoods, as well as in high-demand locations such as neighborhood business districts, community centers, libraries, universities and colleges, employment centers, and schools.
- Create a policy that allows the city to replace on-street parking with on-street bicycle corrals, as well as place on-street corrals at strategic intersection locations where car parking is not allowed.





*Lighting is an important feature for secure bicycle parking facilities, both for safety and function.*

- Better accommodate private entities that wish to install bicycle parking in the right of way by addressing installation guidance, permitting, responsibilities for maintenance, replacement, abandoned bicycles, and/or liability insurance.
- Install high-capacity bicycle parking and secure parking areas in locations that minimize sidewalk clutter and best meet user needs.
- Develop a graphic identity and branding strategy for Seattle's bicycle parking.

### **Bicycle Parking Inventory**

Seattle Department of Transportation (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 there are no plans to update the condition of existing racks or catalog racks missed in the initial inventory. This data is available to the public via digital map or spreadsheet.

**Strategy: Ensure that bicycle parking in the right of way is inventoried every five years and communicate the data to the public.**

#### **Actions:**

- Maintain a digital inventory on the city website.
- Integrate parking data into city-sponsored mapping and digital applications that depict the bicycle network as it grows.
- Track developer-installed bicycle parking as part of the inventory.

### **Bicycle Parking at Transit Stations**

Improving bicycle access to transit increases urban mobility and encourages multimodal travel, extending the reach of public transit. The 2007 BMP advised using a demand estimating methodology developed by the Puget Sound Regional Council in 2001. 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 as induced demand for average daily boardings. The approach does not account for other factors known to influence bicycle parking demand, such as on-board bicycle capacity, quality of bicycle



parking at a transit station, and Seattle's increasing bicycle mode share for commute-to-work and access-to-transit trips.

**Strategy: Ensure an adequate amount of short- and long-term bicycle parking at high-capacity transit stations.**

**Actions:**

- Coordinate with transit agencies and other large institutions to develop clear, comprehensive, and consistent demand estimation methodologies.
- Support the tracking of bicycle parking quality and quantities at transit stations.
- Partner with local and regional transit agencies and large institutions to coordinate funding, construction, operations and maintenance of long-term, on-demand, secure bicycle parking facilities. Develop on-demand access systems that rely on a centralized access control and fee collection.

**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.

**Strategy: Require attended bicycle parking at large/special events.**

**Actions:**

- Define and provide examples of large/special events that should have attended bicycle parking.
- Develop guidelines for event organizers that describe a variety of temporary event parking strategies and identify potential partners for bicycle valet services.

**Abandoned Bicycles**

Abandoned bicycles are bicycles that have been locked to a public bicycle rack and left there. Currently SDOT and the Seattle Police Department work collaboratively to manage abandoned bicycles.

**Strategy: Develop a process and workflow procedure for abandoned bicycle removal with repurposing options.**

**Actions:**

- Ensure roles and responsibilities are clear and communication is seamless within and between SDOT and SPD.
- Establish partnerships with non-profit bicycle groups/shops to create a program to store, repair, and redistribute abandoned bicycles.



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



*Abandoned bicycles, or in some cases wheels, restrict the usability of bicycle racks.*

## Chapter 6:

# PROGRAMS



*“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.”*



While world-class infrastructure is essential to make riding a bike comfortable for people of all ages and abilities, education, encouragement, and promotion efforts are also necessary to help people realize the full potential of Seattle's bike routes and facilities.

The strategies in this chapter are a combination of policy changes, information sharing, and individual behavior change. Together they 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, reach out to new audiences to help people understand the rules of the road, and share a vision of riding a bike as a fun, healthy, community-building activity. The actions have been selected to accomplish the goals of this plan, considering public input and guidance from the Seattle Bicycle Advisory Board.

This chapter is based on research of how people adopt and maintain new behaviors. This framework is not meant to convey the priority of any one type of program. Rather, it acknowledges that changing the way we relate to each other on our streets and how we choose to travel is a process that depends on the following: having strong policies that support riding a bike; providing basic information to people on safety and riding opportunities; and supporting individuals in changing the way they travel. To reflect this, the chapter is organized around three frameworks:

- Policy-Level Work
- Building Knowledge
- Changing Individual Behaviors

At the close of the chapter, a prioritization matrix shows activities broken down into three priority tiers, based on the anticipated impact on safety, as well as community and SDOT input. The matrix also shows how the actions support the overall plan goals.

## Policy-Level Work

Policy-level work consists of actions that build and support the resources and systems to improve safety for everyone and make riding a bike easier and more convenient.

**Strategy: Develop a process to review bicycle-related collisions, and identify and implement safety strategies.**

### Actions:

- Analyze bicycle-involved collisions to identify trends, behaviors, built environment factors, and policy/institutional issues that can be changed to reduce the likelihood of such collisions happening in the future.
- Track bicycle-involved collisions per type of bicycle facility. Review the collision rates over time to determine, by comparing collision rates to other bicycle facility types and streets without any facility, whether new facilities are having the intended effect of increasing safety by reducing collisions.

**Strategy: Promote bicycle safety and multimodal trip knowledge at Seattle driver education programs and licensing centers.**

Education through driver education programs offers a unique opportunity to reach drivers in the formative moment when they are creating lifelong driving habits. The ability to reach beginning drivers has become less centralized since Seattle Public Schools discontinued driver education instruction.

### Actions:

- Create a professional development training course for driver education instructors.
- Support partners in reforming the statewide system that regulates driver training and testing.



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

- Work with state legislators to sponsor a bill requiring that all driver training include bicycle safety.

**Strategy: Pursue any identified local legislative changes to facilitate better bicycling conditions in Seattle.**

The Seattle Municipal Code sections that pertain to the rules of the road and to new development have a powerful effect on use of the right of way and how private land is developed.

**Action:**

- Conduct a regular review of Seattle Municipal Code sections related to bicycling to identify needed changes.

**Strategy: Provide strong bicycle education for primary-age children.**

All children in Seattle should have access to the many benefits of bicycling. Teaching children in Seattle Public Schools basic bicycling skills, rights, and responsibilities will give them a foundation for using bicycles for independence and health throughout their lives.

**Actions:**

- Work with schools through the Safe Routes to School program to teach children how to safely walk and bike to school.
- Expand the reach of the Safe Routes to School program and work with partners to promote the program and develop a long-term funding and



*Covered bicycle parking on University of Washington campus.*

growth plan.

**Strategy: Support bicycling to commercial centers through programming efforts such as Bicycle-Friendly Business Districts.**

Bicycle-Friendly Business District programs in Seattle can vary in their specifics, but all of them allow a business district to “brand” itself as welcoming to customers who arrive by bicycle.

**Action:**

- Provide assistance to neighborhood business districts, or other groups, that want to begin a bicycle-friendly business district.

**Strategy: Support the development of bicycle tourism in Seattle.**

Cities around North America are seeing that a bicycle-friendly reputation can be an advantage in attracting tourists. With the impending launch of Puget Sound Bike Share, and SDOT’s rollout of newer types of bike facilities, riding a bike will be an ever more appealing proposition for visitors.

**Action:**

- Support the development of a bicycle tourism program and ensure communication and education between tourism agencies and other partners about bicycling in Seattle.

**Strategy: Support the development of neighborhood bicycle culture.**

Many neighborhoods are already seeing the formation of local grassroots groups to promote and improve bicycling. There are many ways SDOT can support neighborhood groups and residents who are eager to take action to make their own streets better places for riding a bicycle.

**Action:**

- Support neighborhood groups and other partners who want to promote and improve bicycling.

**Strategy: Support strong bicycling elements in Transportation Management Programs and Commute Trip Reduction sites.**

Transportation management programs (TMPs) are required by the City of Seattle to reduce the traffic impact of large buildings and developments. Large



employers have a similar obligation under the state-wide Commute Trip Reduction (CTR) law. TMP-affected property managers and CTR-affected employers measure the baseline drive-alone mode share of their tenants and employees, then develop goals and a work plan to reduce that rate.

**Action:**

- Develop an information packet that outlines the code requirements for bicycle parking requirements and other amenities and distribute to TMP- and CTR-affected sites.

**Building Knowledge**

By targeting a wider audience to build knowledge about safety and riding opportunities, program strategies and actions can support achievement of plan goals.

**Strategy: Improve wayfinding and trip-planning opportunities for people on bicycles.**

Wayfinding tools (signs, pavement markings, and maps) and online trip planning tools do not replace the need for great bike facilities; however, these tools can make the existing network much easier to navigate.

**Actions:**

- Enhance the existing wayfinding system to incorporate new destinations and include wayfinding signs as a component of all projects.
- Update the annual printed bicycle map. Ensure that the map is accessible to people for whom English is not a primary language and to people who might need larger text.
- 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 and uses.

**Strategy: Develop “Bike 101” Materials.**

SDOT can play a lead role in supporting new bicyclists by developing tools for beginners, and making the materials available to the widest possible range of people. Topics could include bicycling skills, bicycle facilities, and helping people connect to many existing bicycling resources.



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

### Actions:

- Ensure that the materials are accessible to non-English speakers and people with visual impairments.
- Include information about e-bikes (electric bikes) to help overcome topography barriers.

### Strategy: Develop and promote materials that explain how to safely bike and drive on and near bicycle facilities.

As the City of Seattle builds a wider range of bicycle facility types, people will have questions about how they work for all users (e.g., “How are drivers supposed to behave when they reach a bike box?”). SDOT can work to make sure that people driving, riding a bike, or walking get the information they need so that everyone knows how to navigate new facilities comfortably, safely, and predictably.

### Action:

- Develop information for the public to become knowledgeable about upcoming bicycle projects and how the bicycle facility will work for all roadway users within the project development phase of project delivery.

### Strategy: Support communication between the freight, professional driver, and bicycling communities.

All professional drivers—including but not limited to freight operators, public transit operators, taxi and town car drivers, delivery drivers, waste management vehicle operators, and operators of construction and agricultural machinery—have an interest in avoiding collisions with bicyclists for personal and professional reasons.

### Action:

- Support the development of better communication channels to facilitate safer and more considerate behaviors by all roadway users.



*InMotion is a program by King County Metro Transit that partners with local communities to encourage residents to use healthier travel options like the bus, carpooling, bicycling and walking.*



*Bryant Elementary School has a bicycle to school program that teaches children how to bicycle safely and confidently.*

## Changing Individual Behaviors

Changing individual behaviors is key to accomplishing plan goals. The city will support these changes through targeted and tailored direct outreach to people that supports them in starting and continuing to ride a bike.

### Strategy: Develop targeted marketing campaigns to encourage people to try bicycling and follow the rules of the road.

#### Actions:

- Develop marketing campaigns aimed at:
  - The general population throughout the city, such as for Bike 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 biking.



- Ensure all marketing campaigns are evaluated to determine whether goals are being accomplished.

**Strategy: Support events and programs that encourage groups that are currently underrepresented in bicycling to try making trips by bike.**

One important goal of this plan is to serve groups who may not currently ride a bike in large numbers and for whom riding a bike might provide great health, financial, and time benefits.

**Actions:**

- Lead and participate in conversations to better understand who is underrepresented and underserved in the bicycling community and work with partners to change the status quo.

**Strategy: Support bike share and other programs that provide access to bicycles and helmets.**

Lack of access to bicycles and helmets continues to be a barrier to participation for too many Seattle residents. With the launch of Puget Sound Bike Share (PSBS), the city will have a powerful resource to lower the barrier to entry for bicycling.

**Action:**

- Continue to partner with Puget Sound Bike Share to promote their work and focus on safety for new riders and programs.



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

## Program Evaluation

Education, encouragement, and promotional programs are an essential part of SDOT's mission, and will be key to the success of this plan. In some cases, programs will be delivered as part of bicycle facility development, while in other cases they will be stand-alone actions with relatively self-contained goals and timelines. In all cases, however, they are designed to support the goals of this plan. Program indicators of success will relate to the plan goals and will be primarily tracked through the overall performance measures identified in Chapter 3.

The plan's performance measures that relate most directly to programmatic actions in this plan are:

- Ridership (as measured by bicycle counts and mode share surveys)
- Safety (as measured by collision rates and resident input)
- Equity (as measured by female and non-white ridership)

Individual programs may have more tailored goals that can be measured by defining outputs and outcomes tied to that program. For example, if a neighborhood-based marketing program were initiated in order to increase bicycle use in that neighborhood, pre- and post-program surveys should be conducted specifically in that neighborhood to determine whether that program had the desired impact.

***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.***

## Program Prioritization

Programmatic strategies are broken down by priority tiers, with Tier 1 representing the most immediate actions, as shown in Table 6-1. Actions are prioritized based primarily on their potential to improve safety; programs believed to contribute directly to increased safety (through decreased crashes) are included in Tier 1. Other factors in the prioritization include

community input received throughout the Bicycle Master Plan 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 strongly address that goal; lighter shading indicates that an activity addresses the goal less directly.

**Table 6-1: Program Prioritization**

Priority Tier	Strategy	Goals					Strategy Type
		Ridership	Safety	Connectivity	Equity	Livability	
1	Develop a process to review bicycle-related collisions and identify and implement safety strategies		Strongly				Policy
1	Promote bicycle safety and multimodal trip knowledge at Seattle driver education programs and licensing centers	Lightly	Strongly			Lightly	Policy
1	Provide strong bicycle education for primary age children	Strongly	Strongly			Lightly	Policy
1	Develop and promote materials that explain how to safely bike and drive on and near bicycle facilities	Strongly	Strongly			Lightly	Knowledge
1	Develop "Bike 101" materials	Strongly	Strongly		Strongly		Knowledge
2	Support communication between the freight, professional driver, and bicycling communities		Strongly			Lightly	Knowledge
2	Pursue any identified local legislative changes to facilitate better bicycling conditions in Seattle		Lightly			Strongly	Policy
2	Improve wayfinding and trip planning opportunities for people on bicycles	Lightly	Lightly	Strongly		Lightly	Knowledge
2	Support bike share and other programs that provide access to bicycles and helmets	Lightly	Lightly	Lightly	Strongly		Knowledge
2	Support strong bicycling elements in Transportation Management Programs and Commute Trip Reduction sites	Lightly				Strongly	Policy
2	Support events and programs that encourage groups that are currently underrepresented in bicycling to try making trips by bike	Lightly			Strongly	Lightly	Behavior
3	Develop targeted marketing campaigns to encourage people to try bicycling and follow the rules of the road	Strongly			Strongly	Lightly	Behavior
3	Support bicycling to commercial centers through programming efforts such as Bicycle-Friendly Business Districts	Lightly				Strongly	Policy
3	Support the development of bicycle tourism in Seattle	Strongly				Strongly	Policy
3	Support the development of neighborhood bicycle culture	Strongly			Lightly	Strongly	Policy

Strongly addresses goal	
Less directly addresses goal	



## Chapter 7: How We Do

# BUSINESS



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



In addition to guiding the location, type, and extent of bicycle infrastructure and programmatic investments, this plan identifies opportunities for the Seattle Department of Transportation (SDOT) to expand its implementation of strategic initiatives and to support bicycling. These opportunities will leverage resources within SDOT and with partner organizations to implement bicycle projects and programs efficiently and comprehensively.

Decision making by the city to implement the Bicycle Master Plan is supported by a set of activities that include policies, management, and processes. Collectively, these efforts are referred to as “governance”. The sections in this chapter describe current governance practices and provide actions needed to affect the vision of the plan through changes in the way the city does business:

- **An integrated SDOT governance approach** that clarifies SDOT roles and responsibilities during project delivery and for everyday operations
- **The identification of new activities** that expand SDOT roles and responsibilities
- **Partnerships** that will be essential for sustaining increased bicycling
- **Maintenance** roles and responsibilities that keep facilities safe and attractive

## SDOT Governance

SDOT is currently organized into several divisions with varying levels of bicycle program implementation responsibility. This plan does not recommend a formal staffed Bicycle Program or a wholesale staff reorganization to implement the plan, but rather identifies

actions to better integrate bicycling throughout SDOT operations.

### Strategy: Use a consistent approach for project and program delivery.

A key outcome of the plan is the creation of a more integrated and strategic Bicycle Project Delivery Process with which each division within SDOT should comply during project delivery and public engagement processes. Consistency is critical to provide the public a general understanding of how projects will be implemented, regardless of which division is working on the project.

#### Actions:

- Develop procedures and processes that bring consistency to bicycle project delivery as shown in Figure 7-1.
- Develop an implementation matrix to identify actions to implement the plan and to help dictate an organizational structure and assignment of new roles to appropriate divisions as necessary.
- Evaluate and monitor projects by conducting before and after counts and perception surveys, incorporating new technology.
- Develop a public engagement process for use of all SDOT divisions (process may be different for arterial and non-arterial bicycle facility implementation).

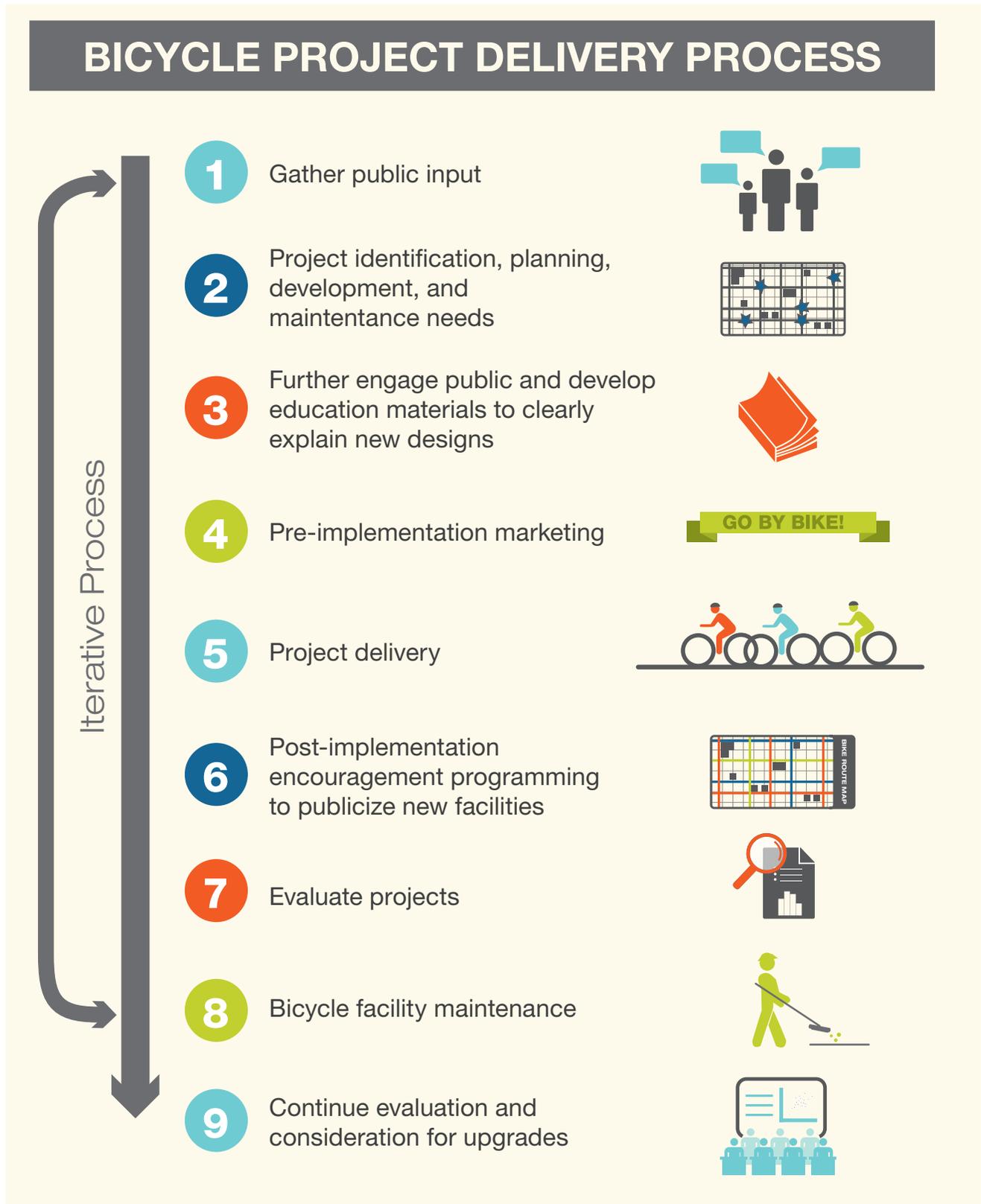
## New Activities

The implementation of the Bicycle Master Plan will result in an expanded set of responsibilities that have not historically been a function of city transportation operations.

### *An Integrated Organizational Approach to Implementation*

*Although many great bicycling cities across the U.S. dedicate a bicycle coordinator or staff to bike plan implementation, SDOT’s organizational structure lends itself better to fully integrating bicycling into agency procedures. Bicycle projects and programs will not fall on the shoulders of a small number of SDOT staff, but rather, through the strength of a variety of project areas and program types, will become business as usual. This shared responsibility will create a culture of multimodalism and better integrate bicycling into agency planning, design, and operations. This will become even more important as the city incorporates its Complete Streets design, operations, and evaluation approaches within SDOT.*

Figure 7-1: SDOT Bicycle Project Delivery Process





**Strategies: Identify new activities that SDOT should add to work plans to better deliver bicycle projects and programs.**

**Actions:**

- Create a Multi-Use Trails Master Plan.
- Enhance data collection, storage, and reporting, including the following actions:
  - Enhance bicycle count collection; ensure that data collection includes an annual phone survey, and gender and helmet usage tracking.
  - Supplement the Puget Sound Regional Council travel survey to increase the City of Seattle sample size.
  - Develop a comprehensive system to manage bicycle facility life-cycle information.
- Encourage regular training of city staff on best practice bicycle facility design and safety countermeasures.
- Update the Traffic Control Manual to include requirements for bicycle detour plans.
- Develop a pilot project implementation process. This will allow SDOT to set up experiments and test improvements prior to final design and implementation in order to determine pros and cons and/or modal trade-offs associated with incorporation of the bicycle facility.
- Take a more active role in both funding and delivering bicycling education and encouragement services.

**Strategy: Track development of the bicycle facility network as part of SDOT’s asset management system in a manner that provides adequate information for benchmarking and future project development.**

**Actions:**

- Develop a formal process for updating the bicycle facility network database. Continue to track the following bicycle facility information and consider tracking new information.

**Strategy: Develop an integrated set of branded bicycle information and marketing tools.**

**Actions:**

- Conduct an internal audit that results in contact numbers for bike program services being assigned to appropriate SDOT staff.
- Ensure any webpages, mobile apps, blogs, Twitter feeds, etc. are fully integrated and complementary. Use SDOT’s social media presence to market improvements, encourage bicycling, and disseminate travel alerts and other resources.
- Use social media as a key marketing and encouragement tool during the project delivery process.

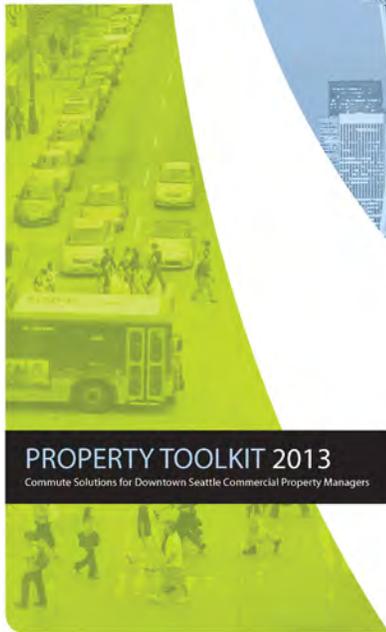
**Partner Roles**

SDOT acknowledges the critical role of various non-governmental, public, and private partners as the city looks to implement the Bicycle Master Plan. 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.

**Strategy: Seek partnerships for implementation of projects, initiatives, and programs.**

**Actions:**

- Work with partners to deliver education and encouragement programs.
- Work with partners to administer bicycle-related events.
- Document bicycle facility maintenance roles.
- Gather expertise and input from local bicycling organizations and the Seattle Bicycle Advisory Board for project prioritization, planning, and design.
- Work with partners to increase the supply of end-of-trip facilities.



COMMUTESEATTLE.COM

*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.*

**Strategy: Work with other departments to implement the plan.**

**Actions:**

- Build partnerships with other city departments. While SDOT is the primary implementer of bicycle improvements in the City of Seattle, coordination with other city departments is critical to success. These departments include the following:
  - Seattle Public Utilities (SPU): Coordinate with SPU during project development to maximize transportation and stormwater benefits. The ideal outcome would be to construct the project with both departments' elements at the same time to reduce construction intensity on one street over a long period of time.

- Seattle Police Department (SPD): Work closely with the Police Department to increase the safety of all street users. Analyze collision data, educate the officers about operations of new bicycle facilities, and support enforcement of the rules of the road for all modes. Ensure funding for the SPD traffic enforcement group.
- Seattle Department of Planning and Development (DPD): Work with staff in DPD to modify any Seattle Municipal Code regulations that will impact bicycling. Educate the staff about new bicycle facility treatments and the contents of this plan for use during streetscape concept plans, neighborhood zoning changes, and future planning studies. Ensure that SDOT staff is included in Early Design Guidance (EDG) meetings to alert private developers of bicycle facilities along their property frontage for opportunistic implementation as well as for access management needs.
- Seattle City Light (SCL): Work with SCL staff to ensure that bicycle facilities, especially off-street facilities, remain safe to use during all hours of the day and throughout the year by providing adequate light levels in critical locations.
- Seattle Parks and Recreation Department (Parks): Work with Parks staff to ensure bicycle access to and, potentially, through parks. Work to ensure that trails within parks that allow people riding bikes are built to current AASHTO standards, and explore opportunities to expand existing trails or build new trails that allow bicycles.
- Seattle Department of Neighborhoods (DoN): Work to educate DoN staff about upcoming bicycle projects and provide SDOT project manager contact information.
- Seattle Office of Economic Development (OED): Work with OED staff on bicycle programmatic actions that enhance the economy.
- Seattle's Office of Stainability and Environment (OSE): Work with OSE staff to develop complementary programs related to the Climate Action Plan.



**Strategy: Expand upon other public partnerships to accomplish the development of a successful and predictable bicycling environment.**

**Action:**

- Build partnerships with other public agencies. These agencies include the following:
  - Transit operators: Engagement with transit providers at the bicycle facility project development stage is crucial when there is an overlap with transit service. Design of the bicycle facility should allow safe operations of both modes. It will be important to acknowledge layover zones, bus stop/bulb locations, traffic signals, and right of way allocation. Providing separation between the two modes is optimal, though this plan does recommend some bicycle facility types along streets that will not allow for complete separation of modes.

- King County Public Health: Engagement with public health officials is crucial to understand public health trends as they relate to bicycling.
- Puget Sound Regional Council (PSRC): Engagement with the Puget Sound Regional Council via membership in its numerous boards and committees will allow SDOT to remain a leading partner for regional transportation success.
- Neighboring jurisdictions: Engagement with and coordination between neighboring jurisdictions will be crucial to ensure continuity of bicycle networks when city boundaries are crossed. Coordination regarding signage and facility type and design can help to create a cohesive regional bicycle network for people riding bikes.

## Bicycle Facility Maintenance

People riding bikes are particularly sensitive to maintenance problems, because maintenance-related hazards like potholes, irregular surfaces, and debris can cause them serious problems, including collisions. Maintenance affects the comfort and appeal of facilities, and improper maintenance may reduce biking rates. Gathering material life-cycle information and cost estimates based on facility type will allow SDOT to have a better gauge on current and future maintenance needs, thus helping to allocate appropriate funding amounts.

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; and 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. Current funding levels will not allow SDOT to achieve all of the desired level of maintenance activity frequency.



*Maintaining markings for bicycle facilities is critical to ensure all users of the roadway are aware of where to expect bicycles.*



**Table 7-1: Maintenance Activities**

Maintenance Activity
Utility cut restoration
Replace drain grates/utility covers
Repair and replace pavement
Fill concrete joints within bicycle facilities
Repair potholes
Replace signs, pavement markings, and striping
Trim vegetation
Ensure visibility at intersections
Upgrade bicycle detection and standard pavement markings with all reconstruction projects
Complete safety improvements at railroad crossings
Remove graffiti
Clean debris, trash, snow, and sand
Repair or replace lighting
Remove unused bollards and bollard receptacles on multi-use trails
Maintain bicycle racks/furniture
Sweep streets with bicycle facilities
Inspect bridge structures

**Strategy: Develop a bicycle facility maintenance program and implementation plan.**

**Actions:**

- Maintain on-street and off-street bicycle facilities to an acceptable standard and develop maintenance schedules for activities described in Table 7-1.
- Encourage use of materials that extend the life cycle of the bicycle facility. Continue to test, evaluate, and implement appropriate innovative design treatments that improve operating conditions and safety for people riding bikes.
- Ensure that consideration of maintenance costs, procedures, and long-term funding mechanisms is a part of all bicycle facility projects.
- Encourage bicyclists to report maintenance complaints and requests.
- Negotiate maintenance agreements.
- Establish a data-driven process to identify and prioritize maintenance and improvements to existing facilities.
- Allocate funding for the assessment of bicycle facility and pavement conditions on a regular schedule to help SDOT staff better understand life-cycle costs, assess different materials, and prioritize paving projects.



*Citizens can direct minor pavement repair requests to SDOT's Pothole Rangers.*

- Create a process for improving corridors that goes beyond the Bicycle Spot Improvement Program spot requests.

**Strategy: Develop a per-mile unit cost range estimate for maintenance of all bicycle facilities proposed within the plan.**

Bicycle facility maintenance costs should be based on a range of per-mile estimates that cover labor, supplies, and equipment costs. As part of the routine roadway maintenance program, extra emphasis will be put on keeping the bicycle facilities clear of debris and ensuring sightline visibility (e.g., trimming vegetation).

**Actions:**

- Update the per-mile unit cost estimate every three years.

## Chapter 8: Investment

# 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 Bicycle Master Plan is a blueprint that provides a clear path for improving bicycling in Seattle. Two key factors that govern how Seattle will change in the short- and long-term include determining what should be implemented first and what resources should be committed to the effort. This chapter includes a description of the project prioritization process, and a recommended approach for a balanced investment in bicycling.

### Prioritization Framework

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

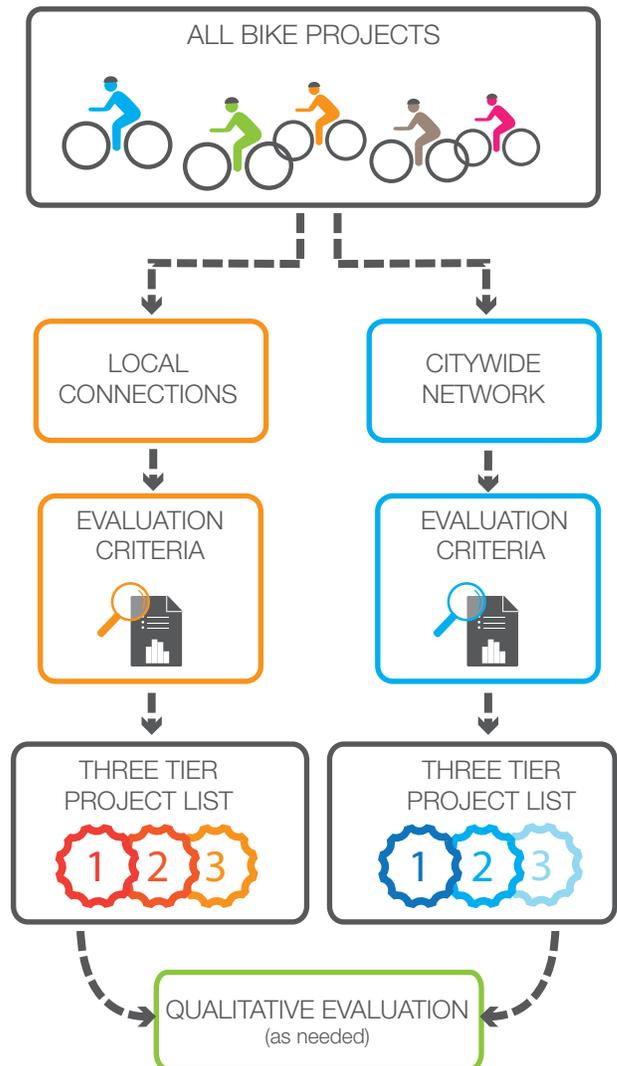
The framework for prioritizing bicycle projects is shown in Figure 8-1 and Tables 8-1 and 8-2.

### Primary Evaluation Process

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

- Citywide network
- Local connections

**Figure 8-1: Prioritization Process**



**Table 8-1: Draft Project Prioritization Framework and Project Categories**

Project Categories	Near-term Strategy:	Longer-term Strategy:
	Increase all ages and abilities ridership through connected facilities	Complete Seattle’s connections
Citywide Network	<ul style="list-style-type: none"> <li>• Complete/upgrade high-demand segments</li> <li>• Closing system gaps</li> </ul>	<ul style="list-style-type: none"> <li>• Projects with strategic challenges (e.g., funding, feasibility, or political issues) or major modal tradeoffs</li> </ul>
Local Connections	<ul style="list-style-type: none"> <li>• Intra-neighborhood connectivity</li> <li>• Intersection improvements</li> <li>• Connections to citywide network</li> </ul>	<ul style="list-style-type: none"> <li>• Inter-neighborhood connectivity</li> </ul>

Each category consists of projects that serve the near-term strategy of increasing ridership by people of all ages and abilities or the longer-term strategy of providing connections to the citywide network, as shown in Table 8-1. The city may decide over time to vary future funding allocations between these 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 may decide to allocate funding based on project type.

### 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 goals in order to develop a short and medium range work plan.

Project evaluation criteria can be weighted to highlight the relative importance of one metric over another. Table 8-2 shows the proposed secondary evaluation criteria.

**Table 8-2: Proposed Evaluation Criteria**

Theme	Criteria Definition
<b>Improve SAFETY</b>	Addresses location with bicycle collision history and emphasis on vulnerable roadway users
	Enhances bicyclist safety by promoting travel on streets with lower motorist speeds and low volumes
	Addresses locations or streets that are associated with greater cyclist stress and more severe collision potential due to high motor vehicle volumes (ADT) and high speeds
<b>Increase RIDERSHIP</b>	Provides a connection to destination clusters
	Provides a connection to areas with high population density
<b>Address EQUITY</b>	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
<b>Enhance LIVABILITY</b>	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
	Reaches the greatest number of riders, but recognizes that all bicycle facilities provide a measurable benefit to at least some bicyclists
<b>Enhance CONNECTIVITY</b>	Removes a barrier or closes a system gap in the bicycling network
	Makes a connection that will immediately extend the bicycle network



The citywide and local connections networks will be grouped into three tiers based on natural breaks in the number of points they score or the number of projects falling into each tier. All projects in the networks will be scored against each other, regardless of facility type. Projects in the highest tier would be top priority; the second tier would be moderate priority, and the third would be lowest.

### Qualitative Evaluation Process

A third step to guide annual prioritization is a set of criteria that focuses on more qualitative factors as opposed to quantifiable criteria (see Table 8-3). These qualitative evaluation criteria 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 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 these projects.

### Strategy: Evaluate bicycle projects annually using the BMP prioritization framework.

#### Actions:

- Develop an annual work plan each year for review by the Seattle Bicycle Advisory Board (SBAB), City Council, and other stakeholders.
- Refine prioritization criteria (adjust weighting and scoring) as needed.



*The cycle track on Linden Avenue provides a physical separation between motorized and bicycle traffic.*

**Table 8-3: Qualitative Evaluation Criteria**

Criteria	Comments
Potential to leverage other funding	Initiating project now 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.

## 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 cycling safety. A balanced investment approach, informed by the information in Table 8-4, will be important for SDOT to effectively reach its ridership, safety, and livability goals. As the network matures, the city can expect to shift some of its emphasis from network improvements to programmatic efforts. From here, this chapter provides an overview of major funding opportunities and recommends strategies for consistent and sustainable funding of bicycle projects, programs, and maintenance.

## 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 goals. The layering of the all ages and abilities network onto the existing network of sharrows and arterial bike 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 and require less maintenance.

## Funding Strategy

Federal and state grant funding sources 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 communities strategies. Local long-term revenue streams have successfully funded bicycle projects and programs, yet are not sufficient for widespread expansion of cycling 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).

### Strategy: Establish a broad-based funding approach.

SDOT should employ a funding allocation strategy that is flexible and allows for opportunistic spending. Roughly 85-90 percent of funding should be dedicated to bicycle network and end-of-trip facility improvements. Seattle's funding approach should be multi-pronged, covering investments not just in constructing bicycle facilities, but also in offering bike 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.

### Actions:

- Fund bicycle projects and programming commensurate to US Census "commute by bike" mode share percentage. In 2010, 3.6 percent of Seattle

**Table 8-4: 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



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*Bridging the Gap funding levy was a substantial funding source for bicycle projects over the last nine years.*

residents commuted by bike, supported by a bicycle project funding level of 2 percent. 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.

- Fund high-priority projects first. The plan includes clear direction on the types of projects that have the greatest potential impact on ridership and safety and represent the greatest opportunity to get more people riding now.
- Include bicycle projects in the CIP. The inclusion of more complex and potentially more expensive bicycle facilities, such as cycle tracks, in the CIP will decouple needed infrastructure improvements from the political instability of annual budgets and move the city beyond cycle track feasibility studies to actual implementation.
- Continue to integrate bicycle projects into Complete Streets efforts.

- Fund bicycle projects through major multimodal capital projects.
- Fund facility maintenance.
- Integrate Multimodal Corridors into any subsequent Bridging the Gap measure and other funding programs.
- Capitalize on the multiple benefits of bicycling to fund neighborhood initiatives out of a variety of fund sources. The Neighborhood Street Fund, Family and Education Levy, and Neighborhood Park and Street Funds are potential funding opportunities.
- Prepare plans with conceptual design and planning level cost estimates for high-priority projects to increase readiness for grant funding.
- Develop a citywide strategic investment approach that integrates bicycle facility development into major capital project, multimodal corridor redesign, and roadway maintenance budgets.
- Continually monitor, evaluate, and improve the bicycle network. A bicycle network is always evolving. The city must continually evaluate and modify

its bicycle streets to best meet the needs of bicyclists of all ages and abilities.

- Refresh the Bicycle Master Plan every five to seven years. This process will trigger new project development sheets and/or action plans. The BMP is a living document that continually responds to new demand, network gaps, program needs, and priorities.

### Local, Regional, State, and Federal Funding Scan

The Bicycle Master Plan contains a variety of facility types, maintenance of such facilities, and programs that will require a diverse range of funding sources. Recently, Seattle has successfully secured project funding through a mix of sources including grant funding. 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 Construction Cost

The rough order-of-magnitude costs of the proposed facilities will be developed for the final plan. See Table 8-5 for a summary of the number of miles to be built to complete the network. A range of costs for each facility mile will be developed using historical costs and supplemented with unit prices and assumed level of infrastructure. This short- and long-term cost assessment will be developed along with plan implementation priorities in the final plan.

**Table 8-5: General Order-of-Magnitude Costs per Facility**

	Total Plan Miles	Facilities to Build (Miles)
Off Street	78.2	31.2
Cycle Track	102.3	101.3
Neighborhood Greenway	244.5	235.8
In Street, Minor Separation	129.9	78.2
Shared Street	29.8	5.1
		451.7

*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, bike boulevards, and bike lanes.*



**Acknowledgments to come from SDOT and to be in the final plan**

