

Chapter 4-4 Bicycle System Plan

Introduction

A “Bicycle Renaissance” is emerging in both Redmond and North America. This renewed interest in bicycling has sparked innovation in bicycle facility design and improved understanding of what gets people biking. Redmond will implement these new best practices and attract a broader segment of the population to bicycling as the system is completed. This reinvigoration of cycling in Redmond will help the community live up to its historical nickname as the “Bicycle Capital of the Northwest.”

Through decades of investment, Redmond has developed many miles of bicycle lanes and paved shared-use paths. The city is at a crossroads with an incomplete, disconnected network which substantially reduces the safety, comfort, and usability of the current bicycle system and is a major barrier to increasing bicycle ridership.

The Redmond Bicycle System Plan will finish connecting and upgrading the bicycle network. Many of these remaining connections and intersection improvements, such as off-street pathways and grade separations, are expensive, but will take advantage of the substantial local and regional network already in place.

The plan prioritizes providing a complete, connected “spine network” of safe, high comfort bicycle facilities that attract a vastly broader segment of residents and employees. As an example, the City of Portland invested into a complete network of high comfort facilities like cycle tracks and paved shared-use paths that resulted in a huge shift in the number of people willing to consider a bike trip. Research in Portland revealed that partially connected and mostly on-street facilities attract only around 10 percent of people to consider a bicycle trip, but roughly 70 percent of people are interested in bicycling on higher comfort facilities.

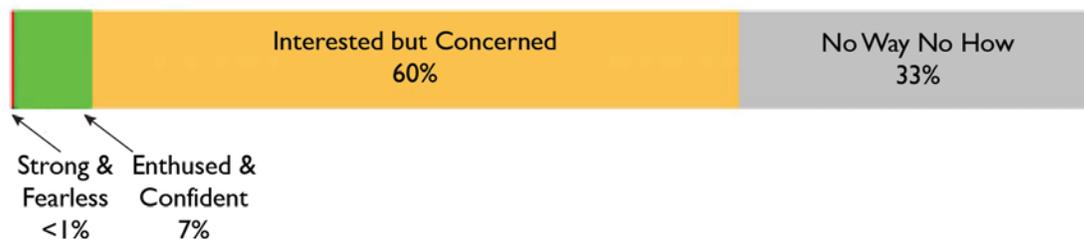


Figure 1. The four types of transportation cyclists in Portland (by proportion of population).

Strategic Approach to Biking in Redmond

The average trip length for all trips in Redmond based on the 2010 Travel Diary is 2.2 miles. This is a typical trip length on a bicycle and a relatively easy distance to bike if the available facilities between destinations are safe and comfortable for the user. The bicycle strategy to encourage a significant increase in bicycle trips has three main parts: 1) Complete a spine network of high comfort cycling facilities, such as paved shared-use paths, cycle tracks that physically separate the bicyclist from the street and automobile traffic, and bike boulevards on lower volume, lower speed streets; 2) in addition to the spine network, the strategy includes a dense network of on-street facilities that shorten bicycle trip lengths and also act as a feeder system to the spine of high comfort facilities ; and 3) finally, abundant access to bicycles through a rental “Bike Share” program, a variety of convenient bike parking options, clearly marked bike routes, and robust education and encouragement programs round out the complete bicycle strategic approach for Redmond.

Transportation Strategies

The suite of travel choices (walking, bicycling, transit, and automobiles) is necessary to provide an efficient, effective transportation system that accommodates planned growth in the two urban centers. Bicycles are particularly well-suited for short- to medium-length trips and often have equivalent travel times to automobiles in urban centers (especially when finding parking is considered). In addition, both Overlake and Downtown possess a gentle topography, thereby eliminating a major impediment to bicycle travel.

Bicycling is important for supporting light rail ridership. Vehicle parking will be limited due to cost and property impacts, whereas bicycle parking is inexpensive and takes up very little space. Bicycling also significantly increases the number of people that can conveniently access light rail without an automobile. Sound Transit estimates that by 2030, 33 percent of light rail riders will access the Overlake Village station by walking or bicycling (East Link Light Rail FEIS Appendix H1 Table 7-12, East Link Light Rail FEIS Appendix H1 Table 4-11).

The images below illustrate one of the fundamental challenges we face and why a transportation network with increased reliance on alternative transportation modes is envisioned: moving 200 people in a two-block space means total gridlock by vehicle (even with five lanes), but only takes one lane width when the same 200 people are riding bicycles.



Figure 2. Spatial efficiency (Image source: i-Sustain).

Bicycling is a particularly competitive mode of travel with the automobile when the trip is 2.5 miles or less. Considering that the average trip length in Redmond is 2.2 miles (from 2010 Travel Survey), bicyclists will be able to take advantage of the connected and higher comfort network of facilities that will be developed between now and 2030 for most of their transportation trips. As the bicycle system plan is implemented, numerous new neighborhood connections will help tie neighborhoods together to community services like buses, schools, and parks, and also link to the urban centers.

Citywide Guiding Principles

Bicycling can increase economic vitality by decreasing household transportation expenses (as shown in Figure 3 below).

Transportation Costs By Mode	
Mode	Cost per Mile
Car	59¢
Transit	24¢
Bicycle	5¢
Walking	0¢

Figure 3. Bicycling is one of the least costly forms of transportation.

Increasing overall bicycle ridership also results in a relatively safer biking environment by decreasing the rate of bicycle collisions. Therefore, Redmond will provide high comfort bicycle facilities that attract additional bicycle riders as a community investment in both economic vitality and safety.

New York City Cycling Risk

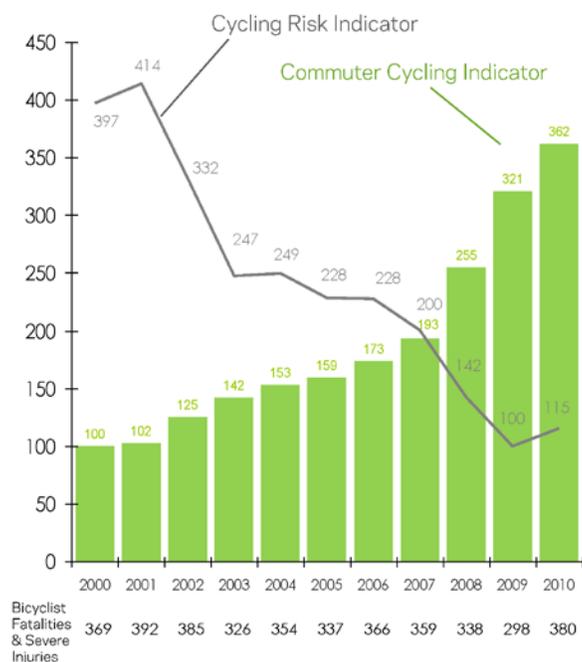


Figure 4. Collision rates have decreased by 71 percent in New York City as commuter bicycling rates tripled.

Bicycling also improves personal and public health. Bicycles are people-powered transportation (“active transportation”) that get people out exercising, providing a plethora of health benefits from heart health to combatting obesity. Bicycling and walking are the only forms of travel that can include exercise while commuting.

Finally, bicycling supports environmental stewardship because it significantly reduces air and water pollution. Reducing emissions from transportation is the best method to reduce overall air pollution—50 percent of carbon emissions come from transportation in our region.

Bicycle System Development

High Comfort Bike Facilities (“The Spine” Network)

Redmond will build a complete bicycle system of safe bicycle facilities that enables a broad array of the population to bicycle safely and comfortably to key destinations. Bicycle ridership will also be supported by access improvements, including bicycle parking, bicycle-sharing programs, and bicycle education and encouragement.

The uppermost tier of bicycle facilities, “High Comfort Facilities,” will attract a wide variety of users and encourage increased bicycle ridership because of physical separation from automobiles. Figure 5 (below) depicts a one-way separated cycle track, providing physical separation from automobiles and incorporating green bicycle lanes that highlight potential conflicts and encourage caution for drivers and bicyclists.



Figure 5. A cycle track. Image source: NACTO.

This backbone network of high comfort bicycle facilities (as shown in Figure 6, Bicycle "Spine Network" Map) has the greatest priority for high safety and comfort corridors and intersection crossings. Today 37 percent of the "Spine Network" is complete, largely through existing paved, shared-use paths, and is anticipated to reach 51 percent completion by 2030 and include investments like cycle tracks on Avondale Road and enhanced bicycle facilities on Old Redmond Road. High comfort corridor facilities (running the length of a corridor link) include:

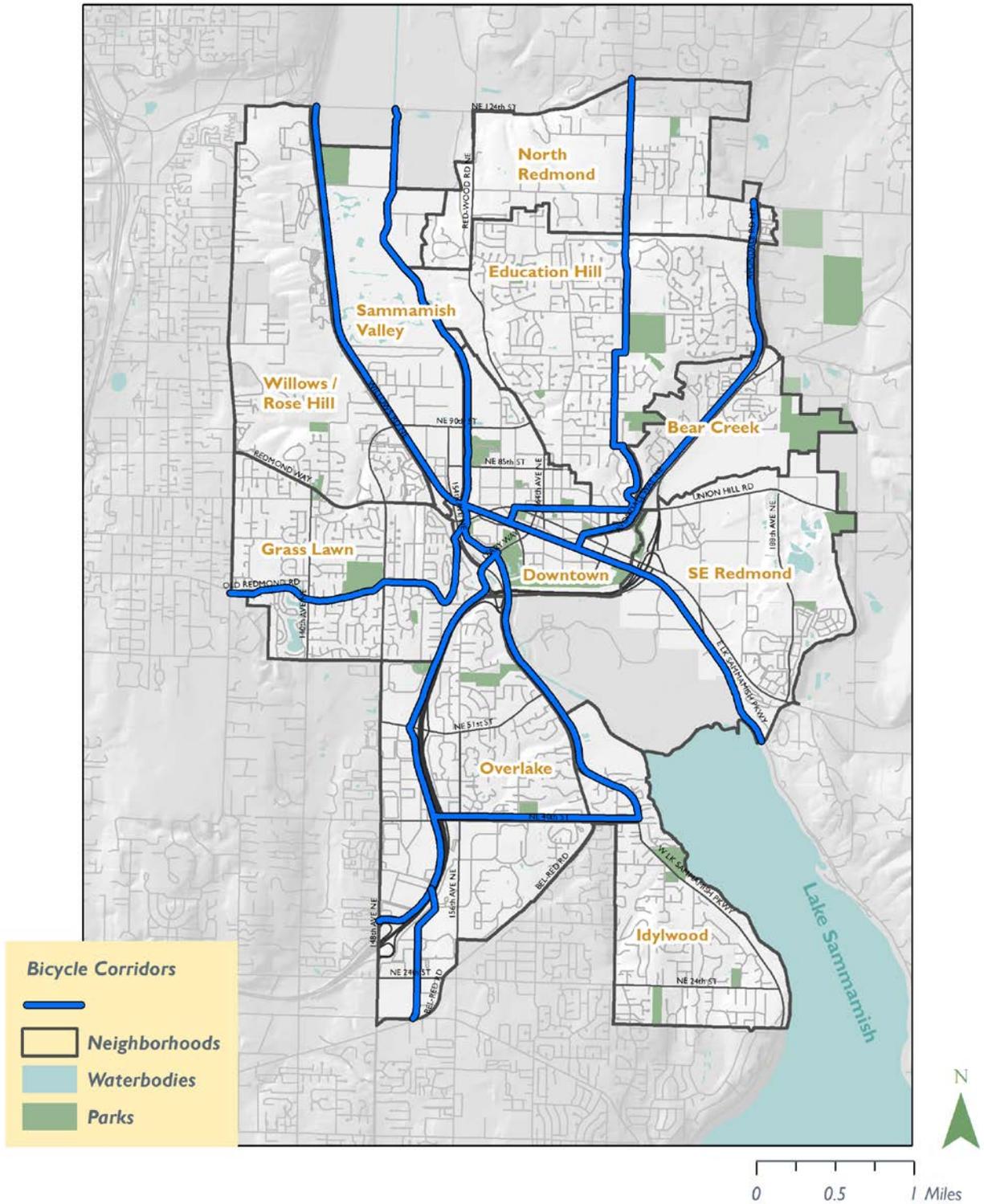


Figure 6. Bicycle “Spine Network” Map.

- Paved, Shared-Use Paths. These are independent of the street network, providing significant physical separation from vehicles.

- Cycle Tracks. These are integrated into streets, but provide physical separation from automobiles and can be particularly effective when vehicle speeds and/or volumes are high.
- Greenway/Bicycle Boulevard. These low-automobile-volume streets include bicycle-supportive traffic calming, keeping automobile speeds low to ensure a safe, comfortable mixing of bicycles and automobiles.

High comfort facilities will provide positioning guidance for bicycles up to the stop bar at intersections, with a priority for a dedicated zone up to the stop bar. Bicycle treatments through an intersection (see Figure 7 below) are recommended in order to best position bicycles and automobiles through an intersection, reducing conflicts with drivers and providing bicyclists with a safe and comfortable experience. Appendix F includes detailed design guidance for corridor (Table 4: Tier 1 High Comfort Bicycle Facilities) and intersection bicycle facilities (Table 7: Intersection Bicycle Facilities).



Figure 7. Intersection treatment. Image source: NACTO.

The Bicycle System Map details bicycle corridor facilities that will be built with City capital improvements and/or conditioned on adjacent development. These include specific high comfort facilities where currently considered feasible and two other tiers of bicycle facilities: standard and guidance bicycle facilities.

Dense Bicycle Facilities Network Connected to Key Destinations

Standard bicycle facilities complete a dense bicycle network that connects to destinations like offices, homes, schools, restaurants, and parks citywide. These facilities ensure route directness and also act as feeder facilities for high comfort bicycle facilities. Standard facilities provide a designated space for bicyclists in the street corridor, but without physical separation from automobiles. The typical standard along a corridor bicycle facility is the bicycle lane. As bicyclists continue along a corridor and approach intersections, standard bicycle facilities should provide continued guidance up to intersection stop bars. Appendix F, Table 5: Tier 2 Standard Bicycle Facilities includes detailed design guidance.

At the lowest tier, guidance facilities are street treatments that help position bicyclists in shared lanes with automobiles and/or provide guidance on how to proceed forward. Shared lane markings, also called

“sharrows,” are typical guidance facilities. Appendix F, Table 6: Tier 3 Guidance Bicycle Facilities provides further design guidance.

Supporting Programs and Facilities

To succeed at increasing bicycle ridership, bicycle facility improvements need supporting programs that provide access to bicycles and educate and encourage the general public to get out and travel by bike.

Bicycle Parking

Bicycle parking and storage is a necessary component of the Bicycle System Plan to make cycling an attractive transportation option. Bicycle parking that meets both short-term and long-term bicycle parking needs is also necessary to support biking in Redmond. Short-term parking allows a bicyclist to find a parking spot quickly for fast stops such as shopping or buying lunch. It needs to be located as close as possible to building entrances in a visible location. Weather protection for short-term parking is appreciated by bicyclists, but is not a necessity.

Long-term bicycle parking provides a place to store a bicycle while at work or at home. Security, such as bicycle cages with access limited by a key, is paramount for successful long-term bicycle parking. Since bicycles will be parked for a long time, weather protection is preferred.

City capital projects and programs will install bicycle parking, but the bulk of new short-term and long-term bicycle parking will be provided by new development. Bicycles will also access light rail in high numbers if enough secure long-term bicycle parking stalls are provided supporting light rail ridership.

Bike Share

“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. Bikes are available on demand to provide fast and easy access for short trips.” (from pugetsoundbikeshare.org homepage)

Redmond is a charter member of the Puget Sound Bike Share, which is a partnership of cities, agencies, and businesses within King County. The vision is to provide residents, employees, and visitors access to a low-cost, flexible, and convenient transportation alternative with economic, social, and environmental benefits to Redmond and the region. The first installations will be installed in Seattle in 2014. In Redmond, bike sharing will be provided in the two urban centers, beginning as soon as 2015, and at future light rail stations

Bike share systems exist in over 200 cities worldwide, with over 30 systems in North America including Boston, Denver, and Chicago. These systems have been successful in increasing bicycle mode split by making bicycling more convenient and encouraging an abundance of bicycle trips throughout the day. Shared bicycles also act as an extension of transit trips, providing important last mile connections that make alternative transportation trips more successful. Lastly, bicycle share programs provide a great opportunity for recreational bicyclists to try out utilitarian bicycling.

Education and Encouragement

Many residents and employees have simply never tried bicycling for utilitarian transportation trips, and could benefit from both education and encouragement to try utilitarian bicycling for the first time. Education on how to ride a bicycle on all facility types will also help new bicyclists ride safely and confidently. Campaigns, classes, events, and promotions will help educate and encourage citizens and employees to consider bicycles for transportation as well as recreation trips. This will also create a self-sustaining program, as more cycling

advocates are willing to educate their friends, family, and coworkers about how to ride safely day and night throughout the year and to encourage them to get out and try bicycling.

Bicycle Wayfinding

Bicycle wayfinding signage along with internet applications will be implemented to help guide users through the bicycle network in a safe, efficient manner. While many residents and employees have a mental map of the automobile network, they do not have a similar sense of the available bicycle network. This increases fear that traveling by bicycle is challenging and confusing. Wayfinding signage will help bicyclists navigate the bicycle network and ensure that bicyclists riding Redmond's network for the first time are directed to travel on the safest and most direct routes to their destination.

Prioritizing Investments to Increase Biking in Redmond

Redmond will invest in bicycling infrastructure through City capital investments, Redmond's Bicycle Program, grants, partner agencies, and private entities. City capital investments, partner agencies, and private entities will build bicycle improvements in the vicinity of specific projects or new development. The Bicycle Program will prioritize investments and leverage grants based on completion of the spine network, significant gaps and "bottlenecks" that create particularly unsafe situations, and feeder connections with the highest anticipated bicycle ridership. In addition, education and encouragement will be a relatively small, but important investment to increase bicycle ridership. The performance monitoring chapter outlines how investments into bicycling will be measured in terms of increased bicycle ridership and completion of the Bicycle System Plan.

Implementation

The bicycle system will continue to evolve into the envisioned plan that provides:

- 1) A complete, connected spine network of safe high comfort cycling facilities;
- 2) A dense, connected network of on-street facilities; and
- 3) Abundant access to bicycles through supporting programs and facilities.

This evolution requires a number of steps. The first is Three-Year Action Plan item 13: Bicycle Facilities Design Manual Update which will review and update standards for high comfort facilities like cycle tracks and intersection treatments. The updated standards will then be applied to the design of future facilities to implement the bicycle plan:

- TFP Projects
Improve bicycle infrastructure per updated Bicycle Facilities Design Manual when TFP projects are constructed on the bicycle system (see bicycle system map below)
 - Key projects identified on the TFP include:
 - Redmond Central Connector Phase II
 - West Lake Sammamish Parkway Widening & Roundabout Phase 1
 - SR 520 Trail Grade Separation at NE 40th Street
 - Overlake Village Ped & Bike Bridge (partnership with Sound Transit)
 - NE 40th Street Pedestrian and Bike Improvements from 520 to BRR
 - SR 520 Trail Grade Separation at NE 51st Street
 - NE 116th Street and 172nd Avenue NE Roundabout
 - Union Hill Phase III Widening
 - 166th Avenue NE Rechannelization
 - NE 116th Street Widening Phase I

- Private Investment

New developments will upgrade bicycle infrastructure per updated Bicycle Facilities Design Manual when development projects are constructed on the bicycle system (see bicycle system map below).

Key projects identified on the TFP include:

- 152nd Avenue NE Main Street – Phase 1 (East)
- 152nd Avenue NE Main Street – Phase 2 (PSBS and Between NE 24th Street and NE 31st Street)
- Overlake Transit Center Ped & Bike Bridge (ST)
- NE 27th Street/NE 28th Street New Connection
- NE 73rd Street Extension
- NE 80th Street Trail Connection
- 150th Avenue NE and NE 51st Street Traffic Signal

- Bicycle Program

Invest in high priority bicycle facilities and supporting programs, particularly high comfort facilities, that fill in the gaps in the bicycle system (see bicycle system map below) that are unlikely to be completed by TFP projects or private investment.

Key projects are likely to include cycle tracks (or other high comfort facility as identified in Action Plan item 12) Avondale Road Bicycle Facilities Study) on Avondale Road, high comfort facilities linking Education Hill to Downtown, extending the Puget Sound Energy Trail west up to NE 93rd Court, and new intersection treatments. Near-term improvements include a bicycle wayfinding system as guided by action plan item 7) Wayfinding Standards for Cyclists and Pedestrians.

Work with Puget Sound Bike Share to implement bike sharing in Redmond.

- Transportation Demand Management Program

Encourage employees and community members to bicycle instead of driving.

