



# *Trail Master Plan* **Bremerton Port Washington Trail**

City of Bremerton  
*October 2005*

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**Bremerton Port  
Washington Trail**  
*Trail Master Plan*

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City of Bremerton

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October 2005

# Trail Master Plan

## Bremerton Port Washington Trail



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# Trail Master Plan

## Bremerton Port Washington Trail



### 1 Executive Summary

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First and foremost, a great street should help make community: should facilitate people acting and interacting to achieve in concert what they might not achieve alone . . . A great street should be a most desirable place to be, to spend time, to live, to play, to work, at the same time that is markedly contributes to what a city should be. Streets are settings for activities that bring people together.

Allan B. Jacobs, *Great Streets*.

Buildings, houses, and parks, are the building blocks of cities. But what ties the building blocks together, creates neighborhoods and districts, and creates a sense of place, is the street network. And yet streets are more than a way to get from one point to another – they are the elemental open space of any city, with the potential to be linear parks that connect neighborhoods, commercial districts, schools, parks and other important destinations.

This project grew out of a desire to create a more interconnected, pedestrian-friendly, livable Bremerton, by creating an urban trail from the City's street network. The original concept was to create a loop around the City that crossed the Port Washington Narrows. The trail route was developed to link downtown, neighborhoods, business and arts districts, civic, community, and recreational facilities, and a number of the City's parks. Because the route parallels the Port Washington Narrows, the trail takes advantage of mountain, City, and water views, and provides the potential for the development of several new open spaces and viewpoints all along the route.

The roughly 3.5 mile Bremerton Port Washington Trail will provide many benefits to the City's residents.

The trail will:

- optimize the transportation function of the City's streets by creating a safer, more aesthetically pleasing and convenient environment for pedestrians, bicyclists, and other non-motorized users
- create new recreational opportunities for pedestrians, bicyclists, and users of the City's parks and open spaces
- provide increased access to the downtown and Manette Business and Arts districts, as well as the Highland, Evergreen, Olympic, Sheridan, Harrison Hospital and East Park neighborhoods
- provide access to Olympic College, Harrison Hospital, Sheridan Park Community Center, the recreational facilities in East Park, and Mosquito Fleet Trail.

In essence, the Port Washington Trail will create a transportation and recreational amenity that will enhance the livability and economic vitality of West and East Bremerton as they grow and change.



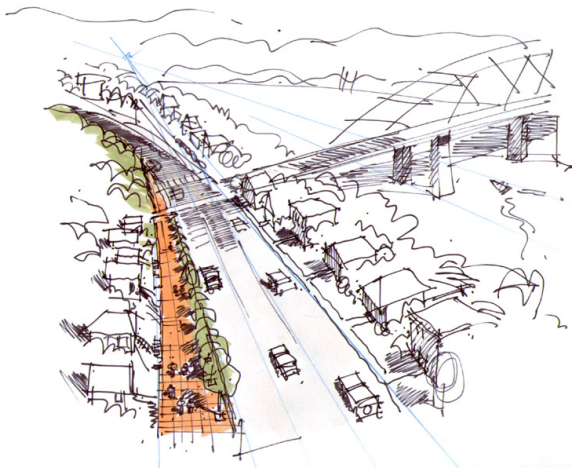
# Trail Master Plan

## Bremerton Port Washington Trail

### 2 Overview

The Bremerton Port Washington Trail is planned as a continuous loop route through central and east Bremerton dedicated to cyclists, pedestrians and other non-motorized users. It will provide access to Bremerton's civic and recreational facilities as well as scenic and natural resources, using existing public rights-of-way.

Running approximately 3.5 miles in length, the trail will connect the downtown central business and arts district, the Highland, Evergreen, Olympic, Sheridan, Harrison Hospital, and East Park neighborhoods, Manette Business and Arts District, as well as important destinations – civic, public, recreation, transit, and community facilities throughout Bremerton.



The trail route parallels the Port Washington Narrows on both the east and west sides of Bremerton, crossing the Warren Avenue Bridge at the north and Manette Bridge at the south. The setting for the trail varies throughout the route from urban to residential to commercial; it passes through existing and planned parks and viewpoints, and provides mountain, City, and water views at various points along the route.

The trail will have a consistent, identifiable character throughout, but will adapt to the individual character and conditions of each district or neighborhood along the route. The trail will therefore be made up of a combination of segments of multi-use path, widened sidewalks, bike lanes, and shared use roadway.

#### Destinations linked by the trail

- Bremerton Harborside development, including the Kitsap Conference Center, Naval Museum, U.S.S. Turner Joy, etc.
- Washington State Ferry Terminal and Bremerton Transportation Center
- Puget Sound Naval Shipyard
- Norm Dicks Government Center and Old City Hall
- Olympic College
- Harrison Memorial Hospital
- Sheridan Park Community Center
- Bremerton Ice Arena
- Kitsap Family YMCA
- Glen Jarstad Aquatic Center
- Future Bremerton Skate Park
- Mosquito Fleet Trail

#### Parks linked by the trail

- Louis Mentor Boardwalk
- City Hall Park
- Evergreen Park
- Smith Playfield
- Roto Vista and Lower Roto Vista Parks
- Lent Landing and Lions Park
- Sheridan Park
- East Park and East Park Nature Area
- Viewpoints on Wheaton Way near Homer Jones Drive
- Domstad Park
- Plus several neighborhood parks and viewpoints planned by the City



### 3 Existing Conditions

A reconnaissance of the city's streets was a first step in the development of the trail master plan. Existing conditions on arterial and residential streets, as well as other rights-of-way along the potential route helped determine the final route selection. Constraints and opportunities that influenced the selection of the route included:

- directness of route
- available right-of-way
- character and configuration of the street
- traffic volumes and speeds
- ability to make safe street crossings
- potential for views
- potential for additional connections and spur routes
- potential effects on the neighborhood or district
- quality of the trail experience.

These elements also helped determine the range of possibility for how the trail will look.

Most of the trail route is along city streets that are currently accessible to pedestrians via sidewalks. However, many of the sidewalks are narrow, "curbside" walks that lack visual or physical buffers from vehicular lanes. Some are discontinuous. There are no dedicated bike lanes along the route, though a few streets are designated as shared use roadways. Few of the crosswalks are marked, and only two major intersections along the route are signalized. Overall, the route is lacking in the design details and amenities that encourage walking and cycling.

Figure 1 shows an aerial photograph of the site area overlaid with the trail route, along with photos illustrating existing conditions along each part of the route. Conditions along these streets and trail segments are described in Table 1.



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**Bremerton Port Washington Trail**  
*Figure 1. Existing Conditions*

<b>Table 1. EXISTING CONDITIONS AND STREET CROSS-SECTIONS</b>		
<b>Street/ Route Segment</b>	<b>General Character</b>	<b>Existing Street Cross-section</b>
<b>Burwell Street</b> <i>Boardwalk to Washington Avenue</i>	Waterfront street end, central business district (CBD)	Parking lot
<b>Washington Avenue</b> <i>Burwell to 6th Street</i>	Urban arterial – CBD	4 travel lanes, wide curbside sidewalks both sides, street trees
<b>Washington Avenue</b> <i>6th Street and Manette Bridge</i>	Urban arterial – transitioning to residential	4 travel lanes, separated by retaining wall, SB lanes higher than NB lanes. Staircases up to home on west side and 3 garage/driveways. Narrow curbside sidewalk on east side. Utility poles in sidewalk.
<b>11th Street</b> <i>Manette Bridge to Pacific Avenue</i>	Arterial	Divided arterial with varying width paved median. 4 travel lanes, curving road, narrow curbside sidewalks (east side narrower), utility poles in sidewalk.
<b>Pacific Avenue</b> <i>11th Street to 13th Street</i>	Arterial	2 travel lanes, 2 parking lanes, sidewalks and narrow planting strips on both sides. Utility poles in planting strips.
<b>Park Avenue</b> <i>Park Drive to north end</i>	Arterial	2 travel lanes, sidewalks and planting strips both sides, utility poles in planting strip, some street trees, parking on west side only
<b>17th Street</b> <i>Park Dr to Elizabeth Avenue</i>	Arterial	2 travel lanes, curbside sidewalk on north side, parking on south side only
<b>Evergreen Park</b>		8' asphalt paths through park
<b>Elizabeth Avenue</b> <i>17th Street to north end</i>	Local street	2 travel lanes, curbside sidewalk and parking both sides
<b>Shoreline right-of-way</b> <i>North end Park Avenue to Lower Roto Vista Park</i>	Public shoreline/ right-of-way	Narrow strip of land separated from Park Avenue Condos by fence. Steep rip-rap bank below, narrow clearance at each end (driveway entrance and end of parking lot)
<b>Warren Avenue Bridge Crossing</b>	Arterial	4 travel lanes with raised median, 5' raised walks each side, separated with low wall
<b>Warren Avenue Bridge</b> <i>Right-of-way slope</i>	Unused right-of-way, NE side	Vegetated right-of-way slopes from bridge embankment down to east as well as north to south. Existing stairway from north end of bridge structure down to Lebo Boulevard for pedestrian access
<b>Lebo Boulevard</b> <i>Along Sheridan Park</i>	Arterial	2 travel lanes, parallel parking north side, parking and narrow rolled curbside sidewalks each side
<b>Campbell Way</b> <i>Lebo Boulevard to Wheaton Way</i>	Arterial	2 travel lanes, parking each side, no sidewalks, curbs and gutters except in front of new town homes
<b>Wheaton Way</b> <i>Campbell Way to East Park</i>	Arterial	2 travel lanes and occasional turn pocket, curbside sidewalks both sides, SB bike lane, west side. Buildings on south side set back minimally, parking lots on north side, utility poles beyond sidewalks
<b>Wheaton Way</b> <i>East Park to Mt. View Road</i>	Arterial	2 travel lanes and SB bike lane, west side. Curbside sidewalk east side. Multi-family residential west side.
<b>Wheaton Way</b> <i>Mt. View Road to Manette Bridge</i>	Arterial	2 travel lanes, narrow curbside sidewalks, both sides
<b>Manette Bridge</b>	Arterial	2 travel lanes, narrow curbside sidewalk, south side only





# Trail Master Plan

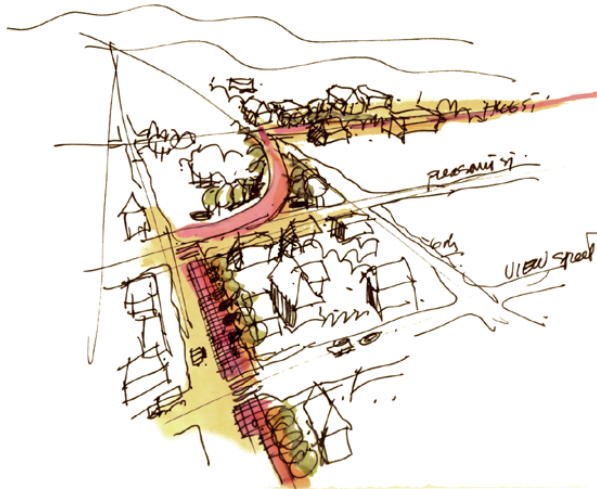
## Bremerton Port Washington Trail

### 4 Trail Master Plan

This section describes the defining elements of the trail:

- the trail route
- specific trail cross-sections for each segment of the route
- street modifications
- materials and details of the trail
- intersection treatments
- programs ideas for parks and viewpoint properties along the trail that have been identified for development and redevelopment.

The trail route is the framework, and the policy and design details described here in regard to the trail’s function and form are the textural details that will give the trail its look, feel, and character. The trail master plan identifies and describes each of these details.



### 4.1 Trail Master Plan

#### Trail Route

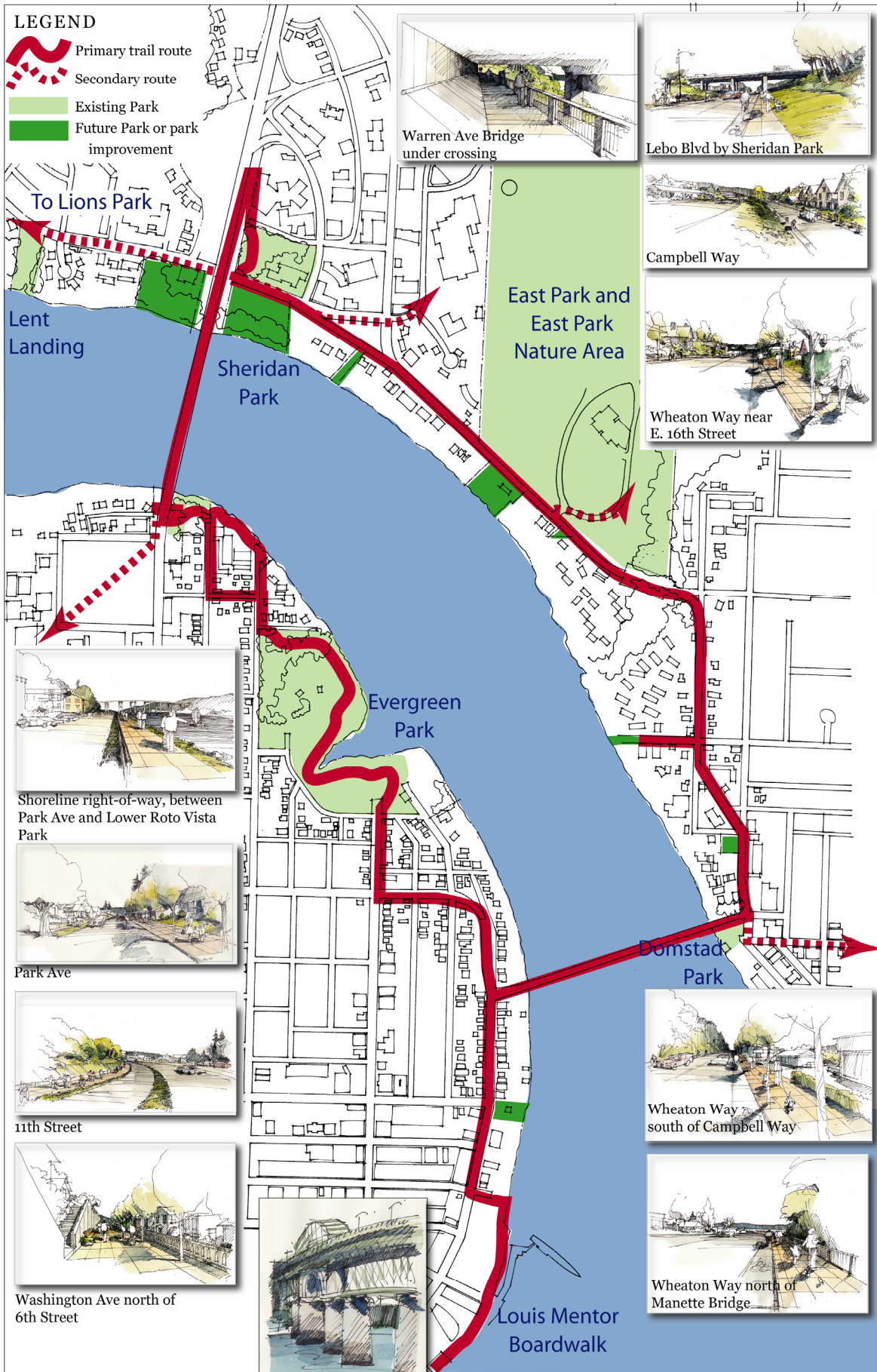
Figure 2 shows the trail route. The trail begins downtown at the Louis Mentor Boardwalk and proceeds north to Burwell Street. From Burwell it continues north and west along Washington Avenue as it turns into 11<sup>th</sup> Street, and then turns north onto Pacific Avenue to Evergreen Park.

From Evergreen Park, the trail proceeds along Park Avenue, with the pedestrian route following the shoreline to Lower Roto Vista Park, then up the existing stairs to the end of Elizabeth Avenue. The bicycle route follows 17<sup>th</sup> Street west and Elizabeth Avenue north toward the Warren Avenue Bridge. From that point, trail users can continue west under the bridge, parallel to the shoreline, or continue north onto the bridge, across the Port Washington Narrows.

Once across the bridge, the trail comes down along the east side of the bridge through upper Sheridan Park to Lebo Boulevard and then proceeds southeasterly along Campbell Way, and Wheaton Way south to the Manette Bridge.

The trail connects to the following destinations via spur routes:

- Olympic College—via an under-crossing of the Warren Avenue Bridge and an extension of the pedestrian walkway through the main parking lot
- Harrison Memorial Hospital—via shared used roadway and sidewalks east along Lebo Boulevard across the Wheaton Way Spur
- Lent Landing and Lions Park—via bike lanes and sidewalks on Lebo Boulevard west of the Warren Avenue Bridge.



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**Bremerton Port Washington Trail**  
*Figure 2. Trail Master Plan*



# Trail Master Plan

## Bremerton Port Washington Trail

### 4.2 Trail Master Plan

#### Trail Cross-sections

The ideal trail cross-section is one that:

- is wide enough to accommodate all users and will minimize conflicts between users
- provides a physical separation from vehicular traffic for safety
- provides a visual or perceptual buffer from vehicular traffic for comfort.

Because conditions along the route vary from neighborhood to neighborhood and street to street, a set of standard cross-sections was developed to serve as a guideline for trail configuration and width, so that the trail is safe, comfortable, and convenient to use. The standards are based on four typical conditions found throughout the route:

- urban arterial streets
- local or residential streets
- multi-use paths, and
- bridges.

The cross-sections were developed based on standards from the following references:

- *Design Manual, Section 1020, Bicycle Facilities*, WSDOT, 2001.
- *Guide for the Development of Bicycle Facilities*, AASHTO, 1999.
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, AASHTO, 2004.
- *Pedestrian Facilities Guidebook: Incorporating Pedestrians into Washington's Transportation System*, WSDOT, 1997.
- *Kitsap County Bicycle Facilities Design Plan*, Kitsap County Department of Public Works, 2000.

The standard cross-sections, listed in Table 2, also ensure a consistent trail character throughout the route while allowing for adaptation to site-specific conditions, such as the character of the neighborhood or district, scale of the street, available right-of-way, and protection of natural, scenic, or historic resources.



Multi-use path  
From: [www.pedbikeimages.org/](http://www.pedbikeimages.org/)Dan Burden



Bicycle lanes  
From: [www.pedbikeimages.org/](http://www.pedbikeimages.org/)Dan Burden



Shared use roadway  
From: [www.pedbikeimages.org/](http://www.pedbikeimages.org/)Michael King

# Trail Master Plan

## Bremerton Port Washington Trail



Multi-use path  
From: [www.pedbikeimages.org/](http://www.pedbikeimages.org/) Dan Burden

Table 3 describes each trail segment, cross-section type, cross-section description, adaptations, and required street modifications. The accompanying drawings illustrate how these cross-sections will look.

### Types of Bicycle and Pedestrian Facilities

**Bicycle lanes**—A portion of a highway or street identified by signs and/or pavement markings and reserved for bicycle use (from WSDOT Design Manual).

**Multi-use path or trail** (also called shared use path or trail) — A facility on exclusive right-of-way with minimal cross flow by motor vehicles. It is designed and built primarily for use by bicycles but is also used by pedestrians, joggers, skaters, wheelchair users (both non-motorized and motorized), and others (from WSDOT Design Manual).

**Pedestrian corridor**—a wide sidewalk or path intended primarily for pedestrians.

**Shared use roadway**—A roadway that is open to both bicycle and motor vehicle travel. Shared roadways do not have dedicated facilities for bicycle travel (from WSDOT Design Manual).

Condition	Preferred Cross-section	Acceptable Minimum
<b>Type I Urban</b> Downtown/urban streets	12' walk , 5' bike lanes each direction, street trees with grates 25' on center	10' walk, shared used roadway
<b>Type II Urban</b> Collector and arterial streets right-of-way width over 40'	8' walks, 5' bike lanes each direction, street trees with grates 40' on center, average	6' walks, shared use roadway
<b>Residential/Local</b> right-of-way under 40'	8' multi-use path, shared use roadway, street trees with grates where possible	6' multi-use path, shared use roadway
<b>Multi-use path</b> Separate or outside street right-of-way	12' multi-use path, 5' min. separation from vehicular traffic	10' multi-use path, 5' min. separation from vehicular traffic
<b>Bridges</b>	6' paths, 5' bike lanes each direction	

**Table 3. TRAIL CROSS-SECTIONS**

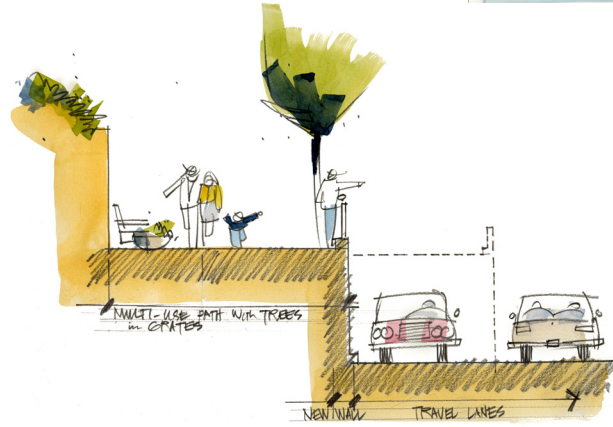
Street and blocks	Est. ROW width	Type	Cross-section description	Side of street	Approx Length	Street modifications
<b>Washington Ave.</b> Burwell to 6th Street	70'	Type I Urban	12' pedestrian corridor with trees and grates, shared use roadway	E	1100'	Widen existing sidewalk, add roadway signage
<b>Washington Ave.</b> 6th Street to Manette Bridge	65'	Type II Urban	12' multi-use path with trees and grates	W	700'	Move retaining wall, eliminate 1 SB lane, expand existing sidewalk
<b>11th Street</b> Manette Bridge to Pacific Ave	varies	Type II Urban	12' multi-use path with trees and grates, 5' separation	W	130'	Widen existing sidewalk, add 5' separation
<b>Pacific Avenue</b> 11th to 13th Streets	70'	Type II Urban	8' walk, trees and grates, shared use roadway	E	550'	Widen existing sidewalk, eliminate parking on E side, add roadway signage
<b>Evergreen Park</b>	N/A	Multi-use	12' multi-use path	N/A	2100'	Widen existing path
<b>Park Avenue</b> Park Drive to north end	60'	Type II Urban	8' walk, trees and grates, shared use roadway	E	600'	Widen existing sidewalk, add roadway signage
<b>Shoreline right-of-way</b> Park Ave to Lower Roto Vista Park	approx. 15'	Multi-use path	8' multi-use path	N/A	350'	Widen access points, pave path, add fencing
<b>17th Street and Elizabeth Avenue</b>	30/40'	Type II Urban, Local	8' walk, shared use roadway	N, E	350'	Widen existing sidewalk, add roadway signage
<b>Elizabeth Avenue</b> Property	N/A	Multi-use path	12' multi-use path	N/A	350'	Grade new alignment, possible retained slopes
<b>Warren Avenue Bridge</b> Under-crossing	200'	Multi-use path	10' multi-use path	N/A	100'	New structure on bridge foundation
<b>Warren Avenue Bridge</b> Crossing	200'	Bridge	8' walk	E	2400'	Widen existing walk with cantilever, coordination with WSDOT
<b>Warren Avenue Bridge</b> Right-of-way slope	200'	Multi-use path	10' multi-use path	NE	900'	Grade new alignment, possible retained slope
<b>Olympic College Connection</b>		Type II Urban	8' walk, shared use roadway; 12' walk in parking lot	W	500'	New walk, signage; extend exist. walk
<b>Lebo Boulevard</b> at Sheridan Park	85'	Type II Urban	8' walk (S side only) and 5' bike lanes	N & S	700'	New walk, add roadway signage
<b>Campbell Way</b> Lebo Boulevard to Wheaton Way	40'	Type II Urban	8' walk (S side only) and 5' bike lanes	N & S	700'	New walk, add roadway signage
<b>Wheaton Way</b> Campbell Way to Manette Bridge	40-60'	Type II Urban	8' walk (S side only) and 5' bike lanes	N & S	4160'	Add or expand existing sidewalk, stripe bike lanes
<b>Manette Bridge</b>	100'	Bridge	6' walks and 5' bike lanes	E & W	1800'	Future bridge replacement, coordination with WSDOT

# Trail Master Plan

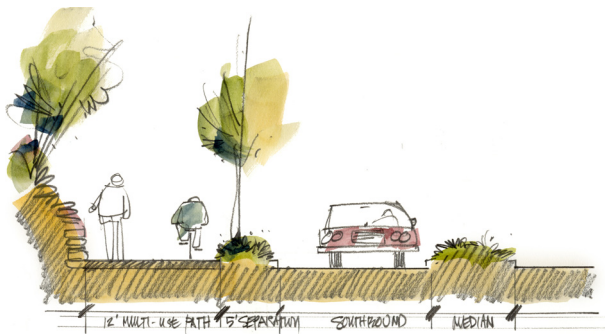
## Bremerton Port Washington Trail



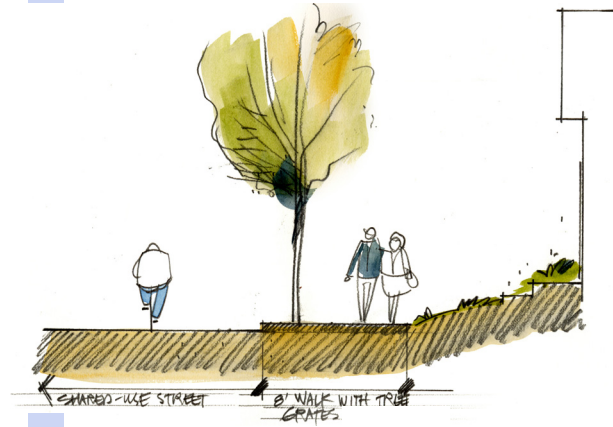
**1** **Washington Ave, looking north**  
*Burwell Street to 6th Street*



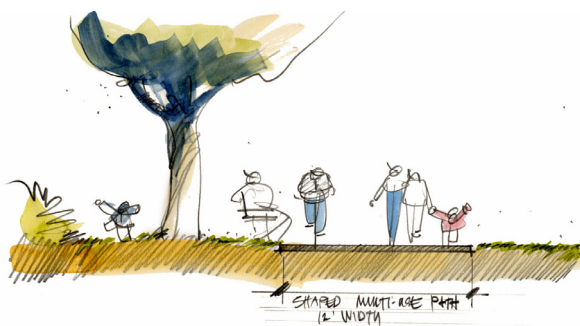
**2** **Washington Ave, looking north**  
*6th Street to Manette Bridge*



**3** **11th Street, looking north**  
*Manette Bridge to Pacific Avenue*



**4** **Pacific Avenue, looking north**  
*11th Street to 13th Street*



**5** **Multi-use Path**  
*Evergreen Park and Elizabeth Avenue Property*

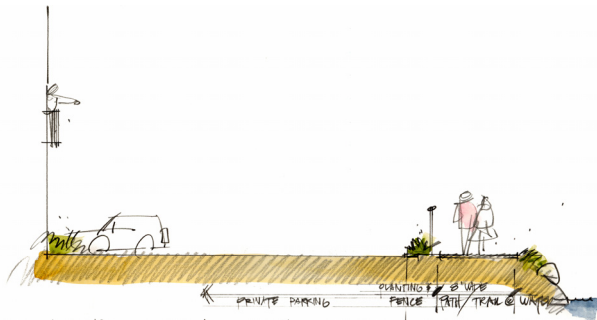


**6** **Type II Urban and Residential/Local**  
*Park Avenue, 17th Street and Elizabeth Avenue*

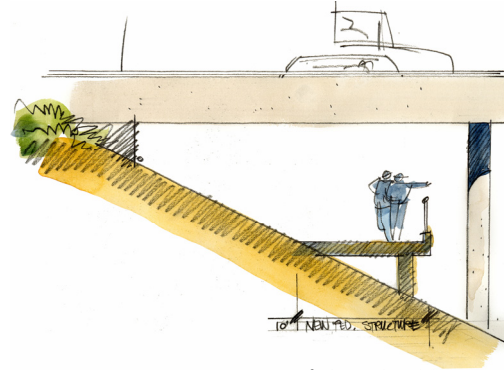


# Trail Master Plan

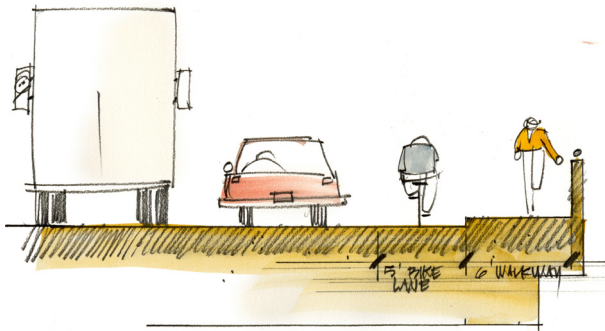
## Bremerton Port Washington Trail



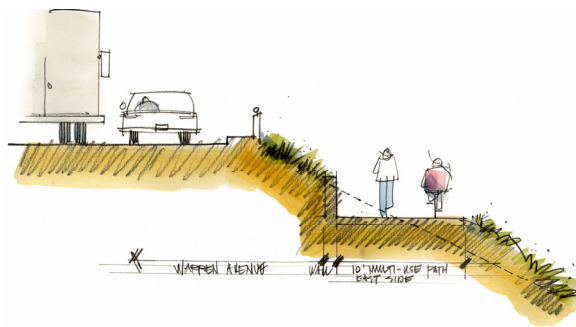
**7 Shoreline right-of-Way, looking north**  
*Park Drive to Lower Roto Vista Park*



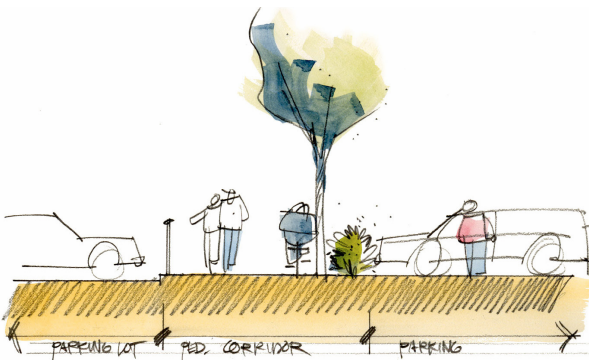
**8 Warren Avenue Bridge, looking west**  
*Under-crossing*



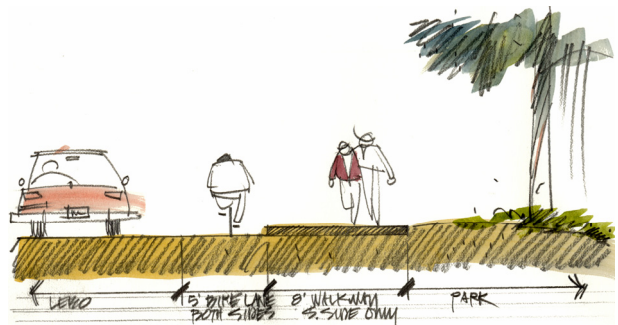
**9 Warren Ave Bridge, looking north**  
*Crossing*



**10 Warren Avenue Bridge, looking north**  
*Right-of-way slope*



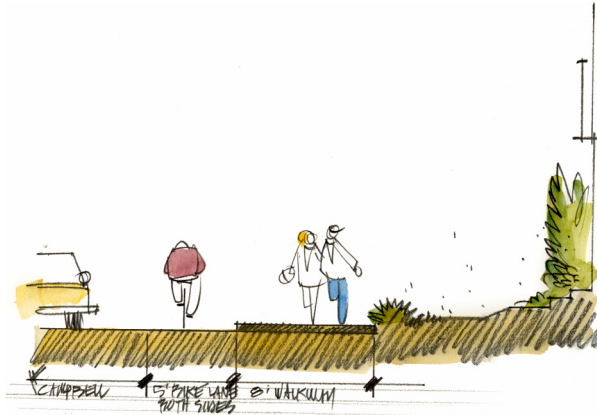
**11 Olympic College Connection**



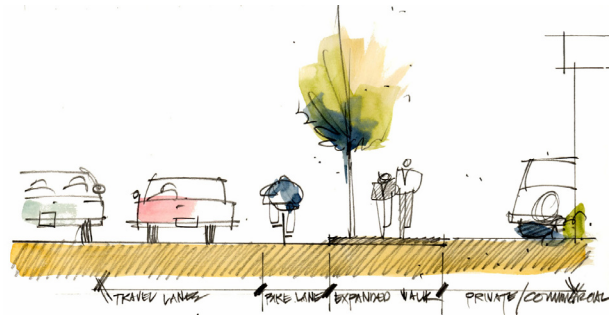
**12 Lebo Boulevard, looking east**  
*Along Sheridan Park*

# Trail Master Plan

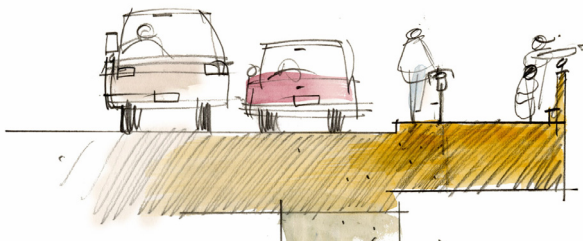
## Bremerton Port Washington Trail



**13 Campbell Way, looking east**  
*Lebo Boulevard to Wheaton Way*



**14 Wheaton Way, looking southeast**  
*Campbell Way to Manette Bridge*



**15 Manette Bridge, looking east**





## Bremerton Port Washington Trail

# Trail Master Plan

### 4.3 Trail Master Plan

#### Street modifications

As described in the existing conditions section, many of the streets along the trail route have limited space for pedestrians on the sidewalk, and no designated bicycle lanes or signage to encourage motorists' awareness of bicycles on the roadway or provide wayfinding for cyclists. Expanding and formalizing the designated space for non-motorized travel will establish a recognizable trail route and increase comfort and safety for cyclists and pedestrians, even though many of the streets are low-volume, low-speed streets.

On most streets throughout the route, the modifications will consist of widening and resurfacing existing sidewalks, thereby narrowing travel lanes, and installing signage for motorists and non-motorized users. Other streets and rights-of-way will require more extensive modifications to establish or accommodate the trail. These modifications are described in general terms below, and modifications specific to each trail segment are listed in Table 3.

#### Typical Street Modifications

##### Type I Urban trail cross-section

*Downtown/urban streets:*

*Washington Avenue*

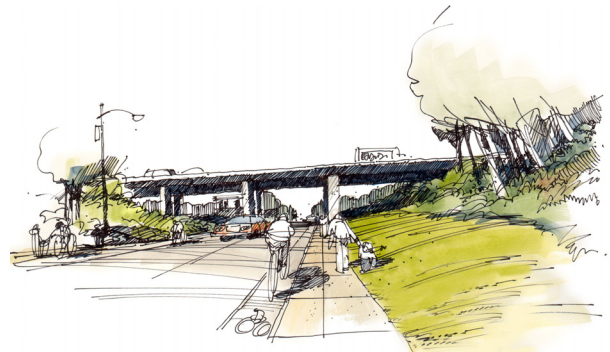
New pedestrian corridor, one side of street only, will require widened, resurfaced sidewalks and pavement marking or signage for shared use roadways, approximately every 1/4 miles (500m), at all turns and major signalized intersections.

##### Type II Urban trail cross-section

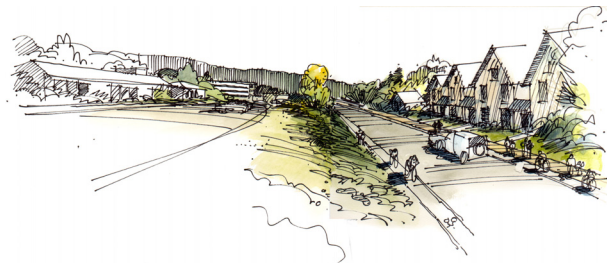
*Collector and arterial streets, right-of-way width over 40':*

*Pacific Avenue, Lebo Boulevard, Wheaton Way*

Widened, resurfaced sidewalk, one side of street only, and striped bicycle lanes or signage for shared use roadways.



*Lebo Boulevard by Sheridan Park*



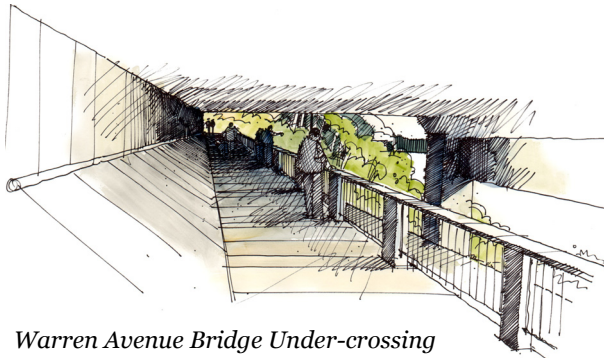
*Campbell Way*

# Trail Master Plan

## Bremerton Port Washington Trail



Park Avenue



Warren Avenue Bridge Under-crossing



11th Street



Washington Avenue north of 6th Street

### **Local/residential street cross-section**

*Right-of-way width under 40':*

*Park Avenue, 17<sup>th</sup> Street, Elizabeth Avenue, Campbell Way*

New pedestrian corridor, one side of street only, will require widened, resurfaced sidewalks and signage for shared use roadways .

### **Bridges**

*Warren Avenue Bridge crossing*

Future bridge expansion by WSDOT will include widened sidewalks and bike lanes on both sides.

*Warren Avenue Bridge under-crossing*

Multi-use trail perpendicular to bridge will require new structure on bridge foundation

*Warren Avenue Bridge right-of-way slope - between north touchdown of bridge and Lebo Boulevard*

Multi-use path along northeast side of bridge Right-of-way on retained slope, and into Sheridan Park to Lebo Boulevard.

*Manette Bridge*

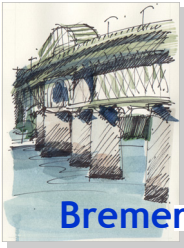
Future bridge replacement by WSDOT will include widened sidewalks and bike lanes on both sides.

### **Atypical Street Modifications and Multi-use Paths**

#### **Divided roadway**

*Washington Avenue and 11<sup>th</sup> Street*

Multi-use path on the west side of the roadway will be accommodated by moving retaining wall to west, reducing the width of the upper roadway to the trail footprint, relocating all vehicular travel lanes to the lower roadway, thereby eliminating one southbound travel lane.



# Trail Master Plan

## Bremerton Port Washington Trail

### Shoreline Right-of-way

*North end of Park Avenue to Lower Roto Vista Park*

Existing public right-of-way outside condominium fence will be paved, and access points at each end of path will be widened by redesigning condominium driveway and associated drainage feature. Fence will remain or be reinstalled at condominium property line. A second fence may be required at the top of the rip-rap bank for safety.



*Wheaton Way near E. 16th St*

### Elizabeth Avenue Property

*East of Roto Vista Park*

Multi-use trail on hillside to provide access to Warren Avenue Bridge under-crossing and access to Warren Avenue Bridge through Roto Vista Park, may require retained slope.



*Wheaton Way south of Campbell Way*



*Shoreline right-of-way, between Park Avenue and Lower Roto Vista Park*



*Wheaton Way north of Manette Bridge*

# Trail Master Plan

## Bremerton Port Washington Trail



### 4.4 Trail Master Plan

#### Details and Materials

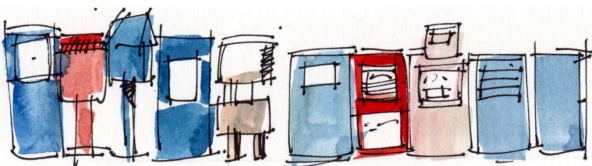
In addition to the street plane, a number of additional elements affect the experience of the trail user, and should be addressed at the design level.

The pedestrian zone will have a clear travel way, free from both horizontal and vertical obstructions. Resurfacing of existing sidewalks will provide opportunities to relocate,



redesign, or consolidate street elements like utility/light poles, newspaper boxes, signs, curb cuts, and driveways that can impede trail user movement and sight distance.

Selection of the trail's surfacing provides an excellent opportunity to create a recognizable



Example of a well-design sidewalk: clear pedestrian travel zone, well-placed pedestrian amenities, and special surfacing.

From: [www.pedbikeimages.org/Dan Burden](http://www.pedbikeimages.org/Dan_Burden)

pathway. In urban areas, such as downtown, the trail will be surfaced in unit pavers. The trail will surfaced in concrete with a distinctive scoring pattern in all other areas except off-road multi-use use paths, where it will be paved in asphalt.

Where the trail cross-section is wide enough to accommodate street trees, trees will be installed and protected with tree grates. Where appropriate, bicycle racks, benches, trash receptacles, informational kiosks, and other amenities can be installed to enhance the trail experience.

In addition, when subsequent street improvements are being made, the City should consider additional enhancements to increase trail user safety and comfort, especially for bicycles. Examples of such improvements include bicycle-safe drainage grates, bridge expansion joints, smooth pavements, and sight lines.



## Bremerton Port Washington Trail

# Trail Master Plan

### 4.5 Trail Master Plan Trail Crossings



Crossing enhancements include marked crosswalks, curb ramps, signage and signal timing adjustments. Standard crossing treatments are shown in Table 4.

Because this is an urban trail that follows a route primarily on city streets, safe street crossings are essential to making the trail a functional and desirable route for all trail users.

Most of the streets the trail crosses throughout its route are low-volume, low-speed streets, yet every crossing will be enhanced to increase safety, give greater priority to bicyclists and pedestrians, as well as to make the trail route more apparent.



Example of marked crosswalks to make trail route more apparent, curb cuts to make crossing accessible to all trail users.

From: [www.pedbikeimages.org/](http://www.pedbikeimages.org/) ITE Pedestrian Bicycle Council

Condition	Treatment
Local/side street crossings	Marked crosswalks and curb cuts, 6' wide or 10' in urban areas
Arterial crossing or trail alignment shift	Special crosswalk markings or surfacing, and curb cuts, 10' wide. At signalized intersections, automatic pedestrian signal

# Trail Master Plan

## Bremerton Port Washington Trail



### 4.6 Trail Master Plan

#### *Parks and Open Space*

One of the best features of the trail is the fact that it connects many of the City’s important parks and open spaces (see list on page 5). By linking these “jewels” with linear open space, even if not necessarily green open space, it will create an “Emerald Necklace,” in the Olmsted tradition of park and open space design. As such, the trail will provide wonderful recreational opportunities to and between the parks, not to mention fine scenic opportunities, with views of the mountains, City, and the Port Washington Narrows, particularly from East Bremerton.

In addition, a number of parks and publicly-owned properties along the trail route have been identified for redevelopment or development as parks, viewpoints, and public open space. The linkage of open spaces will dramatically increase the trail’s value as a



Sheridan Park Community Center

recreational route by providing direct access to recreational and community facilities as well as scenic and natural resources.

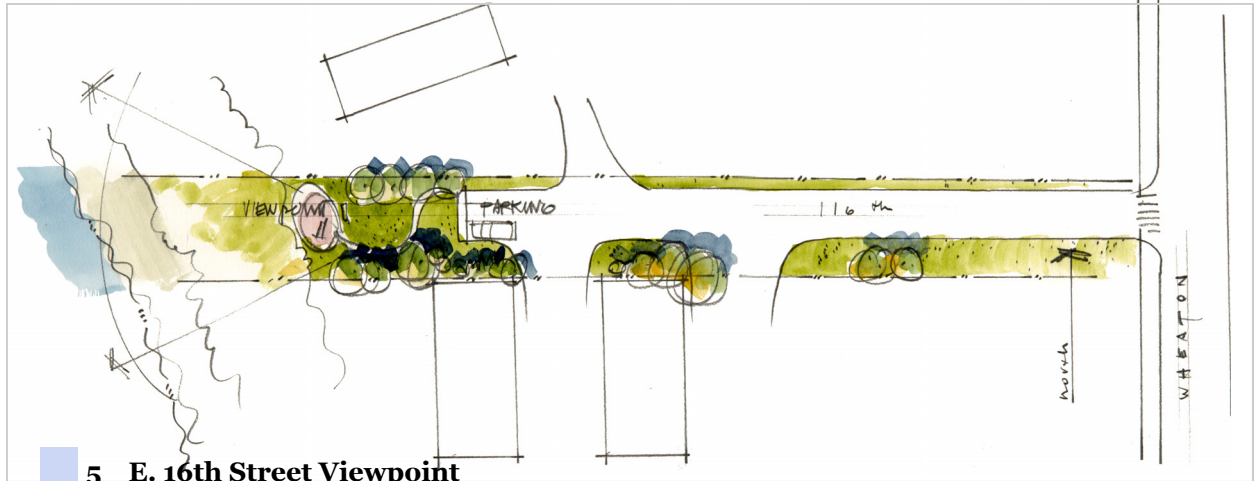
Table 5 describes these proposed open spaces, along with ideas for program elements for each site. The accompanying drawings illustrate these program concepts.

	<b>Site</b>	<b>Type of Open Space</b>	<b>Proposed Program Elements</b>
1	<b>6th Street Viewpoint</b> <i>6th Street and Washington Avenue</i>	Viewpoint	Parking, viewpoint
2	<b>Sheridan Park</b> Community Park and Complex <i>Campbell Way and Warren Avenue, including Theater site</i>	Community Park	Community center, future senior center, relocated park offices, parking, restrooms, pathways, play area, viewpoints, picnicking
3	<b>Campbell Way Viewpoint</b> <i>Vacant lot along south side of Campbell Way</i>	Viewpoint	Beach access, pathways, viewpoint
4	<b>Wheaton Way Viewpoint</b> <i>Wheaton Way north of Homer R. Jones Drive</i>	Viewpoint	Parking, viewpoint, pathways
5	<b>E. 16th Street Viewpoint</b> <i>E. 16th Street street end</i>	Viewpoint	Parking, viewpoint
6	<b>E. 13th Street Park</b> <i>E. 13th Street and Wheaton Way</i>	Neighborhood Park	Play area, picnic shelters, pathways, viewpoint



# Trail Master Plan

## Bremerton Port Washington Trail



### 5 E. 16th Street Viewpoint

E. 16th Street street end

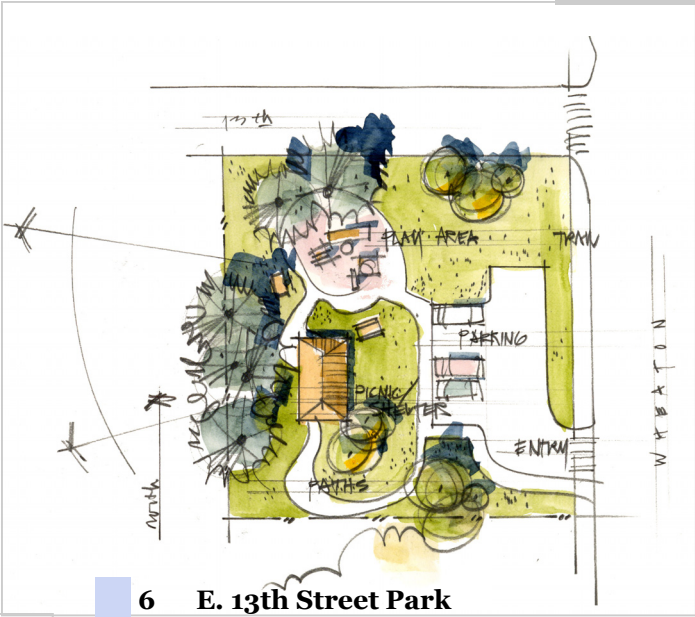
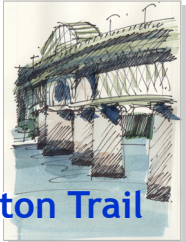


### 2 Sheridan Park

Community Park and Complex

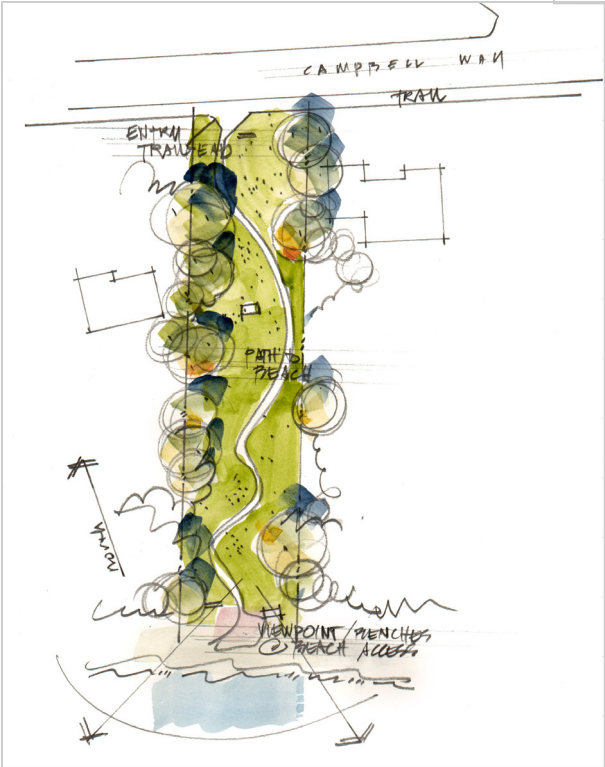
# Trail Master Plan

## Bremerton Port Washington Trail



### 6 E. 13th Street Park

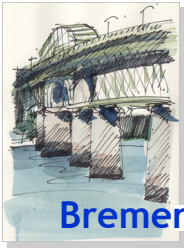
E. 13th Street and Wheaton Way



### 3 Campbell Way Viewpoint

Vacant lot south of Campbell Way





# Trail Master Plan

## Bremerton Port Washington Trail



### 1 6th Street Viewpoint

6th Street and Washington Avenue



### 4 Wheaton Way Viewpoint

Wheaton Way north of Homer R. Jones Drive



## 5 Cost Estimate

This planning-level cost estimate identifies the major cost elements associated with the development and construction of the trail.

Item	Unit	Cost
Mobilization @ 5%		\$276,897
Washington Street Reconstruction		800,000
Warren Avenue Bridge Under-crossing		90,000
Warren Avenue Bridge Crossing		950,000
General trail		
<i>Type I Urban Trail</i>	150 per LF	165,000
<i>Type II Urban Trail</i>	125 per LF	913,750
<i>Residential/local Trail</i>	120 per LF	162,000
<i>Separated multi-use Trail</i>	45 per LF	182,250
		1,423,000
Park development	LS	700,000
Signal modifications	LS	50,000
<b>SUBTOTAL</b>		<b>4,013,000</b>
Estimated contingency @15%		601,950
<b>SUBTOTAL</b>		<b>4,614,950</b>
Soft costs @ 20% (survey, design, permitting)		922,990
<b>DESIGN/CONSTRUCTION TOTAL</b>		<b>\$5,814,837</b>
<b>ACQUISITION</b>		<b>\$ 750,000</b>
<b>GRAND TOTAL</b>		<b>\$6,564,837</b>



## Bremerton Port Washington Trail

# Trail Master Plan

## 6 Acronyms

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AASHTO	American Association of State Highway and Transportation Officials
CBD	Central business district
EB	Eastbound
NB	Northbound
O.C.	On center
ROW	Right-of-way
SB	South Bound
WB	West Bound
WSDOT	Washington State Department of Transportation



## 7 Bibliography

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## Bremerton Port Washington Trail

# Trail Master Plan

## 8 Appendix

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Kitsap County Public Works. *Kitsap County Bicycle Facilities Plan*. Kitsap County:  
Department of Public Works, December 2000.  
Section 4: Design Standards

# KITSAP COUNTY BICYCLE FACILITIES PLAN



KITSAP COUNTY DEPARTMENT OF PUBLIC WORKS  
MAY 2001

## Design Standards

### Purpose

Safety is the primary consideration when designing bicycle facilities. If bicycle facilities do not offer safe and adequate biking conditions, the facilities will not be used and will not encourage greater use. It is the primary goal of this plan to establish standards to serve as a guide in the development of safe and adequate bicycle facilities for Kitsap County. These standards provide recommended base minimums and other information to aid in the development of new bicycle and pedestrian facilities as well as the improvement (increasing safety and usability) of existing facilities.

### Scope

The design guidelines set forth in this plan are based on those established by the American Association of State Highway and Transportation Officials (AASHTO) in “Guide for the Development of Bicycle Facilities” (1999). These design standards defer to AASHTO guidelines for information not covered herein, or for further clarification.

Facilities located within the right-of-way of any State Routes should defer to the standards set forth in the Washington State Department of Transportation’s (WSDOT) Design Manual, Section 1020, Facilities for Non-motorized Transportation. These standards defer to the Manual on Uniform Traffic Control Devices (MUTCD) for any additional information and guidance with signage and pavement markings.

The design guidelines set forth in this manual are not intended to be the sole solution to bicycle safety issues. In conjunction with any well-designed bicycle facilities it is important to include safety education and established “Rules of the Road”. Bicycle programs often provide this information to the public as well as maps indicating recommended safe bicycling routes.

### Definitions

The following definitions are from AASHTO’s “Guide for the Development of Bicycle Facilities” (p. 2-3)

1. **Bikeway:** A generic term for any road, street, path, or way which in some manner is specifically designated for bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.
2. **Bicycle Path or Bike Path (Shared Use Path):** A bikeway physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent right-of-way. Shared use paths may be pedestrians, skaters, wheelchair users, joggers and other non-motorized users.
3. **Bicycle Lane or Bike Lane:** A portion of a roadway which has been designated by striping, signing, and pavement markings for the preferential or exclusive use of bicyclists.
4. **Bicycle Route System:** A system of bikeways designated by the jurisdiction having authority with appropriate directional and informational route markers, with or without specific bicycle route numbers. Bike routes should establish a continuous routing, but may be a combination of any and all types of bikeways.
5. **Roadway:** The portion of the highway, including shoulders intended for vehicular use.
6. **Right-of-Way (R.O.W.):** A general term denoting land, property, or interest therein, usually in a strip, acquired for or devoted to transportation purposes.
7. **Right of Way:** The right of one vehicle or pedestrian to proceed in a lawful manner in preference to another vehicle or pedestrian.



8. Shared Roadway: A roadway which is open to both bicycle and motor vehicle travel. This may be an existing roadway, street with wide curb lanes, or road with paved shoulders.
9. Shoulder: The portion of the roadway contiguous with the traveled way for accommodation of stopped vehicles, for emergency use and for lateral support of sub-base, base and surface courses.
10. Sidewalk: The portion of a street or highway right-of-way designed for preferential or exclusive use by pedestrians.

### **BIKEWAYS AND THE SELECTION OF THE TYPE OF FACILITIES**

One of the main goals of a well designated facility is to avoid conflict between users and motor vehicles. To determine the appropriate design treatment, several factors should be considered, including the type of users the route is likely to serve, the type of roadway that is involved and the traffic characteristics (volume, speed, mix,

existence of parking, etc.)

The design standards discussed below are general in nature and apply to all types of bicycle facilities.

### **Surfacing Materials and Structural Section:**

Bicycle facilities, whether bicycle paths or bicycle lanes, should be paved surfaces. The quality and smoothness of the surface is essential to the safety of the bicyclist. The surfacing material and structural section should be designed so that the facility is capable of supporting maintenance and emergency vehicles. Recommended pavements are asphaltic concrete or Portland Cement. Asphaltic concrete pavement is generally preferred. In order to support maintenance and emergency vehicles the outside edges of pavement should be uniform. Asphaltic concrete surface pavement should be machine laid. If Portland Cement is used, it is preferred that the traverse joints be sawcut in order to provide a smooth surface. The surface should also be either broom or burlap finished (not troweled) in order to provide some skid resistance.



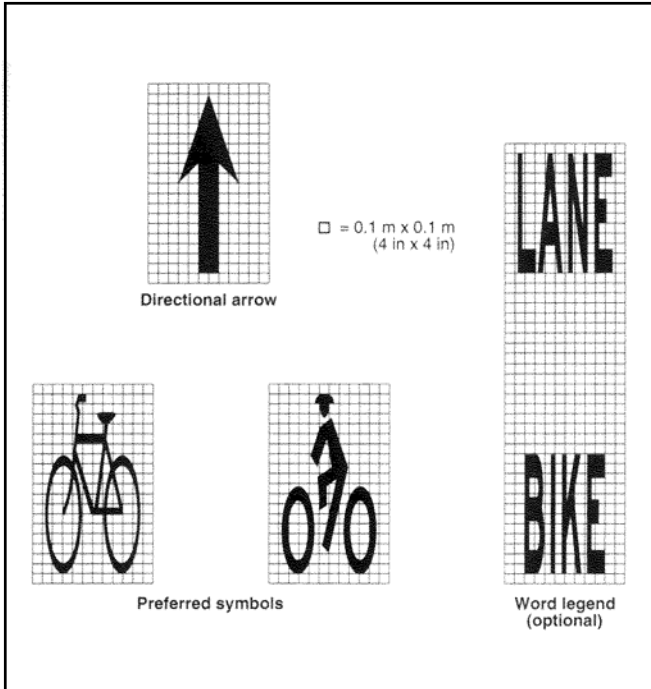


Figure 5.  
Typical Bike Lane symbols.

Loose material, gravel or debris on the travel lanes poses a hazardous situation to the bicyclist. If the bicycle facility crosses an unpaved driveway or road, the road should be paved on both sides of the bikeway in order to reduce gravel debris on the travel lanes.

**Signage and Striping:** There are three main types of signage to consider for bicycle facilities:

1. **Directional Signs:** Directional signs serve to guide the bicyclist (or motorist), indicating and informing the user of roadway crossings, directions, destinations and distances.
2. **Regulatory Signs:** Signs that inform bicycle facility users and motorists of traffic laws or regulations. These signs should be located where the regulation applies and should be easily legible and visible to facility users and/or motorists.

3. **Warning Signs:** Warning signs should be used when it is necessary to alert bicyclists or motorists of an existing or potentially hazardous condition. Warning signs should be located preceding the upcoming hazard. The use of warning signs should be kept to a minimum since the over use of these signs may promote disregard for all signs.

Appropriate and adequate signage and pavement marking is paramount to safe bicycling facilities. Separate guidelines for signage and pavement marking can be found in the MUTCD.

Additional signage and marking should be considered for a bicycle-only facility to prevent pedestrian and other non-motorized use.

**Drainage Grates:** Drainage grates and utility covers located in the travel lanes pose safety hazards for bicyclists. For bicycle lanes adjacent to curbs, curb inlets are recommended. For both



bicycle lanes and paths, if drainage grates or utilities cannot be located (or relocated) outside of the travel areas, the covers should be flush to 0.5 inches below finished grade. Grate openings that run parallel with the direction of travel may trap a bicycle wheel. Openings of drainage grates should be narrow and short enough so as to prevent a bicycle wheel from dropping into the grate.

**Barriers and Railings:** A physical barrier should be provided for a bicycle path if the minimum recommended separation width cannot be met and the motorized vehicle posted speed exceeds 35 mph. The barrier should be suitable for the situation and the intended use. Physical separations such as railings or barriers should be a minimum of 4.5 feet high and vertical surfaces should be smooth to avoid any snagging or prevent any abrasive injury. Smooth rub rails should be attached to the barriers (or railings) at handlebar height of 3.5 feet (See Figure 6).

**Barrier Posts (Bollards):** It is recommended that barrier posts be installed at entrances to bicycle paths in order to prevent unwanted motor vehicle use. The bollards should be designed to allow for emergency and maintenance vehicle access. A 5 foot spacing of posts should be provided (if more than one post is necessary) in order to allow bicyclists to readily pass. The bollards should be a minimum of 3 feet high and should be clearly marked and visible in daytime as well as nighttime conditions (by installing reflective tape, reflective paint or reflectors).

**Bridges:** Bicycle lanes are preferred when adding bicycle facilities to existing bridge structures. The minimum width recommended for a clear (one way) bicycle lane on a bridge is 6 feet. “It is desirable that the clear width on structures be equal to that of the approaching path including the 2 to 3 feet graded areas.” (WSDOT). Recommended vertical clearance is 10 feet.

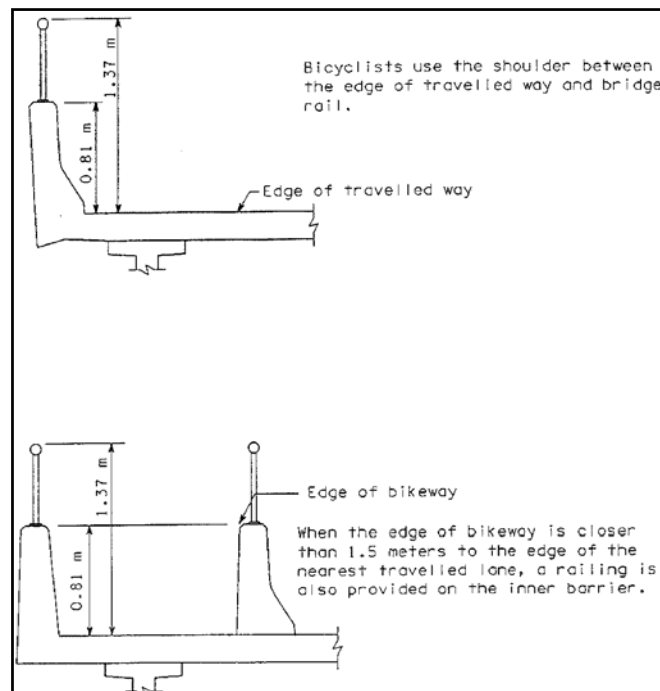


Figure 6.  
Bikeways on highway bridges.

...our highway transportation system is characterized by three basic modes of transportation: motor vehicles (including transit services), bicycles, and walking... Regardless of the source of funding for transportation improvements, all members of the public are entitled to use public thoroughfares by their choice of mode. Therefore, it is incumbent on transportation agencies to plan and design facilities accordingly.

Federal Highway Administration  
Publication  
FHWA-RD-92-073

Bicycle approaches to a bridge should be well designed and continuous with the bicycle bridge. The approach facility should maintain the same width as the bridge crossing and should be oriented with the direction of travel. Appropriate barriers and railings should be provided (See *Figure 6*). In addition, signage and lighting should be provided.

**Lighting:** Minimum lighting levels should be provided for bicyclists' safety. Typically the ambient light from roadway lighting provides sufficient light levels for bicycle facilities. The desired amount of light in foot candles depends on the expected amount of nighttime use. Areas where additional lighting should be considered are intersections (road crossings) and bridges or underpasses. The desirable level of illumination for these areas is between 0.5 foot-candle (5 lux) to 2 foot-candles (22 lux). Any additional light standards or fixtures should be appropriate to the scale of bicyclists and pedestrians, and should meet the required minimum vertical and horizontal clearances.

**Bicycle Parking:** Parking for bicycle users should be provided at destination areas such as ferry terminals, park-and-ride lots, schools, shopping areas, recreation areas, as well as public buildings, such as libraries and post offices. For locations where a bicycle may be parked for an extended length of time (8 hours or more) consideration should be given to bicycle lockers. Lockers provide greater security for the bicycle as well as protection from the elements.

Bicycle racks or lockers should be located in a highly visible area. They should not be in a location that will disrupt motorized or non-motorized traffic. Bicycle parking areas should be well signed if out of view or located away from the main entry to a facility. Adequate lighting should also be provided for safety purposes. If possible, bicycle parking should be located in an area that is protected from the weather.





Figure 7.  
Bicycle Path

## BICYCLE PATH

Bicycle paths are typically two-way facilities and may be either bicycle only or bicycle/pedestrian facilities. The following standards are intended to act as a guide for the development of safe bicycle paths. Typical cross-sections for bicycle paths are illustrated in *Figures 8a, 8b, and 8c*.

- **Traffic Volumes:** The following counts (from WSDOT) indicate a high volume traffic situation: Sixty bicycles per hour on a peak hour on a nice day = high volume. Twenty pedestrians per hour in peak hour condition indicated above = high volume traffic.
- **Width:** The minimum recommended width for a 2-way combined bicycle and pedestrian (multi-mode) use is 10 feet for areas of anticipated low volumes of use; 12 feet minimum for areas of high volume usage. Bicycle paths for exclusive bicycle use should be minimum 8 feet wide for anticipated low volume, 10 feet for high volumes (12 feet preferred). If a bicycle path is one way, the minimum recommended width is 5 feet with a preferred 6 feet width. Careful consideration should be given before constructing a one-way bicycle facility due to difficulty of enforcing a one-way system and the potential for confusion with a pedestrian facility or sidewalk.
- **Separation:** Separation of bicycle users from motor vehicles is recommended. The recommended minimum width for separation between the road edge and the edge of the path is 5 feet (6 feet is preferred). If 5 feet of separation cannot be provided, it is recommended that additional physical separation be provided (see *Barriers and Railings*, p. 33). Planting in the separation should maintain appropriate sight distance and visibility for the safety of both bicyclist and motorist.
- **Shoulder:** Graded shoulders should be provided 1 foot from the edge of pavement on both sides of the path. A minimum shoulder width of 3 feet is recommended for paths adjacent to embankments greater than or equal to 10 feet in height.
- **Horizontal Clearance:** A minimum horizontal clearance of 2 feet is recommended from the edge of pavement. Where full clearance cannot be provided to an obstruction, additional signage and pavement marking should be installed to alert bicyclists of the condition.
- **Vertical Clearance:** A minimum vertical

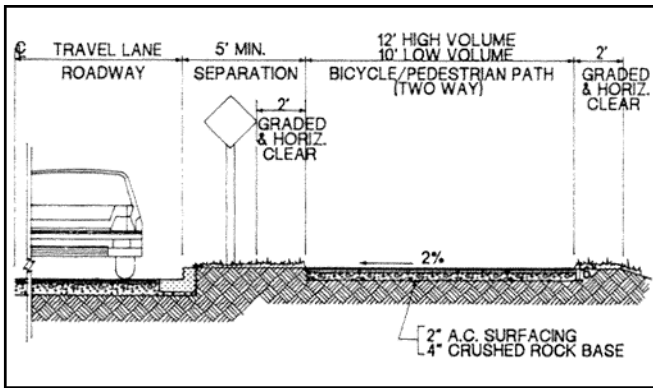


Figure 8a.  
Bicycle/Pedestrian Path  
Two-Way

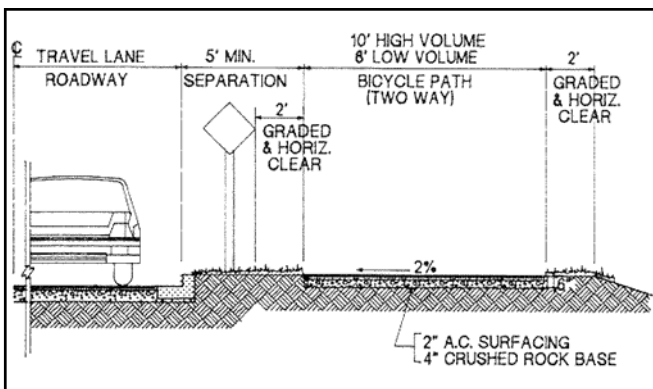


Figure 8b.  
Bicycle Path  
Two-Way

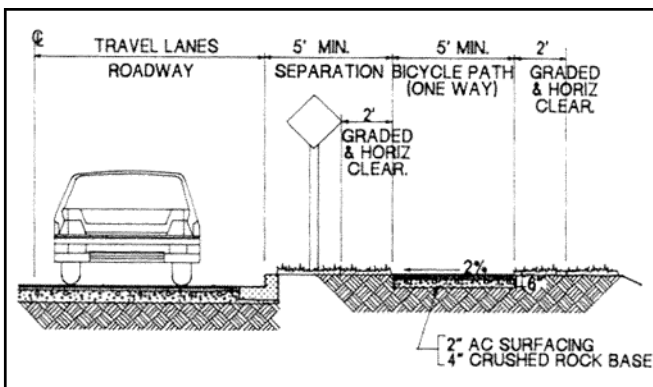


Figure 8c.  
Bicycle Path  
One Way

clearance of 8-10 feet is recommended, particularly if maintenance, motorized or emergency vehicles are expected.

- Grade:** For ease of travel, 2% grades are preferred for bicycle facilities. AASHTO discourages the development of facilities steeper than 5%, citing that “the ascents are difficult for many bicyclists to climb and the descents cause some bicyclists to exceed the speeds at which they are competent.” However, AASHTO does accept 5% to 10% grades when they occur over short distances, 500 feet or less, and when the facilities are designed to accommodate higher design speeds.
- Drainage and Cross Slope:** Adequate drainage is essential to all bicycle facilities. For bicycle paths, the recommended cross slope is 2%. A one directional cross slope is typically preferred over crowning a bicycle path. In situations where the bicycle path is located on the side of a hill, a drainage swale is recommended on the uphill side in order to intercept any runoff and prevent debris from being washed into the area of travel. Drainage swales should be located and oriented with the safety of the bicyclist in mind. It is recommended that all drainage grates and manhole covers be located outside the travel path. Permanent planting and/or seeding should be a part of the plans in order to reduce the amount of runoff and minimize debris on the travel lanes.
- Design Speed:** The minimum recommended design speed is 20 mph. For grades greater than 4% the recommended design speed is 30 mph.
- Horizontal Alignment and Superelevation:** See Figure 9 for minimum curve radius. Where minimum curve radius for the design speed is selected, additional curve widening is recommended for the inside curve to ac-

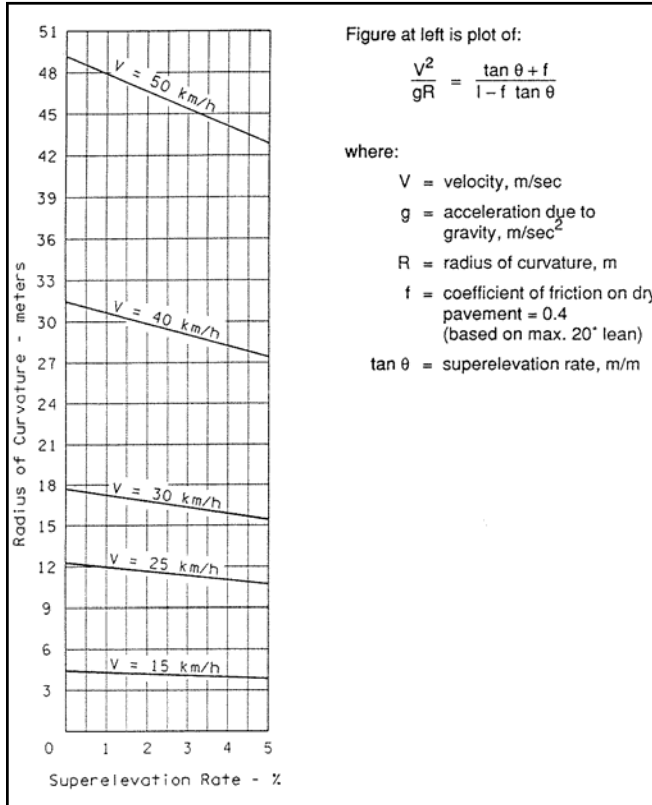


Figure 9.  
Curve radii and superelevations.

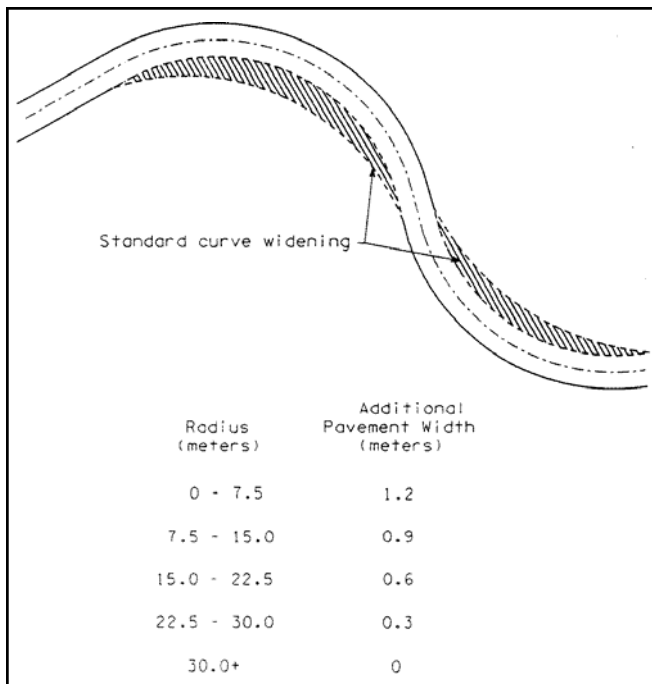


Figure 10.  
Bikeway curve widening for various radii.

commodate the lean of the cyclist. See *Figure 10* for curve widening. The maximum recommended superelevation is 5%. A 2% cross slope is recommended for tangents.

- Stopping Sight Distance:** Adequate stopping distance is necessary for the bicyclist to be able to see and react to an unexpected situation. Stopping sight distance is subject to design speed (See *Figure 11*). For bicycle paths, design speeds need to be considered for both directions; the descending direction determines the design. *Figure 12* should be used to determine the minimum recommended length of vertical curve required to provide minimum stopping distances of various speeds. Eye height of a cyclist is 4.5 feet with an assumed object height of zero. *Figure 13* shows the minimum clearance for line of sight obstructions of horizontal curves.
- Intersections:** Well designed intersections with roadways are crucial to the safety of bi-

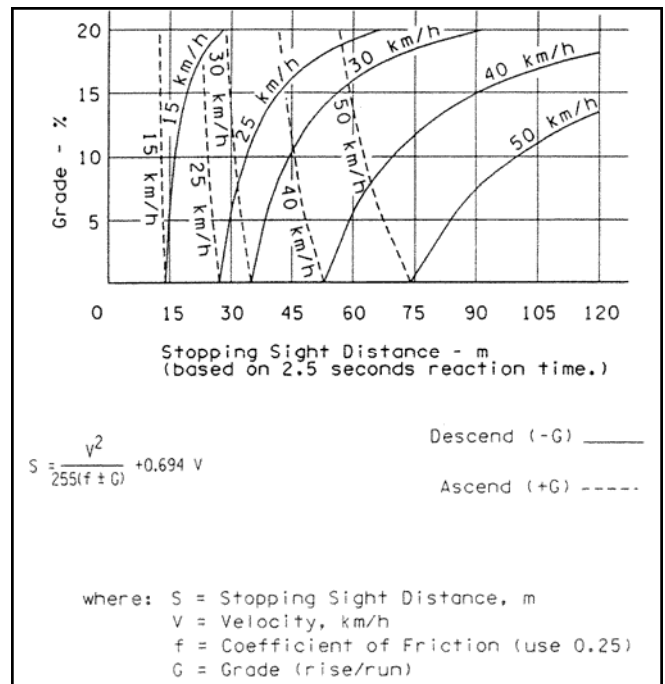


Figure 11.  
Stopping sight distance.

cycle path users. When intersection or roadway crossings occur at grade, the bicycle path should cross perpendicular to the roadway if possible. The bicycle path crossing should be located where possible at intersections with other roadways or should coincide with a pedestrian crossing where motorists can be expected to stop.

Intersections should be clearly marked and signed; necessary traffic control devices should be provided in accordance with the MUTCD. Right of way between path users and motorists should also be clearly established. Signage should warn path users and motorists in advance of the intersection.

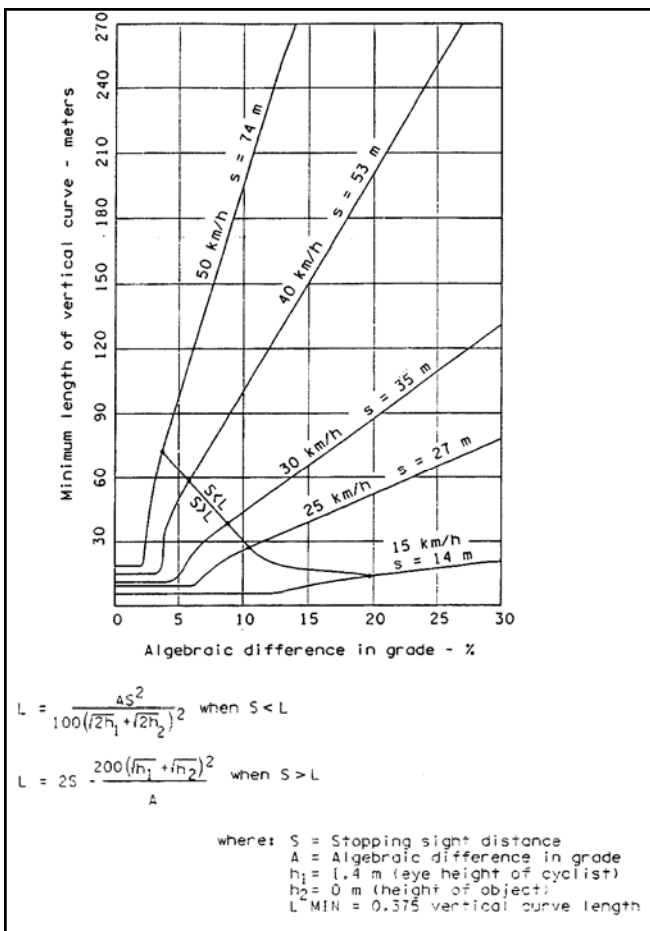


Figure 12. Sight distances for crest vertical curves.

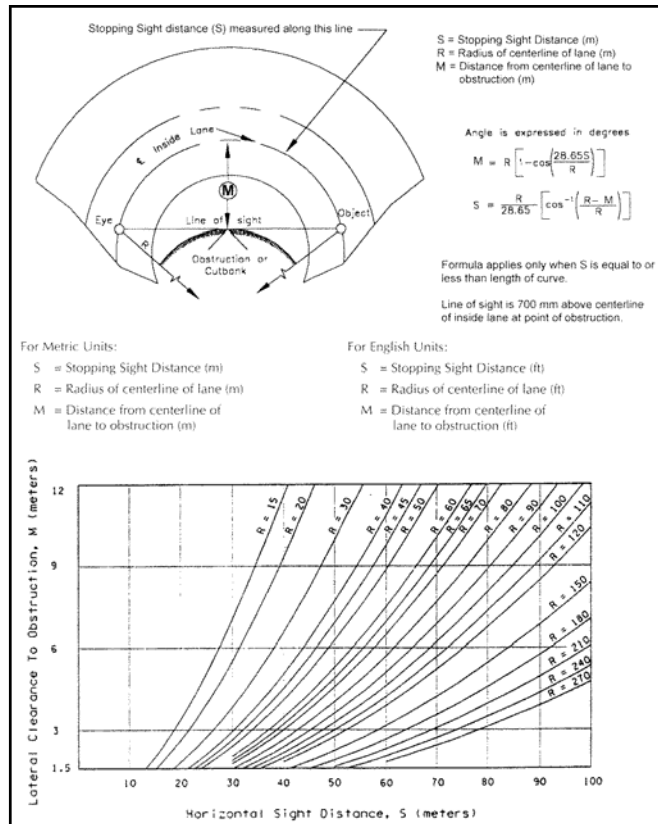


Figure 13. Lateral clearances on horizontal curves.

Signs should be oriented so as not to be confused with roadway signage. Necessary curb cuts and ramps should be provided for bicycle users; they should be the same width as the bicycle path oriented in the direction of travel, and provide a smooth transition to the roadway. Appropriate stopping sight distances should be established and checked at intersections. Intersections and approaches should also be of relatively flat grades (2% preferred).

In crossing situations of high volume and high speed roadways, consideration should be given to additional signalization or to a separated structure such as an underpass or bridge.



Figure 14.  
Bicycle Lanes.

## BICYCLE LANES

Bicycle lanes are always one-way facilities that move in the same direction as motorized vehicles. Bicycle lanes are for bicycles only and should not be used by pedestrians. Pedestrians should be provided with sidewalks in urban areas; an additional 3 foot gravel shoulder outside the bicycle lane may be provided if a separate pedestrian walking facility is not feasible. On one-way streets, the bicycle lane should be located on the right hand side of the roadway. The following design standards are to serve as a guide for the development of safe bicycle lanes. Typical cross sections illustrating bicycle lanes are illustrated in *Figures 16a, 16b, and 16c*.

- Width:** The width of the bicycle lane is dependent upon the edge condition. For curbed roadways, and roadways with on-street parking the recommended lane width is 5 feet minimum from the curb face, 4 feet minimum to gutter edge (where curb and gutters are used). Bicycle lanes along roadways without curbs should maintain a minimum width of 4 feet. AASHTO advises that “a width of 5 feet or greater is preferable,” adding that along roads with high truck traffic and with vehicle speeds exceeding 35 mph “additional widths are desirable.”
- Shoulder:** Bicycle lanes without curbs should provide a recommended grade shoulder width of 1 foot from the outside edge of paving. A 3 foot minimum graded shoulder may be provided in order to accommodate pedestrian traffic, if there are no existing pedestrian facilities.
- Horizontal Clearance:** A minimum of 2 feet of clearance from the face of curb is recommended. For bicycle lanes without curbs a minimum of 2 feet of clearance from the outside edge of pavement should be provided.
- Vertical Clearance:** A minimum of 8 feet; 10 feet is preferred, and recommended for underpasses and bridges.
- Intersections:** The combination of bicycle and motor vehicle traffic can pose turning complications at intersections for both bicyclists and motorists. In order to clarify motor vehicle and bicycle movements at intersections, additional signage and striping is recommended to reduce the likelihood of conflict. The recommended general guide for signage and pavement marking for bicycle lanes and intersections is in the MUTCD. Recommended pavement markings for bicycle lanes approaching motorist right-turn-only



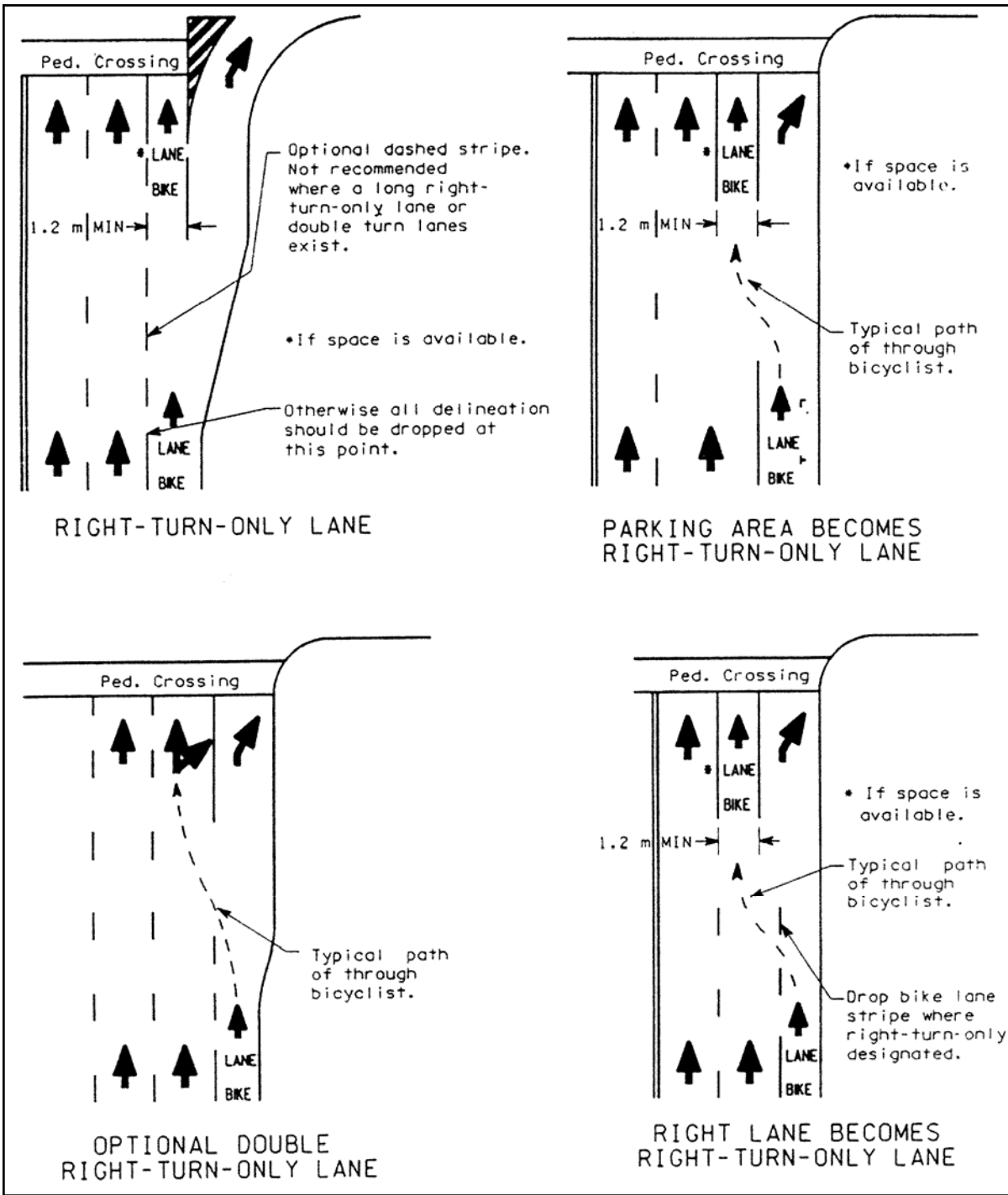


Figure 15.  
Bicycle lanes approaching motorists' right-turn-only lanes.

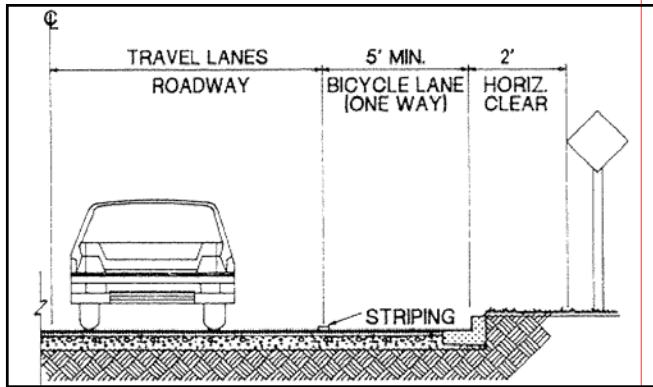


Figure 16a.  
Bicycle Lane with Curb.

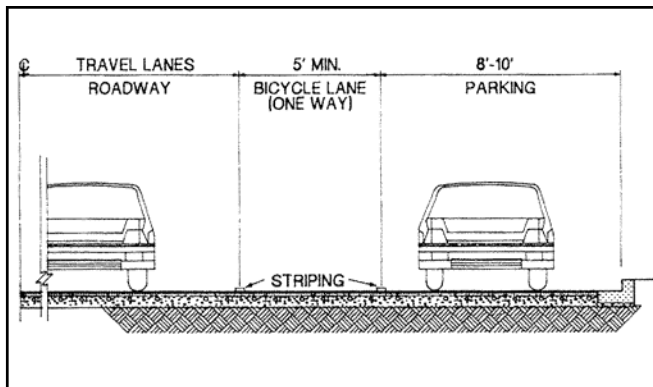


Figure 16b.  
Bicycle Lane with Curb and Parking.

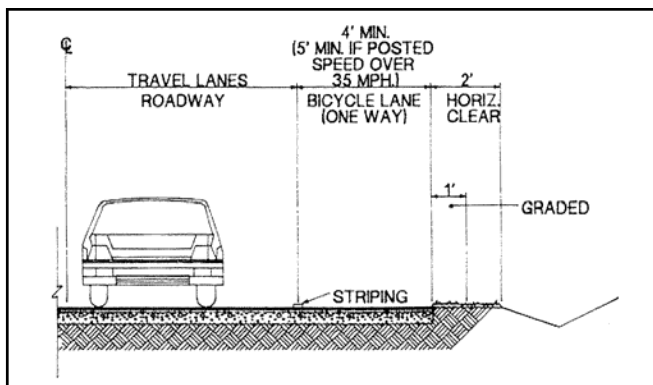


Figure 16c.  
Bicycle Lane without Curb.

lanes are from the AASHTO standard and are illustrated in *Figure 15*. At intersections with both motor vehicles and bicycles it is recommended that bicycle-sensitive loop detectors be installed in the bicycle lane as well as in left turn lanes.

### SHARED ROADWAYS

Shared roadways are defined as roadways with shared use by motor vehicle and bicycle travel. The most serious concern with shared roadways is the available width for these two modes of transportation. If shared roadways are to be signed as designated bike routes, AASHTO advises the provision of paved shoulders or wide outside lanes.

**Paved Shoulders:** In many instances the addition of paved shoulders may be the most cost-effective solution to improving the roadway for use by cyclists and pedestrians. Paved shoulders also help to protect the edge of the roadway from deterioration and provide room for emergency vehicles and break-downs. AASHTO advises that paved shoulders should be 4' wide at minimum to provide adequate space for use by cyclists. If there is a curb, guardrail or other roadside barrier, then AASHTO advises that a 5' shoulder from the face of the obstacle is necessary to meet safety standards. In high traffic situations or along roadways with speeds over 50 mph, additional shoulder width is recommended.

If funding or right-of-way is not available to meet AASHTO standards, then paving a 2' to 3' shoulder is suggested. Even this much additional shoulder will substantially improve the safety of the roadway for use by cyclists.

**Wide Outside Lane:** There are right-side through traffic lanes that are wider than the standard lane width to allow a bicyclist and motorist to share the same lane without coming into conflict or reducing the capacity of the lane. Typically, 14' is the recommended lane width for

shared usage by motor vehicles and cyclists. In situations where roadside barriers such as drainage grates or raised reflectors effectively reduce the usable portion of the lane by cyclists, 15' is the recommended width. If the lane width exceeds 15', AASHTO advises striping in a shoulder. An excessively wide lane may encourage the use of one lane by two motor vehicles. Wide outside lanes are primarily for the regular, adult (commuter) cyclist, and are often favored for that use. Except on residential or low-volume streets, wide lanes do not provide the degree of safety and comfort necessary for less skilled bicyclists or children.

### **SHARED SIDEWALK**

The County currently has no ordinances addressing sidewalk usage by bicycles. Generally, the shared use of a sidewalk by cyclists and pedestrians is undesirable and recommended only in limited circumstances:

- On long, narrow bridges where there is not enough width to accommodate bicycle lanes or paved shoulders and where traffic volumes and speed limits are high enough to preclude safe shared usage of the roadway.
- In order to close gaps along bicycle routes in areas where (as above) there is not enough width to accommodate bicycle lanes or paved shoulders and where traffic volumes and speed limits are high enough to preclude safe shared usage of the roadway.

In order to facilitate safe usage of sidewalks by cyclists in the above situations, curb cuts should be flush with the street.

### **MAINTENANCE**

Maintenance is a factor to be considered in budgeting for development of a bicycle facility. Maintenance and security considerations should be taken into account during the project design and development. It is recommended that a plan be developed for regular policing and maintenance as well as the associated costs budgeted. Without regular maintenance and policing, a bicycle facility may quickly become unusable. Bicycle lanes

*The decision to bicycle and walk is also easily influenced by quite minor factors — the presence or absence of secure bicycle parking, missing signs, lack of medians or curb ramps, deep potholes or dangerous utility covers, etc. Cities such as Seattle, Edmonds, Bellevue, Redmond and Tacoma have developed highly responsive, popular “spot” improvement” programs to quickly correct this kind of defect, with the help of the bicycling and walking public. Each jurisdiction in the region is encouraged to include this type of program as part of their routine road maintenance activities.*

*1995 Metropolitan Transportation Plan,  
p. 56*

and paths should be kept clear of accumulating debris. The surfacing of bicycle facilities should be maintained free of potholes or any other surface obtrusions. All signage and pavement markers should be regularly inspected and maintained. Tree, shrubs, and other vegetation should be regularly controlled in order to maintain necessary horizontal and vertical clearances as well as sight distances. In addition, a regular mowing schedule should be established for sodded/seeded areas. Regular trash removal and inspection of lighting and amenities should also be considered.

Bicycle facilities should also be regularly checked for changes in traffic volumes or any other changes since the time of construction that may require updates, improvements, or the addition of other facilities or amenities.

#### **CITIZEN REVIEW AND EDUCATION**

There is great value in establishing both a forum for citizen review of the implementation of the Bicycle Facilities Plan and an on-going citizen education program for bicyclists as well as drivers on established “rules of the road.” Successful implementation of the Bicycle Facilities Plan depends not only on the initiative of elected officials and government workers, but also on a supportive and educated populace.

**Education:** Bicycle and pedestrian safety education programs should be designed to improve skills and observance of traffic laws and to promote overall safety for bicyclists and pedestrians of all ages. A cooperative effort through a mix of agencies and interest groups, including schools and libraries, the Department of Public Works and the Department of Parks and Recreation, police departments and cycling clubs, will be the most effective way to reach out to a broad spectrum of the population.

Education programs should address the specific needs of target groups. AASHTO suggests topics and skills for four different audiences (p. 13-14),

young bicyclists, parents of young bicyclists, adult bicyclists and motorists. All four groups need to learn the basic rules of the road, but each group has specific needs and concerns to address.

**Citizen Participation:** Citizens and bicycle advocates from around the county can provide support in numerous ways. Citizen participation could include the following:

- Oversee implementation of a bicycle education program.
- Periodically review progress made by the county in regards to implementation of the Bicycle Facilities Plan.
- Annually review the county’s Transportation Improvement Program and Capital Improvement Program.

FACILITY	WIDTH	SEPARATION FROM MOTOR VEHICLES	SHOULDER	HORIZONTAL CLEARANCE	VERTICAL CLEARANCE	GRADE	CROSS SLOPE	DESIGN SPEED	CURVE RADIUS
<b>Bicycle Paths</b>									
Separate 2-way Bicycle/ Pedestrian path (see <i>Figure 8a</i> )	10' minimum (low volume) 12' minimum (high volume)	5' minimum 6' preferred	2' graded	2' minimum	8' minimum 10' preferred	5% max. 2% pref.	2%	20 mph (30 mph for grades > 4%)	$R=v^2$ 15 (e+f) (95 R. @ 20 mph)
Separate 2-way Bike Path (see <i>Figure 8b</i> )	8' minimum (low volume) 10' minimum (high volume) 12' preferred	5' minimum 6' preferred	2' graded	2' minimum	8' minimum 10' preferred	5% max. 2% pref.	2%	20 mph (30 mph for grades >4%)	$R=v^2$ 15 (e+f) (95 R. @ 20 mph)
Separate 1-way Bike Path (see <i>Figure 8c</i> )	5' minimum	5' minimum 6' preferred	2' graded	2' minimum	8' minimum 10' preferred	5% max. 2% pref.	2%	20 mph (30 mph for grades >4%)	$R=v^2$ 15 (e+f) (95 R. @ 20 mph)
<b>Bicycle Lanes</b>									
1-way lane with curb (see <i>Figure 16a</i> and <i>16b</i> )	5' minimum (4' minimum to gutter edge)	NA	NA	2' minimum	8' minimum 10' preferred	NA	2%	NA	NA
1-way lane without curb (see <i>Figure 16c</i> )	4' minimum, 5' recommended if posted speed over 35 mph	NA	1' graded (3' minimum crushed rock for pedestrian use)	2' minimum	8' minimum 10' preferred	NA	2%	NA	NA
<b>Paved Shoulders</b>									
1-way shoulder with curb	3' minimum, 5' recommended	NA	NA	2' minimum	8' minimum 10' preferred	NA	2%	NA	NA
1-way shoulder without curb	2' minimum, 4' recommended	NA	NA	2' minimum	8' minimum 10' preferred	NA	2%	NA	NA
<b>Wide Outside Lane</b>									
Wide outside lane with roadside barriers	15' recommended	NA	NA	2' minimum	8' minimum 10' preferred	NA	2%	NA	NA
Wide outside lane, no barriers	14' recommended	NA	NA	2' minimum	8' minimum 10' preferred	NA	2%	NA	NA