Bike Lanes 2.0: New Engineering Strategies
Brooke DuBose AICP
Regional Director
Toole Design Group

15 years of experience in multimodal transportation planning, pedestrian safety, and bicycle facility design
Toole Design Group is the nation’s leading planning, engineering, and landscape architecture firm specializing in multimodal transportation.
Our guidance work

- AASHTO Guide for the Development of Bicycle Facilities
- NCHRP 803 Pedestrian and Bicycle Transportation Along Existing Roads
- FHWA Achieving Multimodal Networks: Applying Design Flexibility & Reducing Conflicts
- Massachusetts DOT Separated Bike Lane Planning & Design Guide
1974 “Guide for Bicycle Routes”

GUIDE FOR BICYCLE ROUTES

Protected Bike Lanes & Intersections

Davis, California 1967

Figure 3.8.14. Recommended Intersection Design for Intersecting Arterial Roads with Bikeways on Each Road. Intersection is Asymmetrically Designed to Provide Bicycle Queue Areas at the Entrance to the Crossings. (Reference 26, p. 23)
Intersections and Crossings

Because the number and severity of conflicts between motorists, bicyclists, and pedestrians are greatest at intersections and crossings, utmost care must be taken in designing intersection which are to accommodate bicycle traffic. The safest and most effective way of eliminating conflicts where a bicycle route crosses another roadway is to provide a grade separation. This may be feasible in some cases, as discussed under grade separation structures. However, a grade separation usually cannot be provided because of lack of available space, especially where bicycle lanes or shared roadways cross at or near existing at-grade street intersections. Even where space is available, there seldom is warrant for the high cost of the structure. Therefore, a design which utilizes existing at-grade street intersections usually must be provided.

Wherever a bicycle lane is carried across an at-grade street intersection, some form of channelization with specific routings for bicycles should be provided to minimize the number of possible conflict points between bicycles, motor vehicles, and pedestrians within the intersection. Such channelization would not normally be necessary when shared roadways intersect a cross street, except where bicycle and motor vehicle traffic is heavy, motor vehicle speeds are in excess of 30 mph, or where there is a heavy percentage of motor vehicles making right turns out of the shared roadway.

Channelization usually consists of some form of striping or marking which clearly delineates the path which bicycles must take in crossing the intersection. In most cases the crossing should be adjacent to—but striped separately from—the pedestrian crosswalk. Bicyclists who wish to turn left should be encouraged to cross the cross street first and then proceed to the left within a marked path provided for the second stage. The undesirable effect of the conflict between right-turning motorists and straight-through bicyclists can be reduced to some extent by offsetting the bicycle crossing of the cross street away from the intersection.

Examples of channelization arrangements to accommodate bicyclists at intersections are illustrated in Figure 7. Figure 7(a) depicts a pair of bicycle lanes which are carried straight through the intersection. With this arrangement, the bicycle route is a part of the street, directly aligned with the bicycle lane both upstream and downstream. The arrangement in Figure 7(b) likewise carries the bicycle lane through the intersection, but the bicycle crossing is offset from the...
But then...
“Vehicular cycling... is faster and more enjoyable, so that the plain joy of cycling overrides the annoyance of even heavy traffic.”

John Forester
Protected bike lanes removed in first edition of the Bike Guide

(1.5m). Bicycle lanes should always be placed between the parking lane and the motor vehicle lanes. Bicycle lanes between the curb and the parking lane create hazards for bicyclists from opening car doors and poor visibility at intersections and driveways, and they prohibit bicyclists from making left turns; therefore this placement should never be considered.
1980s – 1990s The Wide Outside Lane
Inside the world of local cycling’s WEEKEND WARRIORS

BY STEVE GOLDSMITH
PHOTOS BY SKIP BROWN

fast and furious
“Bicycle lanes tend to complicate both bicycle and motor vehicle turning movements at intersections.”
AASHTO Bike Guide History

- Written in 2010
- Conforms to 2009 MUTCD which was written in 2007
### Other guidance in recent years

<table>
<thead>
<tr>
<th>Year</th>
<th>Guide/Source</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>NACTO Urban Bikeway Design Guide</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>Massachusetts DOT Separated Bike Lane Planning &amp; Design Guide</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>CROW Design Manual for Bicycle Traffic</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>FHWA Achieving Multimodal Networks: Applying Design Flexibility &amp; Reducing Conflicts</td>
<td></td>
</tr>
</tbody>
</table>
NCHRP 15-60: Updating the guide
NCHRP 15-60 Objectives

- Address gaps in 2012 Guide
- Framework for facility selection based on context
- Consider users of all ages and abilities, including children
- Harmonization with applicable standards and guidelines
1. Introduction
2. Bicycle Planning
   • Includes wayfinding
3. Bicycle Operation & Safety
4. Design of On-Road Facilities
   • Includes elements of design, shared lanes, shoulders, bike lanes, traffic signals, roundabouts, structures
5. Design of Shared Use Paths
6. Bicycle Parking Facilities
7. Maintenance and Operations
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Introduction</td>
</tr>
<tr>
<td>2.</td>
<td>Bicycle Operation &amp; Safety</td>
</tr>
<tr>
<td>3.</td>
<td>Planning</td>
</tr>
<tr>
<td>4.</td>
<td>Facility Selection</td>
</tr>
<tr>
<td>5.</td>
<td>Elements of Design</td>
</tr>
<tr>
<td>6.</td>
<td>Shared Use Paths</td>
</tr>
<tr>
<td>7.</td>
<td>Separated Bike Lanes</td>
</tr>
<tr>
<td>8.</td>
<td>Bicycle Boulevards</td>
</tr>
<tr>
<td>9.</td>
<td>Bike Lanes &amp; Shared Lanes</td>
</tr>
<tr>
<td>10.</td>
<td>Traffic Signals and Active Warning Devices</td>
</tr>
<tr>
<td>11.</td>
<td>Roundabouts, Interchanges, and Other Intersections</td>
</tr>
<tr>
<td>12.</td>
<td>Rural Area Bikeways</td>
</tr>
<tr>
<td>13.</td>
<td>Structures</td>
</tr>
<tr>
<td>14.</td>
<td>Wayfinding</td>
</tr>
</tbody>
</table>
1 : Introduction : MUTCD Delays

- Current MUTCD content is pre-2007
- Update in 2020 at the earliest
- FHWA issuing interim approvals for new treatments

2019 Guide includes treatments not in MUTCD
- Upfront caveat for compliance and experimentation
- Caveat each time discussed
2: Bicycle Operation & Safety

- **4 - 7%** Experienced and confident
- **5 - 9%** Somewhat confident
- **51 - 56%** Interested but Concerned

**lower stress tolerance**

**higher stress tolerance**

2 : Bicycle Operation & Safety Default Design User for Guide

Experienced & Confident Cyclist
AASHTO 2012

Interested but Concerned Cyclist
AASHTO 2018

4 - 7%  51 - 56%
Table 14. Option diagram for road sections inside the built-up area

<table>
<thead>
<tr>
<th>Road Type</th>
<th>Vehicle Speed</th>
<th>Vehicle Volume</th>
<th>Cycle network category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>18 mph</td>
<td>&lt; 2,500</td>
<td>Basic network (L_{bicycle} &gt; work 750/day)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; 5,000</td>
<td>Cycle route (L_{bicycle} 500-2500/day)</td>
</tr>
<tr>
<td>Arterial</td>
<td>30 MPH</td>
<td>2x1 lane</td>
<td>Main cycle route (L_{bicycle} &gt; 2000/day)</td>
</tr>
<tr>
<td></td>
<td>45 MPH</td>
<td>2x2 lane</td>
<td>Protected bike lane or bike lane</td>
</tr>
</tbody>
</table>

- Local: Shared lane or bike boulevards
- Arterial: Protected bike lane or bike lane
## 4: Facility Selection

### NACTO

**Contextual Guidance for Selecting All Ages & Abilities Bikeways**

<table>
<thead>
<tr>
<th>Roadway Context</th>
<th>Target Motor Vehicle Speed</th>
<th>Target Motor Vehicle Volume (MOV)</th>
<th>Motor Vehicle Lanes</th>
<th>Key Operational Considerations</th>
<th>All Ages &amp; Abilities Bicycle Facility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any</td>
<td></td>
<td>Any</td>
<td></td>
<td>Any of the following: high curbside activity, frequent buses, motor vehicle composition, or turning conflicts⁴</td>
<td>Protected Bicycle Lane</td>
</tr>
<tr>
<td>&lt; 10 mph</td>
<td>Less relevant</td>
<td>No curbstone, or single lane one-way</td>
<td>Pedestrians share the roadway</td>
<td>Shared Street</td>
<td></td>
</tr>
<tr>
<td>≤ 20 mph</td>
<td>≤ 3,000 – 2,000</td>
<td></td>
<td>≤ 50 motor vehicles per hour in the peak direction at peak hour</td>
<td>Bicycle Boulevard</td>
<td></td>
</tr>
<tr>
<td>≤ 25 mph</td>
<td>≤ 500 – 1,500</td>
<td></td>
<td></td>
<td>Conventional or Buffered Bicycle Lane, or Protected Bicycle Lane</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≤ 1,500 – 3,000</td>
<td>Single lane each direction, or single lane one-way</td>
<td>Low curbside activity, or low congestion pressure</td>
<td>Buffered or Protected Bicycle Lane</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≤ 3,000 – 6,000</td>
<td>Greater than 6,000</td>
<td></td>
<td>Protected Bicycle Lane</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Any</td>
<td>Multiple lanes per direction</td>
<td></td>
<td>Protected Bicycle Lane</td>
<td></td>
</tr>
<tr>
<td>≥ 26 mph⁵</td>
<td>≥ 6,000</td>
<td>Single lane each direction</td>
<td>Low curbside activity, or low congestion pressure</td>
<td>Protected Bicycle Lane, or Reduce Speed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Greater than 6,000</td>
<td>Multiple lanes per direction</td>
<td></td>
<td>Protected Bicycle Lane, or Reduce to Single Lane &amp; Reduce Speed</td>
<td>Protected Bicycle Lane</td>
</tr>
<tr>
<td>High-speed limited access roadways, natural corridors, or geographic edge conditions with limited conflicts</td>
<td>≤ 6,000</td>
<td>Any</td>
<td>High pedestrian volume</td>
<td>Bike Path with Separate Walkway or Protected Bicycle Lane</td>
<td>Protected Bicycle Lane</td>
</tr>
<tr>
<td></td>
<td>Greater than 6,000</td>
<td>Any</td>
<td></td>
<td>Low pedestrian volume</td>
<td>Shared-Use Path or Protected Bicycle Lane</td>
</tr>
</tbody>
</table>

### AASHTO 2019

[Graph showing VOLUME (VEHICLES PER DAY) vs. SPEED (MILES PER HOUR) with separated and shared use paths]
5: Elements of Design

“How to” chapter for critical design elements

Approach clear space

Chapter 5: Elements of Design
  5.1 Introduction
  5.2 Design Speed
    5.2.2 Facility Context Examples
    5.2.3 Acceleration and Deceleration
    5.2.4 Roadway and Street Operating Speeds
  5.3 Sight Distance
    5.3.1 Criteria for Measuring Sight Distance
    5.3.2 Stopping Sight Distance
    5.3.3 Decision Sight Distance
    5.3.4 Intersection Sight Distance
  5.4 Geometric Design Elements
    5.4.2 Operating Width and Clearances
    5.4.3 Surface Considerations
    5.4.4 Horizontal Alignment
    5.4.5 Cross Slope
    5.4.6 Grade
    5.4.7 Vertical Alignment/Vertical Curves

<table>
<thead>
<tr>
<th>Vehicular Turning Design Speed</th>
<th>Approach Clear Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10 mph*</td>
<td>20 ft</td>
</tr>
<tr>
<td>10 mph</td>
<td>40 ft</td>
</tr>
<tr>
<td>15 mph</td>
<td>50 ft</td>
</tr>
<tr>
<td>20 mph</td>
<td>60 ft</td>
</tr>
</tbody>
</table>

*most low volume driveways and alleys
MassDOT 2.0

Improvements over MassDOT:
• ADA Guidance
• Transit Stop Design
• Sight Distance Assessment
• Constrained Tradeoff Assessment
• Transition Guidance
7: Separated Bike Lanes – Some Design Elements

- Street
- Street Buffer
- Bicycle Crossing (Bicycle Lane)
- Pedestrian Crossing (Sidewalk)
- Driveway

- Raised Driveway Crossing
- Raised Side Street Crossing

- Approach Ramp 6-12% (Sidewalk)
- Departure Ramp 4.8' 0

5:1 desirable taper
3:1 minimum taper
8: Bicycle Boulevards

- Incorporating NACTO bicycle boulevard design treatments
- Speed management
  - Creating enclosure
  - Horizontal and vertical deflection
  - Crossing islands
- Traffic diversion
- Traffic control at intersections

**Vehicle and Pedestrian Collision Speed and Survival Percentage**

- When a vehicle is traveling at...
  - 20 MPH
  - 30 MPH
  - 40 MPH

- This is the driver’s field of vision.
- It takes...
  - 45' to stop
  - 85' to stop
  - 145' to stop

- And pedestrians hit at this speed have a...
  - 95% survival rate
  - 55% survival rate
  - 15% survival rate
A bicycle boulevard does not exist unless major street crossings are safe.

### Major Street Crossing Opportunities
- 120 crossings/hour preferred
- 60 crossings/hour minimum

### Motor Vehicle Operating Speeds
- 15 mph preferred
- 20 mph acceptable
- 25 mph maximum

### Daily Volumes: | Hourly Volumes
--- | ---
- 1,000 ADT preferred | - 50 vehicles/hour preferred
- 2,000 ADT acceptable | - 75 vehicles/hour acceptable
- 3,000 ADT maximum | - 100 vehicles/hour maximum
“Wide curb lanes are therefore not recommended as a strategy to accommodate bicycling”

• Recommends SHARE THE ROAD signs not be used, instead:

- MAY USE FULL LANE
- ON ROAD
- IN LANE
Establishes a standard for marking buffered bike lanes
10 : Active Beacons and Traffic Signals

Creates a clear process to evaluate major street crossings
10: Bicycle signal heads

FHWA Interim Approval

Bike signal head warrant/requirement:
- Leading or protected phasing
- Contra-flow movements
- Signal heads beyond cone of vision

Bike signal head application:
- Can only be used without conflicting vehicle turns
• Provide separated facilities
• Separate pedestrians and bikes
• Uncontrolled motorist crossings should be < 25mph…
  • Unless lots of gaps
  • Add active warning
  • Add control
12 : Rural Roadways

Design User:
Between Towns & Villages
    Experienced & Confident

In Towns & Villages
    Interested but Concerned
12 : Rural Roadways

- Shoulder width recommendations
- Transition recommendations
- Rumble Strip spacing, location, and gap guidance
AASHTO Bike Guide Schedule

- 2nd Draft submitted late 2017
- 3rd Draft: early 2018
- Final Draft and Balloting: late 2018
  AASHTO Subcommittee Approvals needed from: design, traffic, bicycle

Final Comments and Publication: 2019
Questions?

Brooke DuBose
bdubose@tooledesign.com

Bill Schultheiss, PE
bschultheiss@tooledesign.com

www.tooledesign.com
Twitter @tooledesign
BETTER BIKEWAYS SJ
Explore your city.
San José: History and Context
San José: History and Context

Historically Multimodal
Growing Up
Embracing Public Life
Policy Background
Support and Demand
What is a Better Bikeway?

- Protected
- Calm
- All Ages and Abilities
Why Better Bikeways?

- Fearless: 7%
- Enthusiastic: 5%
- Interested but Concerned: 51%
- Not Currently Interested: 37%
From Network Vision to Conceptual Design
Some Criteria for Selecting Streets

• Existing and planned bike facilities.
• Motor vehicle traffic volumes and speeds.
• Route recommendations received at community outreach events.
• Feasibility of adding bike facilities into each corridor (considering things like street width, intersection design, transit, and curb zone uses).
• Crossings of barriers formed by freeways, railways, and waterways.
• Creation of direct routes and network density.
Outreach By The Numbers

7

10k

14

596

13

141

City of San Jose
Capital of Silicon Valley
The Political Valley

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 2023</td>
<td>Initiation of project</td>
</tr>
<tr>
<td>Feb 2023</td>
<td>Planning and design stage</td>
</tr>
<tr>
<td>Mar 2023</td>
<td>Community outreach and engagement</td>
</tr>
<tr>
<td>Apr 2023</td>
<td>Design and implementation planning</td>
</tr>
<tr>
<td>May 2023</td>
<td>Construction and facilitation</td>
</tr>
</tbody>
</table>

*Note: This table represents a simplified timeline for project phases.*
The Word on the Street

How to use the new street

- **Drive** Stay in the moving lane. Do not drive in the buffer or bicycle lane.
- **Park** Park your car in the marked parking stalls to the left of the buffer and bike lane.
- **Load** Use buffer zone to get in parked cars. Look for passing bikes before opening car doors.
- **Bike** Put in the new bike lane. Hitch for crossing pedestrians.
- **Walk** Look for approaching bicyclists when crossing these bicycle lanes.

**SAN SALVADOR STREET**
Better Bikeways San Jose upgrades streets to support safety, placemaking, and local businesses.
Visit sanjoseca.gov/betterbikeways for more information.

How to make a right turn in a protected intersection

- **Correct** Turn around the corner island. Yield to bicyclists and pedestrians.
- **Wrong** Don’t turn through the crosswalk & crossbike.

CITY OF SAN JOSE
Capital of Silicon Valley
Designing for All Ages & Abilities

Contextual Guidance for High-Comfort Bicycle Facilities

December 2017

Choosing an All Ages & Abilities Bicycle Facility

This plan provides guidance on creating bicycle design that is sensitive to all ages & abilities. The design process begins with an understanding that the bicycle design must be sensitive to the needs of all ages & abilities. This process involves identifying the specific needs of different populations and selecting appropriate design options that will meet these needs.

Table: Contextual Guidance for Selecting All Ages & Abilities Bicycle Facilities

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Contextual Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target Traffic Volume</td>
<td>Key Design Considerations</td>
</tr>
<tr>
<td>&lt; 15 mph</td>
<td>Less traffic volume, lower speed. Split the road into lanes for better safety.</td>
</tr>
<tr>
<td>15 mph</td>
<td>Moderate traffic volume, moderate speed. Use a combination of lanes for better safety.</td>
</tr>
<tr>
<td>&gt; 20 mph</td>
<td>High traffic volume, higher speed. Use dedicated bicycle lanes for better safety.</td>
</tr>
</tbody>
</table>

Note: This table is a guide and should be used in conjunction with local planning and design considerations. It is important to consult with local experts to ensure that the design is appropriate for the specific needs of the community.

References:


For more information, please contact [contact information].
Context Helps Select Facilities

Protected Bike Lanes

Two Direction Cycletrack

Traditional Bike Lanes

Calm Streets
Context Helps Select Facilities

- Calm
- Buffered
- Protected
- Basic

[Diagram with different layers indicating various types of facilities]
From Pop-Up to Permanent
Build a Menu of Options
Pave Intersecting Streets
Protected Bikeways and Transit

- Bus operations challenges
- Bicycling challenges
Protected Bikeways and Transit
Protected Bikeways and Transit
Fourth and San Fernando: Existing
Fourth and San Fernando: Planned
Thank You!

You may also share feedback by email or phone.

Email: bike.ped@sanjoseca.gov
Phone: (408) 795-1610

Future meetings and project updates are posted at sanjoseca.gov/betterbikeways
Designing for Growth in Seattle
Silicon Valley Bike Summit 2018

Peter Trinh, P.E.
City of Seattle, Multi-Modal Engineering Supervisor
ITE Technical Advisory Panel on Bike Facilities
Growth in Seattle

• Seattle is fastest growing metropolis in America

• Seattle: Ages 25-34 form largest group in City (millennials represent over 31% of population; nat’l average approx 25%)

• In Seattle since 2005: bicycle commuting up 78%, driving down 14%

*US Census Bureau, City of Seattle
Where the cranes are

Seattle has the most cranes in the country for the third year in a row.

- Seattle: 65
- Portland: 30
- Chicago: 40
- Boston: 13
- New York: 20
- San Francisco: 26
- Denver: 28
- Washington, D.C.: 27
- Los Angeles: 36
- Phoenix: 4
- Honolulu: 11

Source: Rider Levett Bucknall
MARK NOWLIN / THE SEATTLE TIMES
Hottest Real Estate Market

The hottest real estate market of 2017: Seattle
Yahoo Finance Video • December 20, 2017
Seattle, home of Amazon headquarters, has just been revealed as the hottest real estate market in 2017. Yahoo Finance's Seana Smith, Andy Serwer, Dan Roberts, and JP Mangalindan discuss.

Redfin's new 'Compete Score' ranks markets based on competition for homes and Seattle is toughest

Seattle-area home prices this spring rose at fastest rate since 2006 bubble

Seattle's Magnolia neighborhood, looking west. In the distance is a section of the Olympic Mountain range. April 18th (Greg Gilbert / The Seattle Times)

A spike in home costs in the metro area's least-expensive homes helped drive the increase this spring. However, the data is about two months old, and more recent reports have found a sudden surge in home...
Biking: part of a growing Seattle

100,000 - 120,000 new residents and 100,000 - 115,000 new jobs in Seattle over the next 20 years
The Paradigm Shift
Free-Floating Bike Share
Free-Floating Bike Share

![Bar chart showing total rides (July - December) for different cities:
- Seattle Free-Floating (2017): 468,976
- Portland Biketown (2017): 184,852
Protected Bike Lanes

Signalized Intersections:
- Bike Crossings (green MMA paint marking)
- Bicycle Signal Heads

2nd Ave Protected Bike Lane
Protected Bike Lanes

Signalized Intersections:
Protected Bike Lanes

Buffer Treatment:

2nd Ave Protected Bike Lane
North Extension

Pike-Pine Corridor
Protected Bike Lanes

Buffer Treatment:

2nd Ave Protected Bike Lane
North Extension

7th Ave Protected Bike Lane
Protected Bike Lanes

Buffer Treatment:

2nd Ave Protected Bike Lane
7th Avenue Protected Bike Lane
2nd Avenue Protected Bike Lane
Westlake Cycle Track

Before

After
Westlake Cycle Track

Before

After
City of Seattle
New street type graphics
Streets Illustrated

Lateral Separation Elements

Lateral separation elements include pavement markings and one or more vertical physical features that create the physical separation from motorized vehicle traffic and/or parking.

Summary Table:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Buffer between bike lane and parking</td>
<td>3'</td>
</tr>
<tr>
<td>Flexible delineators</td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>28&quot; minimum -36&quot; maximum</td>
</tr>
<tr>
<td>Offset</td>
<td>12&quot; minimum offset from edge of bikelane</td>
</tr>
<tr>
<td>Planters</td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>28&quot; minimum -36&quot; maximum</td>
</tr>
<tr>
<td>Offset</td>
<td>12&quot; minimum offset from edge of bikelane</td>
</tr>
</tbody>
</table>

Striped Median: Guidance for marking the buffer zone is provided in Chapter 3D of the MUTCD "Markings for Preferential Lanes". The striped median must also contain a physical separation element (described below) to classify the bicycle lane as a protected bike lane. Retroreflective pavement markers (RPMs) may be used to supplement physical separation elements, particularly where spacing between these elements exceeds 30'. RPMs should be inwardly offset 4" from the outside stripe of the buffer rather than placed directly on the stripe. RPMs should be placed mid-point between physical separation elements.

Physical Separation Elements: Physical separation elements may consist of a wide range of potential treatments to provide a physical barrier such as flexible delineators, raised curbs, planters, parking lanes, or other objects as approved by SDOT. The spacing of the physical separation element should be determined by the need to protect the bicycle lane from vehicle encroachment. On facilities with higher vehicle volumes and speeds use permanent separation treatments.
Accessible On-Street Parking Design Guidance

In many cases, the accessible parking may be provided on block faces that do not conflict with protected bike lane alignment. However, a priority for accessibility is locating the parking spaces where the street is most level and, ideally, closest to obvious destinations such as building entrances. Under these circumstances it may be necessary to include accessible parking on the same block face as a protected bike lane. Providing accessible parking spaces at the end of a block often affords the most flexibility in designing around the protected bike lane. A painted access aisle without any vertical elements provides space to deploy a lift and allows a vehicle to park in the buffer to deploy a left-side lift, if necessary.
If you build it, they will come...
Questions?

Peter.Trinh@seattle.gov  |  (206) 615-0929

http://www.seattle.gov/transportation
Bike Lanes 2.0: New Engineering Strategies
Thanks to all of our Silicon Valley Bike Summit Sponsors!

HOST

SIGNATURE SPONSORS

SUPPORTING SPONSORS

ADDITIONAL SUPPORTERS