

Best Practices and Innovation in Bikeway Design

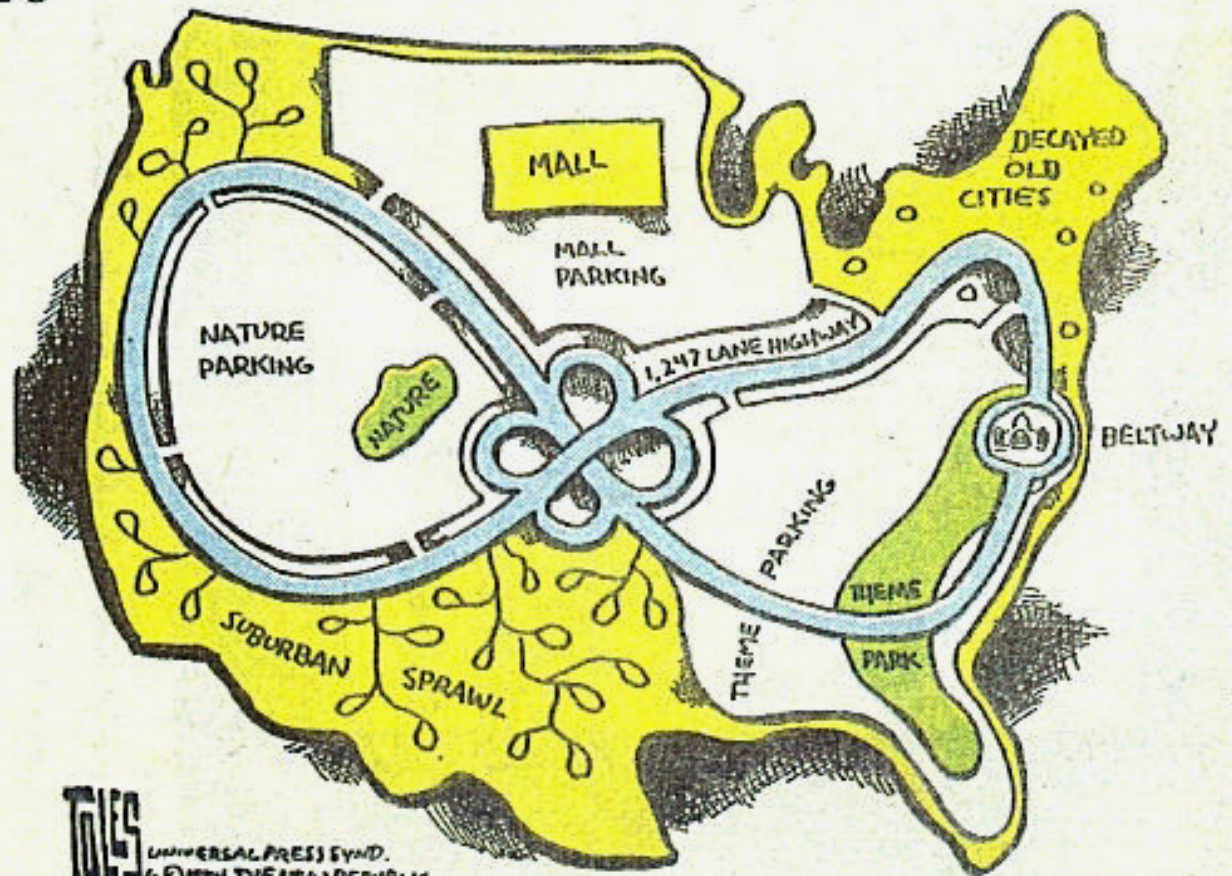
York Region, Ontario
May 26, 2010
Jeff Olson, Principal
Alta Planning + Design



“Someday we’ll look back on this and it will all seem funny...”

A TRIP TO THE MALL OF AMERICA

Page 3



Alta's Mission: *Transportation, Recreation,*



Columbus Bicentennial Bikeways Plan
The City of Columbus, Ohio



SAN FRANCISCO BICYCLE PLAN
2004
FEBRUARY 17, 2004
ADMINISTRATIVE DRAFT

This document is provided to the Technical Advisory Committee, Mayor George Moscone, Board of Supervisors, and Department of Planning and Traffic, and is not for public release.



Marin County
Bicycle and Pedestrian Master Plan



Prepared for:
Marin County Congestion Management Agency

Prepared by:
Alta Transportation Consulting
John B. Perry Associates, Inc.
Consulting & Transportation
Design, Construction, & Engineering



ACHD Roadways to Bikeways

Bicycle Master Plan



City of Cary
BICYCLE AND PEDESTRIAN MASTER PLAN

PREPARED BY:
Alta Planning + Design
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Durham, NC 27601
www.altaonline.com

PREPARED FOR:
City of Cary, North Carolina



City of Oregon
Bicycle and Pedestrian
Master Plan



Bicycle Master Plan
Creating a Bicycle as Integral Part of Daily Life in Portland



Bicycle Master Plan

City of Portland
Office of Transportation



City of Santa Clarita
Non-Motorized Transportation Plan



Prepared by: Alta Planning + Design
October 2007



York Region: Existing Conditions



The 10% Solution



Best Practices and Innovation

- Bike Facilities
 - Shared lane markings (sharrows)
 - Bike lanes
 - Buffered bike lanes
 - Cycle tracks
 - Shared-use paths
- Bike Facilities Alternatives Analysis
- Intersection Treatment
 - Bike boxes
 - Bike lane thru the intersection
 - Bicycle-only signals
- Wayfinding / Signage
- Bicycle Parking

Next Generation Design Guidelines

guide for the development of bicycle facilities
american association of state highway and transportation officials
1999

CITIES FOR CYCLING
NACTO
National Association of City Transportation Officials
Connecting city transportation leaders and promoting an urban transportation agenda.

Home Press Room About NACTO Best Practices Federal Policies Publication & Links Contact Us

Cities for Cycling is a project of the National Association of City Transportation Officials to catalog, promote and implement the world's best bicycle transportation practices in American municipalities.

Bicycling is good for cities. Providing safe, comfortable, convenient bicycling facilities is a cost-effective way for American municipalities to improve mobility, livability and public health while reducing traffic congestion and CO2 emissions.

Cities for Cycling focuses on implementing world-class bicycle transportation systems through design innovation and the sharing of best practices. American municipalities are increasingly pioneering new designs and adapting international best practices to local conditions. To assist this local-level leadership, the Cities for Cycling project works to share and promote state-of-the-art practices that ensure safe traffic conditions for all modes of travel.

Cities for Cycling is pleased to present a sampling of **Design Resources for Urban Bicycle Transportation** that have been developed by and for leading bicycling cities.

More detailed Emerging Best Practices Sheets highlight a few of the engineering techniques being deployed by NACTO members to make bicycling safer, more comfortable and more convenient. The dissemination and fine-tuning of these designs will prove to be key elements in unleashing the potential of American cities to achieve world-class levels of bicycling.

Emerging Best Practices Sheets

- Bike Boxes
- Divided Protected Streets

Internet | Protected Mode: Off 100%

Inbox - Microsoft... BC slide show 101MSDCF Computer NACTO National ...

Shared Lane Markings: “Sharrows”



Portland, Oregon



Somerville, Massachusetts

Advisory Bike Lanes



Holland



Long Beach, California

Bike lanes



Colored Bike Lanes

- ❖ Convenience of riding on the street with some psychological separation
- ❖ Novice cyclists are more likely to ride in bike lane, not on sidewalk
- ❖ Street appears narrower - motorists drive slower
- ❖ Used in many cities within the US (Seattle, New York, Boston and Portland OR) and worldwide



Comm Ave, Boston



Buffered Bike Lanes



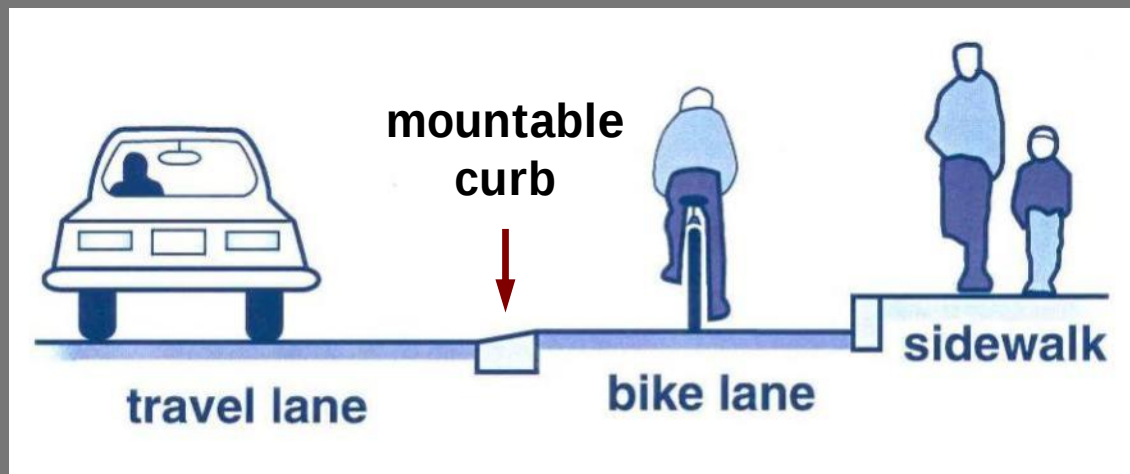
New York



Portland, Oregon

Buffered Bike Lanes

- ❖ Convenience of riding on the street + psychological separation of a barrier
- ❖ Mountable curb allows cyclists to leave bike lane for turning or overtaking
- ❖ Motorists feel bump when they stray into curb
- ❖ Novice bicyclists more likely to ride in bike lane rather than on sidewalk



Example Transformation



Example Transformation



Partial Build-out with Buffered Bike Lane

Example Transformation



Separation – from motorists and pedestrians



Channelized cycle track, Amsterdam



Mountable curb, Copenhagen



Vassar Street, Cambridge Mass. (one-way)



Pavement markings and bollards, Sweden

Cycle Track - What is it?

- ❖ Combines the user experience of a separated path with the on-street infrastructure of a bike lane
- ❖ Provides space exclusively for bicycles, located on the outside of curb-side parking
- ❖ Separated from vehicle travel lanes, parking lanes and sidewalks



Copenhagen

Cycle tracks in North America



Montreal (two-way)

Cycle tracks in North America



9th Avenue, New York (one-way)

Photo courtesy of houze

Cycle tracks in North America



Kelowna, BC (two-way)

Shared Use Paths



Columbus, Ohio



Bentonville, Arkansas

Shared-use Paths on Arterial Roads



Wellington St in Aurora

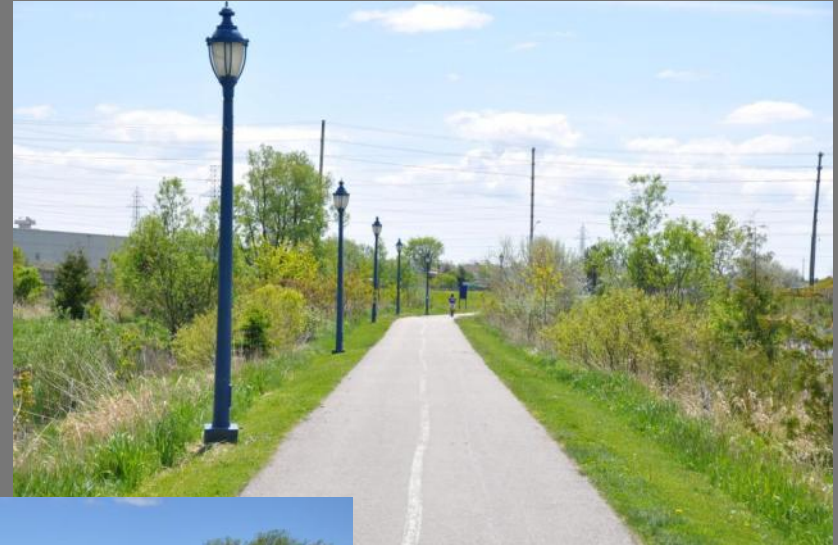


Mulock Dr in Newmarket



Bayview Ave in Aurora

York Region – Shared Use Paths



Tom Taylor/Nokiidaa Trail, Newmarket

Bike Facilities Alternatives Analysis:

Types of Cyclists

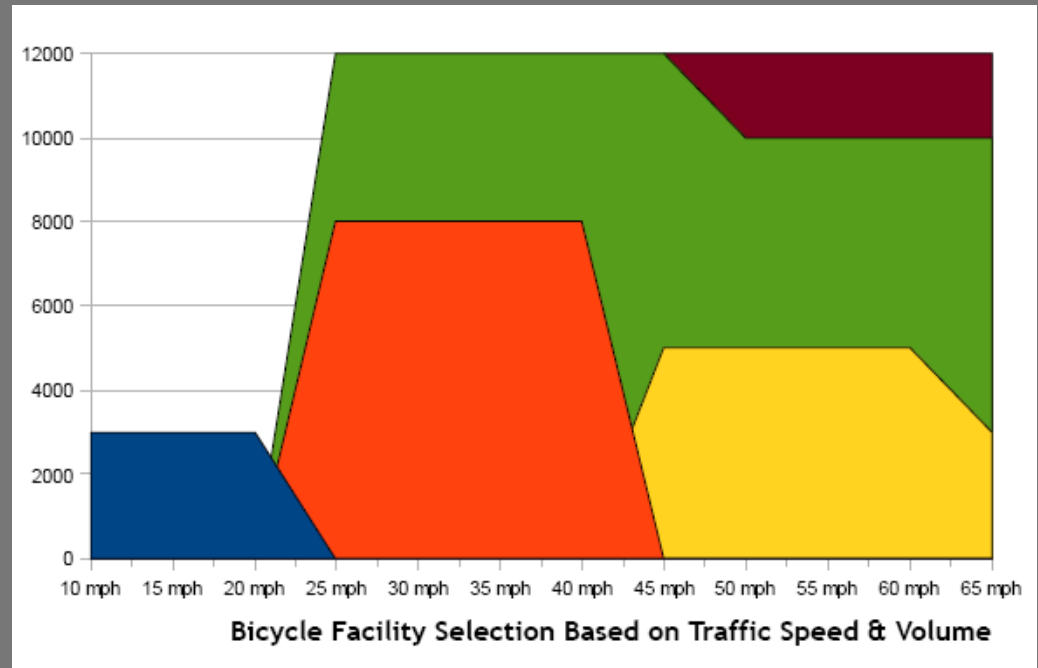
Facility	Less Skilled	Intermediate Skills	Advanced Skills
Slow Mixed Traffic	🚲 🚲	🚲 🚲 🚲 🚲	🚲 🚲 🚲 🚲 🚲
Wide Curb Lane	🚲	🚲 🚲 🚲	🚲 🚲 🚲 🚲
Bicycle Lane	🚲	🚲 🚲 🚲 🚲	🚲 🚲 🚲
Paved Shoulder	🚲	🚲 🚲 🚲 🚲 🚲	🚲 🚲 🚲 🚲 🚲 🚲
Shared Use Path	🚲 🚲 🚲 🚲	🚲 🚲 🚲 🚲	🚲 🚲



Bike Facilities Alternatives Analysis:

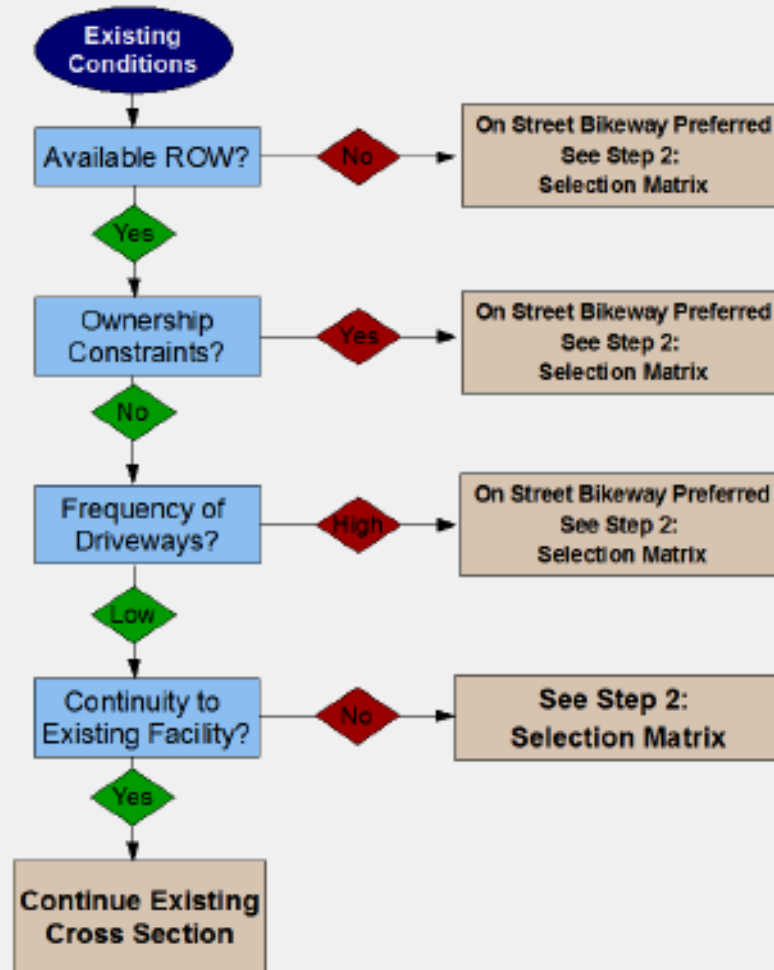
Types of Facilities

- Shared-Use Path
- Bicycle Lane
- Paved Shoulder
- Wide Curb Lane
- Shared Lane
- Signed Shared Roadway



- No Facility
- Wide Outer Lane
- Bikeable Shoulder
- Bicycle Lane
- Off-Street Path

Bike Facilities Alternatives Analysis: *Decision Making Process*



Bike Facilities Alternatives Analysis: *Facility Selection Process*

Bicycle Facility Selection Matrix

AADT Posted Speed Vehicular Mix of Heavy Trucks Frequency of Driveways Functional Class		<5,000 AADT											
		<= 30 mph				31-40 MPH				>40 MPH			
		<10%		>10%		<10%		>10%		<10%		>10%	
		Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
		Collectors											
Facility Type	Cross Section Width*												
Shared Use Path													
Bicycle Lane	>25'												
Paved Shoulder	>25'												
Wide Curb Lane	21'												
Shared Lane	<21'												
Signed Shared Roadway													

AADT Posted Speed Vehicular Mix of Heavy Trucks Frequency of Driveways Functional Class		5,000-10,000 AADT											
		<= 30 mph				31-40 MPH				>40 MPH			
		<10%		>10%		<10%		>10%		<10%		>10%	
		Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
		Arterials											
Facility Type	Cross Section Width*												
Shared Use Path													
Bicycle Lane	>25'												
Paved Shoulder	>25'												
Wide Curb Lane	21'												
Shared Lane	<21'												
Signed Shared Roadway													

AADT Posted Speed Vehicular Mix of Heavy Trucks Frequency of Driveways Functional Class		>10,000 AADT								Limited Access Roadways
		<40 MPH				>40 MPH				
		<10%		>10%		<10%		>10%		
		Low	High	Low	High	Low	High	Low	High	
		Arterials								
Facility Type	Cross Section Width*									
Shared Use Path										
Bicycle Lane	>25'									
Paved Shoulder	>25'									
Wide Curb Lane	21'									
Shared Lane	<21'									
Signed Shared Roadway										

Intersection Treatment – Direct, Logical and Predictable Behavior



Portland, Oregon



Montreal

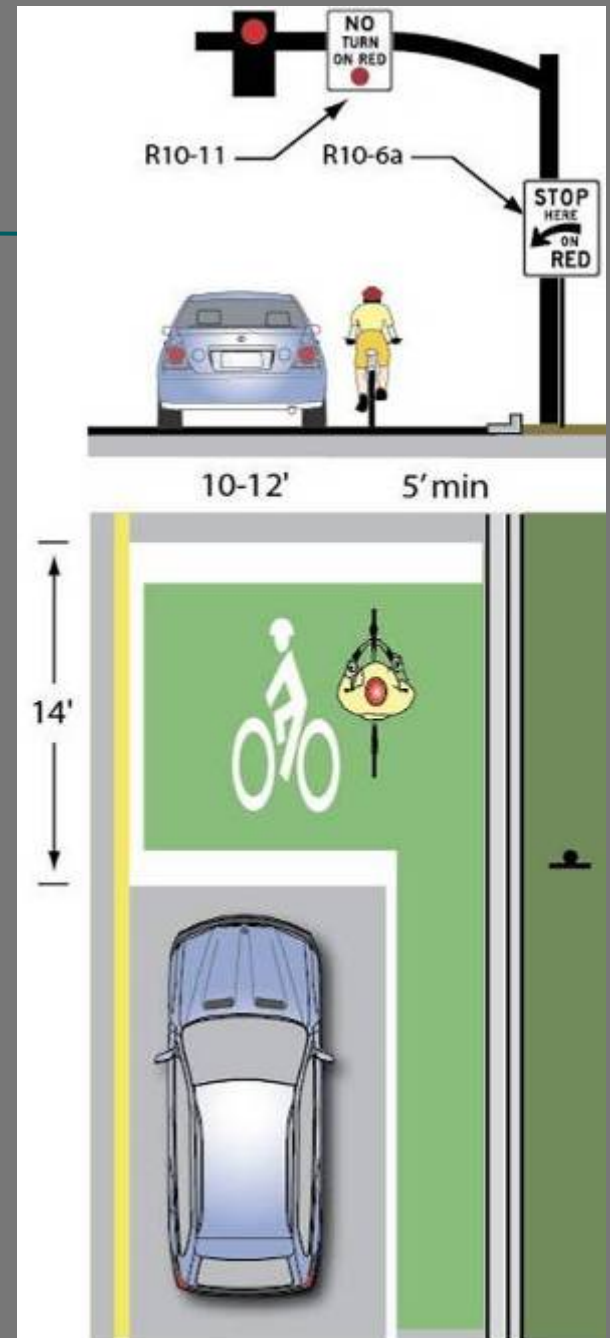
Bike Boxes

Bicyclists move in front of traffic during red phase and proceed first at green

- ❖ Increases visibility of bicyclists
- ❖ Reduces bicycle/car conflicts
- ❖ Can help bicyclists make left-turn movements

Guidance:

- ❖ 14' deep for bicyclist positioning
- ❖ Prohibit right turn on red
- ❖ Use only at signalized intersection



Bike Lanes Through Intersections



Copenhagen, Denmark



**Winterthur,
Switzerland**



Osnabruck, Germany

Source: "Pedestrian and Bicyclist
Safety and Mobility in Europe",
FHWA, February 2010

Alternative Left Turns



Bike-only signal, Switzerland



Portland left turn from Cycletrack



Jug-handle left, Cambridge Mass

Bicycle Signals



Prohibit right-turn on red by cars and left turns by bicycles

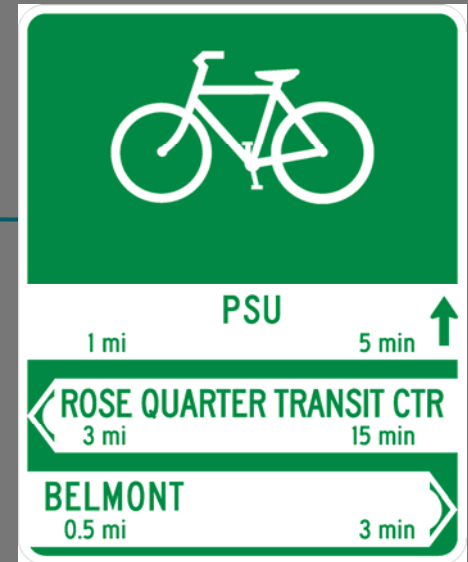
Provide an advance or separate green signal for bicycles

Use bicycle-differentiated signal heads

- Bicycle icon
- Smaller signal
- Located on near-side
- Countdown to red/green
- Longer signal phase

Bicycle Wayfinding - Signage

- ❖ Directs users to and along a bike facility
- ❖ Directs users to places of interest, giving distance and average cycling time
- ❖ Visual queue to motorists to be aware of bicycles
- ❖ Placed at key intersections and decision points



Bicycle Parking: Existing Conditions



Bicycle Parking: “Bike Oases”

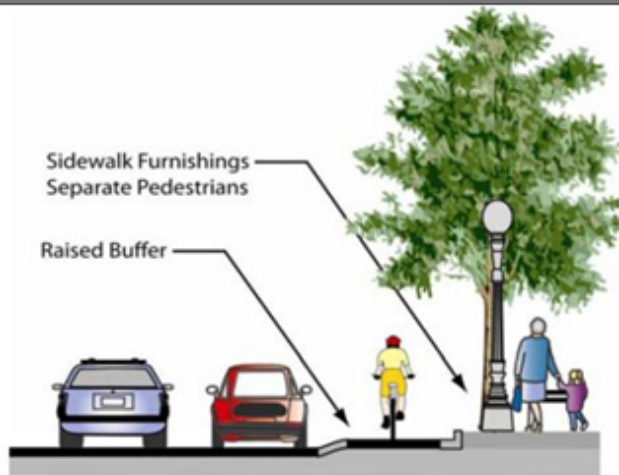


Hawthorne Boulevard, Portland Oregon

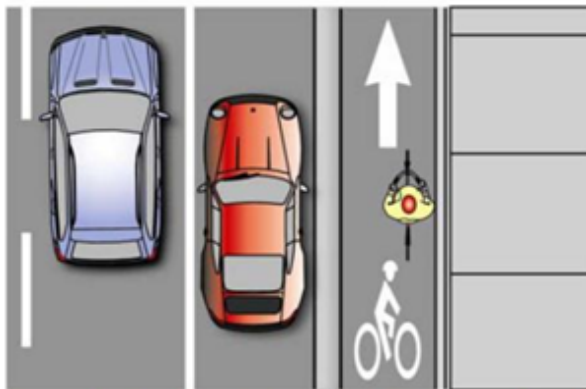
Bicycle Parking: Bike Corrals



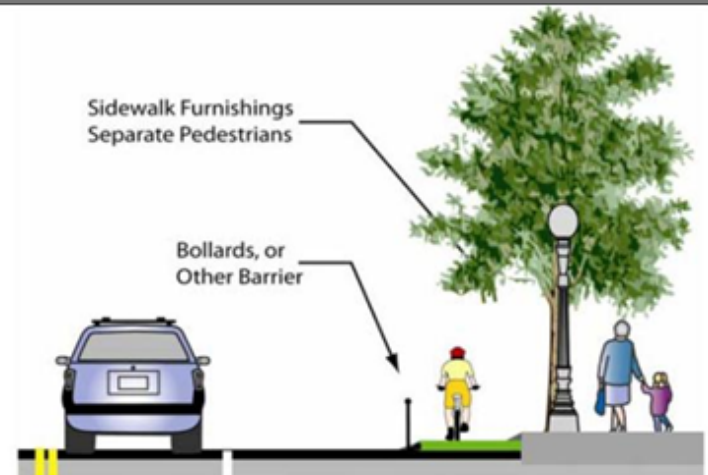
Design Guidelines



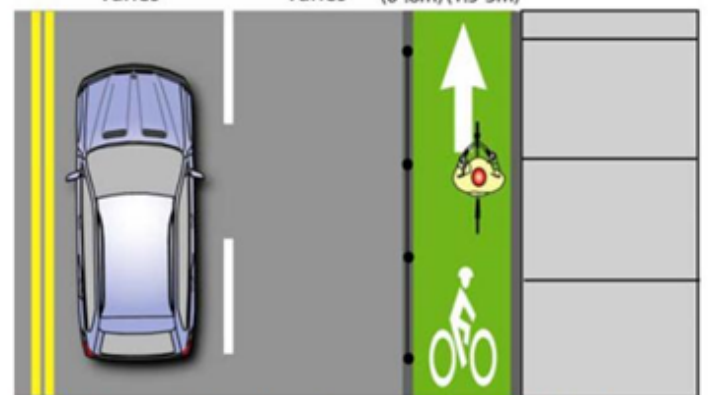
Travel Lane Varies
Parking Varies 0-2' (0-0.6m) 5'-10' (1.5-3m)



Example Section Design for Cycle track with On-Street Parking



Travel Lane Varies
Travel Lane Varies 0-2' (0-0.6m) 5'-10' (1.5-3m)



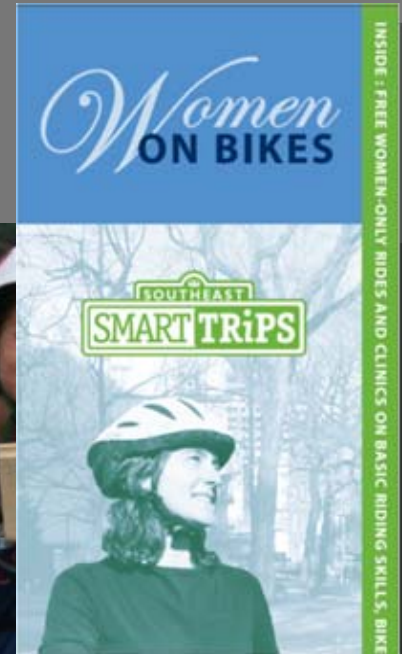
Example Section Design of a Cycle track without Parking

Paved shoulders



Balanced Programs

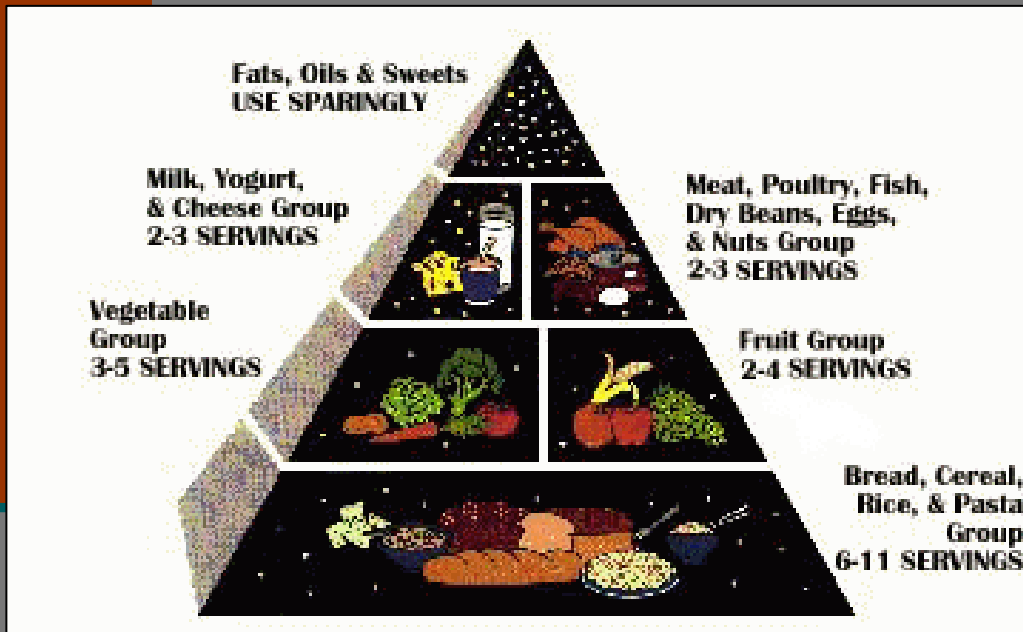
- Education
- Encouragement
- Enforcement
- Evaluation/Policies
- Safe Routes to Schools
- Smart Trips



Transit Connections



The Transportation “Food Pyramid”



Complete Streets

Health
Safety
Mobility
Economy
Energy
Environment
Quality of Life



The Possible Future



Thank You!

Alta Planning + Design
Jeff Olson, Partner
www.altaplanning.com



“Determine that the thing can and shall be done, and then we shall find the way.”
Abraham Lincoln