The Old Standards

Manual on Uniform Traffic Control Devices
for Streets and Highways
2009 Edition

Guide for the Development of Bicycle Facilities
1999

American Association of State Highway and Transportation Officials
“The bicycle has become an important element for consideration in the highway design process. Fortunately, the existing street and highway system provides most of the mileage needed for bicycle travel.”

- 900 pages of guidance
- Less than 1 page on bicycles
PROTECTED BIKE LANES & SHARED USE PATHS

CONVENTIONAL BIKE LANES

SHARED LANES
Do you want separation from traffic?

Credit: Nicole Freedman, Boston
### FHWA Status of Existing Bikeway Treatments

<table>
<thead>
<tr>
<th>Description of Bicycle Facilities</th>
<th>Status in the FHWA’s Manual on Uniform Traffic Control Devices (MUTCD)</th>
<th>Are FHWA Experiments in Progress?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Signs and Markings</strong></td>
<td></td>
<td></td>
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<tr>
<td><strong>Bike Lanes</strong></td>
<td></td>
<td></td>
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<tr>
<td>Conventional bike lanes</td>
<td>Can be implemented at present time</td>
<td></td>
</tr>
<tr>
<td>Continuation of bike lanes up to intersections</td>
<td>Can be implemented at present time</td>
<td></td>
</tr>
<tr>
<td>Dashed bike lanes through intersections</td>
<td>Can be implemented at present time</td>
<td></td>
</tr>
<tr>
<td>Use of green pavement markings for bike lanes and cycle tracks within intersections</td>
<td>Interim approval has been granted. Requests to use green colored pavement need to comply with the provisions of Paragraphs 14 through 22 of Section 1A.10</td>
<td>Yes</td>
</tr>
<tr>
<td>Green bike lanes at conflict points such as heavy turning and merging locations</td>
<td>Interim approval has been granted. Requests to use green colored pavement need to comply with the provisions of Paragraphs 14 through 22 of Section 1A.10</td>
<td>Yes</td>
</tr>
</tbody>
</table>
The Bike Guide: An Overview
The Bike Guide: An Overview

BIKE LANES
- Conventional
- Buffered
- Contra-Flow
- Left-side Bike

CYCLE TRACKS
- One-way
- Two-way
- Raised

INTERSECTIONS
- Cycle Track Intersections

SIGNS & MARKINGS
- Shared Lane Markings
- Green Color

BICYCLE BOULEVARDS
Guide Structure

Required
(Shall)

Recommended
(Should)

Optional
(May)
Defining Success

Comfortable/Safe
Separation is key

Cohesive & Connected
No bike lanes to nowhere

Intuitive
Bicyclists are window shoppers too

Direct
Avoid circuitous routing

Attractive
Commute = Recreation
Design for Every Mode
Bikeway Design = Complete Street Design
Don’t trade the sidewalk for the gutter
Elevation Matters
Avoid cluttered markings
Keep it simple
Design for Loading and Maintenance
An Overview of Bikeway Types in the NACTO Guide
Shared Lane Markings
Bicycle Boulevards
Bicycle Boulevards
Conventional Bike Lanes
Green Bike Lanes
Buffered Bike Lanes
Contra-Flow Bike Lanes
One-way Cycle Track
One-way Cycle Track
Austin, TX
Raised Cycle Track
Raised Cycle Track (two-way)
Indianapolis, IN
Two-way Cycle Track
Mixing Zone
Cycle Track Intersection Approach Strategies
Bicycle Signals
Intersection Crossing and Two-stage Turn
Chicago, IL
David Vega-Barachowitz
Director, Designing Cities Initiative
david@nacto.org
Designing Safe Streets for Bicyclists
GOAL 2: Make transit, walking, bicycling, taxi, ridesharing and carsharing the preferred means of travel

2012
- Auto: 62%
- Bike/Walk: 21%
- Transit: 17%

2018
- Bike/Walk/Transit: 50%
- Auto: 50%
What does bicycling look like in a city that has achieved our goals?

160 miles

3.5% bikeshare

28% are women

5,400 people on bikes on Market Street daily

65% of cyclists bike year round

40% own a bike

40% own a bike
Bicycle Strategy Vision:
Bicycling is part of everyday transportation
Create bikeways that are...

- Safe
- Comfortable
- Continuous
- Convenient
- Welcoming
- Delightful

Design Vehicle
What have we been doing?
Bikeshare!

Photo: Frank Chan
Embarcadero
Market Street
Integrate Transit Into Streetscape Design

- Make System-wide Investments
- Integrate Transit Into Other Projects
- Build a Rapid Network (TEP)
- Minimize Transit Impacts From Other Projects
TEP/Rapid Network
Lesson 1: Document + Evaluate
This’ll be a breeze!
1.5 miles of Cabrillo (Arguello-25th) – 24 intersections and 250 driveways

1.5 miles of JFK – 9 intersections within proposed project area
Proposed Design

Proposed cross-section: 53-61 feet
(e.g. near Stow Lake Drive)
Do people understand it?
Budget for outreach

Be mindful of ADA

Design for driver error
Vehicle Speeds Went Down

Motor Vehicle Speeds Comparison
in Miles per Hour
10am to 5pm

30.4

28.3

85th percentile speed Before (7/14/2011)  85th percentile speed After (7/12/2012)

Bicycle Speeds Went Down

**Bicycle Speed Comparison**
(in miles per hour)

Before (January 2012): 14.734
After (June 2012): 12.483

[Source](www.sfmta.com/news/project-updates/jfk-drive-bikeway-final-evaluation)
Lesson 2: Patience
Existing Conditions
Before

Second Street at Tehama Looking South
Second Street at South Park Looking North
Before

Second Street at South Park Looking North
Second Street at Townsend Looking South
Before

Second Street at Townsend Looking South
After

Second Street at Tehama Looking South
Lesson 3: Detailed design precedes concept design

- Safety: reduces dooring, lowers speeds and reduces parking conflicts
- Accommodates existing traffic volumes
- Greater level of comfort for people new to bicycling
- Improves pedestrian experience and enhances transit access
- Flexible and modular
- Possible to implement in 2013 with planned road re-surfacing

On Your Fiets!
Two Cycle Tracks

**Bikinings**
Wide lanes substantially separated from vehicles.

**Walkings**
Remove bus shelters from sidewalk, other intersection upgrades. No parklets.

**Parkings**
Parking removed fully from both sides.

**Transitings**
Bus boarding islands would reduce delay and provide additional waiting area.

Uphill Cycle Track

**Bikinings**
Significant separation and wide lanes.

**Walkings**
Potential parklets, other intersection upgrades, prevent future shelters on sidewalk.

**Parkings**
Parking removed fully from one side and partially from the other.

**Transitings**
Future boarding islands would reduce delay and provide additional waiting area.

One-way

**Bikinings**
Total separation and wide lanes.

**Walkings**
Potential parklets, remove shelters from sidewalk, other intersection upgrades.

**Parkings**
Parking removed fully from one side and partially from the other.

**Transitings**
Bus and traffic diversions to nearby streets. Boarding islands would reduce delay.
Curbside bikeways (Upper/Middle Polk)

Uphill cycle track (Lower Polk)

Two cycle tracks (Lower Polk)
Lessons Learned

• Invest in evaluation and outreach during construction and afterwards
• Patience pays off
• Sometimes you have to understand the details before you can make conceptual decisions