Designing an All-Ages Bikeway Network

Craig Toocheck
Design Coordinator, NACTO
Biking is ... ?
Biking is ... Under-Performing

Bicycle Mode Share, 2015

- Portland: 7.0%
- Minneapolis: 5.0%
- San Francisco: 4.3%
- Seattle: 4.0%
- San Jose: 1.0%
- National Average: 0.6%
Who are we designing for?
Who are we designing for?
A bike lane is just a start
We can do much more.
Who are we forgetting?

Interested but Concerned 51–60%

Not able or interested 31–37%

Strong & Fearless 1%

Enthused & Confident 6%

Who’s still not counted?
How to get more potential cyclists onto bikes?

The majority of people will ride with protected bike lanes. Of the total population:

- Strong and Fearless: <1%
- Enthused and Confident: 7%
- Interested but Concerned: 60%
- No Way No How: 33%

Of the interested but concerned cyclists, percent who are comfortable on streets with:

- No bike facility: 8%
- A bike lane: 39%
- A separated bike lane: 81%

Sources: Roger Geller (2009) and Jennifer Dill (2012)
Who should our design user(s) be?
All Ages & Abilities means ...

Safe

Photo: City of Austin

Attractive

Photo: City of Vancouver

Equitable

Photo: People for Bikes
Change requires commitment ...
... to attractive projects ...
... and safe, equitable networks, on major corridors ...
... and neighborhood streets ...
... to build a connected, all-ages network.
Robust investments yield results!

Aggregate data from Portland, New York City, Chicago, San Francisco, and Philadelphia
NACTO’s *Designing for All & Ages & Abilities*
## Contextual Guidance

### Roadway Context

<table>
<thead>
<tr>
<th>Target Motor Vehicle Speed (95th Percentile)</th>
<th>Target Max. Motor Vehicle Volume (ADT)</th>
<th>Motor Vehicle Lanes</th>
<th>Additional Operational Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any</td>
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<td>Any of the following: high curbside activity, frequent buses, motor vehicle congestion, or turning conflicts</td>
</tr>
<tr>
<td>&lt; 10 mph</td>
<td>Less relevant</td>
<td>No centerline, or single lane one-way</td>
<td>Pedestrians share the roadway</td>
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<td>≤ 20 mph</td>
<td>≤ 1,000 – 2,000</td>
<td>Single lane each direction or single lane one-way</td>
<td>≤ 100 motor vehicles per direction at peak hour</td>
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<td>≤ 20 – 25 mph</td>
<td>≤ 1,500 – 3,000</td>
<td>Multiple lanes per direction</td>
<td>Low curbside activity, or low congestion pressure</td>
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<td>Greater than 5,000</td>
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</tr>
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<td>Greater than 26 mph</td>
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<tr>
<td>High-speed limited access roadways, natural corridors, or geographic areas with limited conflicts</td>
<td>Any</td>
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<td>Low pedestrian volume</td>
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### All Ages and Abilities Bicycle Facility

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### Motor Vehicle Lanes
- No centerline, or single lane one-way
- Single lane each direction, or single lane one-way
- Multiple lanes per direction

### Additional Operational Considerations
- Pedestrians share the roadway
- Low curbside activity, or low congestion pressure
- Less than 100 motor vehicles per direction at peak hour
Speed & Volume Increase Stress

- 1,000 ADT
- 3,000 ADT
- 5,000 ADT

Stopping Events per 10-Minute Trip

- 20 MPH
- 25 MPH
- 30 MPH
Stress Changes During the Day
Three Levers to Change the Street

Design

Operation

Network
Three Levers to Change the Street Design

- Flip the Bike Lane & Parking Lane
- 4-to-3 Road Diet / Repurpose Motor Vehicle Lane
Three Levers to Change the Street

Operation

- Low-Speed Signal Progression
- Turn Prohibition
- Phase Separation
Three Levers to Change the Street

- Forced turns / Diversion
- Time-of-Day Regulations
- Large Vehicle Prohibitions
Low-Speed, Low-Volume Roadways Can Be Shared

- Use both Peak Volume & Off-Peak Speed
- 20-25mph max Target Speed
- Manage high-end Speeds
- Reduce / Filter Volume
- Use Time of Day analyses for deliveries & stressors

Photo: NACTO
Conventional & Buffered Lanes Organize Only

- Set 95\textsuperscript{th} Percentile below 25mph
- Reduce Motor Vehicle Volume
- Reduce Curbside Conflicts
- Address Intersection Conflicts
- Adjacent Traffic Decreases Comfort

Photo: NYC DOT
Separate Bicyclists When Speed & Volume are High

- Protect where 95\textsuperscript{th} Percentile exceeds 25mph
- Carry protection through Intersections
- Reduce Curbside Conflicts
- Upgrade Separation as Stress Increases
- Minimize the number of travel lanes

*Photo: Adam Coppola for People for Bikes*
Address Common Sources of Stress
Unorganized Multi-Lane Streets
Address Common Sources of Stress
Congestion, Queueing, & Intrusion
Limit Conflicts at Intersections

Photo: Nate Roseberry, CDOT
Don’t Force Bikes to Compete with Transit

Photo: Michael Pieracci
Bikes & Buses move at similar speeds

Avg. Speed ... 10-15mph
Give Each Their Space

Photo: Adam Coppola for People for Bikes
Curbside Activity

Photo: Dongho Chang, SDOT
Thank you!

Keep in touch: craig@nacto.org @nacto

Photo: Adam Coppola for People for Bikes