SERVING ALL MODES

What Is a Complete Street?
Session 5

Accommodating All Modes

Not a Complete Street

More of a Complete Street
Benefits of Complete Streets

- Safety for all modes
- Mobility and access
- Health
- Transportation capacity
- Economic activity and property values
- Quality of life

National Complete Streets Status

2000 US DOT Guidance:
Bicycling and walking facilities will be incorporated into all transportation projects unless exceptional circumstances exist

Few jurisdictions embrace or follow this guidance
Complete Streets Status in Minnesota

• HF 3800 passed in May 2008
• Feasibility and cost-benefit
• Mn/DOT report to Legislature in December 2009
• Legislation currently pending
• Hennepin, Ramsey and Carver Counties and cities of Rochester and Duluth have developed formal policies

Accommodating All Modes

• All users should receive attention in the design process for all projects
• Many decisions must be made early in the planning and design process
• But, many detailed design issues arise later in the design process
Consider Level of Service for All

- Pedestrians
- Bicyclists
- Vehicles
  - Trucks
  - Cars
  - Transit Vehicles
- Transit Users
- Parking

Same Needs – Different Solutions

<table>
<thead>
<tr>
<th>Interstate</th>
<th>Rural Highway</th>
<th>Urban Arterial</th>
<th>Local Road</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interstate 494</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak Period LOS</td>
<td>Mobility</td>
<td>Mobility and Peak Period LOS</td>
<td>Local Access</td>
</tr>
<tr>
<td>Overpass Crossings</td>
<td>Shoulder Operations</td>
<td>Sidewalks and Crosswalks</td>
<td>Sidewalks</td>
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<tr>
<td>Shoulder Operations</td>
<td>Park-n-Ride Lots</td>
<td>Bus Shelter</td>
<td>Bus Stop</td>
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<td>Overpass Crossings</td>
<td>Shoulder Operations or Trail</td>
<td>On-Street Bike Lanes or Multi-Use Trail</td>
<td>Share the Road</td>
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<tr>
<td>Grade Separation</td>
<td>At+ Grade or Grade Separation</td>
<td>At+ Grade or Grade Separation</td>
<td>At+ Grade</td>
</tr>
</tbody>
</table>
Massachusetts Approach

Chapter 5 Cross-Section: Flexible Multimodal Accommodation Approaches

- Descriptions have been developed for the cases:
  - Case 1: Independent Accommodation
  - Case 2: Partial Bicycle/MV Sharing
  - Case 3: Bicycle/MV Sharing
  - Case 4: Pedestrian/Bicycle Sharing
  - Case 5: Shared by All Users

Be Aware Of:

- ADA requirements
- Modal priorities and space allocation
- Pedestrian and/or bicycle crashes
- Access to transit
- Modal conflicts
- Pedestrian/bicycle volumes
- Quality of walking environment
Hennepin Avenue – Before

Hennepin Ave – crash data

Safety – Existing Crash Data

- 31 of 38 recorded bicycle crashes located between 12th St and 1st St
- 94% left turn related (56% left hook)
Session 5
Accommodating All Modes

Hennepin Avenue - After

1st Avenue - After
Transit Characteristics

- Frequency/loadings
- Pedestrian & bicycle access
- Safety and personal security
- Lighting
- Near and farside stops
- Signal preemption
- Shelter design and maintenance
Snow Removal Is a Big Issue

Bicyclist Characteristics
Urban Bikeway Design

Table 4-1: Bikeway Design Selection for Urban (Curb and Gutter) Cross Section - English Units

<table>
<thead>
<tr>
<th>Motor Vehicle ADT (2 Lane)</th>
<th>&lt;100n</th>
<th>100-1,000</th>
<th>1,000-2,000</th>
<th>2,000-4,000</th>
<th>4,000-10,000</th>
<th>10,000-20,000</th>
<th>&gt;20,000</th>
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</thead>
<tbody>
<tr>
<td>Motor Vehicle ADT (4 Lane)</td>
<td>N/A</td>
<td>N/A</td>
<td>2,000-4,000</td>
<td>4,000-10,000</td>
<td>10,000-20,000</td>
<td>&gt;20,000</td>
<td>Not Applicable</td>
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<tr>
<td>Motor Vehicle Speed</td>
<td>25 mph</td>
<td>SL</td>
<td>WUL</td>
<td>WCL</td>
<td>WCL</td>
<td>BL = 5 ft</td>
<td>BL = 6 ft</td>
</tr>
<tr>
<td></td>
<td>30 mph</td>
<td>SL with sign</td>
<td>WOL</td>
<td>BL = 5 ft</td>
<td>BL = 6 ft</td>
<td>BL = 6 ft</td>
<td>BL = 8 ft</td>
</tr>
<tr>
<td></td>
<td>35-40 mph</td>
<td>WUL</td>
<td>BL = 6 ft</td>
<td>BL = 8 ft</td>
<td>BL = 10 ft</td>
<td>BL = 12 ft</td>
<td>BL = 16 ft</td>
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<tr>
<td></td>
<td>45 mph and greater</td>
<td>BL = 6 ft</td>
<td>BL = 8 ft</td>
<td>BL = 10 ft</td>
<td>BL = 12 ft</td>
<td>BL = 16 ft</td>
<td>SUP or PS = 10 ft</td>
</tr>
</tbody>
</table>

DL = Bicycle Lane. SL = Shared Lane. WOL = Wide Outside Lane. SUP = Shared-Use Path, PS = Paved Shoulder

Source: Mn/DOT Bikeway Facility Design Manual

Snow Removal

Source: Mn/DOT Bikeway Facility Design Manual
Pedestrian Characteristics

- Older people
- Children
- Persons with disabilities
  - Physical
    - Wheelchair (manual, motorized or scooters)
    - Walkers, crutches, canes
  - Visual
    - Low vision
    - Blind (cane or guide dog)
  - Hearing
  - Cognitive

*Figure 5. Spatial dimensions for people with disabilities (4).*
Pedestrian Networks: Common Problems

- Missing sidewalks
- Unusually long blocks
- Natural barriers
- Freeways
- Other barriers

Pedestrian Networks: Best Practices

- Sidewalks on both sides of every street
- Pedestrian “short-cuts” through unusually long blocks
- Small blocks where new streets are constructed
- Maintaining the street grid across barriers
- Bridges
Sidewalk Corridors: Common Problems

- Insufficient width for people and all the other “stuff”
- Too close to moving traffic for comfort
- No space for trees and street furniture
- Street furniture obstructs direct walking path
- Narrow corridors are even narrower with snow

Sidewalks: Best Practices

- Zone system with minimum widths
  
  Minimum acceptable width: 12 feet
Best practices: Curb extensions

- Use curb extension to maximize space for desired elements
- Especially where sidewalk corridor is less than 12 feet
- Transit shelters

Creative Uses of Parking Lane
Bridges: Common Problems

- Narrow sidewalks
- Sidewalk on only one side
- Next to moving traffic (often higher speed)
- No adjacent land uses
- No “escape route”
- Matching into adjoining facilities
- Expensive to build and to modify

Bridges (and under): Best Practices

- Use same zone philosophy as for sidewalks
- Sufficient space for snow clearance equipment (jeep)
- On bridges connecting to off-street trails, sidewalks should be sufficiently wide to accommodate both pedestrians and bicycles
- Bridges should have pedestrian-scale lighting
Street Corners: Common Problems

- Insufficient space for people, curb ramps and other “stuff”
- Curb ramp condition, placement and design
- Lack of obstruction-free area

Curb Ramp Problems
Best Practice: Clear Corner Zones

- No obstructions
  - Street furniture
  - Vegetation
  - Utilities
- Priority use: accessible ramps and pedestrian call buttons at signals

Best Practice: Small Corner Radius

- Particularly on narrow sidewalks
- More space for two perpendicular curb ramps
- Better aligns sidewalk, curb ramp and crosswalk
- Slows the speed of turning vehicles
- Shortens crossing
**Best Practice: Curb Ramp Design**

- 2 ramps per corner
- Avoid diagonal ramps
- No steep slopes
- Align with sidewalk and crosswalk, while maintaining level landing
- Option – returned edge next to planted boulevard
- Easier for snow removal

**Street Crossings: Common Problems**

- Wide crossings
- Poor visibility
- Turning vehicle conflicts
- Speeding vehicles
- Faded crosswalk markings
Lane Width Trade-Offs

- Wider lanes:
  - allow for higher speeds
  - reduce lane departure crashes
- Narrower lanes:
  - reduce right-of-way needs
  - lessen pedestrian crossing time

Best Practices: Crosswalks

Figure 10.5.3: Standard (Transverse) and High-visibility (Longitudinal) Crosswalk

Figure 10.5.4: Crosswalk Visibility for Drivers.
Best Practices: Refuge Islands

- Provides space to enable pedestrian crossings one direction at a time
- Reduces vehicle speeds
- Provides better placement for signal poles

Best Practices: Pedestrian Signals

- Designs that clearly communicate available crossing time
- Accessible push buttons with clear indication of crossing direction
- Mn/DOT policy – APS on all new signals
Bike Ramp Design

45° angle; short taper, located in taper

Cyclists Can Choose

Mn/DOT
UM Center for Transportation Studies

Advanced Design Flexibility Workshop
May 2010
Example: Excelsior Blvd.

- 11 foot lanes – no shoulders
- 35 mph
- Turn lanes store 2 vehicles
- Tapers 10:1 on turn lanes; 5:1 for parking bays
- Crash reduction over 55%

Example: Excelsior Blvd.

- Landscaped median
- Access management
- Pedestrian amenities
- Transit oriented development
Example: Excelsior Blvd.

- Curb extensions for pedestrian crossings
- 8 foot parking bays
- Mix of near side and far side transit stops
- Wider boulevards

Exercise