Complete Streets
&
Maintenance Projects

Transportation Engineering Association of Missouri
March 9, 2017
Project Development

Key Complete Streets Themes

Modal Hierarchy
Typology
Design Values
Procedures
Project Development

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Modal Hierarchy

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Key Complete Streets Themes
<table>
<thead>
<tr>
<th>ADT on Green Street</th>
<th>Daytime Routes &amp; Bus Stops</th>
</tr>
</thead>
<tbody>
<tr>
<td>10,000 - 12,000</td>
<td>20 / 35</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Crashes in 5 Years</th>
<th>Daily Boardings &amp; Alightings</th>
</tr>
</thead>
<tbody>
<tr>
<td>325</td>
<td>28,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Peds/Hour Wright &amp; Green</th>
<th>Bicyclists on Campus</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,500</td>
<td>6,000</td>
</tr>
</tbody>
</table>
Urbana/Champaign, IL
MCORE Project
Project Development

Key Complete Streets Themes

Modal Hierarchy  Typology

Procedures Design Values
Manchester Road (Route 100)

- MoDOT St. Louis District
- Route 141 to Lindbergh Blvd (US 61)
- Approximately 6 miles broken into two projects
Manchester Road (Route 100)

Existing Conditions

- Varying cross section of 4 to 8 lanes
- Open and closed drainage systems
- Bus Stops without sidewalk access
- Older sidewalk and ramps (PROWAG)
- Outdated signals (PROWAG)
- Short segments with marked bike lanes
- Some newer developments
Manchester Road (Route 100)

- Primary Work is mill and overlay of roadway

**What else must be done?**

- PROWAG Section R201.1 Scope
  
  “All newly constructed facilities, altered portions of existing facilities, and elements added to existing facilities for pedestrian circulation and use located in the public right-of-way shall comply with the requirements in this document.”

- As stated in EPG 642:
  
  “…when an alteration is made to a roadway on which pedestrian facilities (sidewalks, pedestrian grade separations, curb ramps, etc.) exist on Missouri Highways and Transportation Commission (MHTC) right of way, each altered element or space within the limits or scope of the project shall comply with the applicable requirements for new construction to the maximum extent feasible.”
Manchester Road (Route 100)

- **Alterations (EPG 642)**
  - “A change that affects or could affect the usability of all or part of a building or facility. Alterations of streets, roads, or highways include activities such as reconstruction, rehabilitation, resurfacing, widening, and projects of similar scale and effect.”
  - All barriers to access between curb ramps, steep cross slopes, or steep running sloped areas will be addressed.
  - All existing pedestrian facilities disturbed will be replaced.
  - Signal projects should include curb ramps and/or island cut through, detectable warnings, and ADA-compliant pushbuttons at a minimum.
PROWAG Background

PROWAG - Public Rights of Way Accessibility Guidelines

- ADA Accessibility Guidelines focus mainly on facilities or sites.
- New guidelines for public rights-of-way address various issues, including access for blind pedestrians at street crossings, wheelchair access to on-street parking, and various constraints posed by space limitations, roadway design practices, slope, and terrain.
- The new guidelines will cover pedestrian access to sidewalks and streets, including crosswalks, curb ramps, street furnishings, pedestrian signals, parking, and other components of public rights-of-way.
- These guidelines ensure that access for persons with disabilities is provided wherever a pedestrian way is newly built or altered, and that the same degree of convenience, connection, and safety afforded the public generally is available to pedestrians with disabilities.
Manchester Road (Route 100)

Proposed PROWAG Sidewalk Improvements
- Replacement of 4’ and narrower sidewalk
- Replacement of sidewalk ramps
- Addition of raised detectible warnings
- Provide paths through intersection islands
- Connect bus stops to sidewalk
- Add segments to improve route continuity
- Identify other hazards
Manchester Road (Route 100)

Proposed PROWAG Traffic Signal Improvements

- Add pedestrian heads for each crossing
- Add Audible Pedestrian Signals (APS)
- Provide buttons for each direction crossed
- Correct vertical/horizontal button placement
Project Development

Key Complete Streets Themes

- Modal Hierarchy
- Typology
- Design Values
- Procedures
Buses and Pavement Design

How do we design for bus loadings?

Can we assume they are no worse than a multi-unit truck?

Impact of Fully Loaded CUMTD Buses vs Typical Assumption of a Multi-Unit Truck

<table>
<thead>
<tr>
<th>Bus Length</th>
<th>Gross Vehicle Weight (Loaded)</th>
<th>Actual % Increase in Traffic Factor vs MU Truck</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 Feet</td>
<td>42,350 lbs.</td>
<td>377%</td>
</tr>
<tr>
<td>60 Feet</td>
<td>66,790 lbs.</td>
<td>531%</td>
</tr>
</tbody>
</table>
Buses and Pavement Design

Existing Pavement Structure
- 8” PCC Base
- 4” HMA Overlay
- Current Condition = Poor

Proposed Options Based on Bus = Multi-Unit Truck (MU)

<table>
<thead>
<tr>
<th>Initial Pavement Alternatives</th>
<th>Alt-1</th>
<th>Alt-2</th>
<th>Alt-3</th>
<th>Alt-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patching</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mill 4” HMA</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mill 2” PCC</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rubbelize PCC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8” HMA Overlay</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>9” HMA Overlay</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>8” PCC Pavement</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>13” Full Depth HMA</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
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<tr>
<td>Estimated Cost</td>
<td>$1,183,438</td>
<td>$1,039,261</td>
<td>$1,528,072</td>
<td>$1,464,930</td>
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</tbody>
</table>
Buses and Pavement Design

Rigid Pavement Traffic Factor Triples

<table>
<thead>
<tr>
<th>Vehicle</th>
<th>Volume</th>
<th>Percentage of ADT</th>
<th>Typical Bus = MU</th>
<th>Adjusted Bus Load Factors</th>
<th>Percent Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>12,846</td>
<td>91.7%</td>
<td>0.012</td>
<td>0.012</td>
<td>0%</td>
</tr>
<tr>
<td>MU</td>
<td>280</td>
<td>2.0%</td>
<td>1.755</td>
<td>1.755</td>
<td>0%</td>
</tr>
<tr>
<td>40' Bus</td>
<td>461</td>
<td>3.3%</td>
<td>2.889</td>
<td>12.105</td>
<td>319%</td>
</tr>
<tr>
<td>60' Bus</td>
<td>413</td>
<td>3.0%</td>
<td>2.589</td>
<td>15.276</td>
<td>490%</td>
</tr>
<tr>
<td>Total Traffic Factor</td>
<td>7.245</td>
<td></td>
<td></td>
<td>29.149</td>
<td>302%</td>
</tr>
</tbody>
</table>

Pavement Structure Increases

Typical
- 8” PCC with 12” AGG

Adjusted
- 10 1/2” PCC with 12” AGG

+2 1/2”
Thank You!