Restoring One-Way Couplets to Two-Way Operation

2019 Traffic Engineering Workshop and Transportation Planning Forum

April 9, 2019
Introduction

- Background
- Considerations
- Examples
Background

One-Way Couplet

- Portion of a bi-directional traffic facility where its opposing flows exist as two independent and roughly parallel facilities.

- Generally, flows combine at one or both ends of the pair into a single two-way street.
Throughout the United States, many downtown roadway networks feature one-way street grids.
Background

History

• 1617: First recorded introduction of one-way streets in London.
• 1800: Albemarle Street, London
• 1909: Paris, near Arc de Triomphe
• 1934: Ocean Avenue and Kingsley Street, Asbury Park, New Jersey
• Disaster of the SS Morro Castle
• Increased number of streets converted to one-way operation during the 20th Century.
In recent decades, consideration has been given to the restoration of one-way couplets to two-way operation. Ayres Associates has evaluated a number of locations around Wisconsin in recent years.

No “One-Size-Fits-All” Solution!

Each location should be evaluated based on unique conditions.
Considerations

- Traffic Operations & Corridor Progression

  - Reduced number of movements
  - Higher percentage of green time
  - Potentially better progression

- One-Way Couplet

- Reduced circulation
- Potentially reduces travel speed

- Two-Way Street

- Volume Distribution
  - Parallel Routes
  - Street Characteristics
  - Land Use
Considerations

- Safety & Pedestrian/Bicycle Impacts

**One-Way Couplet**

- Reduces conflict points
- Pedestrians cross one direction of vehicular travel
- Wrong-Way Driving

**Two-Way Street**

- Reduces risk of wrong-way head-on collisions
- May reduce travel speeds/provide traffic calming
Considerations

Intersection Geometrics
- Non-Standard Intersections
- Restrict Movements
- Turn Lanes
- Bus Stops

Parking
- Maintain Existing Cross-Section
- Pedestrian Bump-outs
- Islands
Considerations

Business Visibility
- New traffic patterns – improved exposure
- Potential lower volume of through traffic

On-Street Parking

Loading Zones/Double Parking

Economic Impacts
- Roadway Jurisdiction/Classification
Considerations

Implementation

• New Signing & Marking
• Phased Restoration
• Timing – Overnight, Off-Peak

Public Involvement

• Stakeholders
• Restoration Schedule
• New Travel Patterns
City of Janesville, WI
Milwaukee Street & Court Street
City of Janesville, WI
Milwaukee Street & Court Street

Goals

• Evaluate feasibility of two-way operation

Considerations

• Traffic Operations
• Parking
• Geometrics
• Heavy Vehicle Traffic
• Impact on Parallel Routes
City of Janesville, WI
Milwaukee Street & Court Street

Results

- Study suggested restoration would be feasible
- Expect acceptable intersection LOS
- Potential for increase in parking
- Truck turning restrictions may be needed

Implementation

- Two-way operation on Milwaukee and Court
- Isolated one-way segments
- Connections to “Five-Points” intersection
Goals

• Evaluate feasibility of two-way operation
• Understand public priorities

Considerations

• Traffic Operations
• Parking – Truck Deliveries
• Safety
• Public Comments
• Impact on Parallel Routes
City of Eau Claire, WI
Barstow Street & Graham Avenue

Barstow St (NB) 3,100 vpd
Farwell St (Two-Way) 13,000 vpd
Graham Ave (SB) 3,300 vpd
City of Eau Claire, WI
Barstow Street & Graham Avenue

- Redistribution:
  (change in expected daily volume for given roadway)
  - Graham Ave: -40%
  - Barstow St: +65%
  - Farwell St: -4%
## Public Involvement

- Comment Form/Public Priorities

<table>
<thead>
<tr>
<th>Street Characteristic</th>
<th>Average Rating</th>
<th>Performance Ability One-Way</th>
<th>Performance Ability Two-Way</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pedestrian accessibility</td>
<td>2.6</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>2. Business exposure</td>
<td>3.3</td>
<td>Limited</td>
<td>Good</td>
</tr>
<tr>
<td>3. Pedestrian safety</td>
<td>3.6</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>4. On-street parking</td>
<td>3.6</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>5. Traffic flow</td>
<td>3.6</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>6. Sidewalk size/treatment</td>
<td>4.2</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>7. Traffic Accessibility</td>
<td>4.3</td>
<td>Limited</td>
<td>Good</td>
</tr>
<tr>
<td>8. Delivery access</td>
<td>5.6</td>
<td>Good</td>
<td>Limited</td>
</tr>
</tbody>
</table>
Public Feedback

- Consider parking improvements on side streets
- Address service and delivery vehicle needs
- Improve bicycle accommodations

Parking

- Considered parallel and angled parking
City of Eau Claire, WI
Barstow Street & Graham Avenue

Results

• Study suggested restoration would be feasible
  • Expect acceptable intersection LOS
  • Improved downtown accessibility
  • Potential for slight increase in parking
  • Trucks limited to designated loading zones

Implementation

• Two-way operation on Barstow and Graham
• Isolated one-way segments
• Near south end of Graham Avenue
City of Milwaukee, WI
Prospect Avenue & Farwell Avenue

- Farwell Ave (SB) 9,000 vpd
- Prospect Ave (NB) 11,000 vpd
City of Milwaukee, WI
Prospect Avenue & Farwell Avenue

Goals

• Evaluate two-way operations
• Improve Business Visibility
• Support Pedestrians

Considerations

• Traffic Operations/Progression
• Geometrics
• Parking
• Transit & Streetcar
• Pedestrian & Bike Facilities
• Funding
City of Milwaukee, WI
Prospect Avenue & Farwell Avenue

- Redistribution
## Intersection Geometrics and Parking Impacts

<table>
<thead>
<tr>
<th>Corridor</th>
<th>Intersection</th>
<th>Approach</th>
<th>Lane Added</th>
<th>Accommodation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farwell</td>
<td>North Ave</td>
<td>Southbound</td>
<td>Shared through/left and shared through/right</td>
<td>Only space for 1 lane, will require eliminating bumpout</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Northbound</td>
<td>Shared through/left and shared through/right</td>
<td>No space for SB receiving lane, will require eliminating bumpout</td>
</tr>
<tr>
<td></td>
<td>Brady</td>
<td>Northbound</td>
<td>Add a shared through/right (Middle lane will be shared through/left)</td>
<td>Pull back parking on southeast corner of Brady/Farwell, in front of CVS (5 spaces)</td>
</tr>
<tr>
<td></td>
<td>Albion</td>
<td>Northbound</td>
<td>Add a right turn storage lane</td>
<td>Pull back parking on southeast corner of Albion/Farwell (1 space)</td>
</tr>
<tr>
<td></td>
<td>Franklin</td>
<td>Southbound</td>
<td>No lane addition required</td>
<td>Remove island lane delineators</td>
</tr>
<tr>
<td>Prospect</td>
<td>Ogden</td>
<td>Southbound</td>
<td>Add a right turn storage lane</td>
<td>Pull back parking on northwest corner of Ogden/Prospect (2 spaces)</td>
</tr>
<tr>
<td></td>
<td>Curtis</td>
<td>Southbound</td>
<td>Add a right turn storage lane</td>
<td>Pull back parking on northwest corner of Curtis/Prospect (2 spaces)</td>
</tr>
<tr>
<td></td>
<td>Brady</td>
<td>Southbound</td>
<td>Add a right turn storage lane</td>
<td>Currently no parking on northwest corner of Brady/Prospect due to Edgewater Driveway, may need to restrict access</td>
</tr>
<tr>
<td></td>
<td>Kane</td>
<td>Southbound</td>
<td>Add a right turn storage lane</td>
<td>Pull back parking on northwest corner of Kane/Prospect (2 spaces)</td>
</tr>
<tr>
<td></td>
<td>Lafayette</td>
<td>Southbound</td>
<td>Add a right turn storage lane</td>
<td>Pull back parking on northwest corner of Lafayette/Prospect (2 spaces)</td>
</tr>
<tr>
<td></td>
<td>North Ave</td>
<td>Southbound</td>
<td>No lane addition required</td>
<td>Receiving lane is shifted west of SB lane, as it is currently the NB Left Turn Lane</td>
</tr>
</tbody>
</table>
City of Milwaukee, WI
Prospect Avenue & Farwell Avenue

Results

Planning level study

- Study suggested restoration could be feasible
- Challenges
  - Parking Impacts
  - Streetcar Impacts
  - Funding Impacts

Average Corridor Travel Speeds

<table>
<thead>
<tr>
<th>Corridor</th>
<th>Farwell</th>
<th>Prospect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Peak Hour</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Existing One-Way</strong></td>
<td>AM Peak</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>PM Peak</td>
<td>19</td>
</tr>
<tr>
<td><strong>Two-Way w/o Streetcar</strong></td>
<td>AM Peak</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>PM Peak</td>
<td>17</td>
</tr>
<tr>
<td><strong>Corridor</strong></td>
<td><strong>NB</strong></td>
<td><strong>SB</strong></td>
</tr>
<tr>
<td><strong>Peak Hour</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Existing One-Way</strong></td>
<td>AM Peak</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>PM Peak</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Two-Way w/o Streetcar</strong></td>
<td>AM Peak</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>PM Peak</td>
<td>20</td>
</tr>
</tbody>
</table>
City of Waukesha, WI
St Paul Avenue & North Street

One-Way Couplet:
• North St (WB): 9,400 vpd
• St Paul Avenue (EB): 11,300 vpd
City of Waukesha, WI  
St Paul Avenue & North Street

Goals

- Evaluate two-way operations
- Reduce ‘cut-through’ traffic
- Create ‘Gateway’ to downtown

Considerations

- Traffic Operations
- Business Visibility
- Parking
- Geometrics
- Implementation
- Long Range Plans

<table>
<thead>
<tr>
<th>Intersection</th>
<th>FINAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>North/St Paul/Wisconsin</td>
<td>B</td>
</tr>
<tr>
<td>Madison/North/Delafield</td>
<td>E</td>
</tr>
<tr>
<td>Madison/St Paul</td>
<td>E</td>
</tr>
<tr>
<td>Barstow/North</td>
<td>B</td>
</tr>
<tr>
<td>Barstow/St Paul</td>
<td>C</td>
</tr>
</tbody>
</table>
City of Waukesha, WI
St Paul Avenue & North Street

- Intersection Geometrics
City of Waukesha, WI
St Paul Avenue & North Street

- Traffic Diversion/New Construction
City of Waukesha, WI
St Paul Avenue & North Street

• Implementation Strategy
City of Waukesha, WI
St Paul Avenue & North Street

Results

Planning level study
• Study suggested restoration could be feasible
• Challenges
  • Regional and Long-Range Plans
  • Operations
  • Maintain One-Way connections
• Funding
Conclusion

- Two-way restorations can refocus the purpose of downtown corridors on local access and improved circulation.

No “One-Size-Fits-All” Solution!
Each location should be evaluated based on unique conditions
Questions?

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  - MotlA@AyresAssociates.com

Thank You!