Solving Congestion and Safety Issues with Roundabouts

March 7, 2017
Topic of Discussion

Existing

Proposed
Where is Blue Ash, OH?
Blue Ash

- 8 Sq Miles
- Population
  - 12,000 (nighttime)
  - 40,000 (daytime)
- Major Employment Center
- Commuter routes
- Redevelopment of Airport & nearby parcels
Project Area

Plainfield Road
- 4-Lane, Minor Arterial
- AADT = 28,600
- % Trucks = 2%

Hunt Rd
- 4-Lane, Minor Arterial
- AADT = 15,700
- % Trucks = 2%

SR 126
- 4-Lane, Freeway
- AADT = 48,500
- % Trucks = 3%
12th largest intersection crash rate in OH
Congestion

Typical Southbound Queue in PM Peak

Peppermill Lane Intersection
Congestion

EB exit ramp frequently queues onto mainline SR 126

SB queues of a ½ mile or more are common
2007 Corridor Study

- Recommendations
  - Add 1 southbound lane
  - Widen bridge over SR 126
  - Add new roadways

- City’s Stance:
  - Not in favor of widening
  - Explore roundabouts
Initial Concept

- 5 Roundabouts
  - All interchange ramps
  - Hunt Road
  - Crossgate Lane / Target

- 2 Signals
  - Georgetown Road
  - Peppermill Lane
Recent Studies

- Crash Analysis
- Traffic Study
- Safety Study with RSA
- Feasibility Study
- Interchange Operations Study (IOS)
Crash Patterns

# of Crashes
- 0
- 1-5
- 6-10
- 10-15
- >15
Crash Patterns

# of Crashes
- 0
- 1-5
- 6-10
- 10-15
- >15

Peppermill Ln
Georgetown Rd
Plainfield Rd
Hunt Rd
Crash Patterns

# of Crashes
- 0
- 1-5
- 6-10
- 10-15
- >15
Road Safety Audit

- Goals
  1. Identify Safety Concerns
  2. Identify Potential Countermeasures
- Diverse team
- Field Review
- Analysis of Potential Countermeasures
- Report Back to Team
- Finalize Recommendations

Name | Organization
--- | ---
Frank Aransky | American Structurepoint, Inc.
Ryan Huebschman | American Structurepoint, Inc.
Bryan Becker | Michelman, Inc.
Michael Miller | Sycamore Community Schools
Pete Gemmer | UC Blue Ash
Lt. Steve Schueler | Blue Ash Police Department
Fire Chief Rick Brown | Blue Ash Fire Department
Tommy Arnold | ODOT District 8

Radius too small for trucks turning right
Roundabouts

Largest potential for crash reductions
Level of Service

AM Existing

AM Proposed

Legend
- LOS A, B
- LOS C, D
- LOS E, F

2017 PURDUE ROAD SCHOOL

AMERICAN STRUCTUREPOINT
Level of Service

PM Existing

PM Proposed

Legend
- LOS A, B
- LOS C, D
- LOS E, F
Queues

Roundabouts address queuing issue on EB exit ramp

Roundabouts generally produce shorter queues than signals

Roundabouts address SB queuing issue
Eastbound Exit Ramp

Existing Conditions

EB exit ramp queues onto mainline SR 126 today

<table>
<thead>
<tr>
<th>Peak Hour</th>
<th>NB</th>
<th>SB</th>
<th>EB</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM</td>
<td>LOS D (35.8)</td>
<td>LOS C (33.7)</td>
<td>LOS D (58.3)</td>
<td>LOS D (42.9)</td>
</tr>
<tr>
<td>PM</td>
<td>LOS C (23.4)</td>
<td>LOS A (6.5)</td>
<td>LOS D (46.6)</td>
<td>LOS C (21.3)</td>
</tr>
</tbody>
</table>

Scenario 3

Roundabout keeps queues on ramp

<table>
<thead>
<tr>
<th>Peak Hour</th>
<th>NB</th>
<th>SB</th>
<th>EB</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM</td>
<td>LOS C (24.0)</td>
<td>LOS A (2.5)</td>
<td>LOS C (26.5)</td>
<td>LOS B (17.9)</td>
</tr>
<tr>
<td>PM</td>
<td>LOS B (11.2)</td>
<td>LOS A (2.9)</td>
<td>LOS E (61.6)</td>
<td>LOS C (20.0)</td>
</tr>
</tbody>
</table>

50th Percentile

95th Percentile

Figure 3.8
Plainfield Road & SR 126 Intersection Comparison
Feasibility Study

- Conceptual Design
- ROW Needs
- Construction Costs
Final Concept

- Roundabouts
  - Peppermill Ln
  - Hunt Rd
  - SR 126 EB Ramps
- No improvements
  - Georgetown Rd
  - SR 126 WB Ramp
  - Crossgate Ln / Target
## Project Costs

<table>
<thead>
<tr>
<th>Intersection</th>
<th>PE - Detailed Design Cost</th>
<th>Right of Way / Utilities Cost</th>
<th>Construction Cost</th>
<th>Construction Inspection Cost</th>
<th>Project Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peppermill Lane</td>
<td>$437,600</td>
<td>$72,400</td>
<td>$2,844,900</td>
<td>$284,500</td>
<td>$3,639,400</td>
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<tr>
<td>Hunt Road</td>
<td>$848,400</td>
<td>$1,704,000</td>
<td>$3,952,100</td>
<td>$395,200</td>
<td>$6,899,700</td>
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<tr>
<td>SR 126</td>
<td>$375,600</td>
<td>$101,200</td>
<td>$2,402,900</td>
<td>$240,300</td>
<td>$3,120,000</td>
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<tr>
<td>Totals</td>
<td>$1,661,600</td>
<td>$1,877,600</td>
<td>$9,199,900</td>
<td>$920,000</td>
<td>$13,659,100</td>
</tr>
</tbody>
</table>
Cost Comparison

Widening
- PE-Environmental: $2,500,000
- Final Design: $15,000,000
- ROW: $2,000,000
- Construction: $1,500,000
- Construction Inspection: $1,877,600
- Total: $21.0 M

Roundabouts
- PE-Environmental: $920,000
- Final Design: $1,611,600
- ROW: $1,199,900
- Construction: $2,500,000
- Construction Inspection: $1,677,600
- Total: $13.7 M
## Project Funding

<table>
<thead>
<tr>
<th>Source</th>
<th>Phase</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMAQ</td>
<td>Construction and CE</td>
<td>$4.0 M</td>
</tr>
<tr>
<td>HSIP</td>
<td>Construction</td>
<td>$5.9 M</td>
</tr>
<tr>
<td>STP</td>
<td>ROW</td>
<td>$2.0 M</td>
</tr>
<tr>
<td>Local</td>
<td>All</td>
<td>$1.8 M</td>
</tr>
<tr>
<td>Total</td>
<td>All</td>
<td>$13.7 M</td>
</tr>
</tbody>
</table>

$11.9 M in Federal Funding
Closing Comments

- Roundabouts can provide an alternative to widening
- Roundabouts and signals can work together
- Multiple funding sources can be combined on a project
Traffic Simulation
Questions

Gordon M. Perry, PE
Public Works Director
City of Blue Ash
513.745.8545
gperry@blueash.com

Zak Bradley, PE
Engineer
City of Blue Ash
513.745.8536
zbradley@blueash.com

Ryan Huebschman, PE, PTOE
Project Manager
American Structurepoint, Inc.
317.547.5580
rhuebschman@Structurepoint.com