Follow-up Report on Research on The Gateway R1-6 Treatment
Gateway Treatment:
Three-lane road
Gateway Treatment:
Three-lane road

Yielding at this site increased from 40% to 90%. ADT 10,000.
Urban One-Way Street
Gateway Treatment: Urban one-way street

Yielding at this site increased from 3% to 94%. ADT around 9000.
Partial Gateway on Multilane
The Gateway Works on Multilane Roads

✓ Livernois (Detroit)

Averages

✓ No sign: 1%
✓ 1 sign: 37%
✓ PHB: 62%
✓ PHB and 1 sign: 85%
✓ Gateway configuration: 72%
Overview

- Long Term Effects on Yielding
- Long Term Effects on Speed
- Effects of Gateway Width
- Effects of Advance Gateway Placement
- Issues Effecting Sign Survival
**Yielding Data Over the Year**

<table>
<thead>
<tr>
<th>Crosswalk Location</th>
<th>Follow up Period</th>
<th>Baseline</th>
<th>Temporary Installation</th>
<th>Permanent Installation 2015</th>
<th>Percent of Drivers Yielding</th>
<th>Permanent Installation 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Aug</td>
<td>Sept</td>
<td>Oct</td>
<td>May</td>
</tr>
<tr>
<td>Midblock refuge island or median</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monroe RRFB Off</td>
<td>6</td>
<td>X</td>
<td>82</td>
<td>*50</td>
<td>*56</td>
<td>*57</td>
</tr>
<tr>
<td>Stadium @ High School</td>
<td>15</td>
<td>54</td>
<td>X</td>
<td>64</td>
<td>70</td>
<td>73</td>
</tr>
<tr>
<td>E. Huron St. W of Ingalls</td>
<td>40</td>
<td>86</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Midblock without refuge or island</td>
<td>6</td>
<td>X</td>
<td>64</td>
<td>53</td>
<td>50</td>
<td>55</td>
</tr>
<tr>
<td>Intersection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S. Westnedge at Ranney</td>
<td>0</td>
<td>59</td>
<td>33</td>
<td>29</td>
<td><strong>NA</strong></td>
<td>X</td>
</tr>
<tr>
<td>Nixon Rd. at Bluett Rd.</td>
<td>40</td>
<td>86</td>
<td>X</td>
<td>93</td>
<td>89</td>
<td>87</td>
</tr>
<tr>
<td>Division St. at Jefferson</td>
<td>3</td>
<td>94</td>
<td>X</td>
<td>94</td>
<td>93</td>
<td>89</td>
</tr>
<tr>
<td>Wealthy at Cass</td>
<td>33</td>
<td>73</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Lake at Carroll</td>
<td>4</td>
<td>50</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Intersection with Ciub Extension</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cherry at Hollister GR</td>
<td>8</td>
<td>92</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>76</td>
</tr>
<tr>
<td>Wealthy at Henry GR</td>
<td>6</td>
<td>68</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>62</td>
</tr>
<tr>
<td>Cherry at Warren GR</td>
<td>13</td>
<td>88</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>69</td>
</tr>
<tr>
<td>Mean all sites</td>
<td>15</td>
<td>75</td>
<td>60</td>
<td>67</td>
<td>76</td>
<td>73</td>
</tr>
</tbody>
</table>

*Gateway element was identified as damaged or destroyed

**Two Gateway elements were destroyed**
Why It Works

Mean Yielding By Condition

Percent Drivers Yielding

Baseline  18 Foot  16 Foot  14 Foot  12 Foot
Yielding Data Over the Year

- Allegan Midblock
- Huron W of Ingalls
- Stadium Dr. at High School
- Main Street Midblock
Yielding Data Over the Year

- Nixon at Bluett
- Wealthy at Cass
- Division at Jefferson
- Cherry at Holister
Yielding Data Over the Year

- Wealthy at Henry
- Westnedge
- Cherry at Warren
- Mean All Sites
Average Yielding Across All Sites

Mean All Sites

Percent Drivers Yielding

Months

1 2 3 4 5 6 7 8 9 10 11 12
## Gateway At Roundabouts and Traffic Circle Locations

<table>
<thead>
<tr>
<th>Crosswalk Location</th>
<th>Baseline</th>
<th>Temporary Installation</th>
<th>Percent of Drivers Yielding</th>
<th>Permanent Installation 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Percent of Drivers Yielding</td>
<td>Permanent Installation 2016</td>
</tr>
<tr>
<td>Follow up Period</td>
<td>X</td>
<td>X</td>
<td>Aug</td>
<td>Sept</td>
</tr>
<tr>
<td>Traffic circle</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marshall Circle NW Leg</td>
<td>13</td>
<td>54</td>
<td>71</td>
<td>71</td>
</tr>
<tr>
<td>Marshall Circle SE Leg</td>
<td>11</td>
<td>29</td>
<td>26</td>
<td>38</td>
</tr>
<tr>
<td>Roundabout</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E. Main St. at 5th St.</td>
<td>19</td>
<td>45</td>
<td>61</td>
<td>60</td>
</tr>
<tr>
<td>E Main at Riverview Dr.</td>
<td>9</td>
<td>43</td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td>Mean all roundabout sites</td>
<td>13</td>
<td>43</td>
<td>51</td>
<td>53</td>
</tr>
</tbody>
</table>

*Gateway element was identified as damaged or destroyed*
Yielding Data Over the Year
Speed Reduction when Pedestrians are Not Present at the Crosswalk

Overall the gateway produces a 5 mph reduction in speed when pedestrians are not present.
Speed Reduction when Pedestrians are Not Present at the Dilemma Zone
Speed Reduction when Pedestrians are Not Present at the Dilemma Zone

Speeds were also reduced in advance of the crosswalk. Could help prevent rear-end crashes.
Gateway vs. other treatments

✓ Florida sites
Yielding Distance (Florida sites)
Signs can be placed in advance of the crosswalk

**Bennett & N. Main St.**

- Percentage of yielding
- Time of Day

Legend:
- **Baseline**
- **Δ** 5 Ft
- **◊** 10 ft
- **×** 20 ft
- **×** 30 ft
- **▪** 50 ft
Advance Gateway Induces Drivers to Yield Further From the Crosswalk

![Graph showing the percent of drivers yielding at different distances from the crosswalk. The graph includes lines for BL, 5 ft back, 10 ft back, 20 ft back, 30 ft back, and 50 ft back, with the y-axis labeled as Percent of Drivers Yielding and the x-axis labeled as Distance Vehicles Yielded in Advance of Crosswalk.]
Benefits

- Increases yielding
- Reduces vehicle speed
- Drivers yield further from crosswalk
- Works on multilane roads
- Less expensive than RFBs and PHBs
Sign Survival

- Curb-type base
- Flexible delineator
- Gutter pan placement

Flush-mounted base (avoid)
Sign Survival (Type of Sign)

- Signs on a curb type base with a flexible rubber connector rather than a pivoting base survive.
- Use flexible delineators on lane line.
- Use of curb type base on the center line may even survive during.
- Curb type base may survive on lane line with wider lanes.
Sign Survival (Sign Placement)

- Signs can survive well if placed in the gutter pan
- Can be placed on curb on edge of refuge island or median island
- Can be placed on the edge of a curb extension
- Can be placed on top of curb on right side of road without curb extension under permission to experiment (IA may come soon)
- Can be placed in advance of crosswalk to avoid path of turning vehicles
Sign Survival (Other Variables)

✓ Use of city post delineators for vulnerable locations
✓ Protection by a delineator
Standard:

If used, the In-Street Pedestrian Crossing sign shall be placed at one or more of the following locations at or near the crosswalk:

a. In the roadway on the center line
b. In the roadway on a lane line
c. On a median island
d. In either (but not both) the bottom of curb which is level with the roadway or on top of the curb

in the roadway at the crosswalk location on the center line, on a lane line, or on a median island. The In-Street Pedestrian Crossing sign shall not be post-mounted on the left-hand or right-hand side of the roadway.

If used, the Overhead Pedestrian Crossing sign shall be placed over the roadway at the crosswalk location.

An In-Street or Overhead Pedestrian Crossing sign shall not be placed in advance of the crosswalk to educate road users about the State law prior to reaching the crosswalk, nor shall it be installed as an educational display that is not near any crosswalk.

Guidance:

If an island (see Chapter 31) is available, the In-Street Pedestrian Crossing sign, if used, should be placed on the island.

Option:

If a Pedestrian Crossing (W11-2) warning sign is used in combination with an In-Street or an Overhead Pedestrian Crossing sign, the W11-2 sign with a diagonal downward pointing arrow (W16-7P) plaque may be post-mounted on the right-hand side of the roadway at the crosswalk.
Support:

The Provisions of Section 2A.18 concerning mounting height are not applicable for the In-Street Pedestrian Crossing sign. See Section 2A.21 for sign mounting methods.

Standard:

The top of an In-Street Pedestrian Crossing sign shall be a maximum of 4 feet above the pavement surface. The top of an In-Street Pedestrian Crossing sign placed in an island or on top of a curb shall be a maximum of 4 feet above the island or top of curb.

Option:

The In-Street Pedestrian Crossing sign may be used seasonally to prevent damage in winter because of plowing operations, and may be removed at night if the pedestrian activity at night is minimal.

In-Street Pedestrian Crossing signs, Overhead Pedestrian Crossing signs, and Yield Here To (Stop Here For) Pedestrians signs may be used together at the same crosswalk.

C:NCUTCD/June 2016/Heydel/16B-RW-02 in-street pedestrian signs Gateway Treatment APPROVED BY COUNCIL 1-6-17
Future research

✓ Advance sign placement on multilane roads
✓ Yielding rates at downstream crossings?
✓ More data on night yielding rates and effect on night speeds
✓ Effect of gateway with full size and slim size R1-6
✓ Gateway as traffic calming at crosswalks in small communities along trunk routes
Studies Published on Gateway
