



## Gateway Treatment for Pedestrian Crossings



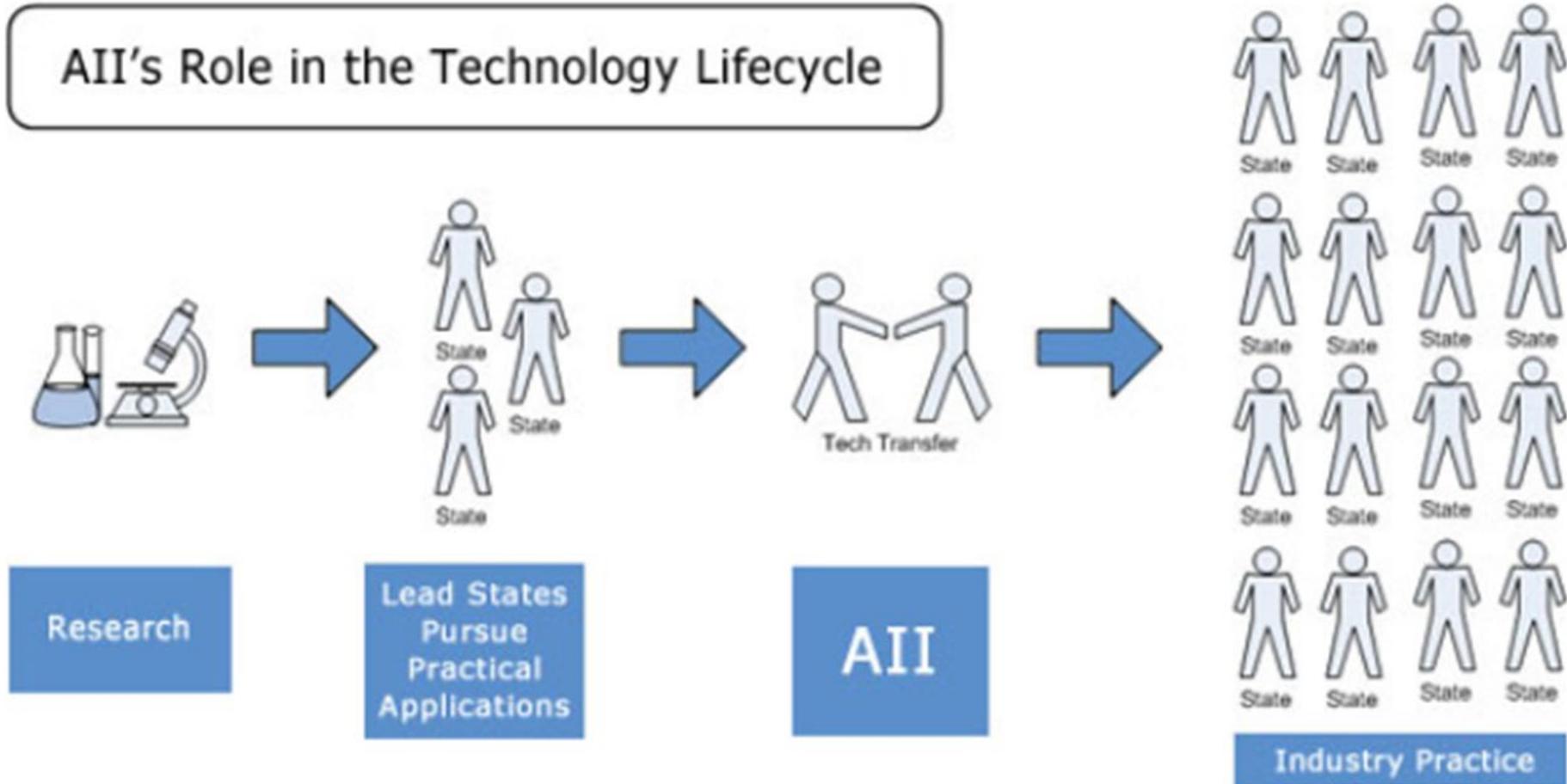
*Carissa McQuiston, PE*  
*Non-Motorized Safety Engineering Specialist*

September 2019



Western Michigan  
University





**MDOT Gateway Treatment became a Focus Innovation in October 2017**



## Pedestrian Gateway 3 Simple Signs to Save Lives



How much?

Less than \$2000

How long?

About 2 hours

Why?

Immediate Results  
Drivers Yield Intuitively  
Works Almost Anywhere



## Pali Highway

'Stop for pedestrian' signs and plastic posts added to site of deadly crash.



State adds 'gateway' crosswalk system to protect pedestrians on Pali Highway

By [Jim Mendoza](#) | October 19, 2018 at 6:11 PM HST - Updated October 20 at 9:29 AM

HONOLULU (HawaiiNewsNow) - On Friday morning, the Hawaii Department of Transportation installed yellow stop-for-pedestrian signs and plastic lane delineators across a crosswalk on Pali Highway.

Highways Division deputy director Ed Sniffen said the "gateway" system should get drivers to closer attention.

"When people see this they know they should be expecting pedestrians to come through the area," Sniffen said.

The un-signalized crosswalk is adjacent to Wood Street where 83-year-old Raymond Endow was killed in a fatal crash.



### DEPARTMENT OF TRANSPORTATION

DAVID Y. IGE  
GOVERNOR

JADE T. BUTAY  
DIRECTOR

9, 2018

### PEDESTRIAN SAFETY TREATMENTS INSTALLED ON PALI HIGHWAY

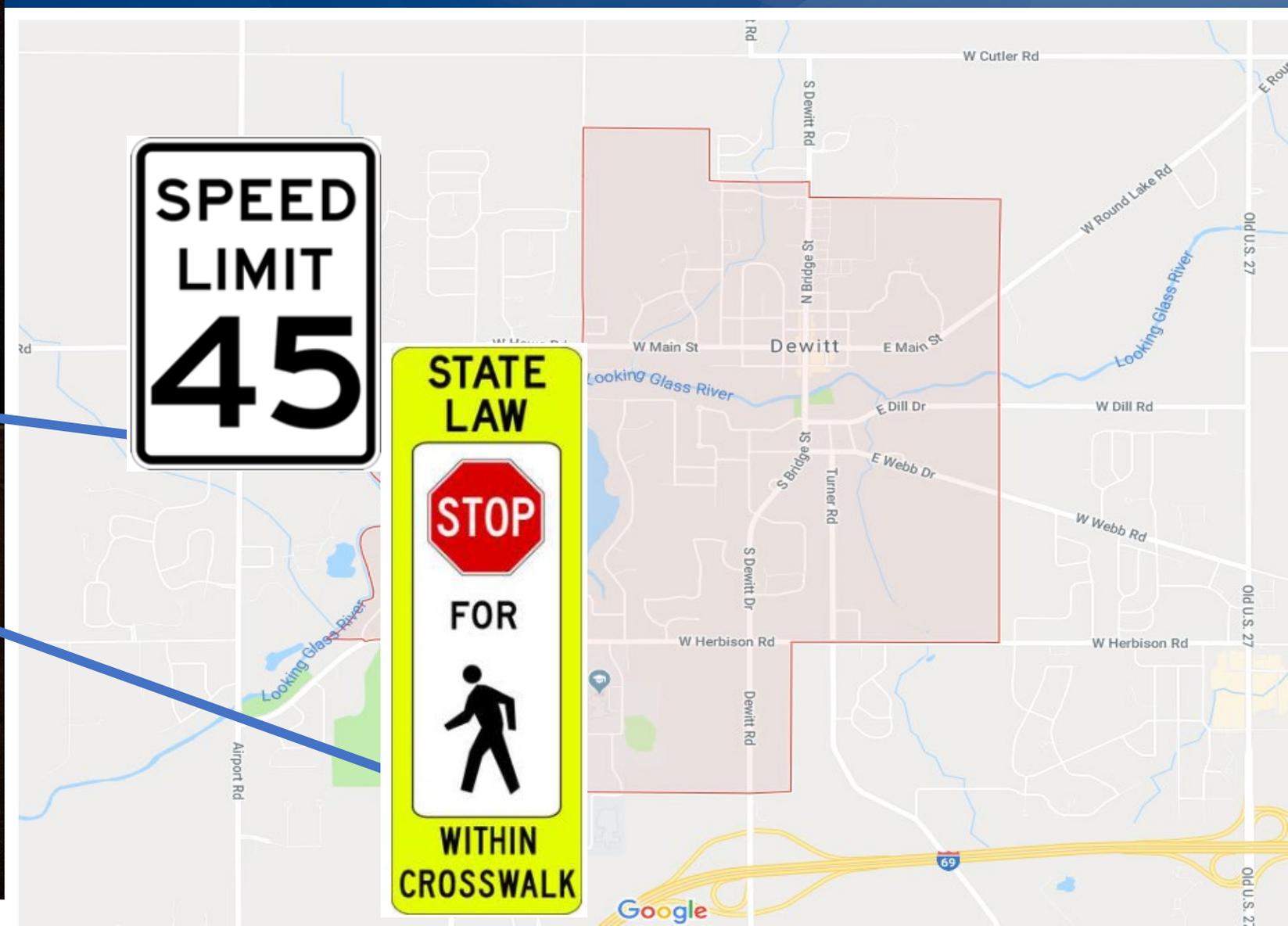
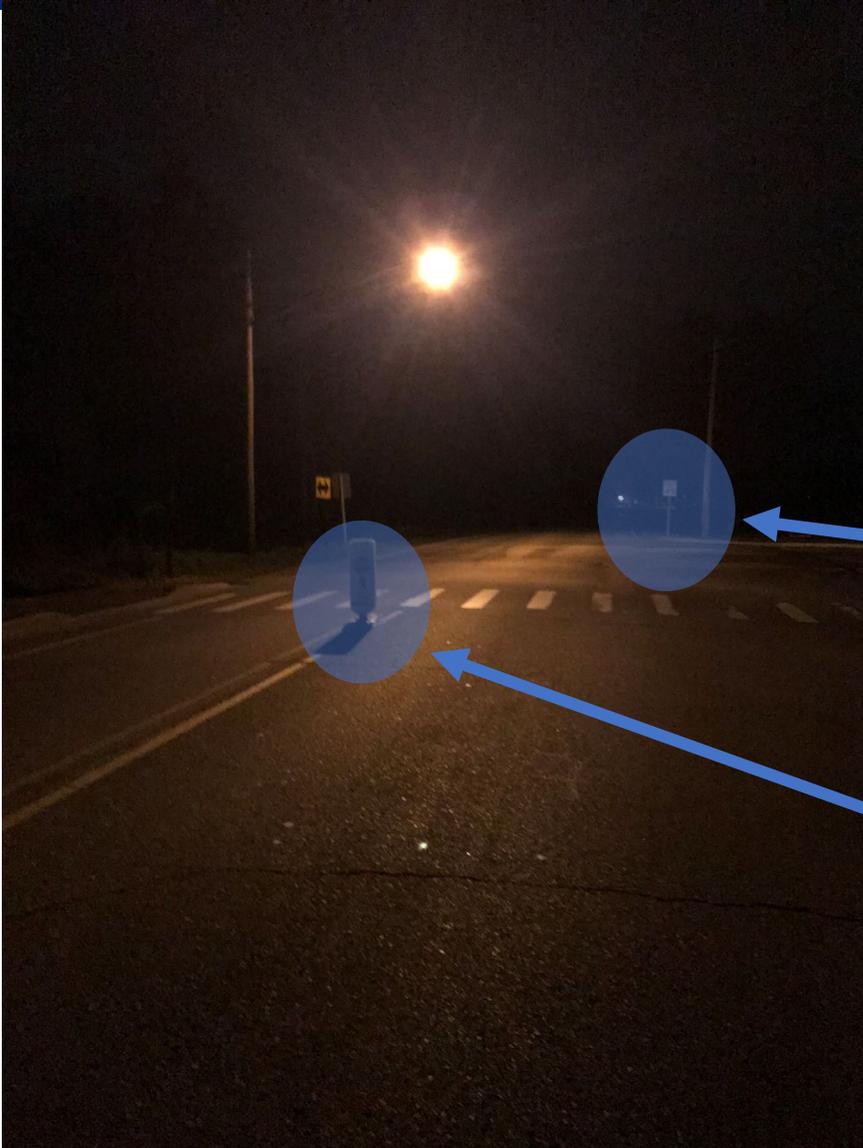
*Gateway in-street signs remind drivers that state law requires vehicles to stop for pedestrians in crosswalks.*

The Department of Transportation (HDOT) notifies the public that gateway in-street signs are being installed in both directions on Pali Highway at the Wood Street crosswalk between 9:30 a.m. and 10:30 a.m. The Pali Highway and Wood Street crosswalk was the location of the fatal collision that claimed the life of a Nuuanu resident on Oct. 10, 2018.

HDOT Deputy Director for Highways said: "The safest transportation systems separate motorists from bicyclists and pedestrians to minimize the potential for human error, which is the most common cause of fatal crashes. We are working towards this end, and it will take time and money.

HDOT is committed to providing the safest transportation system possible. That means we are always looking for solutions that can be implemented quickly to bring safety improvements. The gateway concept is one that the State of Michigan has found to be effective in reducing crashes at un-signalized crosswalks.

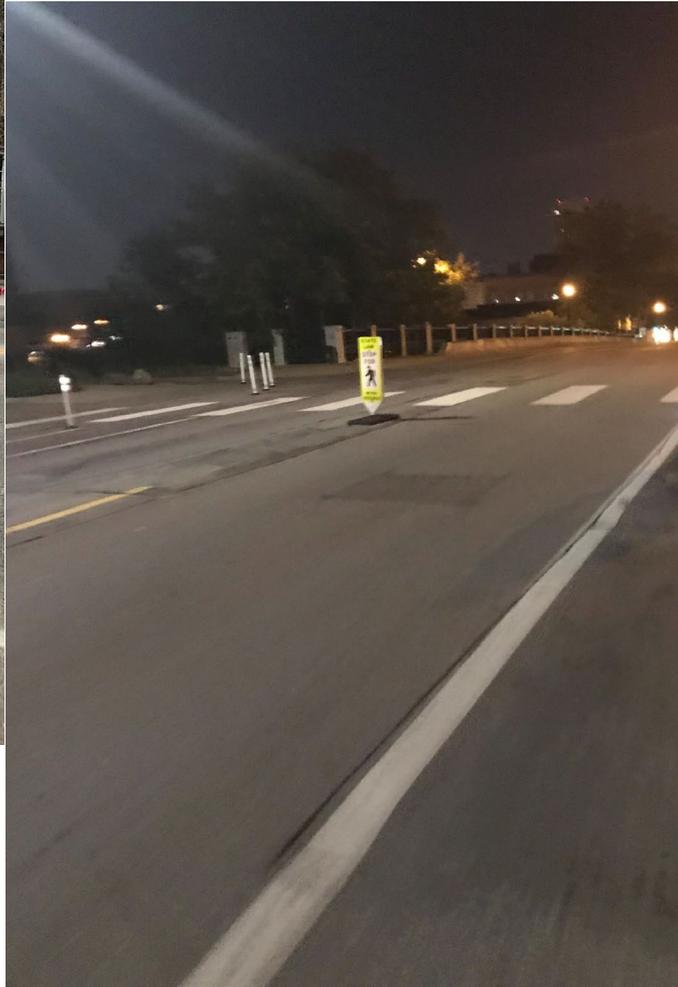




# Gateway Treatment Components



**Minnesota**



**10% - 36%**

**Jackson Hole**

**36%**

**Ft. Lauderdale**

**Gateway 80% - 89%**

# Gateway Treatment Components



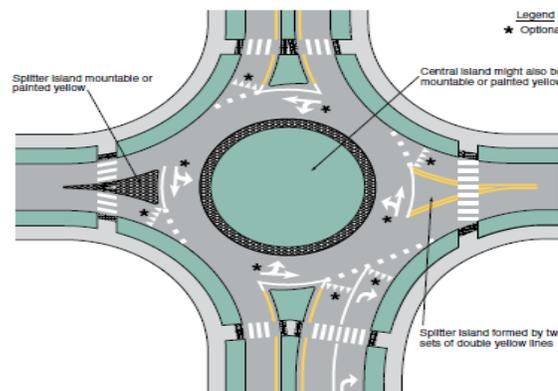
**80%**



**32%**

## Project/Research Goals

- Determine driver yielding compliance rates
- Determine how, when and where treatment should be used
- Determine the cost benefits of the treatment compared to other treatments
- Determine the effect the treatment has on speed reductions



## Project Specifics



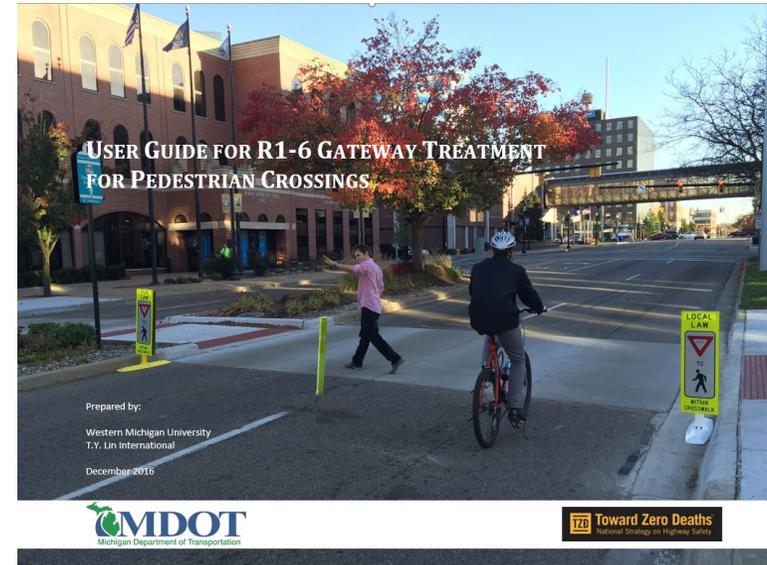
Site	Quick Kops	White	Yellow	Imped Recovery	Qty Post.
<b>Interstate Interchange Ramp, Uncontrolled</b>					
Interstate Ramp I 94 and S. Westnedge North	2	1	1		2
Interstate Ramp I 94 and S. Westnedge South				2	2
<b>Roundabout</b>					
Roundabout East Main and 5th Street, Benton Harb	2	2		2	
Roundabout East Main and Riverview, Benton Harb	2	2		2	
Marshall Traffic Circle, Marshall, SE by City Hall	1	1		1	6
Marshall Traffic Circle, Marshall, NW	1		1	1	6
<b>Hybrid Beacon/ RRFB</b>					
Hybrid Beacon West Huron St. at Chapin St. Ann Ar	2	1	1	1	2
Midblock RRFB Monroe St., Allegan	2	1	1	2	
East Stadium and Ferdon, Ann Arbor	2	1	1	2	2
<b>Midblock Crosswalk</b>					
US 131 N Main St. between (M60+Portage), Three Ri	1	1		2	2
Rose and KVVC, Kalamazoo (not an MDOT road)					
<b>T Intersection</b>					
S. Westnedge and Ranney St. Kalamazoo	1	1		1	1
Rose St at Academy, Kalamazoo (Not MDOT site)					
<b>Full Intersection</b>					
Monroe St. and N. Walnut, Allegan	2	1	1	2	
W. Michigan and Grand, Marshall	2	1	1	1	2
E Michigan and Madison, Marshall	2	2		1	2
E Michigan and Hamilton, Marshall	1		1	2	2
M 89 at Kalamazoo St., Otsego	1	1		2	2
<b>Trail Crossing</b>					
Cellery Flats Trail, Portage, Not MDOT site					
Oakland Rd Trail Crossing, Not MDOT site					
<b>TOTAL</b>	<b>24</b>	<b>16</b>	<b>8</b>	<b>24</b>	<b>31</b>





## Some examples from the study:

- Following are locations with:
  - Initial collected data (compliance rates)
  - Study findings on yielding compliance
  - Installation guidance from the Final User Guide



## #1 – The Initial Data

Rose Street at KVCC -  
Uncontrolled Midblock  
Crossing



Full Gateway

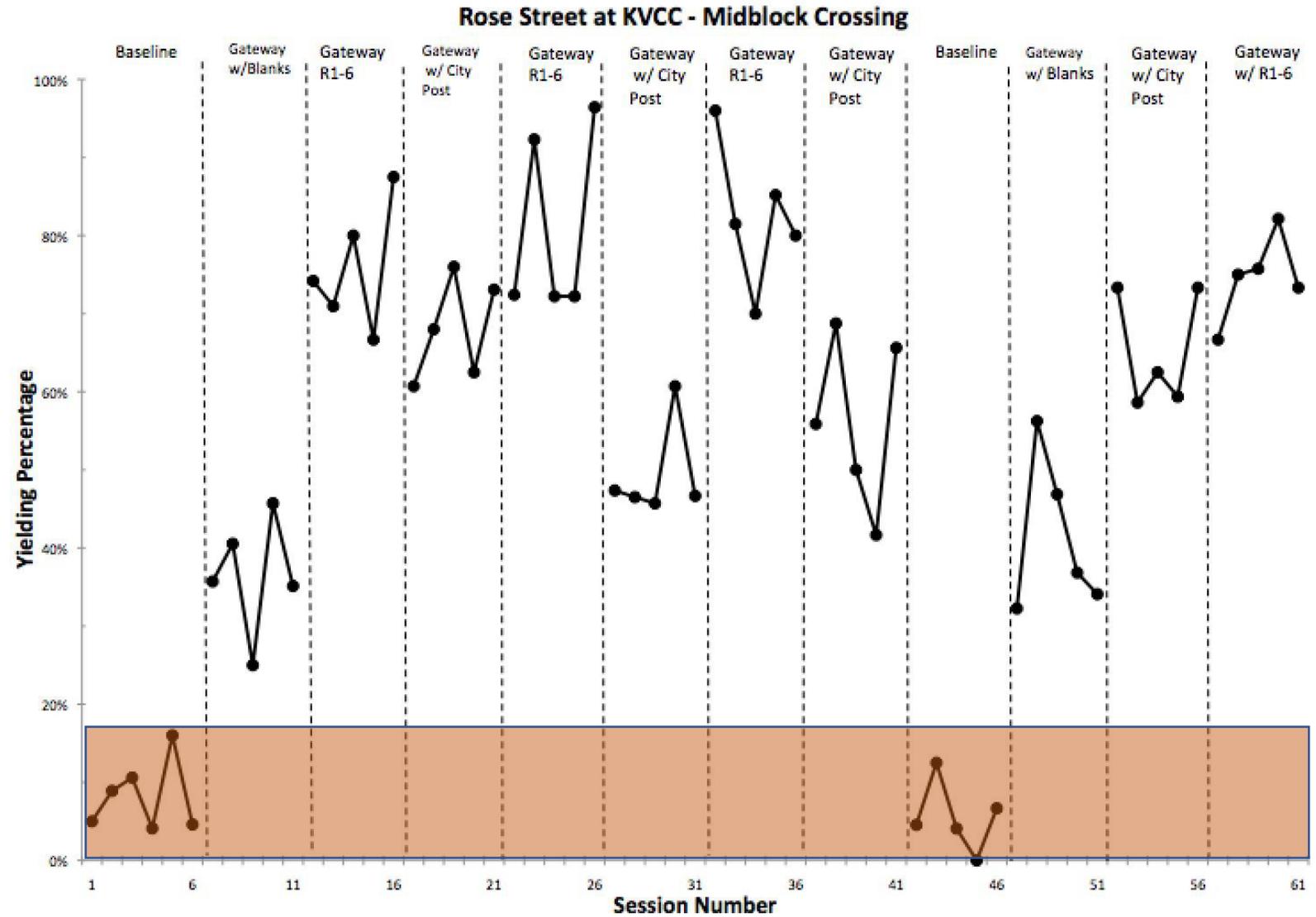


Gateway with City Post

**Kalamazoo**VALLEY™  
community college

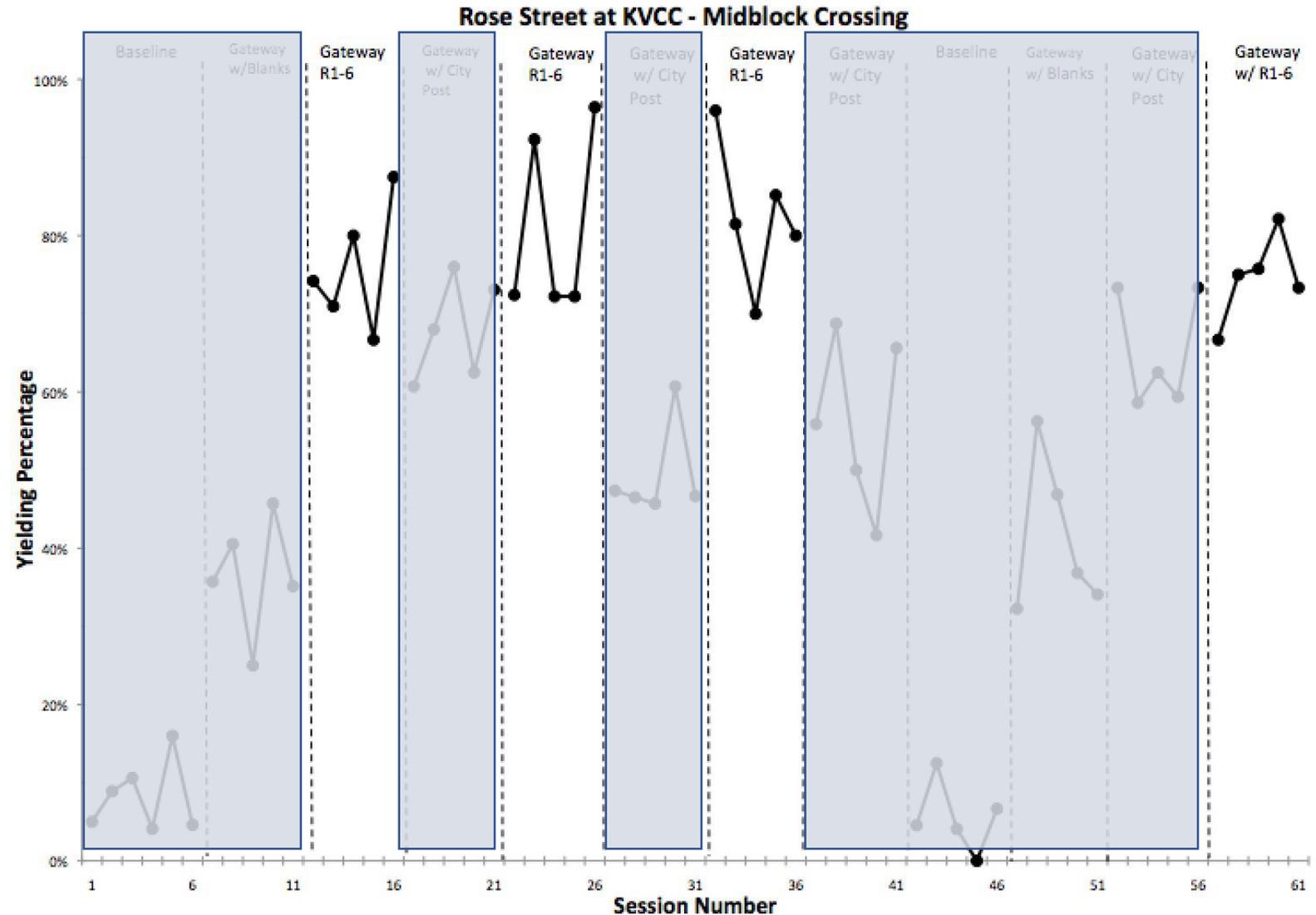
## #1 – The Initial Data

## Baseline



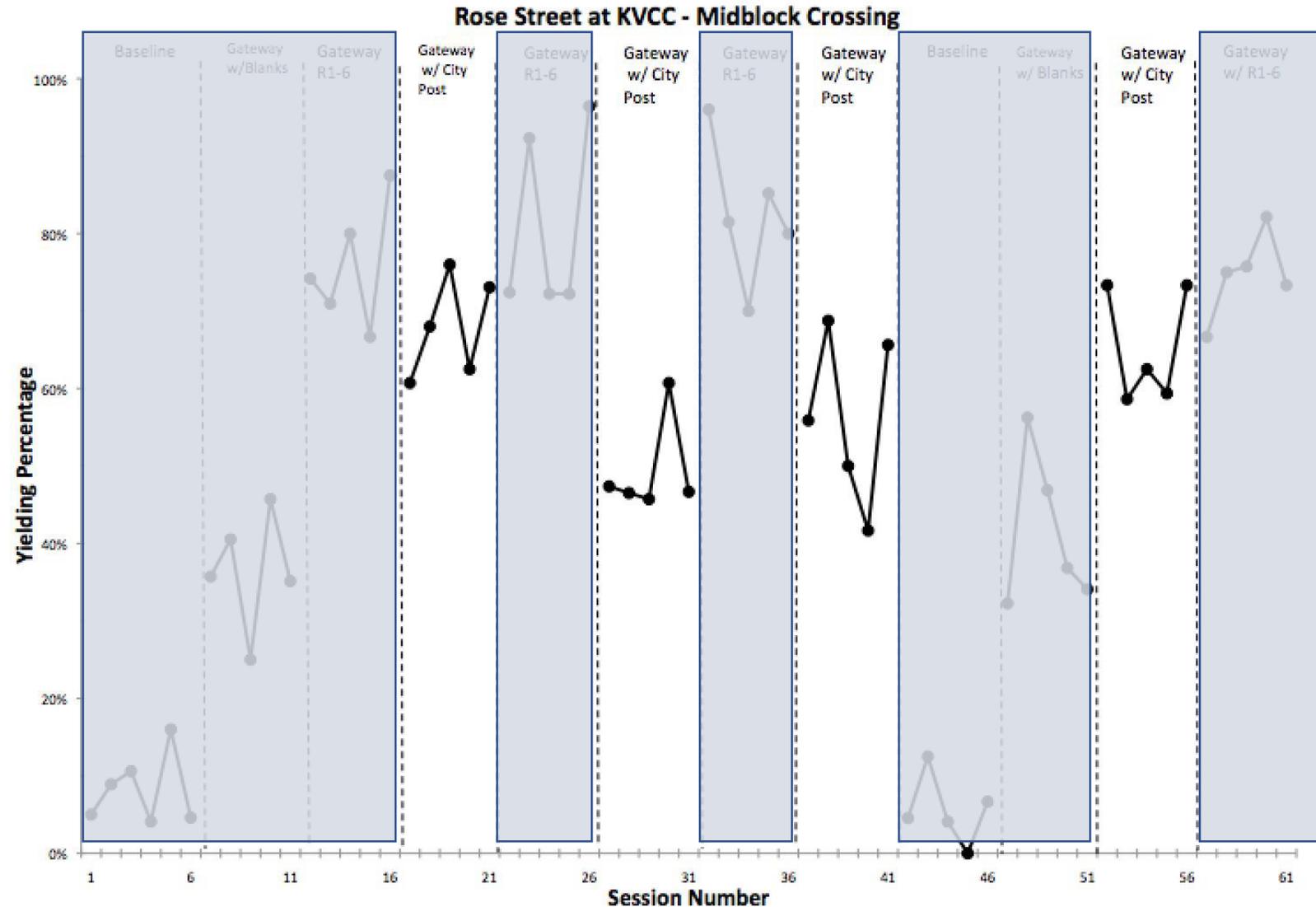
## #1 – The Initial Data

## Gateway Treatment

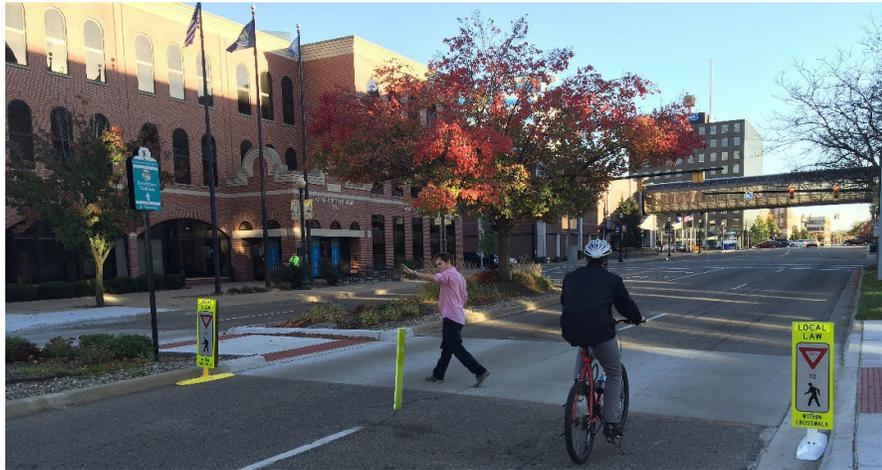


## #1 – The Initial Data

## Gateway with City Post



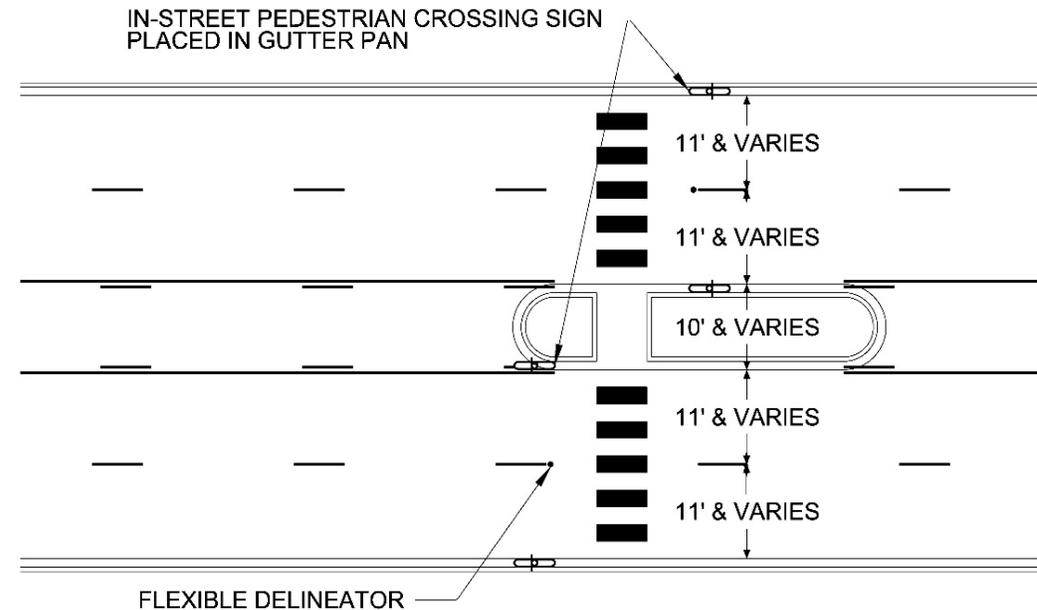
## #1 – Final Results – Guidance Document



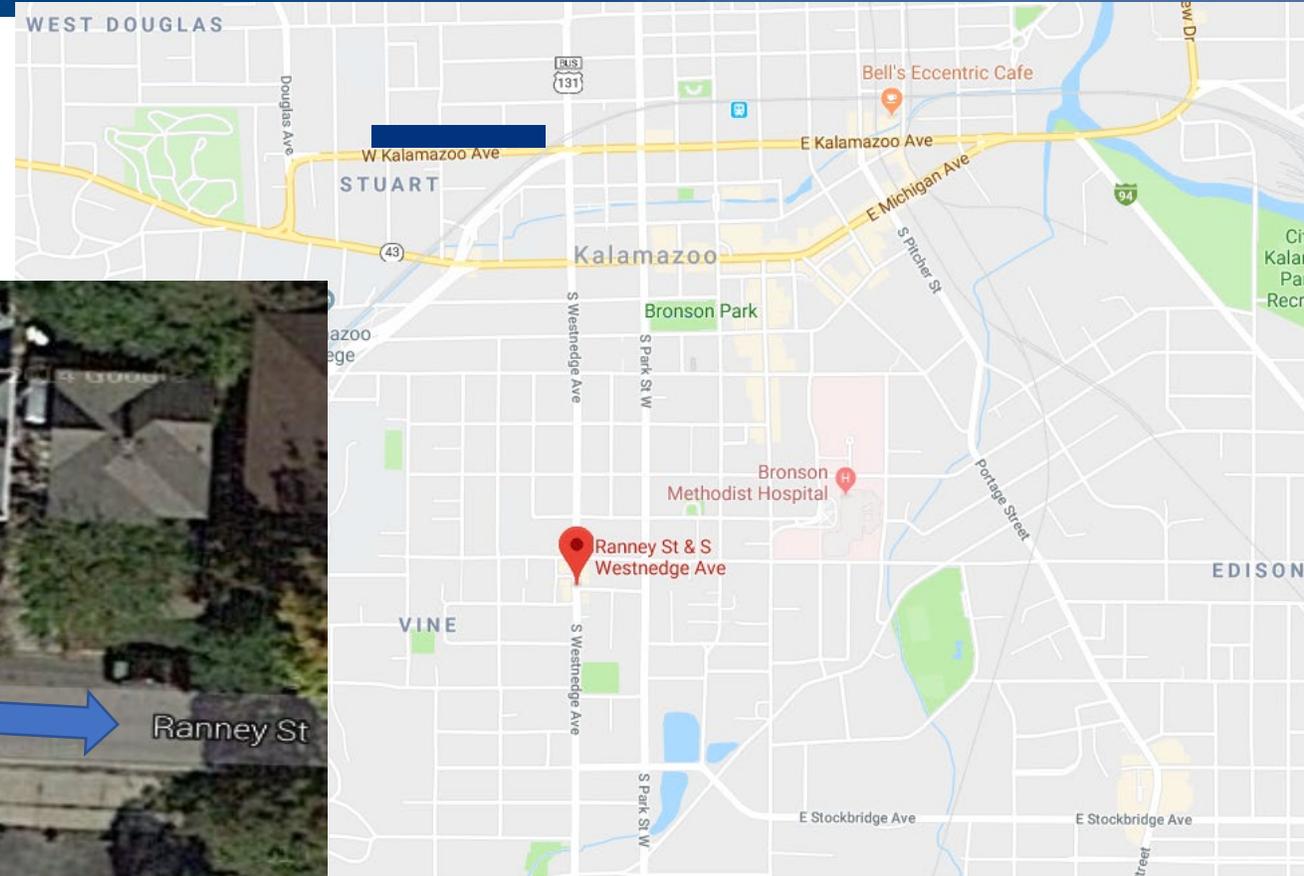
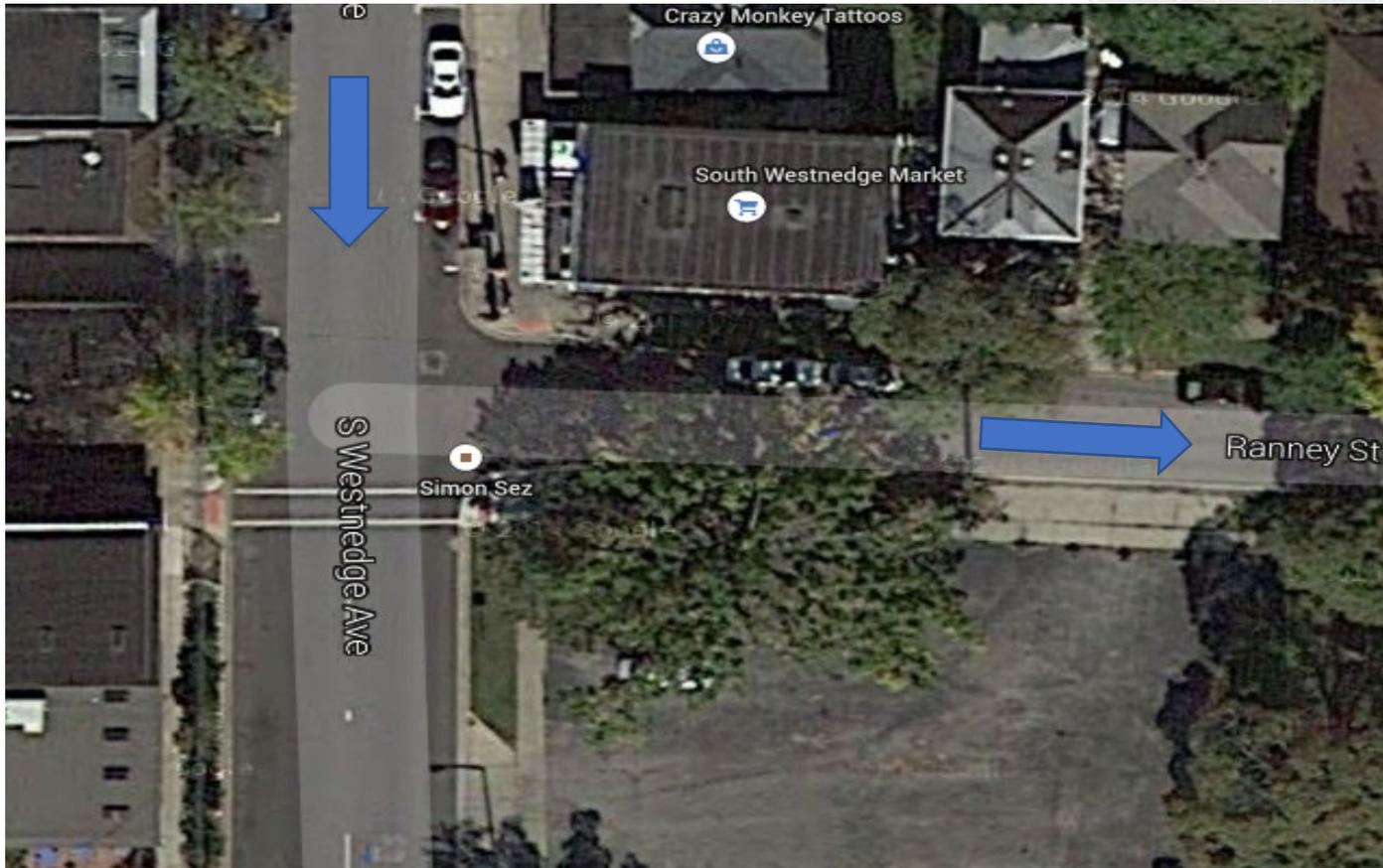
Between 70% and 90% compliance

- Posted speeds of 30 mph or lower
- ADT up to 25,000

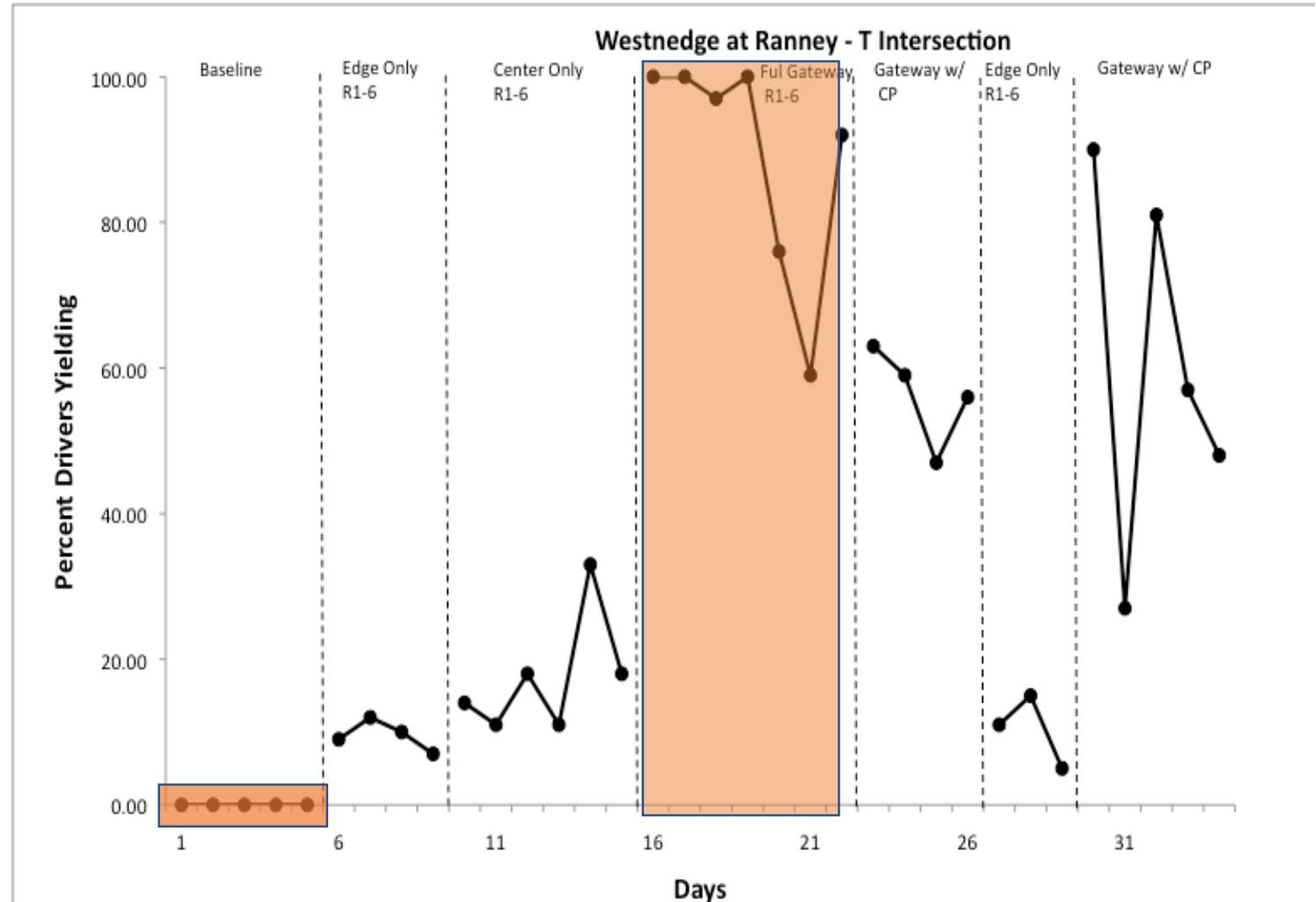
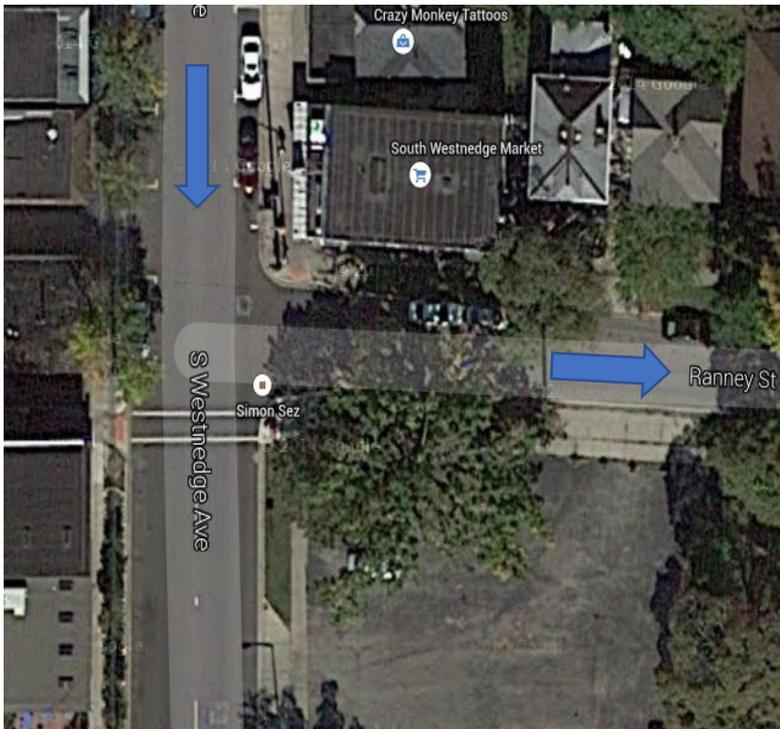
### Gateway Treatment, *Four-Lane Configuration with Refuge Island*



## #2 – The Initial Data



## #2– The Initial Data



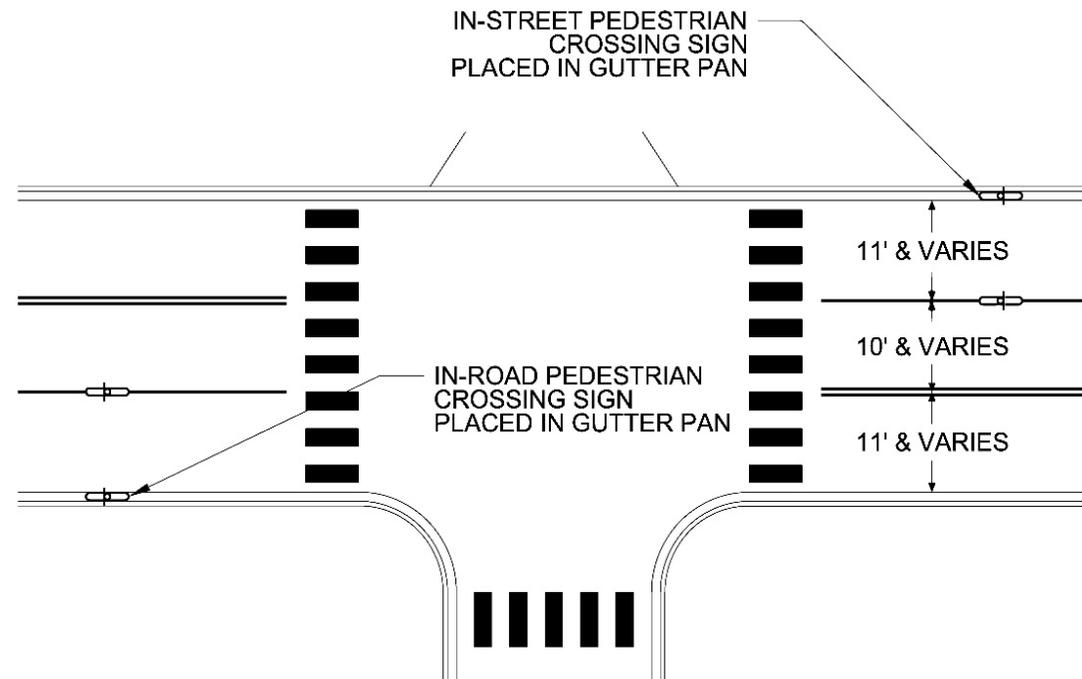
## #2 – Final Results – Guidance Document



Between 70% and 80% compliance

- Posted speed limit is 30 mph

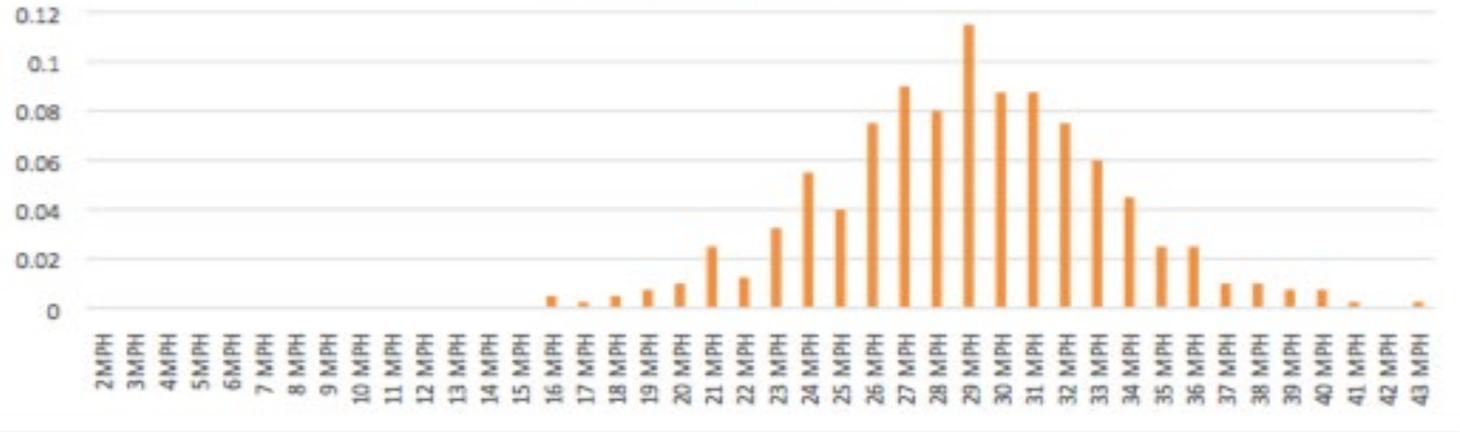
### Gateway Treatment, *Three-Lane Configuration, T-Intersection with Offset Installation*



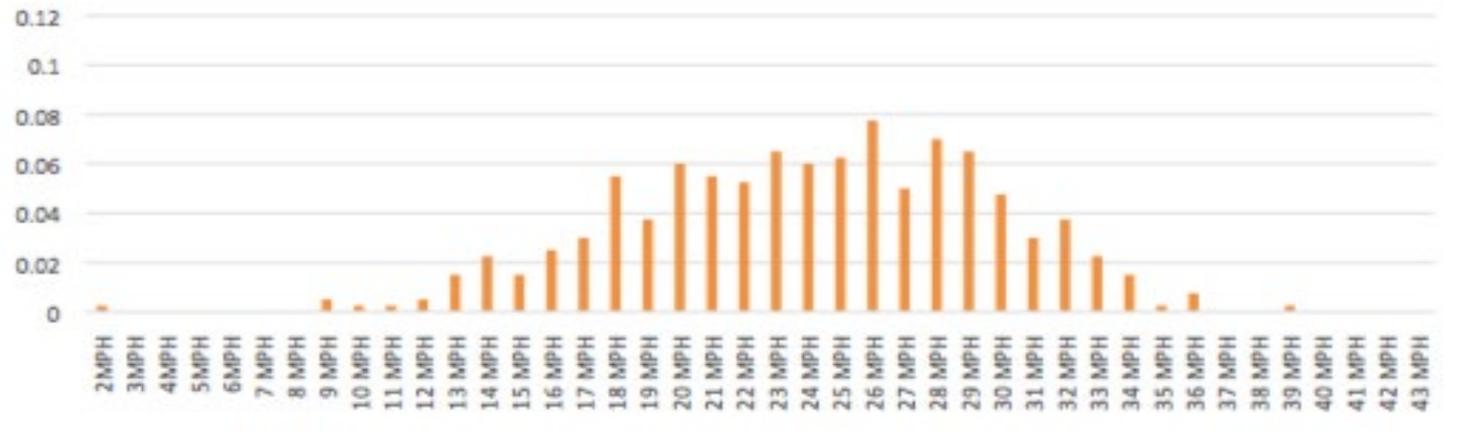
## #2 – Speed Data



Baseline Distribution



June Distribution



## #3 – The Initial Data

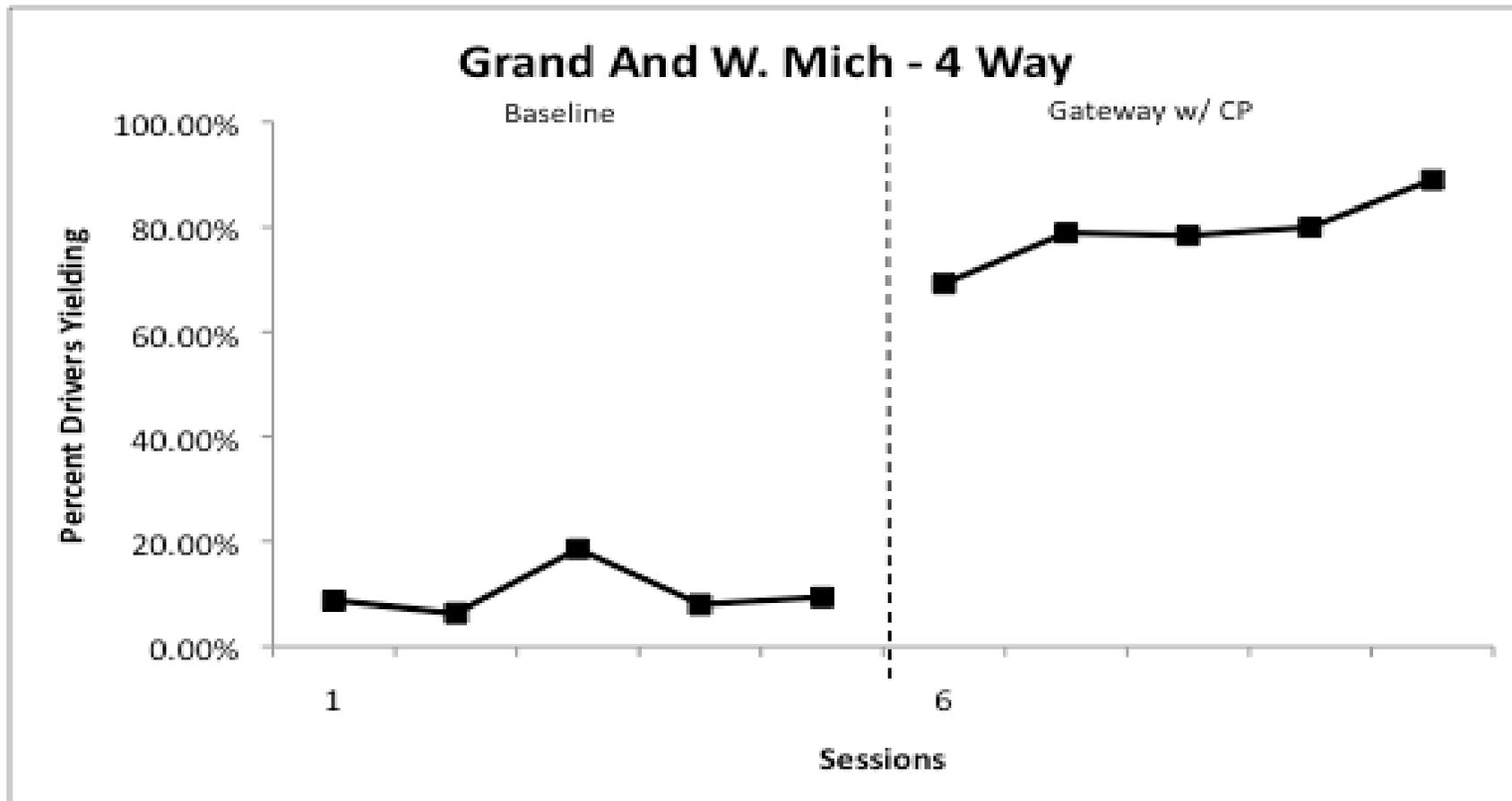


- Four lane undivided
- Parking on both sides
- Two-way STOP controlled

## West Michigan Avenue and Grand Street



## #3– The Initial Data



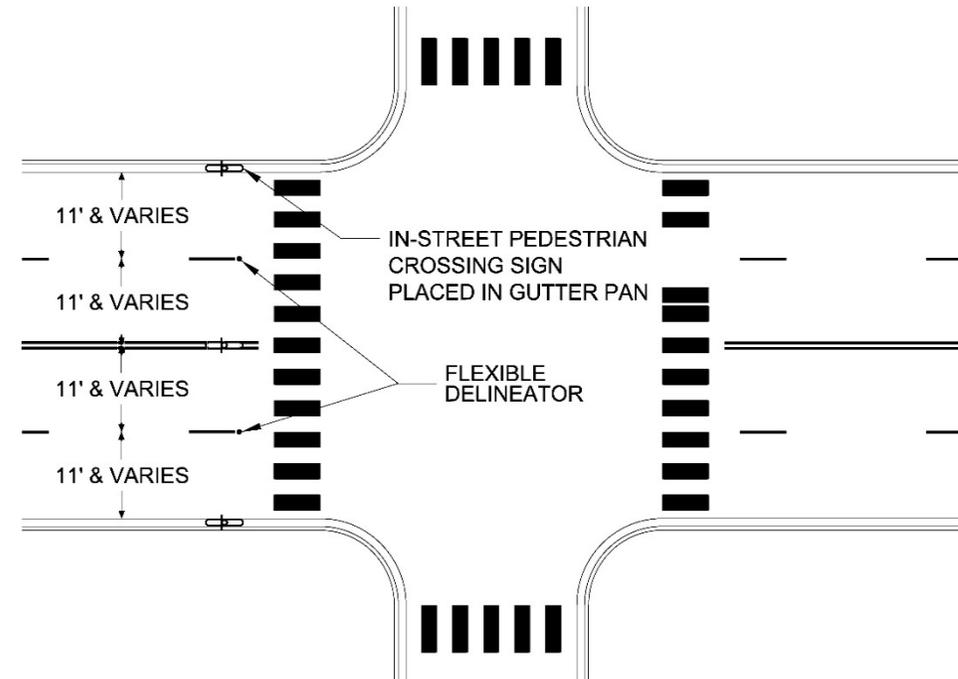
## #3 – West Michigan Ave & Grand St. Final Results – Guidance Document



Between 55% and 80% compliance

- Posted speeds of 30 mph or lower
- ADT up to 25,000

Gateway Treatment,  
*Four-Lane  
Configuration, No  
Refuge Island*



# Gateway Treatment



## Speed Data

	Baseline		Jun		Aug		Oct	
	Mean Speed		Mean Speed		Mean Speed		Mean Speed	
<b>SW Michigan</b>	<i>Dillema Zone</i>	<i>Crosswalk</i>						
Westnedge & Ranney	27.6	29	24.3	23.0	NA	NA	NA	NA
Three Rivers N.Main	23.9	22.6	22.8	21.6	21.5	14.0	20.5	19.7
Benton Harbor	29.4	19.2	27.6	18.8	27.4	15.7	27.2	16.4
Allegan	27.2	28.1	25.9	25.4	27.2	27.1	26.9	26.9
<b>Grand Rapids</b>								
Cherry & Hollister	25.6	25.2	22.8	21.9	21.5	20.5	21.5	20.5
Wealthy & Henry	24.8	24.4	24.4	22.0	24.7	23.6	23.0	22.3
<b>Ann Arbor</b>								
7th & Stadium	34.1	30.6	31.6	27.6	32.1	28.9	29.6	28.4
Division & Jefferson	28.1	27.4	25.4	19.1	22.6	19.5	NA	NA
Nixon & Bluett	32.8	32.3	28.5	27.1	31.6	29.3	29.9	28.8
Huron	32.8	32.9	29.4	28.3	24.6	23.5	23.4	22.6

## Speed Data

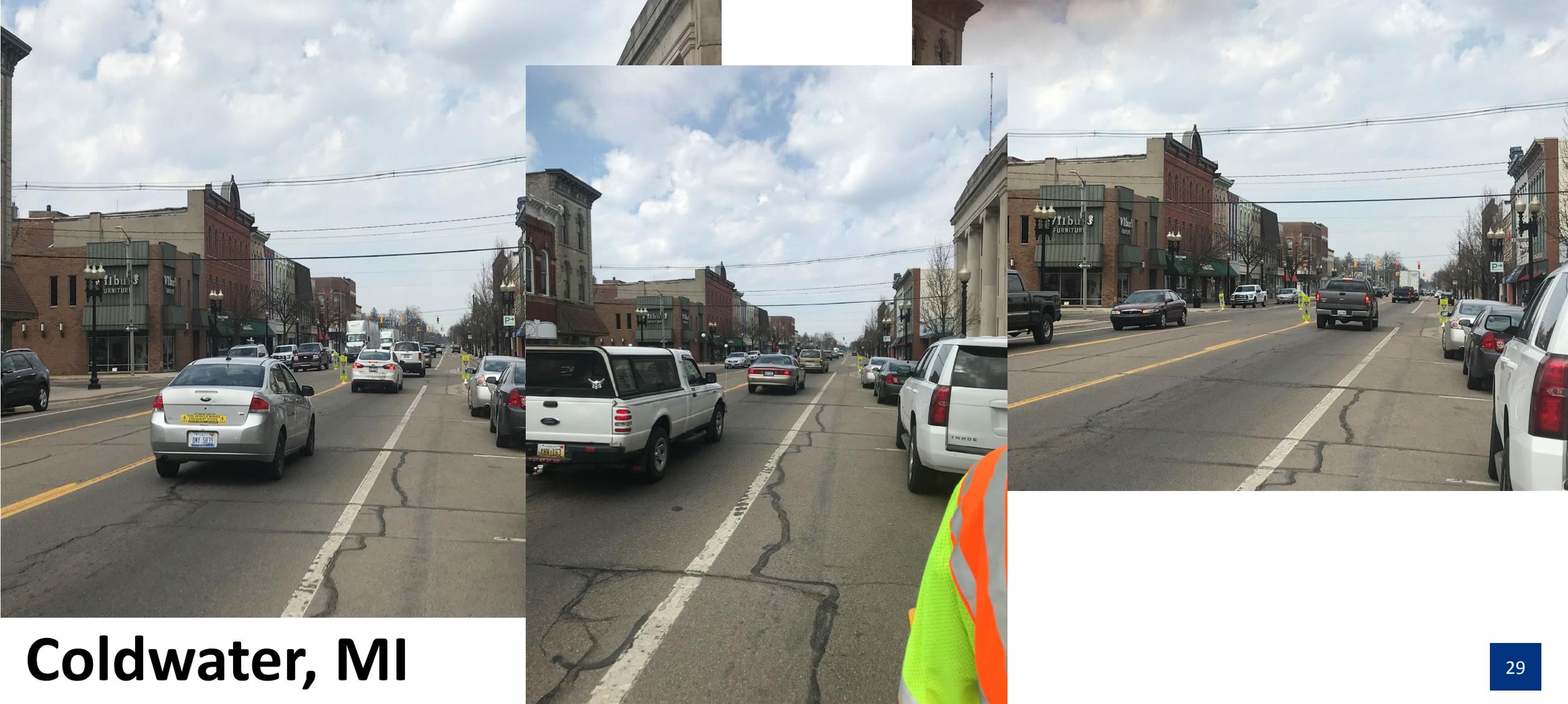
Location	Speed Redution at Crosswalk			Speed Reduction Dilemma Zone		
	Jun	Aug	Oct	Jun	Aug	Oct
Monroe	2.7	1	1.2	1.3	0	0.3
Stadium	3.2	1.9	2.4	0	0	1
Huron	4.6	9.4	8.3	3.4	8.2	7.4
Westnedge	6.1	NA	NA	3.3	NA	NA
Nixon	3.6	3	3.5	2.4	1.9	3
Division	8.3	7.9	NA	3	5	NA
Cherry	3.3	4.7	3.3	2.8	4.1	3.5
Mean	4.5	4.7	3.7	2.3	3.2	3.0

## Speed Matters

As speed increases, driver focuses less on surroundings

16





**Coldwater, MI**



**MDOT**  
Michigan Department of Transportation

## Pedestrian Safety

user can contribute to the vision of 0 Deaths on Michigan roadways.

fatalities and serious injuries have been causing, representing approximately 21-64 account for the majority of pedestrian fatalities

is the highest number of pedestrian crashes

pedestrians make up the majority of fatalities in MI

and 21-64 account for the majority of pedestrian fatalities

**MICHIGAN STATE POLICE**

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### Walking and Pedestrian Safety in Michigan

MDOT is working to create better, safer roadways for all users by providing a variety of services and information supporting walking and pedestrian safety, including:

- Training for Engineers and Planners
- Educational Safety Videos and Publications
- [Non-Motorized Regional Plans](#)
- [Senior Mobility](#)
- Americans with Disabilities Act (ADA) Guidance

This new [hiking and bicycling route](#) showcases Michigan's spectacular natural, cultural and historic resources. It builds upon Michigan's extensive trail network, linking many existing trails to provide you with a signature Pure Michigan experience.

Two routes, one great trail.

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**Ruth Johnson, Secretary of State**  
Department of State

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**USER GUIDE FOR R1-6 GATEWAY TREATMENT FOR PEDESTRIAN CROSSINGS**

**Pedestrian Gateway Treatment Technical Memo**

Prepared by:  
Western Michigan University, International  
December 2016

The Pedestrian Gateway Treatment can be made up of R1-6 pedestrian in-street signs installed at the curb and on all lane lines and/or R1-6 signs installed at the curb and flexible delineator posts installed on lane lines. Appropriate installation locations include intersections and midblock crosswalks on roads with speed limits of 35 mph or less. Because the treatment components are simple and adaptable, the treatment can be used in a variety of roadway configurations including one- and two-way travel lanes, with or without pedestrian refuge areas, and with or without

**80%** yield rates

*"We wanted a low-cost, effective treatment to improve pedestrian safety. It's exciting to show that the gateway treatment can be of value at lots of locations."*

*The Pedestrian Gateway Treatment alerts drivers that a crosswalk is in place and failure to yield to pedestrians in the crosswalk violates local and/or state laws. The treatment has*



*"We wanted a low-cost, effective treatment to improve pedestrian safety. It's exciting to show that the gateway treatment can be of value at lots of downtown locations."*

**Carissa McQuiston, P.E.**  
Project Manager

projects to evaluate the effectiveness of the treatment in its various configurations, both initially and over the course of a spring-through-fall test period. In addition since the gateway treatment includes in-street signs, MDOT investigated the likelihood of the signs' survival and the effectiveness of a partial treatment if one sign is struck down by a vehicle.

**Research**  
The initial project evaluated the effectiveness of the gateway treatment. The research team installed the signs in several configurations at a variety of sites, including non-signalized intersections, traffic circles, trail crossings, midblock crosswalk and Interstate highway ramp entrances. To evaluate the influence of the message imprinted on the signs, researchers also tested a gateway configuration using all blank signs.

In a follow-up project, researchers evaluated whether the impact of the gateway treatment on driver behavior would persist over time, and they collected speed information as part of this study to see whether speed reductions were noticed with the installation of the gateways. During the initial study, researchers observed sites for two or three months. In the follow-up phase, they monitored sites for six months, from May through October,

## Research Spotlight

### Gateway treatment makes crosswalks safer for pedestrians

Pedestrian safety is an important issue for MDOT, but getting drivers to yield to pedestrians consistently at crosswalks is a significant challenge. The gateway treatment, which consists of yield signs installed both at the edge of the roadway and between travel lanes, is an inexpensive strategy to increase driver yielding rates. Two research projects evaluated and confirmed the strategy's effectiveness and durability.

**Problem**  
Nationally, there were more than 4,700 pedestrian fatalities in 2013, with 148 such fatalities in Michigan. Enhancing pedestrian safety is one of the main goals of Michigan's Toward Zero Deaths statewide safety campaign, and improving the rates at which drivers yield to pedestrians at crosswalks is an important part of that campaign. However, the established strategies for achieving this goal (which are provided in the Michigan Manual on Uniform Traffic Control Devices) have limited effectiveness, particularly at sites with more than one travel lane in each direction. The rectangular rapid flash beacon and pedestrian hybrid beacon are more effective, but with

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installation costs of \$20,000 and \$100,000, respectively, they are too expensive for widespread implementation. The gateway treatment is a promising and less-expensive option, costing only \$1,200 to \$1,800 for a six-sign configuration. MDOT conducted two research

study period, but among flush-mounted signs with a pivoting base, only 58 percent survived.

**Value**  
The gateway treatment is an inexpensive and effective strategy for improving pedestrian safety in crosswalks. Appropriate locations include intersections and midblock crosswalks on roads with speed limits of 30 mph or less, or speed limits of 35 mph with average annual daily traffic levels below 12,000.

MDOT has published a [user guide](#) to aid implementation of the gateway treatment. This guide describes the signs

This final report is available online at  
[www.michigan.gov/documents/mdot/SPR-1638\\_552736\\_7.pdf](http://www.michigan.gov/documents/mdot/SPR-1638_552736_7.pdf) and [www.michigan.gov/documents/mdot/SPR-1643\\_552737\\_7.pdf](http://www.michigan.gov/documents/mdot/SPR-1643_552737_7.pdf).

Research Spotlight produced by CTC & Associates LLC, May 2017.

The logo for the AASHTO Innovation Initiative is centered on a dark blue background. It features a thick white horizontal bar at the top. Below the bar, the word "AASHTO" is written in a large, white, sans-serif font. Underneath "AASHTO", the words "INNOVATION INITIATIVE" are written in a smaller, white, sans-serif font.

**AASHTO**  
INNOVATION INITIATIVE

Questions?