
FINAL Study Report - EXECUTIVE SUMMARY

Audible/Tactile Pedestrian Signal Device Study

Monroe County

April 2011

PREPARED FOR:

Monroe County Department of Transportation
50 W. Main Street
Rochester, NY 14614

PREPARED BY:

TY Lin International
255 East Avenue
Rochester, NY 14604

TY·LININTERNATIONAL
engineers | planners | scientists



EXECUTIVE SUMMARY

The Monroe County Audible/Tactile Pedestrian Signal Device Study was initiated by the Monroe County Department of Transportation (MCDOT) to update existing protocol and to further identify locations in the highest need of the installation of audible/tactile pedestrian signal devices (ATPSD) to improve accessibility within Monroe County. The implementing regulations of ADA and the Draft Public Rights-of-Way Accessibility Guidelines are moving towards the installation of ATPSD at all new signals equipped with pedestrian signals. Installation of these devices at existing locations with pedestrian signals is also desired, and that is the focus of this study. The MCDOT plans to add ATPSD equipment at traffic signals that they operate each year as their budget permits, and this study will help identify which intersections and crosswalks should be done first.

T.Y. Lin International (TYLI) and Accessible Design for the Blind worked with MCDOT in determining a prioritized list of crosswalks at signalized intersections for audible/tactile devices to be installed based on destination locations, bus routes and origins of visually impaired people. The study team was assisted by an advisory group – the Accessible Pedestrian Advisory Committee (APAC) - representing ABVI-Goodwill, American Council for the Blind, Commission for the Blind, Center for Disability Rights, Lifespan, Monroe County Office of the Aging, Genesee Transportation Council (GTC), and Rochester Genesee Regional Transportation Authority (RGRTA), as well as members of the blind and visually impaired community.

Summary of Project Scope

The study scope of work included the following work efforts:

- Assembly of the Accessible Pedestrian Advisory Committee (APAC) & Committee Meetings – to obtain the perspective of the visually impaired community
- Two Public Meetings – to present project status and receive feedback
- Mapping of pedestrian needs & Activity Analysis – Filter A
- Identification of geometric needs through the Intersection Analysis - Filter B
- Detailed data collection & Crosswalk Analysis – Filter C
- Identification of needs & appropriate solutions – prioritized list of crosswalks
- Cost estimate & implementation priority
- Expansion of MCDOT Guidelines

Meetings

An advisory group was assembled which included members of the blind and visually impaired community, to obtain input into the process. The team met with the committee on several occasions to discuss the process and results of the Filter analyses. Two public meetings were also held, one on January 28, 2010 and another on October 21, 2010, to present and discuss the project methodologies and results.

Project Set-Up

To set up the project, the existing ATPSD Request Evaluation Procedure of the MCDOT was reviewed. The MCDOT provided data regarding all of the existing signal types and locations, as well as locations with existing ATPSD. These existing utilities were

mapped in ArcGIS – a mapping software consisting of a group of geographic information system (GIS) software products which allows several layers of geographic data to be analyzed – which was then used as the base of the mapping data for the project.

Project Approach

This study consisted of a three-step process in order to identify the highest priority crosswalks where ATPSD are in need of installation. For each step a ‘Filter’ was created to narrow the candidate locations based on the 2006 NCHRP Project 3-62: Guidelines for Accessible Pedestrian Signals criteria. These Filters (A, B, and C) were designed to reduce the number of signalized intersections and more specifically crosswalks as each one was applied. Each Filter used a unique scoring system to rank the locations in order of priority. Statistical analysis was then used to group the remaining locations from each Filter into high, medium and low priority. For the statistical grouping, the scores were plotted on a graph, and then separated into these three categories. The locations with the highest priority moved through to the next Filter. The three Filters include the following ranking criteria:

Filter A – Activity Analysis

The first step looked at the broad influences of Origin, Transportation, Destination, and Signal Type data that was reviewed in order to develop an initial list of the highest priority signalized intersections based on the level of approximated pedestrian activity. Origins included ZIP Codes with high concentrations of ABVI consumers as well as Lift Line passengers. Transportation included bus routes and the concentration of ridership. Destinations included: residential complexes; assisted living complexes; hospitals and health care centers; support service centers; civic and municipal buildings; food and shopping centers; entertainment locations; and other locations such as Universities, and the airport. The signal timing type was reviewed and identified as pre-timed, actuated or semi-actuated. Each influence was given a point value and the points for each of the traffic signals evaluated was totaled. Using statistical analysis the intersections with the highest scores (ranging from 22 to 57 points) were identified as candidates for further review. Through this process 103 out of 554 (18%) intersections were identified as high priority candidates and applied to Filter B.

Filter B – Intersection Analysis

The second step further reduced the 103 intersections by evaluating the existing pedestrian accommodations including intersection geometrics, signal phasing, and nearby influences. These factors help to identify the relative difficulty of crossing at each location. The geometric analysis included the intersection configuration noting the number of legs, and the presence/lack of skew in each leg. The signal phasing analysis determined what type of signalization was present at each intersection with the order rising in influence from pre-timed, to actuated, to split phasing, and finally the highest influence of exclusive pedestrian phasing. Also taken into consideration for this Filter was the distance to support service facilities, distance to inaccessible destinations – locations with unfriendly pedestrian access or no sidewalks, and distance to pedestrian attractions. Each of the Intersection Analysis criteria was given a point value and the points for each of the 103 intersections evaluated was totaled.

Using statistical analysis the intersections with highest scores (ranging from 18 to 47 points) were identified as high priority intersections for further review of their crosswalks in Filter C. This Filter found 28 intersections (83 crosswalks – 6 of which are already equipped with ATPSD devices) as high priority locations that potentially meet the needs for ATPSD as shown on **Figure ES-1**.

Filter C – Crosswalk Analysis

The third step developed criteria to rank each of the 83 crosswalks in order of priority. Six of the crosswalks are already equipped with ATPSD devices, therefore only the remaining 77 crosswalks were analyzed. Each crosswalk was inspected in the field to assign a value to each ranking criteria of detailed intersection geometry and crosswalk amenities. Criteria analyzed in Filter C were:

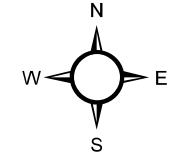
- Important roadway network features such as posted speed limits, off-peak traffic presence distances to alternative ATPSD devices, and availability of alternate crosswalks within the intersection;
- Specific intersection/crosswalk geometrics such as curb radius, islands or medians, traverse (cross) slope, apex curb ramps, channelized right turn islands, and skewed crosswalks; and
- Signal operation specifics such as push-button actuation requirements, non-concurrent walk intervals, leading pedestrian intervals, right-turn-on-read permission, protected left-turn phases, protected right-turn phases or right-turn overlap, signalization of channelized right-turn lanes, and pushbutton locations.

Each of the Crosswalk Analysis criteria was given a point value and the points for each of the crosswalks evaluated was totaled. The highest possible crosswalk score is 75 points.

Summary of Priority Crosswalks & Study Recommendations

The final priority list of crosswalks that will be the first locations recommended to be equipped with ATPSD was determined by the Total Crosswalk Score. This Total Score is the sum of the Intersection Score (Intersection Analysis - Filter B) and the Crosswalk Score (Crosswalk Analysis – Filter C), ranging from zero to 122 points. Using statistical analysis the crosswalks with the highest scores were identified as candidates for the installation of ATPSD devices.

The study concludes that 33 crosswalks (at 19 intersections) were found to be in the highest priority for the installation of ATPSD, which are shown on **Figure ES-2** and in **Table ES-1**. The MCDOT will also consider adding an ATPSD to additional crosswalks at each priority intersection, as they deem necessary.



Legend

- MCDOT Traffic Signal Locations
- Existing ATPSD Locations

Intersection Analysis

- ◆ Highest Priority
- ◆ Mid Priority
- ◆ Low Priority

Destinations

- Support Services
- Health Care
- Civic/Municipal
- Food/Shopping
- Residence (Apartments)
- Residence (Assisted Living)
- Entertainment
- Other

Mapping

- County Boundaries
- City/Town Boundaries
- Hydrography

Roads

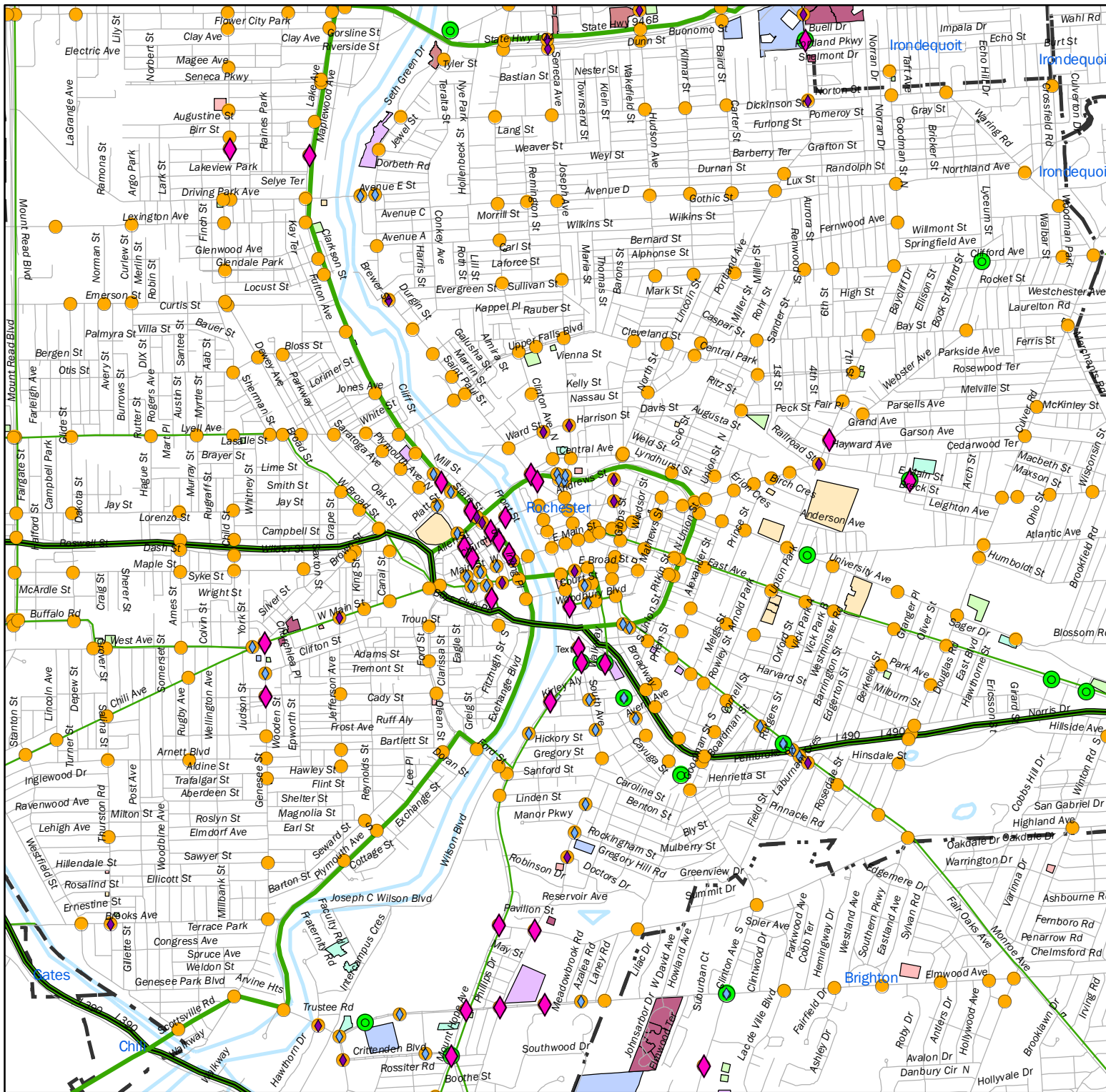
CLASS

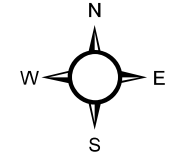
- Interstate
- Principal Arterial
- Minor Arterial
- Streets

FIGURE ES-1

**Audible/Tactile Pedestrian
Signal Device Study**

Intersection Analysis - Filter B





Legend

- MCDOT Traffic Signal Locations
- Existing ATPSD Locations

Crosswalk Analysis

- + High Priority
- + Mid Priority
- + Low Priority

Destinations

- Support Services
- Health Care
- Civic/Municipal
- Food/Shopping
- Residence (Apartments)
- Residence (Assisted Living)
- Entertainment
- Other

Mapping

- County Boundaries
- City/Town Boundaries
- Hydrography

Roads

CLASS

- Interstate
- Principal Arterial
- Minor Arterial
- Streets

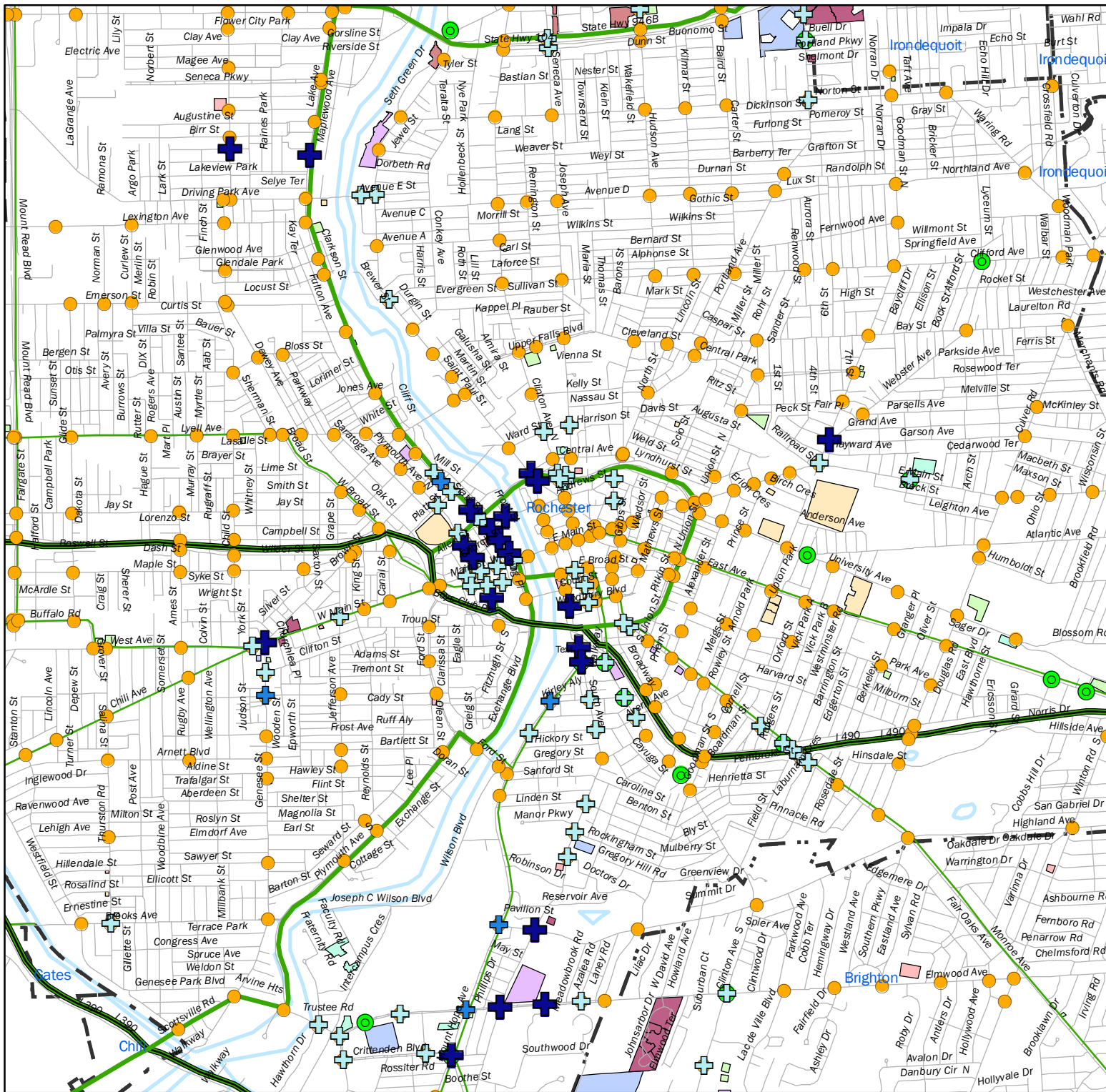


FIGURE ES-2
Audible/Tactile Pedestrian
Signal Device Study
Crosswalk Analysis - Filter C

Table ES-1: Recommended Crosswalks for ATPSD Installation

Intersection	Crosswalks Leg (Rank)
1. South @ Griffith/1490	East Leg (1), North Leg (12)
2. Lake @ Nazareth Academy (PED)	North Leg (2)
3. South @ Elmwood	West Leg (3), NW Leg (4), North Leg (5), East Leg (8), South Leg (13)
4. St. Paul @ Inner loop/ Cumberland	West Leg (6), East Leg (7), North Leg (9), SE Leg (15), East Leg (16), SW Leg (24), West Leg (25)
5. Plymouth @ Church	NW Leg (10), SE Leg (17), NE Leg (67)
6. Goodman @ Garson/Webster	NE Leg (11), SW Leg (28), NW Leg (36), SE Leg (37), East Leg (48), West Leg (61)
7. Plymouth @ Allen	South Leg (14), West Leg (47)
8. State @ Commercial	NW Leg (18), NE Leg (70)
9. South @ Highland	South Leg (19), North Leg (40), East Leg (59), West Leg (66)
10. Mt. Hope @ E.Hen/Crittenden Blvd	West Leg (20)
11. Dewey @ Bryan (PED)	North Leg (21)
12. Elmwood @ Roch Psych Ctr	East Leg (22), West Leg (38), North Leg (43), South Leg (62)
13. South @ Woodbury	North Leg (23), East Leg (76)
14. South @ Byron/ Mt. Hope	East Leg (26), West Leg (54)
15. Main @ Brown/Genesee	East Leg (27), West Leg (39), North Leg (63), South Leg (69)
16. State @ Church	South Leg (29), North Leg (49), West Leg (51)
17. State @ Andrews	SE Leg (30), NW Leg (34), NE Leg (55)
18. Plymouth @ Spring	North Leg (31), South Leg (32), West Leg (56)
19. Andrews @ Front	East Leg (33), North Leg (74), South Leg (77)

NOTE: Crosswalks with existing ATPSD devices were removed from this list.

The full lists of ranked locations from Filters A, B, and C are shown in **Appendix H**.

Implementation Considerations

The study concludes that the cost of installation of an ATPSD device at a single crosswalk is approximately \$1,200. To install a device at every crosswalk at the high priority intersections from Filter B, the total project cost will be approximately \$92,400. MCDOT has approximately \$30,000 per year for installing new devices, which means it will take approximately 3 years for all of the high priority intersections to be equipped with ATPSD devices, or as their budget permits. After the high priority intersections are complete, MCDOT may choose to move on to the medium-priority intersections and then low priority intersections of Filter B. If all 331 crosswalks - crosswalks that do not currently have an ATPSD device - in the intersections analyzed in Filter B were to be equipped with a device, it would cost approximately \$435,600, and take approximately 14 and ½ years to complete. In addition, the existing 24 pair of devices should be replaced with updated hardware as they wear out or as the budget permits, at an additional cost of \$28,800. Thus, the total cost to completely install the current hardware standards at all these locations would be \$464,400. However, it should be noted that current guidelines do not require these devices to be used in all situations.

To accelerate the pace of device installation, a joint letter from both the blind and visually impaired community and MCDOT to State legislators is recommended as a starting point for requesting additional funding for this specific purpose.

Summary of New Guidelines

New guidelines for assessing the need for audible/tactile pedestrian signal devices at intersections and crosswalks equipped with pedestrian signals are included in **Appendix N**. The new guidelines provide instructions for three scenarios a crosswalk can be considered for an ATPSD as listed below.

- Recommended from the ATPSD Study
- Individual Request
- Roadway Project

The recommended list of prioritized crosswalks created through this study should be equipped with ATPSD starting with highest priority locations first until all the priority locations are complete. If an individual requests an ATPSD or a public project involves alteration of an existing signal or installation of a new signal, the same methodologies used in the ATPSD study should be used to evaluate the location. In order to follow the same methodologies, an ATPSD Scoring Evaluation Sheet has been created to determine the location's Intersection Analysis - Filter B score and Crosswalk Analysis - Filter C score. The Scoring Evaluation Sheet then shows the combined Total Crosswalk Score, which can then be used to determine where the crosswalk ranks in terms of priority for installation. Refer to the following two cases:

- **Case 1 – Not Evaluated in the ATPSD Study**
If the location was not previously evaluated, then a Total Crosswalk Score should be determined using the ATPSD Scoring Evaluation Sheets.
- **Case 2 - Previously Evaluated in the ATPSD Study**
If the crosswalk was previously evaluated, the Total Crosswalk Score should be updated, as modifications may have been made to the location.

If the Total Crosswalk Score falls within the high or medium point values (34 points or higher), the request should be approved and installation of an ATPSD should be done in advance of any remaining locations on the ATPSD Study prioritized list. If the Total Crosswalk Score falls below 34 points, the location should be added to the ATPSD Study prioritized list and evaluated once all the locations with higher scores have been equipped with ATPSD.