US 40 Dual Highway
Pedestrian Safety Study and Audit



FINAL REPORT

August 28, 2015

Prepared For:

Hagerstown Eastern Panhandle Metropolitan Planning Organization (HEPMPO)

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Section 1: Introduction

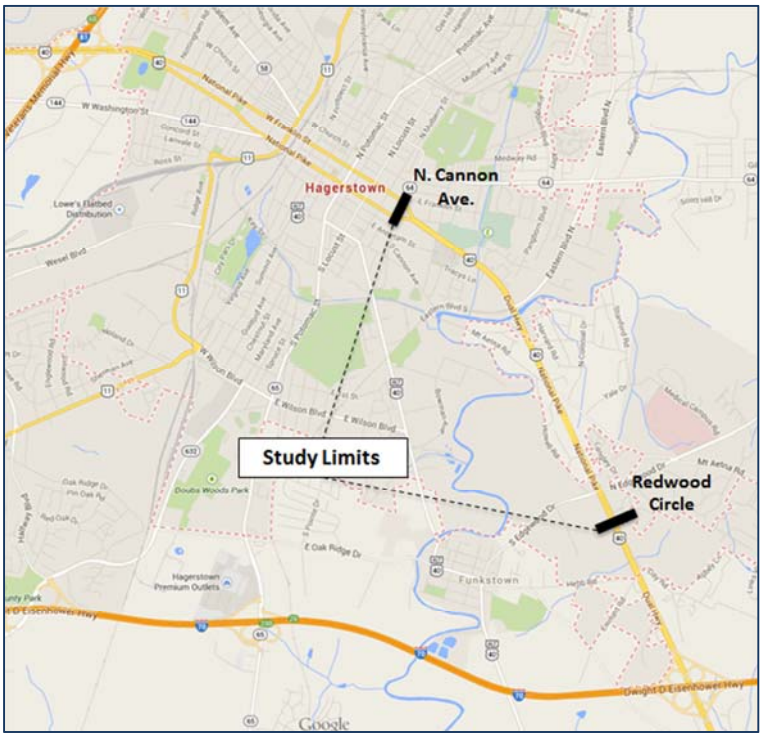
1.1 Study Objectives

This study has been conducted to expand upon previous study efforts completed by the Maryland State Highway Administration (SHA) District 6 for pedestrian safety along the US 40 Dual Highway. SHA's *US 40 (Dual Highway) Pedestrian Safety Improvements Study* (January 2015) includes an evaluation of existing pedestrian accommodations and lighting conditions, field observations, crash data analysis, and an initial assessment of potential pedestrian safety improvements. The SHA study is included in **Appendix A**.

The objectives of this study include the collection of additional data, a public pedestrian safety survey, a formal Pedestrian Road Safety Audit (PRSA), an enhanced Americans with Disabilities Act (ADA) assessment, and a more detailed assessment of potential improvement strategies for the corridor. The study area remains consistent with the SHA study as illustrated in **Exhibit 1**, which includes US 40 between Cannon Avenue and Redwood Circle.

Exhibit 1: Pedestrian Safety Study Project Limits

Google Maps



1.2 Background

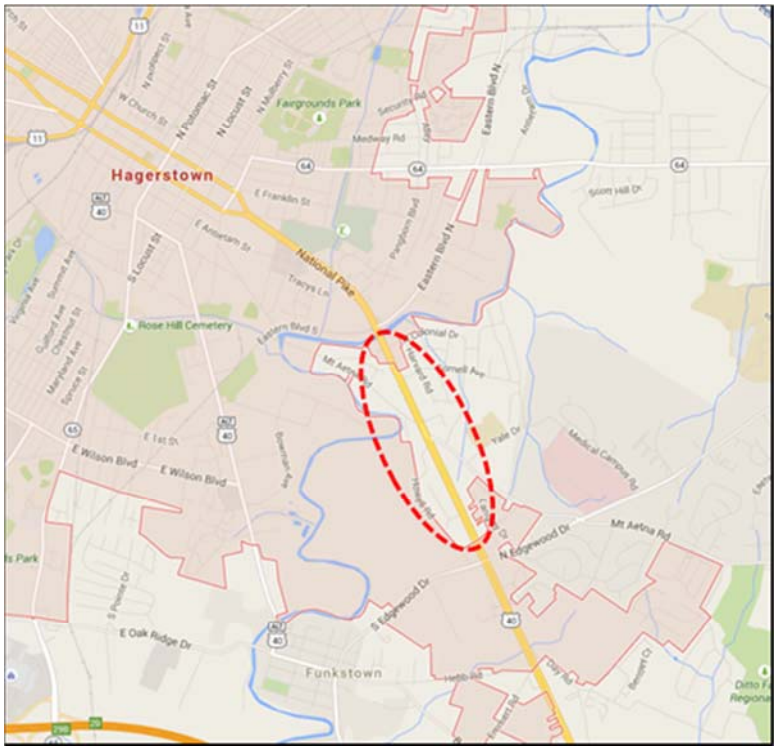
The Hagerstown Eastern Panhandle Metropolitan Planning Organization (HEPMPO) Interstate Council has requested a pedestrian safety study and audit along US 40 east of downtown Hagerstown. The corridor has had several recent pedestrian fatalities and has been specified as a priority by both the City of Hagerstown and the Washington County Commissioners. Additionally, the City of Hagerstown has determined the Dual Highway to be one of highest locations for pedestrian and bike crashes as documented in the city's Livable Street Guidelines (2014). The safety issues have also garnered additional exposure in recent local newspaper and television news stories.

SHA's pedestrian safety inventory study includes a crash data analysis for incidents that occurred between January 1, 2009 and September 20, 2014. In that period, 13 pedestrian crashes (3 fatalities) have occurred within the study corridor. These include two recent (2014) pedestrian fatalities that occurred between Cleveland Avenue and Eastern Boulevard and near Cornell Avenue. Since the SHA study, an additional pedestrian fatality occurred in December, 2014. A pedestrian was struck in the median just southeast of the Mt. Aetna intersection during the evening hours. The location is an area without streetlights or sidewalks.

Pedestrian accommodations along the US 40 study corridor vary by location. In some locations, sidewalks, clearly marked crosswalks, and/or pedestrian signal phases do not exist. Inconsistencies in the pedestrian facilities have been attributed to the requirements between Hagerstown and Washington County, as the regulations regarding sidewalks differ between the two jurisdictions. **Exhibit 2** illustrates the colored Hagerstown city boundary. Areas outside of the Hagerstown city limits including the section of US 40 between Cornell and Edgewood Drive (highlighted in the exhibit) have limited or no pedestrian facilities.

Exhibit 2: Hagerstown City Boundary

Google Maps



1.3 Report Organization

This report has been organized to provide information to complement SHA's US 40 pedestrian inventory study. Sections 2-3 document additional data collection efforts including pedestrian counts and the pedestrian safety survey. Section 4 includes an assessment of the current US 40 pedestrian accommodations with regards to ADA requirements. Section 5 provides an overview of the PRSA field visit and recommendations. Based on the PRSA, Section 6 provides the recommended US 40 corridor improvement strategies including an evaluation of priorities and potential cost ranges. Additional education and enforcement strategies are described in Section 7. Finally Section 8 provides a brief recommendation for the continued monitoring of corridor performance measures.

Section 2: Existing Conditions

The SHA *US 40 (Dual Highway) Pedestrian Safety Improvements Study* (**Appendix A**) provides existing conditions for the US 40 project study corridor including traffic volumes (AADT), speed limits, pedestrian accommodations, intersection lighting, and a crash analysis. This study provides additional information including a compilation of SHA intersection turning movement and pedestrian counts, additional counts, GPS traffic speed data, an assessment of traffic signal timing, and housing density data from the CENSUS.

2.1 Traffic and Pedestrian Counts

Intersection vehicle turning movement and pedestrian counts were conducted by SHA in January and February of 2015. The counts were conducted at the US 40 intersections with Cannon Avenue, Cleveland Avenue, Manor Drive, Eastern Boulevard, Mt. Aetna Road, and Edgewood Drive. The SHA counts are provided in **Appendix B**.

This study included additional traffic and pedestrian counts to complement SHA's data. **Exhibit 3** provides traffic counts at the US 40 mid-block U-turn between Manor Drive and Eastern Boulevard (across from Cancun Cantina). The counts were conducted on June 4, 2015 between 5:30 – 6:30pm. This traffic count was used during the assessment of strategy recommendations.

Exhibit 3: U-turn Traffic Counts (Between Manor and Eastern)

Time	US 40 Eastbound			US 40 Westbound		
	Left	U-turn	Total	Left	U-turn	Total
5:30	0	2	**2**	10	13	**23**
5:45	0	3	**3**	3	11	**14**
6:00	1	4	**5**	8	7	**15**
6:15	2	3	**5**	9	8	**17**

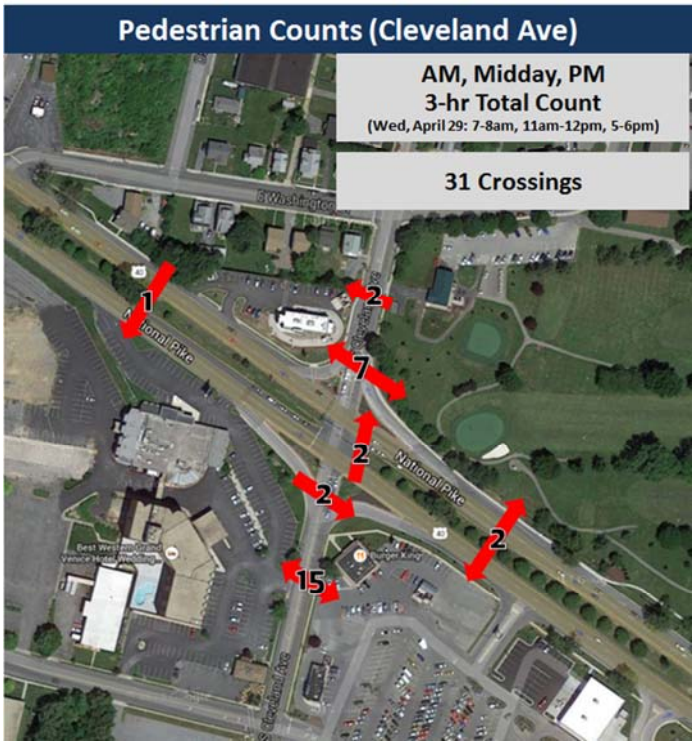
The pedestrian counts completed for this study included one hour in each of the morning, midday, and evening time periods for a total of three hours. The counts were conducted at the US 40 intersections with Cleveland, Manor, Eastern, Mt. Aetna, Edgewood, and Redwood Circle. An additional count was also conducted for a one hour nighttime period (Saturday May 9, 2015 from 11pm-12am) between Manor and Eastern Boulevard. All counts included observations for mid-block crossings within sight. **Appendix C** provides the count sheets. **Exhibit 4** summarizes the pedestrian count observations. At all locations, the pedestrian counts observed (during comparable time periods) are higher than the winter counts conducted by SHA.

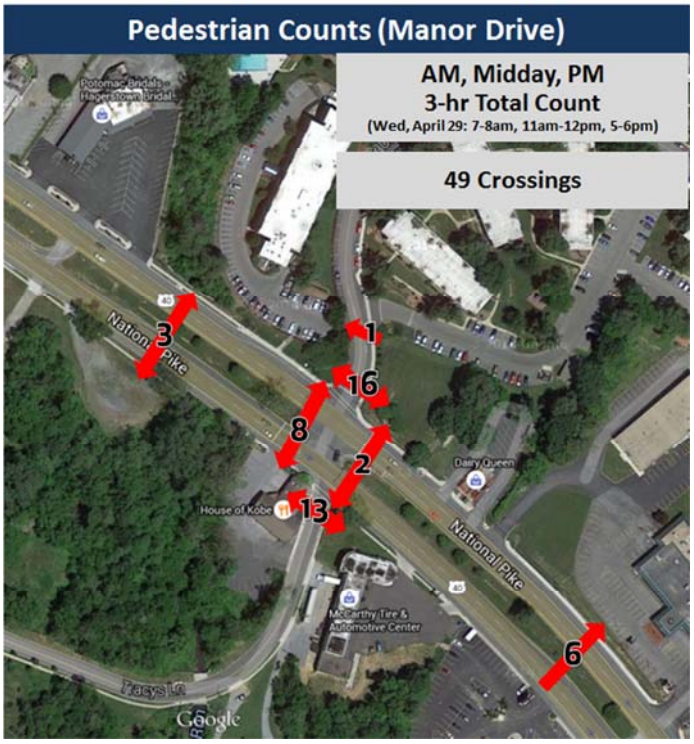
2.2 Traffic Speed and Travel Time Data

To complement existing traffic volume and speed limit information, available TomTom GPS data was obtained from the recent HEPMPO Long Range Transportation Plan (LRTP). The GPS data represents average weekday conditions based on speed observations over a two year period from 2011-2012 The data was reviewed for the US 40 project study area to estimate travel time ratios (Peak Travel Time / Off-Peak Travel Time) and travel speeds. The data is illustrated in **Exhibits 5-6**.

Exhibit 4: Additional Study Pedestrian Counts

(Overlays on Google Earth Imagery)





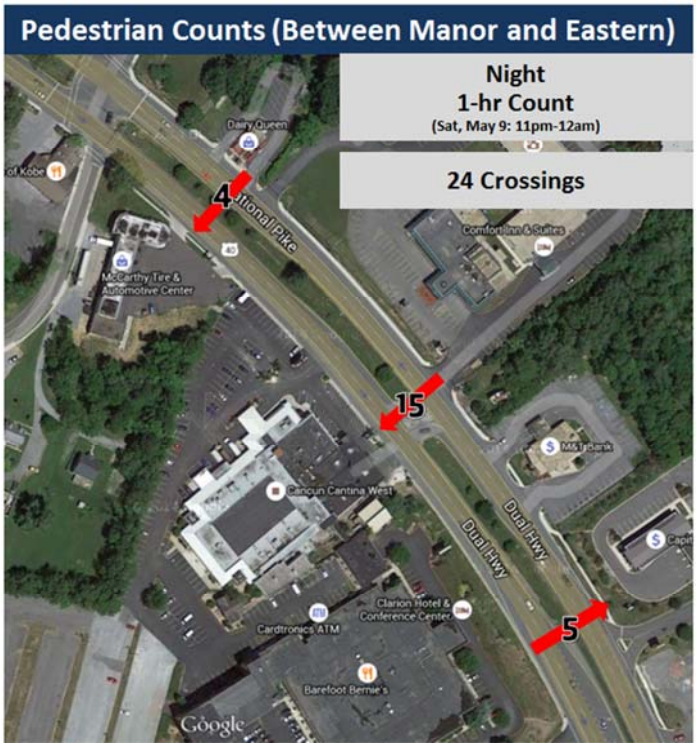
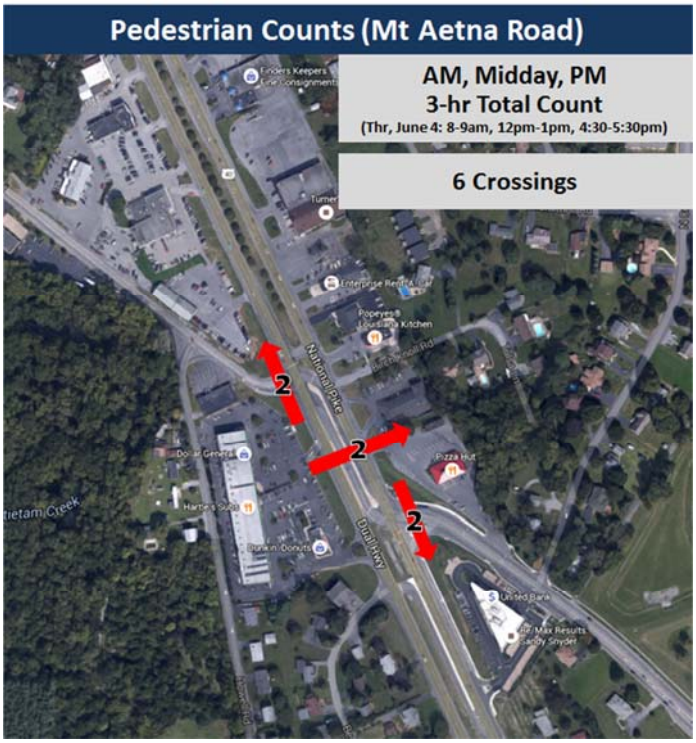
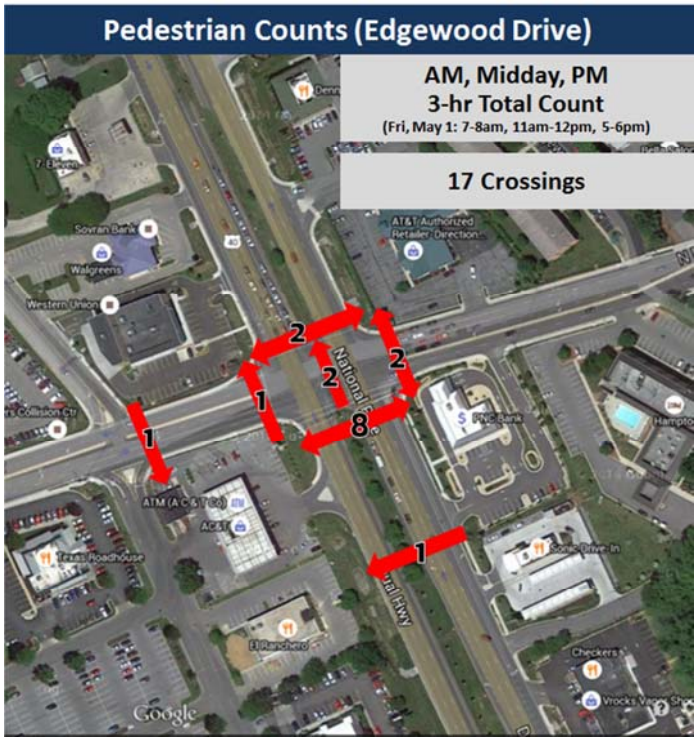


Exhibit 4: Additional Study Pedestrian Counts (Continued)

(Overlays on Google Earth Imagery)





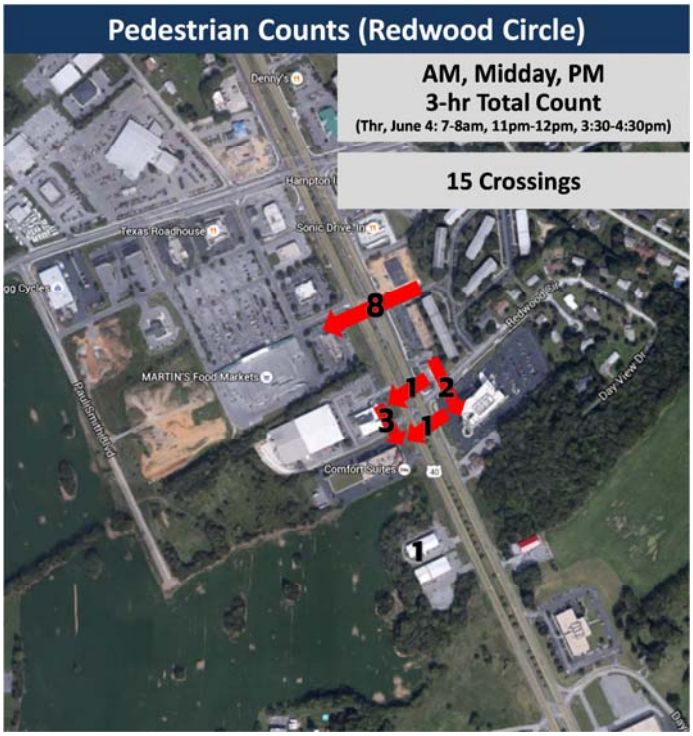


Exhibit 5: TomTom Travel Time Ratios

(Overlays on Google Earth Imagery)

* Yellow = Medium Traffic Congestion, Red = High Traffic Congestion

Exhibit 6: TomTom Average Weekday Peak Period Travel Speeds

(Overlays on Google Earth Imagery)

* Green = 25-34mph, Yellow = 35-39mph, Orange =40-44mph, Red = 45-50mph

As illustrated by the travel time ratio plots, traffic queuing occurs at multiple intersections indicating potential limitations and concerns over adding or increasing pedestrian phases at each intersection. Actual travel speeds are indicative of the speed limits within each section. From the Hagerstown corporate limits, just southeast of Eastern Boulevard, to Redwood Circle the speed limit is 45 mph. The GPS data indicates the average peak period speeds often exceed that value, most commonly between Mt. Aetna Road and Edgewood Drive. These higher speeds create additional concerns regarding pedestrian safety in the median and limit the potential options for mid-block crossing strategies.

2.3 Traffic Signal Timing and Pedestrian Phase Assessment

Traffic signal timing data was obtained from SHA as provided in **Appendix D**. Each traffic signal was evaluated to determine if sufficient pedestrian crossing times were available per the existing timing plans. **Exhibit 7** provides a summary of the calculations and evaluation. The table includes the available accommodations at each intersection including whether there are marked crosswalks and pedestrian signals. The evaluation included the following assumptions:

- **Needed Crossing Time**: The needed crossing times were estimated by dividing the crossing distance by a typical walking speed. Distances were estimated from aerial photographs in Google Maps and were based on the distance to the far side of the travel way or to a median of sufficient width. Walking speeds were estimated using the FHWA Manual on Uniform Traffic Control Devices (MUTCD) standard walking speed of 3.5 feet/second. In cases, where there is 20% elderly, the MUTCD recommends the use of a walking speed

of 3 feet/second. Data is not available on the typical elderly usage at the intersections; however the field counters provided a qualitative assessment indicating low numbers of elderly walkers within the corridor.

- **Available Crossing Time per Signal Timing:** Available crossing times were estimated from the signal timing plans. For locations without separate pedestrian signals, the available time is based upon the amount of green time in the walking direction. All of the signals along the corridor are actuated which results in varying green times based on the number of vehicles detected by the sensors.

For the locations with pedestrian signals (Manor, Eastern, Edgewood), the pedestrian clearance phase time is compared against the needed crossing time based on the distance and walk speed. A pedestrian can enter the intersection and start to cross the roadway at any time of a "Walk" interval. The flashing "Don't Walk" means a pedestrian shall not enter and start to cross, but any pedestrian who has already started to cross must be able to proceed to the far side the roadway. Therefore the flashing "Don't Walk" phase time alone should be equal or greater than the needed cross walk time. For the locations without pedestrian signals (Cannon, Cleveland, Mt. Aetna), the minimum and maximum green phase time is compared to the needed crossing time.

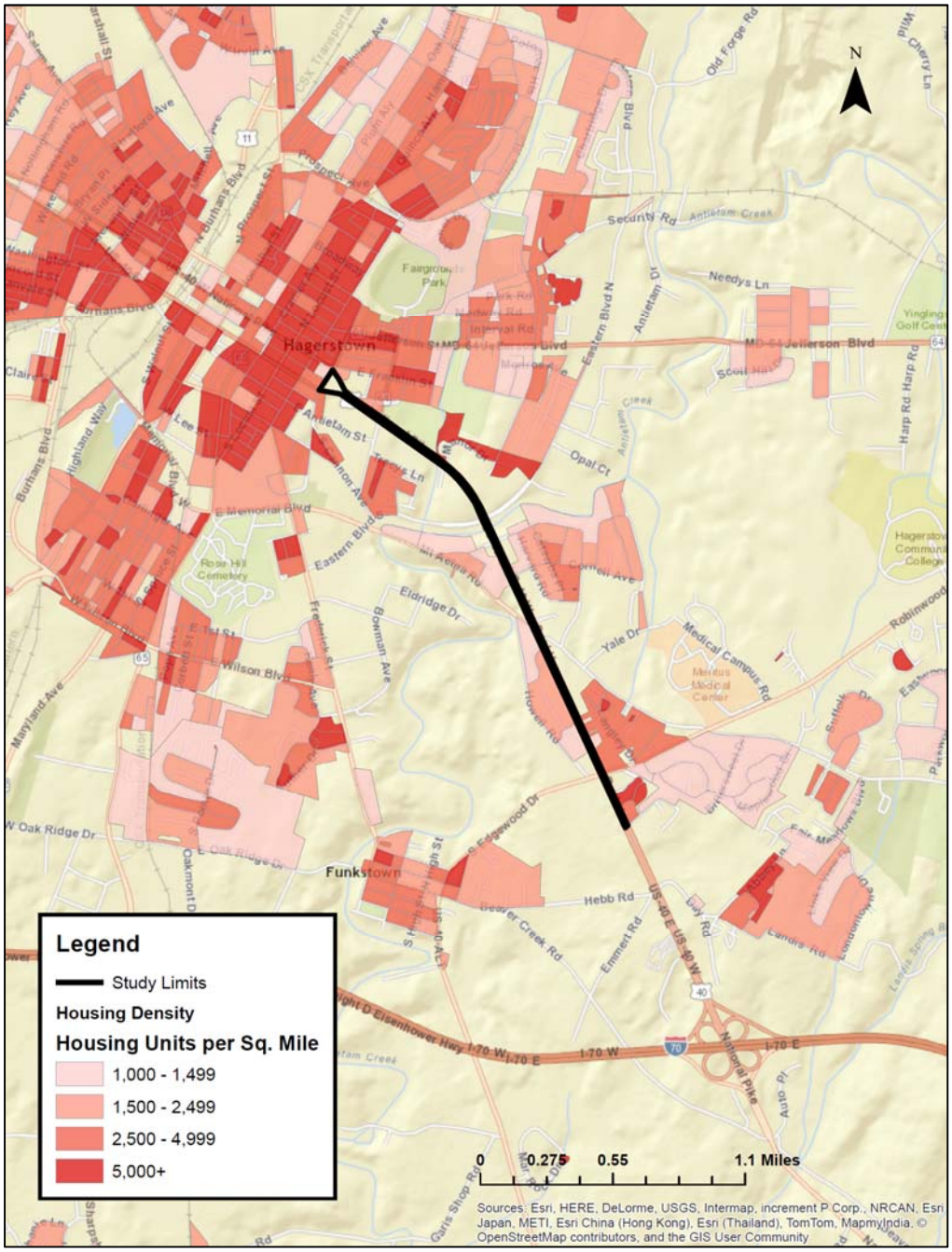
Exhibit 7: Evaluation of Pedestrian Crossing Times at Traffic Signals
Red highlight values indicate deficient signal timing for pedestrian crossing

US 40 Intersection	Available Accommodations		Needed Crossing Time Per Distance (seconds)		Available Crossing Time Per Signal Timing (seconds)		Evaluation of Signal Timing Plan
	Marked Crosswalk	Pedestrian Signal	US 40	Side Street	US 40	Side Street	
Cannon (US40 EB)	Yes	No	14	10	**Min = 10** Max = 25	Min = 15 Max = 40	No pedestrian signal; Insufficient crossing time (across US 40) could occur during minimal phase times
Cannon (US40 WB)	Yes	No	14	10	**Min = 5** Max = 25	Min = 15 Max = 40	
Cleveland	No Across US40	No	29 11 to median	13	**Min = 8** Max = 30	Min = 20 Max = 60	
Manor Drive	Yes	Yes No signal for Tracys Lane	38 18 to median	18	**Walk=10 Clearance=16**	Min = 20 Max = 60	Insufficient pedestrian crossing phase time (across US 40) for slower walkers
Eastern	Yes	No Signal exists only for Eastern cross	36 18 to median	29	**Min = 8 Max = 30**	**Walk=10 Clearance=16**	
Mt. Aetna	No	No	38 16 to median	24	**Min = 8 Max = 30**	**Min = 20** Max = 60	Insufficient crossing time (across US 40) for pedestrians
Edgewood	Yes	Yes	50	27	Walk=5 Clearance=48	Walk=7 Clearance=24	Acceptable

2.4 Housing Density

The CENSUS2010 provides a "Block-Level" assessment of regional housing and population densities. **Exhibit 8** provides a summary of the housing densities in the vicinity of the US 40 project study area. Areas of higher housing density indicate potential areas of higher pedestrian activity. Higher densities of housing development exist on the western side of the project corridor including areas near Cannon Avenue and just north of the Cleveland Avenue intersection. Additional locations of higher housing densities include areas near Manor Drive, Cornell Avenue, and Edgewood Drive.

Exhibit 8: CENSUS 2010 Higher Density Housing Locations



Section 3: Pedestrian Safety Surveys

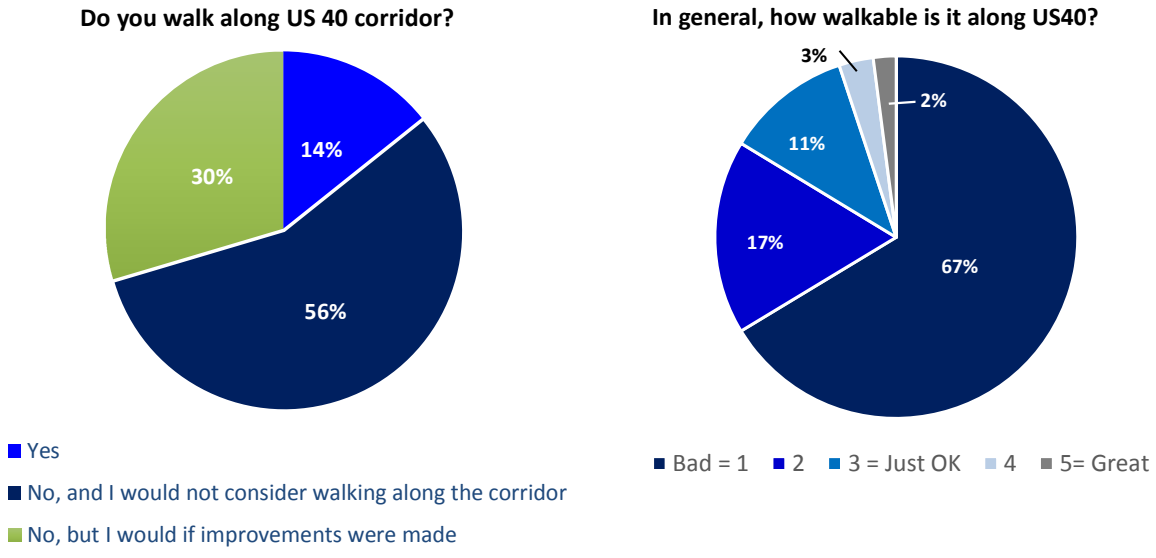
This study included several public involvement efforts including a pedestrian safety survey administered by the HEPMPO and outreach conducted by the City of Hagerstown through their "*engageHagerstown*" website.

3.1 US 40 Pedestrian Safety Survey

A pedestrian safety survey was developed to obtain input on the walkability of US 40, areas of concern related to pedestrian safety, and potential improvement strategies. The survey forms are shown in **Appendix E**. The survey was conducted using distributed hard copies and an online survey (in both English and Spanish) through the *Survey Monkey* platform. Hardcopies of the survey were distributed to local housing developments and businesses along the corridor by HEPMPO staff. The online survey was provided on the HEPMPO website and was distributed using email outreach lists and advertised through an April 1, 2015 news story by the Herald-Mail Media. The online survey was open to the public for a 30-day period in April 2015.

The survey produced 99 responses: English online (98), Spanish online (0), and hard-copy returns (1). **Exhibits 9-11** illustrate results of the survey. Most of the survey respondents do not currently walk along the US 40 project study area. For those responses that do walk within the corridor, about 19% walked during the AM peak period, 39% during the Midday, 35% during the PM peak period, and 7% at night. Those that crossed US40, either at intersections or mid-block locations, provided key destinations that included: Martins, CVS, Sonic, the Community College, Robinwood Drive, downtown Hagerstown, auto shops, Dunkin Donuts, and the Foxshire and Edgewood shopping areas.

Exhibit 9: Survey Responses on Walkability of US 40



In general, survey responses indicate that US 40 is not safe for pedestrians. As illustrated in **Exhibit 10**, issues include the lack of lighting, the need for more clearly defined crosswalks at intersections, missing sidewalks, and high traffic and vehicle speeds. The survey also generated a number of recommendations to improve pedestrian safety along the corridor. **Exhibit 11** provides the recommended strategies ranked by the number of responses.

Improved lighting and sidewalk connections match with some of the safety concerns provide in other questions. Enforcement and education activities were also highly recommended including educating pedestrians on wearing light-colored clothing at night and more aggressive enforcement of aggressive driving.

Exhibit 10: Survey Responses on Pedestrian Safety Concerns

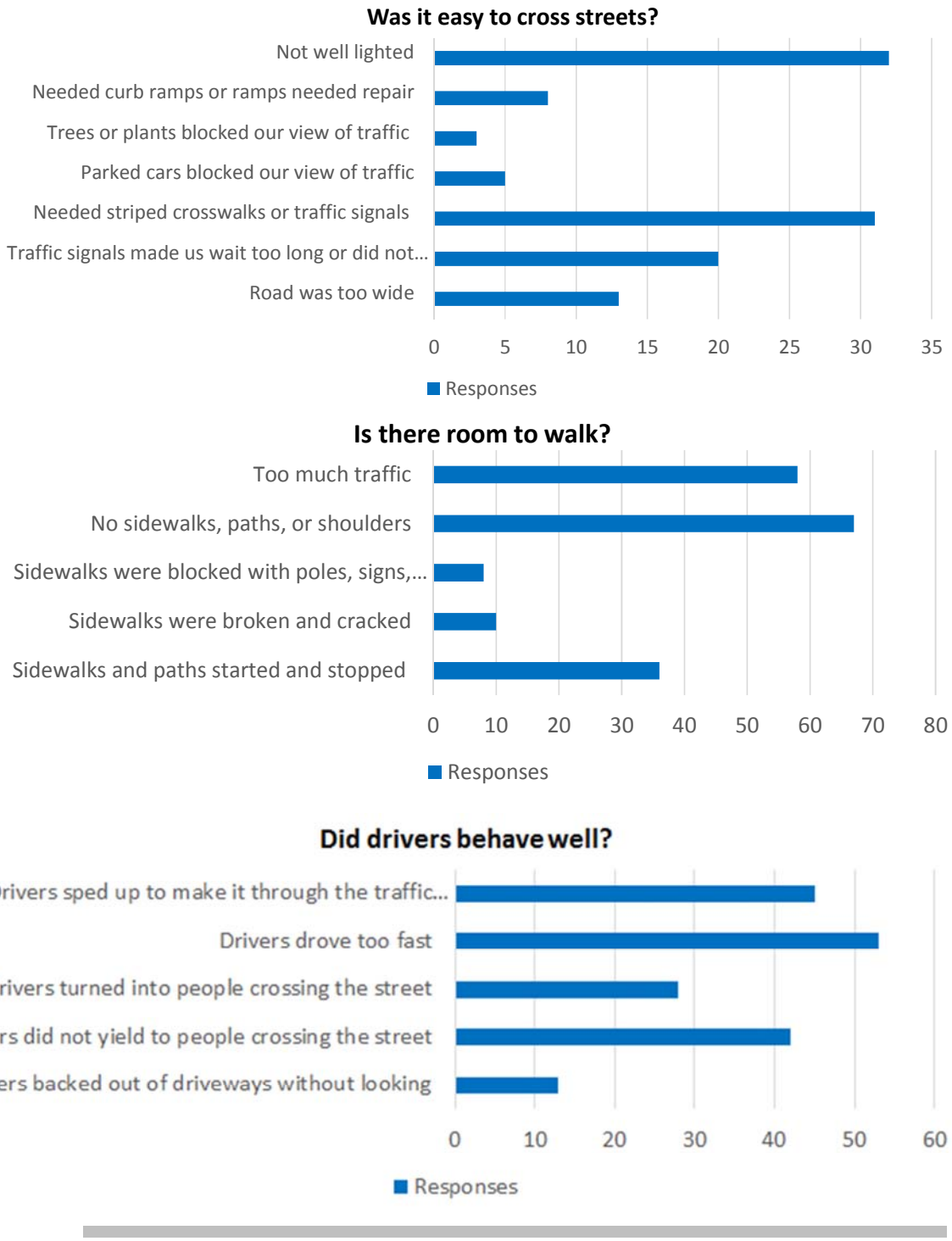


Exhibit 11: Survey Responses on Strategies
(Ranked based on those with the highest number of responses)

Rank	Strategy	Examples
1	Better Marked and Lighted Crosswalks	Lighting in Median, Mid-Block crossings
2	New Sidewalks at Missing Locations	Eastern Blvd Pedestrian Bridge
3	Enforcement	Both Pedestrian (Alcohol) and Vehicle (Aggressive driving, High Speeds)
4	Pedestrian Education	Light-Colored Clothing, Signing, No Pedestrians on Bridge
5	Median Fencing	-----
6	Traffic Improvements	Reduce Speed Limit, "Road Diet", Roundabouts, Speed Bumps, Traffic Light at Cornell, No U-turns (e.g. Edgewood)
7	Pedestrian Bridge	At Mt Aetna, South of Edgewood
8	Do Nothing	-----
9	Pedestrian Signal Timing Improvements	-----
10	Public Transportation along US 40	-----

3.2 engageHagerstown Discussion Topics

The engageHagerstown is an online platform managed by the City of Hagerstown that provides opportunities for the community to connect, collaborate and share ideas. Based on the collaborative discussions, the following supported strategies were identified for the US 40 corridor to improve pedestrian safety:

- Continuous sidewalks along the corridor
- Better lighting
- Improved pedestrian crosswalk markings at intersections
- Median fences
- Improved alternatives for those walking westbound across Antietam Creek bridge near Eastern Avenue
- More law enforcement including the ticketing of jaywalkers
- Pedestrian education with a focus on walking at night
- Speed cameras and enforcement to reduce vehicle speeds

Many of the above strategies are consistent with those obtained through the online survey conducted for the study. Some other strategies that were discussed include the construction of pedestrian bridges. While some were in support of bridges, others were skeptical of the potential usage and costs related to such improvements.

Section 4: ADA Assessment and Needs

This section provides an assessment of ADA accessibility along the US 40 project study area. Based on the Maryland SHA document, "*Accessibility Policy and Guidelines for Pedestrian Facilities along State Highways – June 2010*"[1], all projects shall accommodate and provide accessibility for persons with disabilities where it is reasonable, feasible and appropriate to do so. Features of the roadway specifically intended for pedestrians such as sidewalks, driveway aprons, curb ramps and crosswalks must meet accessibility design criteria. In the State of Maryland these criteria are defined in the policy document referenced above as well as in the *SHA Standard Details* (Section 655)[2].

ADA accessibility is affected by the longitudinal slope and cross slope of the Pedestrian Access Route (PAR), the width of the travel way, surface material, grade differentials, vertical lips and gaps in the PAR. Additionally, Detectable Warning Surfaces (DWS) must be installed to inform vision impaired pedestrians that they are crossing into a vehicular hazard area when travelling along the PAR.

The ADA accessibility review for this corridor addresses existing accessibility with regard to all these parameters. The impediments to ADA accessibility were grouped into three major categories: (1) existing sidewalk accessibility; (2) existing ADA ramp compliance; and, (3) anticipated issues for ADA accessibility for future extension of the sidewalk system.

4.1 Existing Sidewalk Accessibility

To be considered ADA accessible, The Maryland SHA Standards for ADA Accessibility indicate that sidewalks must:

- Be 5' wide standard (3' min. is allowed across driveways or with a design exception.)
- Have a 2% max. cross slope
- Have no vertical lips >1/4" (or ½" if beveled)
- Have no steep running slopes
- Have curb cuts meeting slope and width criteria at all pedestrian walkways intersected by curbs.

If the sidewalk is not accessible; either through width, slope or lip constraints; it will not be used by the ADA community. They will instead use the shoulder or roadway. For example: though ADA ramps may be provided at all curb cuts giving access to the sidewalk; if there is a lip, missing sidewalk, width constraint or excessive slopes mid-block along the sidewalk between the ramps, the ADA user will not be able to proceed along the sidewalk and will have to turn around and exit the sidewalk system. They will then likely use the smoother, flatter roadway or shoulder; thus defeating the purpose of constructing ADA ramps to give accessibility in the first place.

Exhibit 12 provides locations along the sidewalk within the study area that pose potential accessibility constraints including sidewalk width constraints, steep cross slopes, vertical lips greater than ½ inch, and missing ramp locations. The locations are noted by cross streets, a brief description of the constraint, and a provided photo from Google Map Street view.

[1] http://roads.maryland.gov/Index.aspx?PageId=26
[2] http://apps.roads.maryland.gov/BusinessWithSHA/bizStdsSpecs/desManualStdPub/publicationsonline/ohd/bookstd/toccat6.asp?PageId=12

Exhibit 12: US 40 Accessibility Constraint Locations

Category	Location Along US 40	Constraint	Image
Existing Sidewalk Constraints	N. Cannon Intersection with US 40 WB	Utility pole	
	S. Cannon Intersection with US 40 EB	Utility pole	
	West of Cleveland Intersection (near Taco Bell)	Debris and weeds	
	East of Cleveland Intersection (along golf course)	Tree	
	East of Manor Drive (near Dairy Queen)	Mailbox	
	West of Edgewood Drive	Cars parked blocking the sidewalk	
Vertical Lips (Inlet Settling)	East of Cannon Avenue Intersection with US 40 WB (Behind CVS)	Inlet	

Category	Location Along US 40	Constraint	Image
	East of Cleveland Ave (In front of Golf Course)	Inlet	
	East of Manor Dr.	Inlet	
	West of S. Eastern Blvd (In front of Clarion Hotel)	Inlet	
	East of S. Eastern Blvd (In front of Days Inn)	Inlet	
	West of N. Edgewood Dr. (In front of Tires Plus and Denny's)	Inlet	
	West of N. Edgewood Dr.	Inlet	
	N. Edgewood Dr.	Inlet	
	East of N. Edgewood Dr. (In front of Checkers)	Inlet	

Category	Location Along US 40	Constraint	Image
	West of Redwood Circle (In front of J and J Cleaners)	Inlet	
Vertical Lips (Other Causes)	East of S. Cleveland Avenue (In front of Hagerstown Shopping Center)	Tree root	
	West of S. Eastern Blvd	Remnant curbing	
	East of S. Eastern Blvd	Sidewalk failure	
	East of S. Eastern Blvd	Bridge juncture	
	East of S. Eastern Blvd (In front of Days Inn)		
Steep Running Slopes	East of N. Cannon Ave (At CVS driveway)		
	East of N. Cannon Ave (At KFC driveways)		

Category	Location Along US 40	Constraint	Image
	West of N. Cleveland Ave (At Taco Bell driveway island)		
	East of S. Cleveland Ave (At Hagerstown Shopping Center)		
	East of N. Cleveland Ave (At Golf Course)		
	East of Manor Drive (Between Cantina and Firestone)		
	East of Manor Drive (at Cantina driveway)		
Missing Ramps/ Curbing obstructs	East of S. Cannon Ave (Island at Advance Auto)		
	East of S. Cannon Ave (In front of Sheetz)		
	East Washington Street		

4.2 Existing ADA Ramp Compliance/Accessibility

To be considered ADA accessible, SHA Standards for ADA Accessibility indicate that ADA ramps must:

- (Should) be located to minimize pedestrian exposure to traffic.
- Be 4’ or 5’ wide depending on type.
- Have running slopes 12:1 maximum (independent to the surrounding terrain.)
- Have no lip at the curb line of the gutter.
- Provide a level landing where turning movements occur
- Have 2% cross slope.
- Have DWS at all street crossing and signalized intersections. Placement requirements for DWS by national standards (PROWAG) include the following: DWS shall extend the full width of the ramp excluding flared sides, and shall extend 2’ (min.) into the ramp in the direction of pedestrian travel; and, the concrete border should not exceed 2” at the sides of the DWS on the ramp.

Three of the intersections within the study area currently have some or all compliant ADA ramps;

1. Edgewood Drive Intersection – All 8 existing ADA ramps appear to be compliant
2. Mt Aetna Road – All 4 ADA ramps on the northern crossing appear to be compliant.
3. Redwood Circle – The western ramp appears to be compliant. The landing of the eastern ramp does not appear to be level.

The ADA ramps at the remainder of the intersections appear to have some deficiency and would not currently be considered ADA complaint. Additionally, a number of the ramps or curb cuts along the sidewalk within the study area at driveways and alleys have some deficiencies. The specific driveway curb cuts and their deficiencies are listed and depicted in **Exhibit 13**.

Exhibit 13: US 40 Driveway and Alley Curb Cut (Ramp) Deficiencies
(Continued on following pages)

Category	Location Along US 40	Image
Lip at the curb ramp	N. Cannon Ave	
	East of Sheetz driveway	

Category	Location Along US 40	Image
	East of N. Cannon Ave (At Dual Highway Liquors driveway)	
	West of N. Cleveland (At Taco Bell driveway)	
	West of Tracy's Lane (At computer business driveway)	
Ramp angle directs pedestrians into the turn lane/ deceleration lane	West of N. Cannon Ave (In front of Car Wash)	
	East of N. Cannon Ave (In front of KFC)	
	East of N. Cannon Ave (In front of McDonalds)	
	East of Manor Dr. (In front of Dairy Queen)	
	West of Edgewood Dr. (Near Susquehanna Bank and 7-11 driveways)	

Category	Location Along US 40	Image
DWS not fully cover depressed curb	Tracys Lane	
	West of N. Eastern Blvd (At Capital One driveway)	
	West of N. Eastern Blvd (At M and T Bank driveway)	
Rolled flare in PAR	East of N. Eastern Blvd (Long and Foster driveway)	
	Colonial Drive	
No level turning area on ramp	West of S. Eastern Blvd. (Driveway of Clarion Hotel)	
	East of N. Cannon Ave (In front of KFC)	
	Colonial Drive	

4.3 Anticipated Issues for Future ADA Accessibility

In addition to the accessibility issues noted in the current sidewalks and existing ADA ramps sections above; accessibility challenges have been noted for future sidewalk expansion areas. These issues relate primarily to potentially steep cross slopes at driveway and street crossings. If confronted with a cross slope that makes wheelchair use unstable, these pedestrians will likely opt to use the street or shoulder rather that the sidewalk as intended. Steep street or driveway cross slopes either exist or are anticipated at the following locations:

1. East Washington Street at eastern ADA ramp
2. Super 8 Driveway east of Eastern Blvd.
3. Pizza Hut Driveway west of Mt. Aetna Rd.
4. Car lot driveway west of Mt. Aetna

Additionally the SHA Policy document indicates that if there is evidence of pedestrian activity on a Level 3 project, then ADA complaint sidewalks and ramps should be provided if there are none. The remote evaluation indicated three areas where there was evidence of worn pedestrian dirt paths. These locations are:

1. East of Advance Auto
2. In front of the Super 8 Hotel
3. In the median east of McDonalds

Photos of the cross slopes and existing dirt worn paths are shown in **Exhibit 15**. If a median is going to be used as a refuge area and pedestrian push buttons are added to the median for pedestrian actuation of the appropriate phase, then the pedestrian push buttons must be made accessible. Ramps/landings to access those push buttons, as well as wait in the 'refuge' area, may be required depending on the design and phasing of the signal

4.4 Approximate Costs for ADA Improvements

Higher level planning costs have been estimated based on the ADA accessibility issues discussed in the previous sections. The costs are summarized in **Exhibit 14**. The cost estimates do not include the addition of new sidewalks in areas without current pedestrian facilities.

Exhibit 14: Approximate Costs for ADA Accessibility Improvements

Category	Quantity	Cost Estimate
Non-compliant ramp replacement at intersections	33 ramps x $6,000/each	= $198,000
New/Replace Ramp at Alleys	3 ramps x $6,000/each	= $18,000
Replace ramps with Detectable Warning Surface (DWS) at Driveways	13 ramps x $6,000/each	= $78,000
Replace ramps without DWS at Driveways	22 ramps x $3,000/each	= $66,000
Replace/Reconstruct Existing Sidewalk Areas	300 square yards (SY) x $100/SY	= $30,000
Replace/Reconstruct Concrete Curbs	400 linear feet (LF) x $90/LF	= $36,000
Rest Inlets	3 inlets x $1,000/each	= $3,000
Total		**= $429,000**

Exhibit 15: US 40 Cross Slope Issues and Dirt Paths

Category	Location Along US 40	Image
Steep cross slopes	E. Washington Street	
	East of N. Eastern Blvd (Driveway of Super 8 Hotel)	
	West of Mt. Aetna Rd (Driveway of Pizza Hut)	
	West of Mt. Aetna (Car lot driveway)	
Existing worn dirt paths	East of S. Cannon Avenue (East of Advance Auto)	
	East of N. Eastern Blvd (In front of Super 8 Hotel)	
	In median east of McDonalds	

Section 5: Pedestrian Roadway Safety Audit

A Pedestrian Road Safety Audit (PRSA) is a formal safety performance review of an existing intersection or roadway corridor by a multidisciplinary team. The PRSA process qualitatively estimates and reports on potential road safety issues and identifies opportunities for safety improvements for all road users. The goals of the PRSA are to:

- Document existing conditions
- Promote awareness of pedestrian needs
- Identify improvements to address existing facility deficiencies linked to crash history
- Make recommendations to address the deficiencies and list available educational programs
- Develop conceptual sketches of the improvements
- Identify existing and future opportunities for implementation
- Develop phased recommendations for implementation as time and resources permit

The audit process (**Exhibit 16**) seeks to identify and evaluate road safety concerns to address high pedestrian crash locations and corridors. The audit also identifies which roadway elements may present a safety concern to which users, to what extent, and under what circumstances.

Exhibit 16: PRSA Audit Process

The audit process includes three primary stages:

- Pre-audit Stage – Includes data collection and field investigations to identify pedestrian trip generators, observe and document travel patterns of pedestrians and driver behavior, and document existing conditions of pedestrian facilities and deficiencies which may affect pedestrian safety and accessibility. These efforts have been addressed in previous sections of this report and through SHA's previous pedestrian safety inventory study (**Appendix A**).
- Audit Stage – The PSRA team conducts a one-day walkability audit of the selected corridor to identify pedestrian safety issues in the study area and provide feedback for possible recommendations and improvements. The group works toward a consensus to identify the improvements which they believe are of the highest priority for advancement. An overview of the data collection is presented prior to the audit event.

- Post-audit Stage – A recommendations report is prepared based on the feedback of the audit participants. The recommendations are developed within the "5-E's" framework, Engineering, Encouragement, Education, Enforcement, and Evaluation.

The "5-E's" are key elements needed to create a successful walking environment and should be considered collectively to develop a comprehensive approach to the recommended improvements. The physical improvements, or engineering, provide facilities that safely accommodate pedestrians. Encouragement promotes the use and benefits of bicycling and walking as means of transport, recreation, and physical activity, and should be considered as part of the design. The improvements should be along the path that pedestrian would normally choose. In conjunction with the physical improvements all users and of all capabilities (motorists, bicyclists, pedestrians, those in wheelchairs and with impaired vision) should be educated in their roles and responsibilities and how to operate within these facilities and safely share the road. Enforcement is often required to reinforce the rules of the road and support the educational efforts. Finally, evaluation is necessary to understand the impacts, if any, the improvements have. Successful improvements can be considered as best practices or added to a toolbox of potential improvements for use in other similar areas.

5.1 Pedestrian Safety Audit Team

The US 40 PRSA included a field visit to the project corridor on May 19, 2015. A follow-up meeting was conducted on July 16, 2015 to discuss draft recommendations and priorities. The audit team included representatives from the Maryland SHA, City of Hagerstown, Washington County Sheriff's Department, HEPMPO, and Michael Baker International. **Exhibit 17** provides the agency personnel that attended the field visit and follow-up meeting.

Exhibit 17: PRSA Team

Name	Organization	May 19 Field Visit*	July 16 Meeting*
Matt Mullenax	HEPMPO	X	X
Tony Crawford	SHA District 6, District Engineer		X
Linda Puffenbarger	SHA District 6, Assistant District Engineer	X	X
Chris Perkins	SHA District 6, Traffic Engineer	X	X
John Wolford	SHA District 6, Traffic Engineer	X	X
Dustin Kuzan	SHA Bicycle and Pedestrian Coordinator	X	
Doug Mullendore	Washington County Sheriff's Department	X	
Rodney Tissue	City of Hagerstown	X	X
Alex Rohrbaugh	City of Hagerstown	X	
Merle Saville	Washington County, Division of Engineering		X
Mark Mishler	Washington County, Division of Engineering		X
Jim Frazier	Michael Baker International	X	X
Dan Szekeres	Michael Baker International	X	X
Steven Wong	Michael Baker International	X	

"X" = Present at field visit and/or meeting

5.2 PRSA Field Visits

The US 40 PSRA was held on Tuesday, May 19, 2015, at the Washington County Planning and Zoning Building from 9:00 AM to 4:00 PM. A total of 11 people attended the event as listed in the previous section. The PSRA consisted of three parts:

1. A morning presentation was conducted that summarized existing conditions in the study area and reviewed the PSRA process and field investigation. A copy of the presentation and reference materials were included as part of a PSRA Workbook that was provided to each person attending. The PRSA Workbook has been included in **Appendix F**.
2. The PRSA walking audit was conducted at each of the intersections within the project study area. The key stops and audit plan is provided in the audit workbook materials. Attendees identified existing pedestrian deficiencies along the corridor and discussed potential solutions. At approximately 2:30pm, the team regrouped at the Washington County offices.

3. The team then collaborated to discuss potential solutions to improve the observed pedestrian deficiencies. The team worked towards a consensus to identify the improvements which they believe to be the highest priority for advancement. The team's feedback was organized into priority recommendations.

A follow-up meeting was conducted on Thursday, July 16, 2015 to review recommendations assembled by the consultant team and to determine priorities. This meeting included additional personnel as identified in **Section 5.1**. The comments received at the meeting have been incorporated into the recommendations provided in this document (**Sections 6-7**) and the implementation priorities (**Section 8**).

5.3 PRSA Recommendations

After the May 19th PRSA field visit, team members evaluated deficiencies at each section along the project corridor**. Exhibit 18** provides a summary of the issues and strategies identified by the group. The PRSA team highlighted several high priority strategies that apply to the entire corridor length. These included:

- Improve lighting across the corridor including mid-block intersection locations.
- Provide sidewalks along both sides of US 40 along the entire corridor.
- Conduct pedestrian education programs to market safe pedestrian practices including the need to wear bright clothing at evening and night hours and to avoid un-safe midblock crossings.
- Conduct future enforcement activities to warn pedestrians of unsafe walking.

Exhibit 18: PRSA Noted Safety Concerns and Strategies

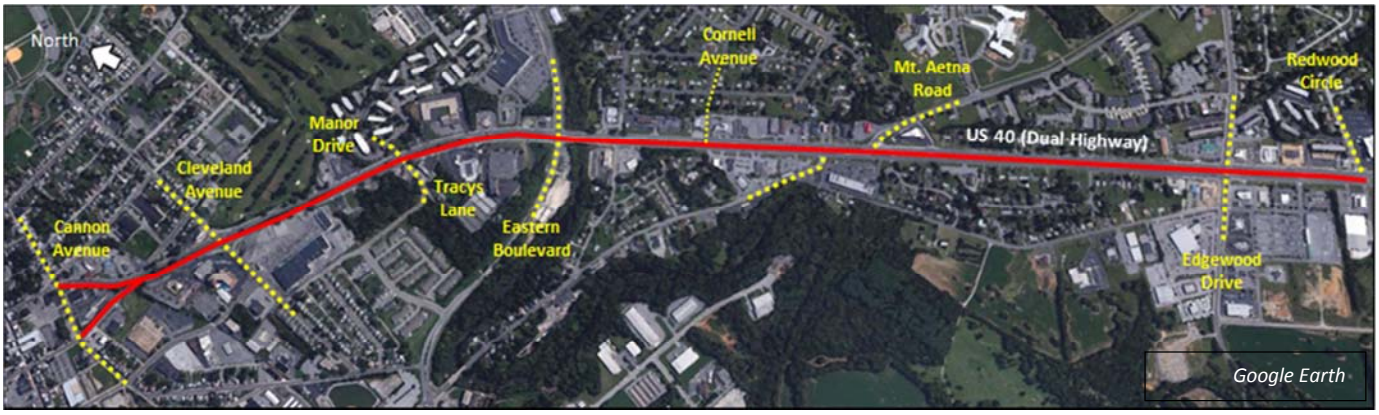
Location	Key Issues or Concerns	Potential Strategy
Cannon Avenue	• Higher pedestrian volumes. • No dedicated pedestrian signal phase	• Pedestrian signal with adequate crossing phase
Between Cannon and Cleveland	• No sidewalk on US 40 EB direction • Potential concerns over mid-block crossing pedestrians (trees, lighting) • Pedestrians cross US 40 near McDonalds through median • ADA accessibility	• Sidewalk along US 40 EB – slope issues may require fill, possible relocation to shoulder • Pedestrian fence • ADA ramps and improvements
Cleveland Avenue	• Not clear on how pedestrians should use crosswalks • No defined crosswalks or pedestrian signals to get across US 40 • Limited signal green time to allow for crossing • ADA accessibility • Large number of pedestrians crossing Cleveland Avenue in front of hotel	• New pedestrian signal and crosswalk design at Cleveland Avenue • ADA accessible ramps • Additional sidewalk • Pedestrian fence
Between Cleveland and Manor Drive	• Sidewalks currently provided on both sides of US 40 • Limited pedestrian crossings in this section • Some ADA issues noted • Lighting	• Improved lighting • Some extension of pedestrian fencing from Cleveland and Manor intersections. Fencing not required along entire section due to low pedestrian crossings.
Manor Drive	• High location of pedestrian usage as compared to other corridor locations. Nearby housing/apartment developments. • Pedestrian crossing times appear to be low for slower walkers • Bus stops near the intersection on the US 40 WB direction.	• Potential pedestrian signal timing changes and/or refuge island. • Redesign of intersection to include safer locations for bus access and stop. • Relocation of US 40 crossing to south side of intersection • Pedestrian fence
Between Manor Drive and Eastern Blvd.	• High location of mid-block pedestrian crossings to bar/restaurant and former hotel. • Location of previous pedestrian crashes	• Pedestrian fence would limit crossing. • ADA acceptable ramps between the numerous driveways • Must determine options to address U-turn (closure or leave open). Closure of U-turn would have traffic impacts on Eastern and Manor intersections. Tight turning radius at Eastern for U-turns.
Eastern Boulevard	• No pedestrian signal for crossing US 40. Current signal timing limits crossing time. Unsafe crossing for pedestrians; conflict with vehicles making U-turns. • No pedestrian sidewalk on US 40 WB across the bridge • Pedestrians observed crossing mid-block west of the intersection	• Add pedestrian signal with timing changes and/or refuge island. • Restripe US 40 WB to allow for sidewalk – add crosswalk across Eastern Blvd on northern side. • Signage for southbound approach reminding motorists to yield to pedestrians in crosswalk

Exhibit18 (continued): PRSA Noted Safety Concerns and Strategies

Location	Key Issues or Concerns	Potential Strategy
Between Eastern Blvd and Mt. Aetna Road	• Sidewalk continuity and access on the US 40 WB direction • Limited locations for pedestrians to cross US 40 to access sidewalks on US 40 EB direction. • Turning vehicles at Cornell are high	• Add sidewalks on both side of US 40 • Lighting • Pedestrian fencing to prevent mid-block crossings. • Signs prohibiting pedestrian crossing US 40 • ADA acceptable ramps between the numerous driveways
Mt. Aetna Road	• Sidewalks not available on either direction of US 40 • Limited pedestrian observations at these locations • Signal timing may prohibit enough time for pedestrians to cross. • Intersection design limits simple solutions	• Add sidewalks on both side of US 40 • Lighting • Add pedestrian crosswalks at intersection with potential fencing to limit un-safe movements. Potential use of median for pedestrian use. • ADA acceptable ramps between the numerous driveways • Bus shelter on US 40 EB
Between Mt. Aetna and Edgewood Drive	• Pedestrian fatality occurred with pedestrian walking in median during night hours. • No sidewalks on US 40 EB direction • Lighting concerns • Limited pedestrian crossings (across US40) at these locations	• Add sidewalks along US 40 EB • Lighting • Potential pedestrian fencing at select locations • Sidewalk realignment along US 40 WB at Crest View Road
Edgewood Drive	• Sidewalks are available along with pedestrian signals and phases at intersection. Pedestrian phasing appears adequate for crossing pedestrians.	• No major improvements needed
Between Edgewood Drive and Redwood Circle	• Sidewalks not available on US 40 EB direction • Pedestrians cross mid-block; apartments located on US 40 WB side; shopping on US 40 EB.	• Add sidewalks along US 40 EB • Lighting • Potential pedestrian fencing at select locations • Potential signalization of Redwood Circle intersection to allow for pedestrian crossing

Section 6: Pedestrian Design Improvement Concepts for the Corridor

This section provides recommended design and operational strategies to improve pedestrian safety along the US 40 study corridor. The recommendations are based on the PRSA meeting and field visits, national sources like FHWA's PedSafe initiative, and the consultant's review and assessment of corridor features, constraints and operations. Recommendations are organized by key intersections within the study corridor as illustrated below:



6.1 Summary of Design and Operation Strategies

A summary of the recommended strategy categories is provided in **Exhibit 20**. The PRSA team has placed the highest level of priority on ensuring a continuous sidewalk system exists on both sides of US 40 and that sufficient lighting levels exist along the corridor including mid-block locations. The PRSA has also determined that education and enforcement activities should be an important component of future efforts to improve pedestrian safety. Recommendations on program components and examples from other areas are provided in **Section 7** of this document. The recommended design and operation strategies do not currently include a major redesign of the US 40 corridor. Efforts to develop a "Complete Streets" corridor could provide significant benefits to multi-modal users including pedestrians and bikes. However, such alternatives would come at a significant cost and may not fit into the city's vision for this corridor. The City of Hagerstown developed "*Livable Street Design Guidelines*" in December 2014. In these guidelines, US 40 is designated as an "Auto-Oriented Commercial/Industrial Spoke", with a typical cross section as shown in **Exhibit 19**. Per the guidelines, this corridor has not been designated as a priority corridor for complete streets design concepts. However, the inclusion of sidewalks and accessible pedestrian signals are indicated as potential accommodations for pedestrians.

Exhibit 19: Design and Operation Strategy Overview
Per City of Hagerstown Livable Street Design Guidelines, December 2014

AUTO ORIENTED COMMERCIAL/ INDUSTRIAL (SPOKES)

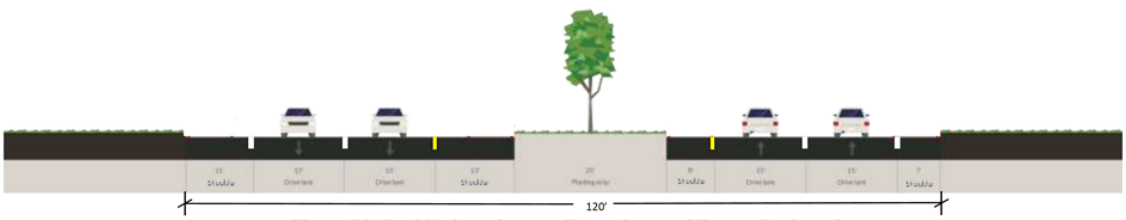


Figure B2. *Dual Highway between Tracys Lane and Eastern Boulevard*

Exhibit 20: Design and Operation Strategy Overview

Strategy	Description
Crosswalk Markings	Marked crosswalks should be provided at intersection locations. Standard longitudinal crosswalks are recommended for locations where the pedestrian crossing is controlled by a signal, while transverse high visibility crosswalks are recommended for unsignalized crossing locations. Although transverse striped high visibility crosswalks are more conspicuous, overuse of high visibility crosswalks reduces their effectiveness.
Curb Extension	Curb extensions (as recommended at Manor Drive) visually and physically narrow the roadway, causing motorists to slow down. In this case, the placement of the curb extension will create a far-side bus turnout. This will reduce the likelihood of rear-end crashes by putting a physical barrier between buses and right-turning traffic, as well as reducing bus travel times by reducing the amount of time it takes the bus to merge with traffic after boarding.
Curb Ramps	Curb ramps should be provided at each crosswalk location. Curb ramps provide access to pedestrian facilities for people who use wheelchairs, who would otherwise be excluded because of the barrier created by the curb. Curb ramps should be designed in compliance with ADA standards.
Median Fencing	Fencing should be provided along the median at locations where pedestrian crossings are undesirable. The median fence discourages pedestrian crossing at locations other than marked crosswalks.
Pedestrian Clearance Time	This time provides for a pedestrian crossing in a crosswalk, after leaving the curb to travel to the far side of the traveled way or to the median. Signal timing directives should be revised to provide adequate pedestrian clearance time at signalized crossings.
Pedestrian Pushbutton	Pushbuttons should be installed and placed at locations that are within easy reach of pedestrians intending to cross each crosswalk and that make it obvious which pushbutton is associated with each crosswalk. In instances where installing a pushbutton on an existing traffic signal pole would not be easily accessible to pedestrians or where a traffic signal pole is an inadequate distance away from a crosswalk, separate pushbutton poles should be installed. Pushbuttons should be ADA-compliant.
Pedestrian-scale Lighting	Lighting is recommended along poorly lit sidewalk areas and crosswalk locations along the corridor. Pedestrian scale lighting increases the conspicuity of pedestrians to motorists and improves safety and the perception of safety, which in turn increases mobility as pedestrians are more likely to travel after dark in well-lit areas where they feel safe.
Pedestrian Signal Head	Signal heads, which contain the 'walking person' and 'upraised hand' symbols representing WALK and DON'T WALK respectively, should be installed at signalized crossing locations to direct pedestrians. Pedestrian signal heads should also feature a countdown timer to display the amount of time that a pedestrian has left to cross.
Sidewalks	Sidewalks should be installed to fill in missing gaps along the US 40 corridor and provide access to crosswalks. Impacts to drainage were not considered when recommending locations for new sidewalk installation.
Signage	Ground mounted R9-3 (No Pedestrian Crossing) and R9-3bP (Use Crosswalk) signs should be installed to prohibit pedestrian crossing at locations where crossing is not designated and undesirable. Additionally W11-2 (Pedestrian Crossing) warning signs should be installed with applicable sub-plaques (left/right arrow, AHEAD, etc.) at unsignalized and mid-block crossing locations to warn motorists to be alert for crossing pedestrians.

6.2 Project Improvement Descriptions by Location

A summary of the recommended design and operations strategies is provided for each section of the US 40 study corridor. Provided information includes a brief paragraph of the improvement supplemented by a summary table and figure (associated Exhibit).

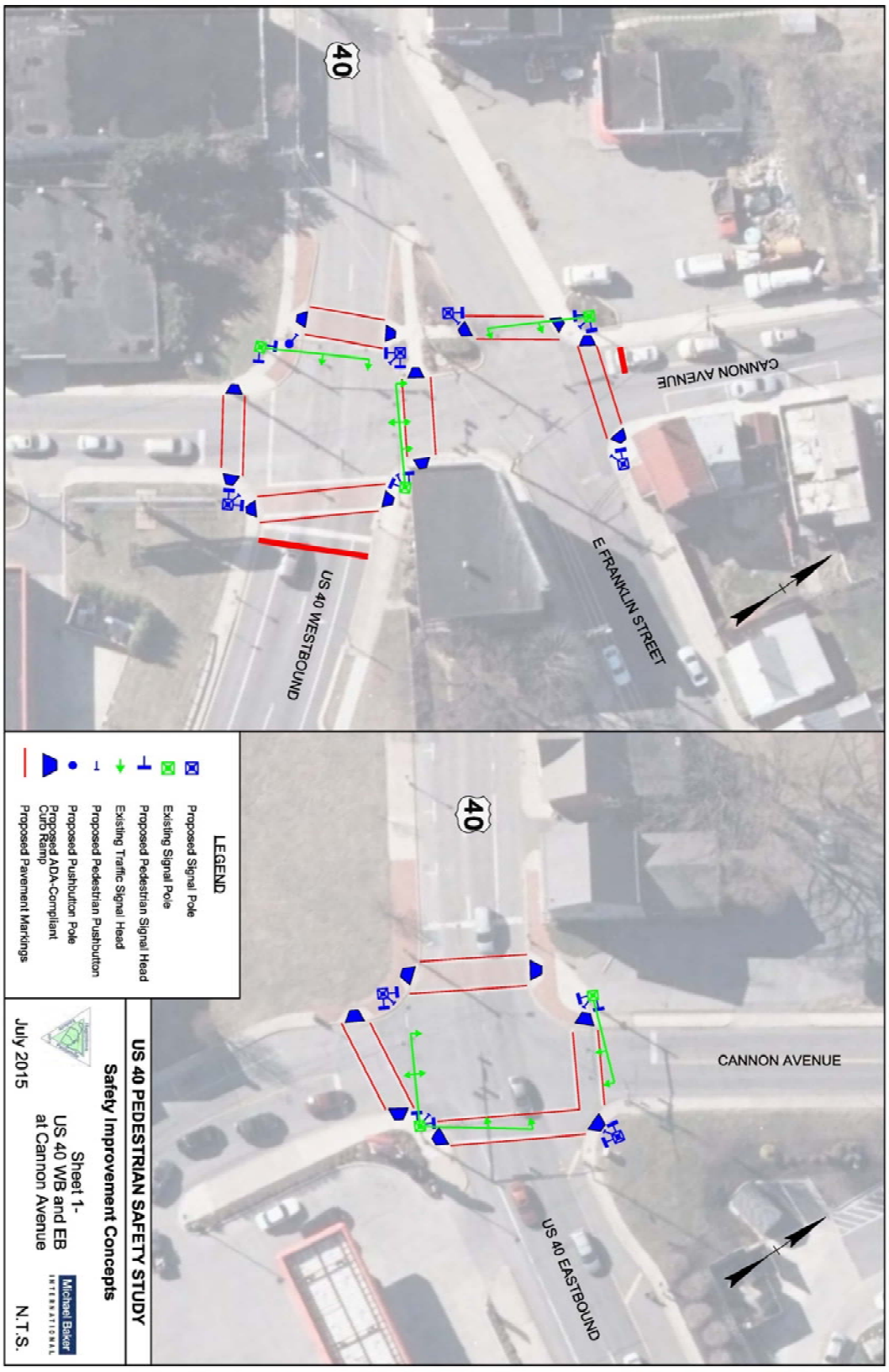
➢ US 40 and Cannon Avenue (Exhibit 21)

Improvements to the intersections of US 40 and Cannon Avenue focus on enhancing the existing pedestrian environment by recommending improvements in compliance with ADA and Manual on Uniform Traffic Control Devices (MUTCD) guidelines. These improvements include installation of ADA compliant curb ramps and pedestrian signals with countdown timers and pedestrian pushbuttons.

Location	Improvement
Pavement Markings	
Cannon Ave & E. Franklin St – northern leg	- Add 6 feet wide longitudinal crosswalk markings - Relocate stop bar to 4 feet north of the northern crosswalk marking
Cannon Ave & E. Franklin St – western leg	- Add 6 feet wide longitudinal crosswalk markings
US 40 WB & Cannon Ave – all approaches	- Restripe existing longitudinal crosswalk markings
US 40 WB & Cannon Ave – eastern leg	- Relocate stop bar to 4 feet east of the eastern crosswalk marking
US 40 EB & Cannon Ave – all approaches	- Restripe existing longitudinal crosswalk markings
Sidewalk / Curb Reconstruction	
All crosswalk locations	- Install / reconstruct ADA-compliant curb ramps at crosswalk locations
Traffic Signals	
Cannon Ave & E. Franklin St – northwest corner	- Install 2 pedestrian signal heads with countdown timers facing south and east on the existing signal pole - Install pedestrian pushbutton on the existing signal pole
Cannon Ave & E. Franklin St – northeast corner	- Install new signal pole - Install 1 pedestrian signal head with countdown timer facing west on the proposed signal pole - Install pedestrian pushbutton on the proposed signal pole
Cannon Ave & E. Franklin St – southwest corner	- Install new signal pole - Install 1 pedestrian signal head with countdown timer facing north on the proposed signal pole - Install pedestrian pushbutton on the proposed signal pole
US 40 WB & Cannon Ave – northwest corner	- Install new signal pole - Install 2 pedestrian signal heads with countdowns timer facing south and east on the proposed signal pole - Install pedestrian pushbutton on the proposed signal pole
US 40 WB & Cannon Ave – northeast corner	- Install 2 pedestrian signal heads with countdown timers facing south and west on the existing signal pole - Install pedestrian pushbutton on the existing signal pole

Location	Improvement
US 40 WB & Cannon Ave – southeast corner	- Install new signal pole - Install 2 pedestrian signal heads with countdowns timer facing north and west on the proposed signal pole - Install pedestrian pushbutton on the proposed signal pole
US 40 WB & Cannon Ave – southwest corner	- Install 2 pedestrian signal heads with countdown timers facing north and east on the existing signal pole - Install pedestrian pushbutton pole with pushbutton facing the crosswalk across US 40 WB
US 40 EB & Cannon Ave – northwest corner	- Install 2 pedestrian signal heads with countdown timers facing south and east on the existing signal pole - Install pedestrian pushbutton on the existing signal pole
US 40 EB & Cannon Ave – northeast corner	- Install new signal pole - Install 2 pedestrian signal heads with countdowns timer facing south and west on the proposed signal pole - Install pedestrian pushbutton on the proposed signal pole
US 40 EB & Cannon Ave – southeast corner	- Install 2 pedestrian signal heads with countdown timers facing north and west on the existing signal pole - Install pedestrian pushbutton on the existing signal pole
US 40 EB & Cannon Ave – southwest corner	- Install new signal pole - Install 2 pedestrian signal heads with countdowns timer facing north and east on the proposed signal pole - Install pedestrian pushbutton on the proposed signal pole
All crossing locations	- Revise signal timings to provide adequate pedestrian clearance intervals
All traffic signals	- Upgrade traffic signal heads to 12 inch lenses - Install retroreflective backplates to increase traffic signal conspicuity

Exhibit 21: Safety Improvement Concept: US 40 and Cannon Avenue

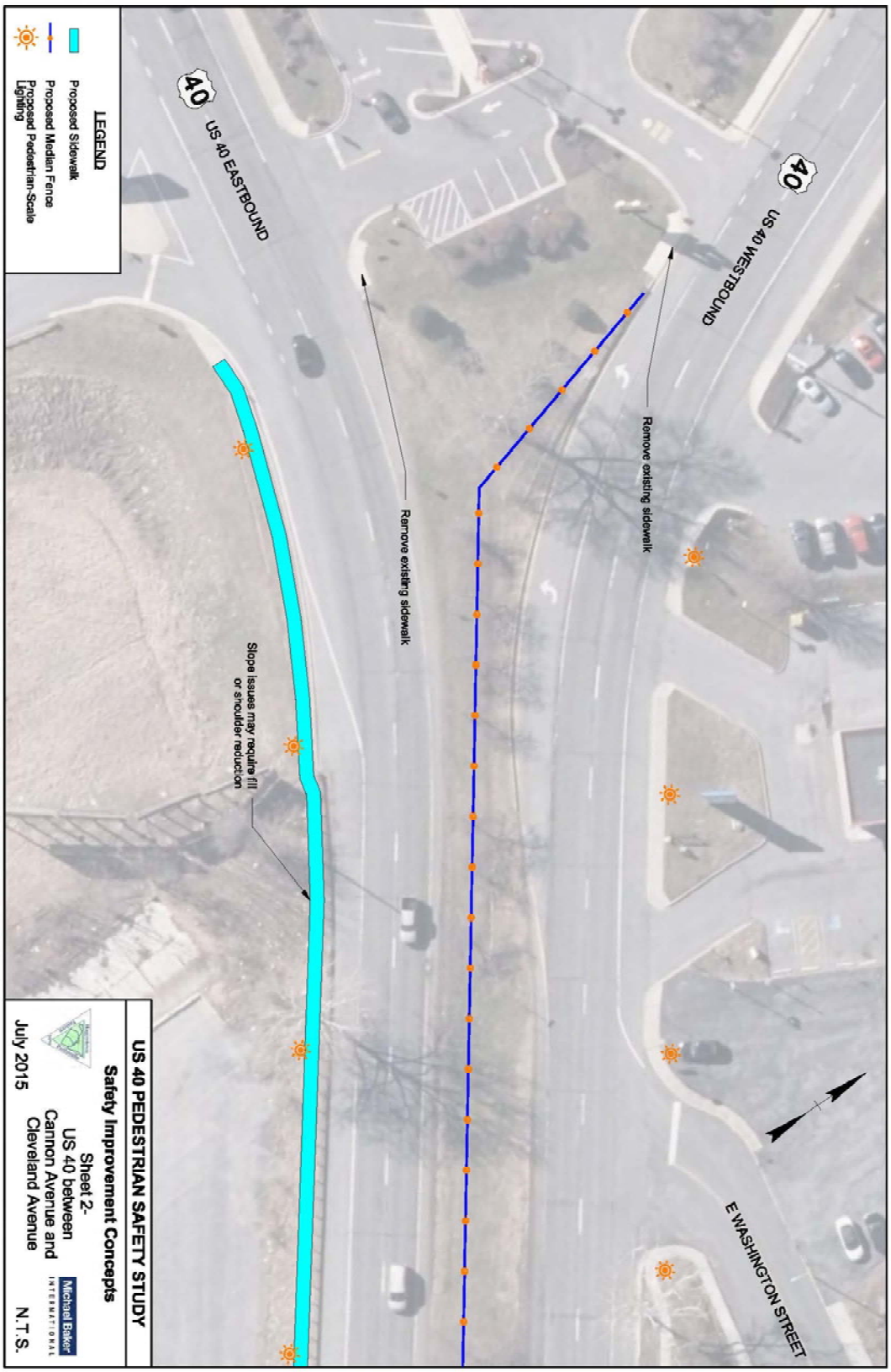


➢ US 40 between Cannon and Cleveland Avenue (Exhibit 22)

A sidewalk is recommended along US 40 eastbound to remove pedestrians from the travel shoulder. Additional lighting along the existing and new sidewalks will improve safety and promote walkability. Mid-block pedestrian crossings were observed during field observations and the PRSA. Horizontal and vertical curves on US 40, eastbound and westbound, reduce sight distance for motorists and pedestrians. These conditions are also unfavorable for mid-block pedestrian activated signal installations. Improvements to the upstream and downstream intersections, at East Franklin Street and Cannon Avenue and at Cleveland Avenue, will encourage pedestrian crossings at those locations. The installation of a center median pedestrian fence is recommended to discourage mid-block crossings.

Location	Improvement
Sidewalk / Curb Reconstruction	
Along US 40 EB	- Install sidewalk along the eastbound side of the roadway **Note: Slope issues may require fill or possible relocation into shoulder as depicted in the figure.*
Miscellaneous	
Along the center median	- Install median fencing between the McDonalds driveway and the vicinity of Cleveland Ave
Along US 40 EB & WB	- Install pedestrian-scale lighting along existing and proposed sidewalk

Exhibit 22: Safety Improvement Concept: US 40 Between Cannon and Cleveland Avenue



➢ US 40 and Cleveland Avenue (Exhibits 23-24)

Improvements to the intersection of US 40 and Cleveland Avenue provide for more complete and direct pedestrian crossings. In addition to ADA and MUTCD improvements, high visibility crosswalks and installation of pedestrian scale lighting at the unsignalized slip ramp crossings are recommended. Center median pedestrian fencing is also recommended to prevent pedestrian crossings outside of the marked intersection crosswalks. New sidewalk connections along US 40 eastbound are recommended. These improvements may require the widening of existing sidewalks which are currently about 3 feet wide.

Location	Improvement
Pavement Markings	
Four signalized approaches	- Add 6 feet wide longitudinal crosswalk markings - Relocate stop bar to 4 feet from the crosswalk markings
Four slip ramps	- Add 6 feet wide (min) high-visibility crosswalk markings across the slip ramps, connecting sidewalk to the median islands
Southwest corner	- Restripe shoulder along the slip ramp to match geometric improvements - Restripe gore area along the median island to match geometric improvements
Sidewalk / Curb Reconstruction	
All crosswalk locations	- Install / reconstruct ADA-compliant curb ramps at proposed crosswalk and driveway locations shown
Center median at the western and eastern legs	- Install sidewalk to provide a pedestrian refuge
Median islands	- Install sidewalk to connect slip ramp crosswalks to signal controlled crosswalks
Southwest corner	- Install sidewalk to connect slip ramp crosswalk to existing sidewalk. Existing sidewalk may need to be widened to meet minimum width requirements.
Southwest corner	- Realign curb line along the slip ramp to provide adequate space to install sidewalk along the shopping center. - Install crosswalk along the shopping center. - Realign the median island as necessary to maintain the existing width of the shoulder and travel lane along the slip ramp.
Traffic Signals	
Northwest median island	- Install new signal pole - Install 2 pedestrian signal heads with countdown timer facing south and west on the proposed signal pole - Install pedestrian pushbutton on the proposed signal pole
Northeast median island	- Install 2 new signal poles at the west and south sides of the island - Install 1 pedestrian signal head with countdown timer facing west on the west proposed signal pole - Install 1 pedestrian signal head with countdown timer facing south on the south proposed signal pole - Install pedestrian pushbutton on the south proposed signal pole
Southeast median island	- Install new signal pole - Install 2 pedestrian signal heads with countdown timer facing north and west on the proposed signal pole - Install pedestrian pushbutton on the proposed signal pole

Location	Improvement
Southwest median island	- Install 2 new signal poles at the north and east sides of the island - Install 1 pedestrian signal head with countdown timer facing north on the north proposed signal pole - Install 1 pedestrian signal head with countdown timer facing east on the east proposed signal pole - Install pedestrian pushbutton on the north proposed signal pole
Western leg – center median	- Install 2 pedestrian signal heads with countdown timers facing north and south on the existing signal pole - Install 2 pedestrian pushbutton poles on the north and south sides of the median with pushbuttons facing the crosswalk across US 40
Eastern leg – center median	- Install 2 pedestrian signal heads with countdown timers facing north and south on the existing signal pole - Install 2 pedestrian pushbutton poles on the north and south sides of the median with pushbuttons facing the crosswalk across US 40
All crossing locations	- Revise signal timings to provide adequate pedestrian clearance intervals
All traffic signals	- Upgrade traffic signal heads to 12 inch lenses - Install retroreflective backplates to improve conspicuity
Signing	
Four slip ramps	- Install ground mounted W11-2 (pedestrian crossing), and W16-7P (slanted down arrow) signs to warn motorists of an unsignalized crosswalk
Miscellaneous	
Along the center median west of the intersection	- Install median fencing between the McDonalds driveway and the vicinity of Cleveland Ave - Install pedestrian-scale lighting at sidewalk locations
Along the center median east of the intersection	- Install median fencing to a point approximately 300 feet east of the intersection
Four slip ramps	- Install pedestrian-scale lighting at each side of the proposed high visibility crosswalks

Exhibit 23: Safety Improvement Concept: US 40 and Cleveland Avenue

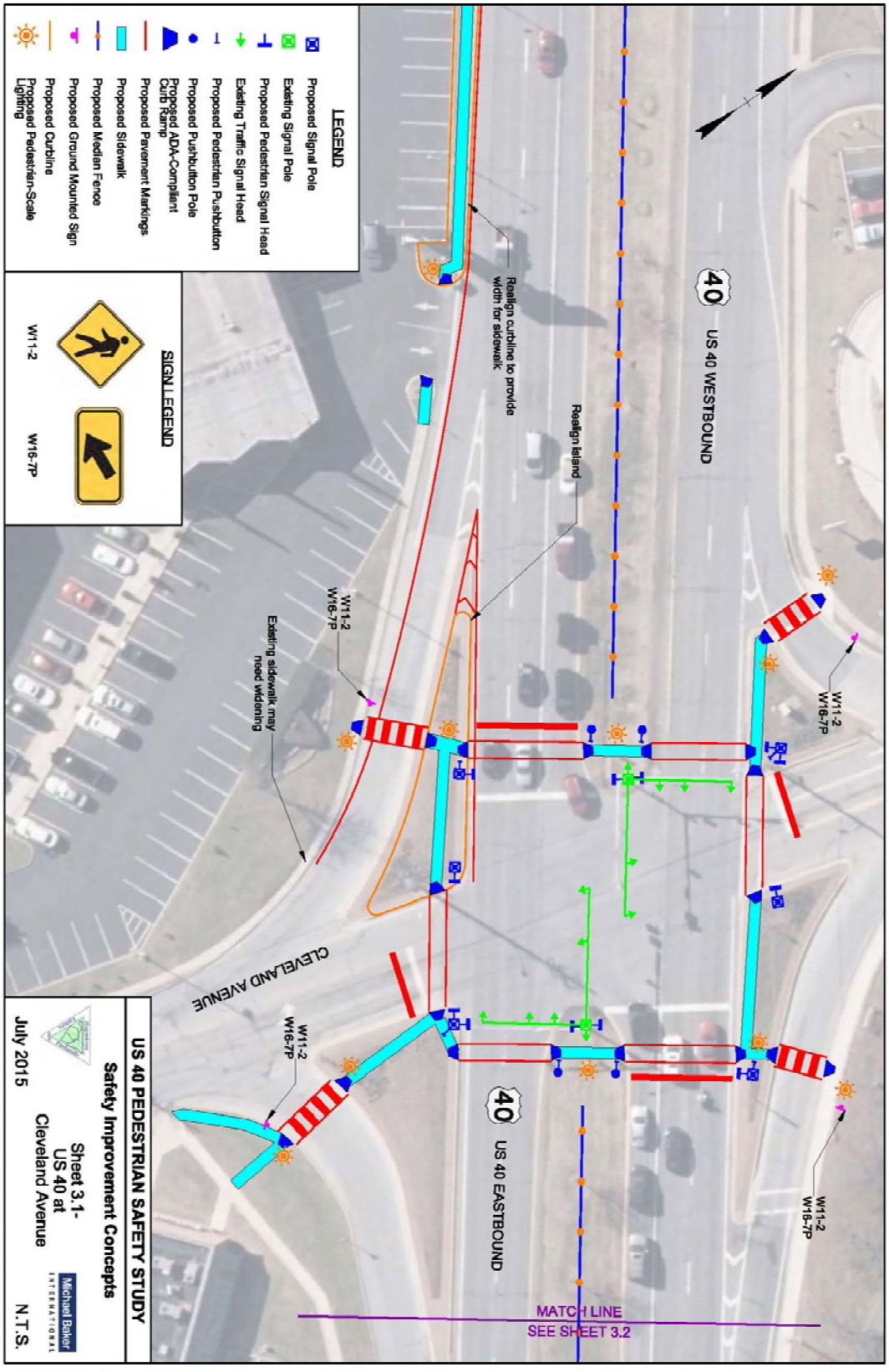
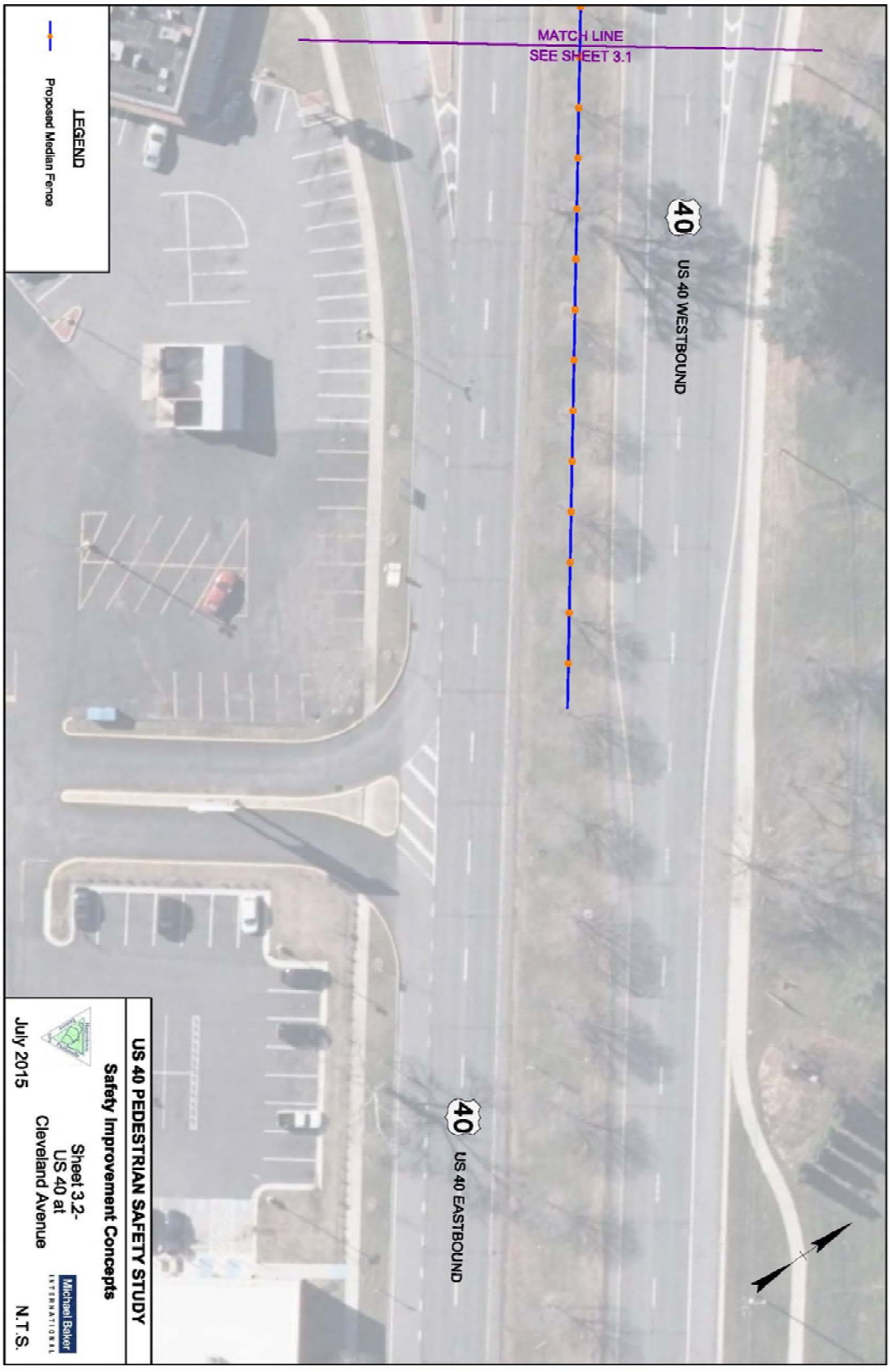


Exhibit 24: Safety Improvement Concept: US 40 Just East of Cleveland Avenue



➢ US 40 and Manor Drive (Exhibits 25-26)

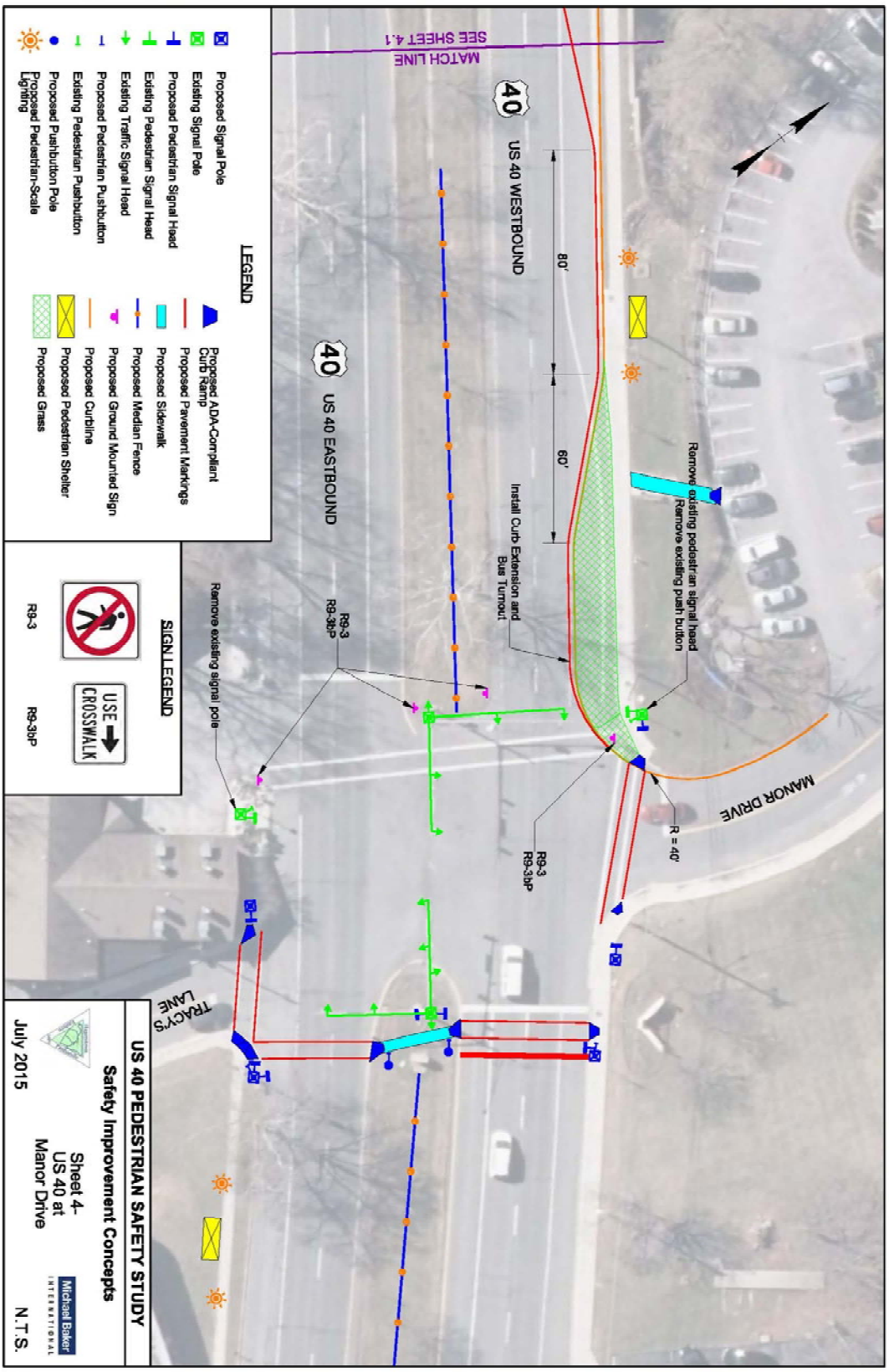
ADA and MUTCD improvements are recommended for US 40 and Manor Drive. In addition, the current intersection pedestrian crosswalk is recommended for relocation to the eastern side of the intersection. This revised location matches better with the existing sidewalks on Manor Drive and would allow for unobstructed vehicle right turns from Manor Drive onto US 40 westbound. A refuge island is recommended due to the crossing distance.

Additionally, a curb extension (or bump-out) may provide additional pedestrian and bus safety for the northwest (or possibility southeast) quadrant of the intersection. The curb extension creates a bus turn out and limits pedestrian exposure by reducing the crossing distance. This location (both on US 40 eastbound and westbound) has been identified as a typical stop for Washington County Commuter transit service. As such, bus shelters and pedestrian scale lighting are recommended to formalize the bus stop and enhance safety of pedestrian access.

Location	Improvement
Pavement Markings	
Northern, western, and southern legs	- Add / restripe 6 feet wide longitudinal crosswalk markings
Northwest corner	- Restripe the shoulder to match the proposed curb extension and bus turnout
Sidewalk / Curb Reconstruction	
All crosswalk locations	- Install / reconstruct ADA-compliant curb ramps at proposed crosswalk and driveway locations shown
Northwest corner	- Realign curb to provide a curb extension - Install a bus turnout along US 40 westbound downstream from the proposed curb extension - Install sidewalk along the proposed curb extension - Replace stairs with sidewalk connecting to Golden Living Center nursing home
Center median at the eastern leg	- Install sidewalk to provide a pedestrian refuge
Traffic Signals	
Northwest corner	- Install 1 pedestrian signal head with countdown timer facing east on the existing signal pole - Remove existing northbound pedestrian signal head and push button
Northeast corner	- Install 2 new signal poles - Install 1 pedestrian signal head with countdown timer facing west on the proposed signal pole - Install 1 pedestrian signal head with countdown timer facing south on the proposed signal pole. Install pushbutton on same pole.
Southeast corner	- Install new signal pole - Install 2 pedestrian signal heads with countdown timer facing west and north on the proposed signal pole. Install pushbutton.
Southwest corner	- Remove existing signal pole
Eastern leg – center median	- Install 2 pedestrian signal heads with countdown timers facing north and south on the existing signal pole - Install 2 pedestrian pushbutton poles on the north and south sides of the median with pushbuttons facing the crosswalk across US 40
All crossing locations	- Revise signal timings to provide adequate pedestrian clearance intervals
All traffic signals	- Upgrade traffic signal heads to 12 inch lenses - Install retroreflective backplates to improve conspicuity

Signing	
Western leg	- Install ground mounted R9-3 (no pedestrian crossing), and R9-3bP (use crosswalk) signs to encourage pedestrians to cross at the marked crosswalks
Miscellaneous	
Along the center median west of the intersection	- Install median fencing to a point approximately 200 feet west of the intersection
Along the center median east of the intersection	- Install median fencing to the U-turn between Manor Drive and Eastern Boulevard
Northwest corner	- Install a pedestrian shelter at the proposed bus turnout - Install pedestrian-scale lighting at the proposed pedestrian shelter - Plant grass in the vicinity of the proposed curb extension.
Southeast corner	- Install a pedestrian shelter at the proposed bus turnout - Install pedestrian-scale lighting at the proposed pedestrian shelter

Exhibit 25: Safety Improvement Concept: US 40 West of Manor Drive



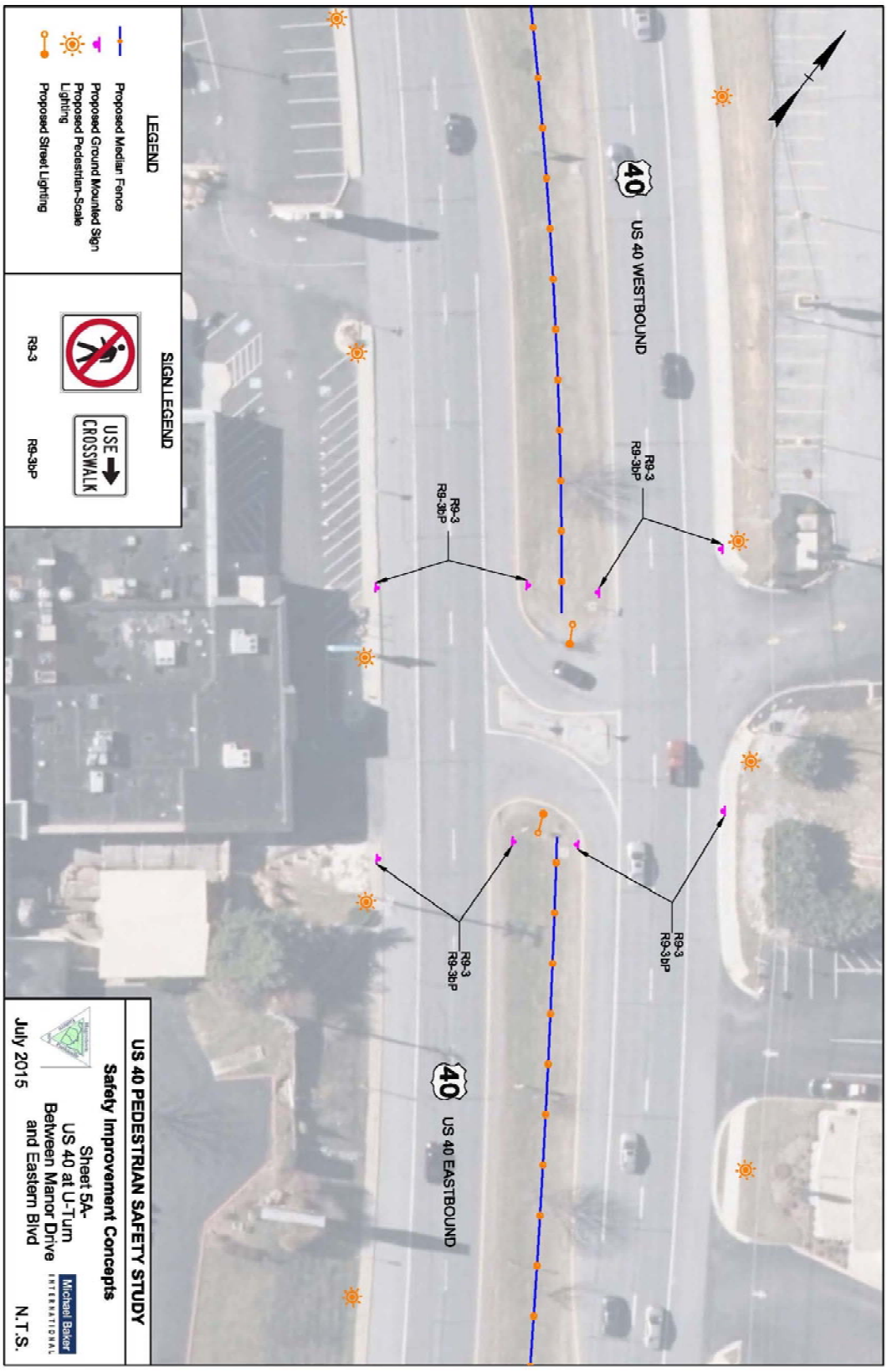
➢ US 40 between Manor Drive and Eastern Boulevard – Option 1 (Exhibit 26)

The U-Turn area on US 40 between Manor Drive and Eastern Boulevard has been identified as a high pedestrian crossing location with Cancun Cantina being the main trip generator. Westbound on US 40, the U-Turn facility is at the crest of a vertical curve which limits sight distance for motorists and pedestrians. Due to this condition and the proximity of the Manor Drive and Eastern Boulevard intersections, a pedestrian activated signal is not recommended. Vehicles travelling westbound from Eastern Boulevard were observed to rapidly accelerate up the vertical curve, limiting driver reaction time if pedestrians are present.

Option 1 recommends the installation of a center median pedestrian fence and a pedestrian crossing prohibition. Pedestrians will be encouraged to use the crossings at Manor Drive and Eastern Boulevard. As most of the pedestrian activity occurs at night, pedestrian scale lighting is recommended in this location.

Location	Improvement
Sidewalk / Curb Reconstruction	
All crosswalk locations	- Install / reconstruct ADA-compliant curb ramps at driveway locations shown
Signing	
At the western and eastern U-Turn ramps	- Install ground mounted R9-3 (no pedestrian crossing), and R9-3bP (use crosswalk) signs to encourage pedestrians to cross at the marked crosswalks
Miscellaneous	
Along the center median west of the U-Turn	- Install median fencing to vicinity of Manor Drive
Along the center median east of the U-Turn	- Install median fencing to the vicinity of Eastern Boulevard
Along US 40 WB and EB	- Install pedestrian-scale lighting along existing sidewalk
At U-Turn	Recommend additional street lighting

Exhibit 26: Safety Improvement Concept Option 1: US 40 between Manor Drive and Eastern Blvd.



➢ US 40 between Manor Drive and Eastern Boulevard – Option 2 (Exhibit 27)

Option 2 for the US 40 U-Turn between Manor Drive and Eastern Boulevard closes the U-turn facility and includes installation of a center median pedestrian fence, requiring pedestrians to cross US 40 at Manor Drive or Eastern Boulevard. Improvements to both of those intersections are recommended to encourage their use. From a traffic operations standpoint, those vehicles currently using the U-turn facility would be required to use either Manor Drive or Eastern Boulevard. Closing the U-turn may result in degraded traffic operations at nearby intersections and may be opposed by businesses in the area whose customers currently have access from the facility.

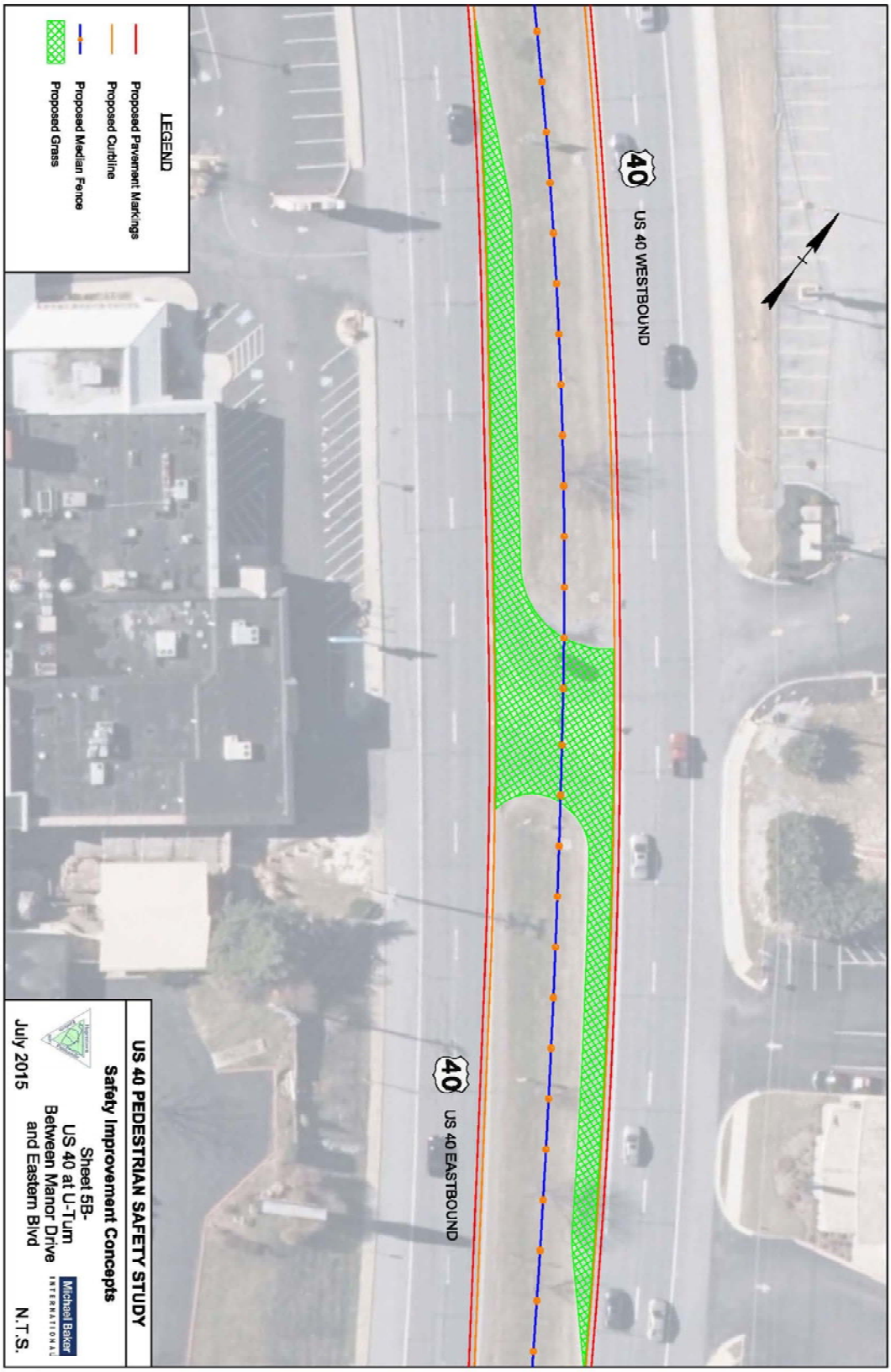
Location	Improvement
Pavement Markings	
Along the center median	- Restripe shoulders to match the geometry of the proposed center median
Sidewalk / Curb Reconstruction	
All crosswalk locations	- Install / reconstruct ADA-compliant curb ramps at driveway locations shown
Center median at the existing U-Turn	- Reconstruct the median to remove the U-turn and approach ramps. Provide a continuous median between Manor Drive and Eastern Boulevard
Signing	
At the western and eastern U-Turn ramps	- Install ground mounted R9-3 (no pedestrian crossing), and R9-3bP (use crosswalk) signs to encourage pedestrians to cross at the marked crosswalks
Miscellaneous	
Along the center median	- Install continuous median fencing between the vicinity of Manor Drive and the vicinity of Eastern Boulevard

To evaluate the potential traffic impacts of the U-Turn closure between Manor Drive and Eastern Boulevard, an intersection capacity analysis, including level of service (LOS) and queuing, was conducted for the peak hours using the Synchro/SimTraffic simulation software. This software tool allows for a quick turnaround analysis. Other more advanced simulation tools are recommended for more detailed future assessments. The analysis was only conducted at the US 40 and Eastern Boulevard intersection, as that intersection is currently congested.

Based on the analysis software results, the existing LOS for the overall intersection is “D” under both AM and PM peak hours, and “E” for the US 40 east bound left (EBL)/U-turn approach under both AM and PM peak hours. Three scenarios (additional 15, 45 and 100 east bound U-turns) were analyzed to reflect the impacts of the U-Turn closure between Manor and Eastern Boulevard. The analysis indicates that under all of the scenarios, the US 40 / Eastern Boulevard intersection operates at a sufficient LOS. The approach LOS will remain at “E” and the queue will not spill over the 275 feet EBL storage length under any of the scenarios.

Although, the analysis indicates the intersection will operate at a sufficient LOS with the additional turns, field visits and a qualitative assessment indicate concerns with the current intersection configuration and turning radii. U-turns must be executed over a tight radius that would most likely prohibit trucks from making such movements. If additional U-turns are made at the intersection, then further modifications may be needed to the intersection design and/or signage on vehicle restrictions.

Exhibit 27: Safety Improvement Concept Option 2: US 40 between Manor Drive and Eastern Blvd.

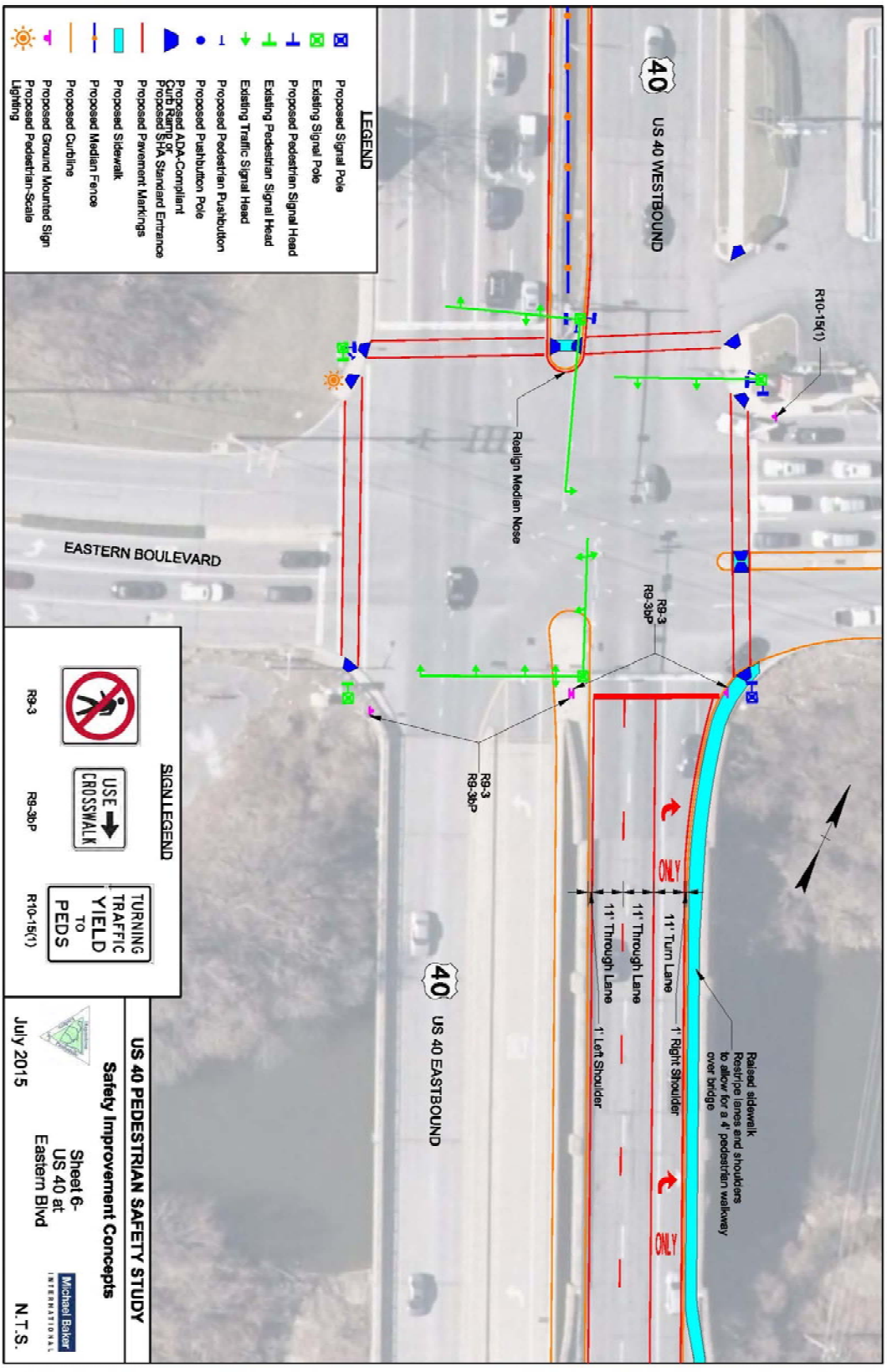


➢ US 40 and Eastern Boulevard – (Exhibit 28)

During field observations and the PRSA, pedestrians were observed walking in travel lanes along US 40 westbound over the Antietam Creek bridge. A 4' wide sidewalk is recommended on US 40 westbound from the Eastern Boulevard intersection extending approximately 60' to the east to connect to the existing sidewalk. Given the lack of available roadway right-of-way, space for the sidewalk can be achieved by reducing the 12' wide travel lanes by 1'. Although SHA standards specify a 5' wide sidewalk, a further reduction in travel lane width is not recommended. In addition to providing room for a sidewalk the reduced lane widths reduce vehicle speeds. This is consistent with the reduced posted speed limit as vehicles approach the downtown section of the City. Note, that due to the right-of-way constraints, there would not be room for any physical barriers separating the pedestrian walkway from the travel lanes. In addition to ADA and MUTCD upgrades, additional lighting is recommended for the southwest quadrant.

Location	Improvement
Pavement Markings	
All crosswalk locations	- Restripe/stripe all crosswalk locations.
Eastern leg	- Add stop bar westbound approaches. - Reduce through and right-turn lane widths to 11 feet.
Sidewalk / Curb Reconstruction	
All crosswalk locations	- Install / reconstruct ADA-compliant curb ramps at crossing and driveway locations as shown
Along the center median west of the intersection	- Extend median nose to provide adequate space to install sidewalk for a pedestrian refuge - Install sidewalk to provide a pedestrian refuge
Along the north side of the bridge in the westbound direction	- Install sidewalk to connect Eastern Boulevard to the existing sidewalk east of the Antietam Creek
Traffic Signals	
All crosswalk locations	- Install pedestrian signal heads with countdown timers and pedestrian push buttons.
Miscellaneous	
Along the center median west of the intersection	- Install median fencing from the U-Turn facility at Cancun Cantina to Eastern Boulevard.

Exhibit 28: Safety Improvement Concept: US 40 and Eastern Blvd.



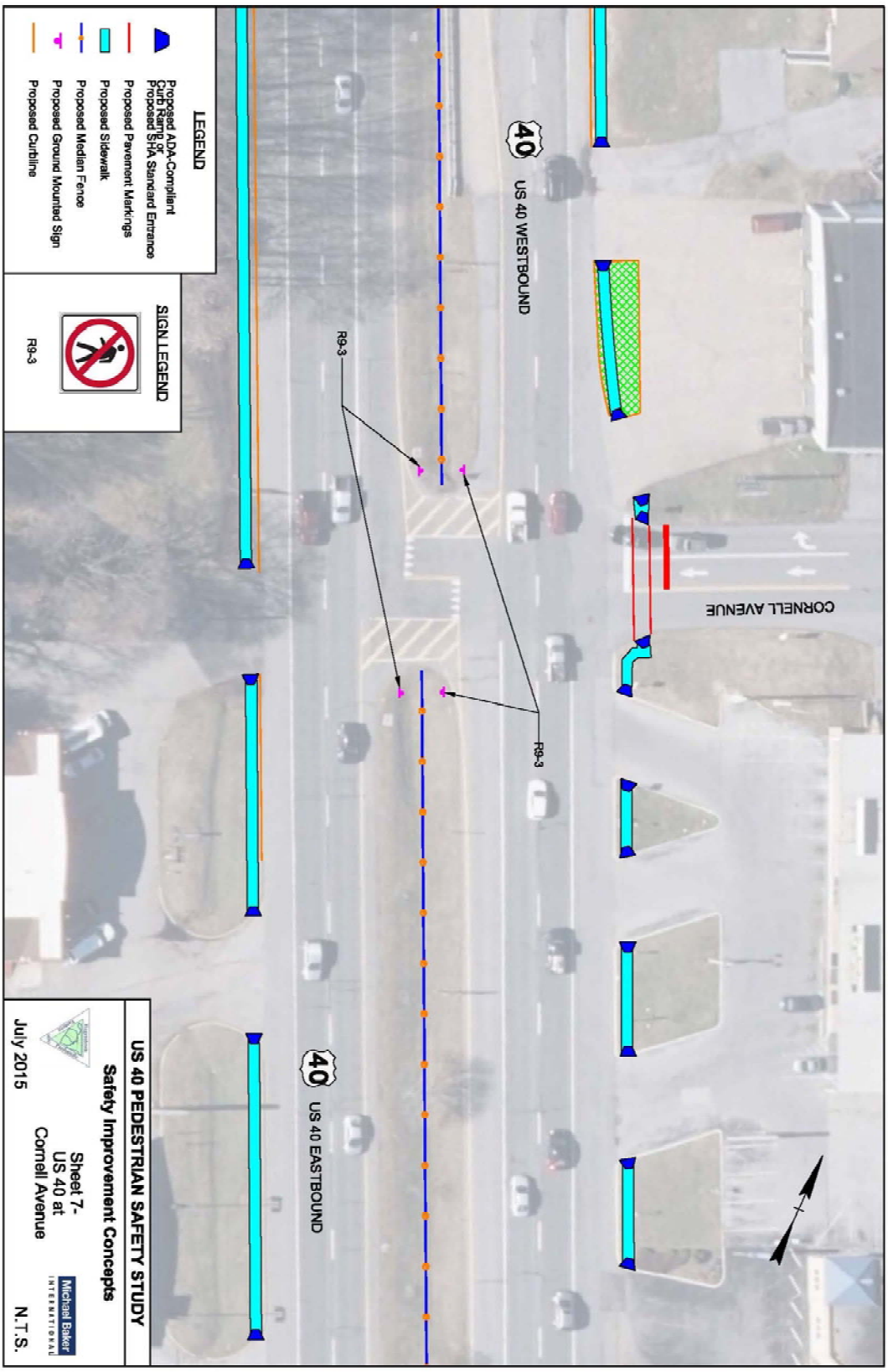
➢ US 40 and Cornell Avenue – (Exhibit 29)

The Cornell intersection is currently unsignalized and is not safe for pedestrian crossings due to high traffic volumes, speeds, and turning vehicles. During the PRSA process, some consideration was given to signalizing this intersection to provide a pedestrian crosswalk and signal phase. However, the PRSA team concluded that a signal is not currently warranted at this location due to current traffic volumes, the proximity to the Eastern Boulevard intersection, and due to the potential roadway infrastructure and community impacts of additional vehicles on Cornell Avenue.

As a result, recommendations for this intersection focus on prohibiting unsafe pedestrian crossing through the use of pedestrian fencing and signing. Without a pedestrian crossing at this location, an increased emphasis is placed on constructing a sidewalk along US 40 westbound with a raised sidewalk over the bridge near Eastern Boulevard (per **Exhibit 28**).

Location	Improvement
Pavement Markings	
Northern leg	- Stripe crosswalk locations. - Relocate stop bar.
Sidewalk / Curb Reconstruction	
All crosswalk locations	- Install / reconstruct ADA-compliant curb ramps at crossing and driveway locations as shown
Along the eastbound and westbound roadway	- Install sidewalk from S Colonial Drive to Mt. Aetna Road.
Along the east side of Cornell Avenue	- Install sidewalk from US 40 to the C&R Liquors driveway.
Northwest corner	Curb a portion of the driveway to eliminate the extensive access to US 40. Install standard SHA driveway crossings.
Signing	
Along the center median east and west of the intersection	- Install ground mounted R9-3 (no pedestrian crossing) signs
Miscellaneous	
Along the center median east and west of the intersection	- Install median fencing from the existing guiderail to the Mt. Aetna Road intersection.

Exhibit 29: Safety Improvement Concept: US 40 and Cornell Avenue

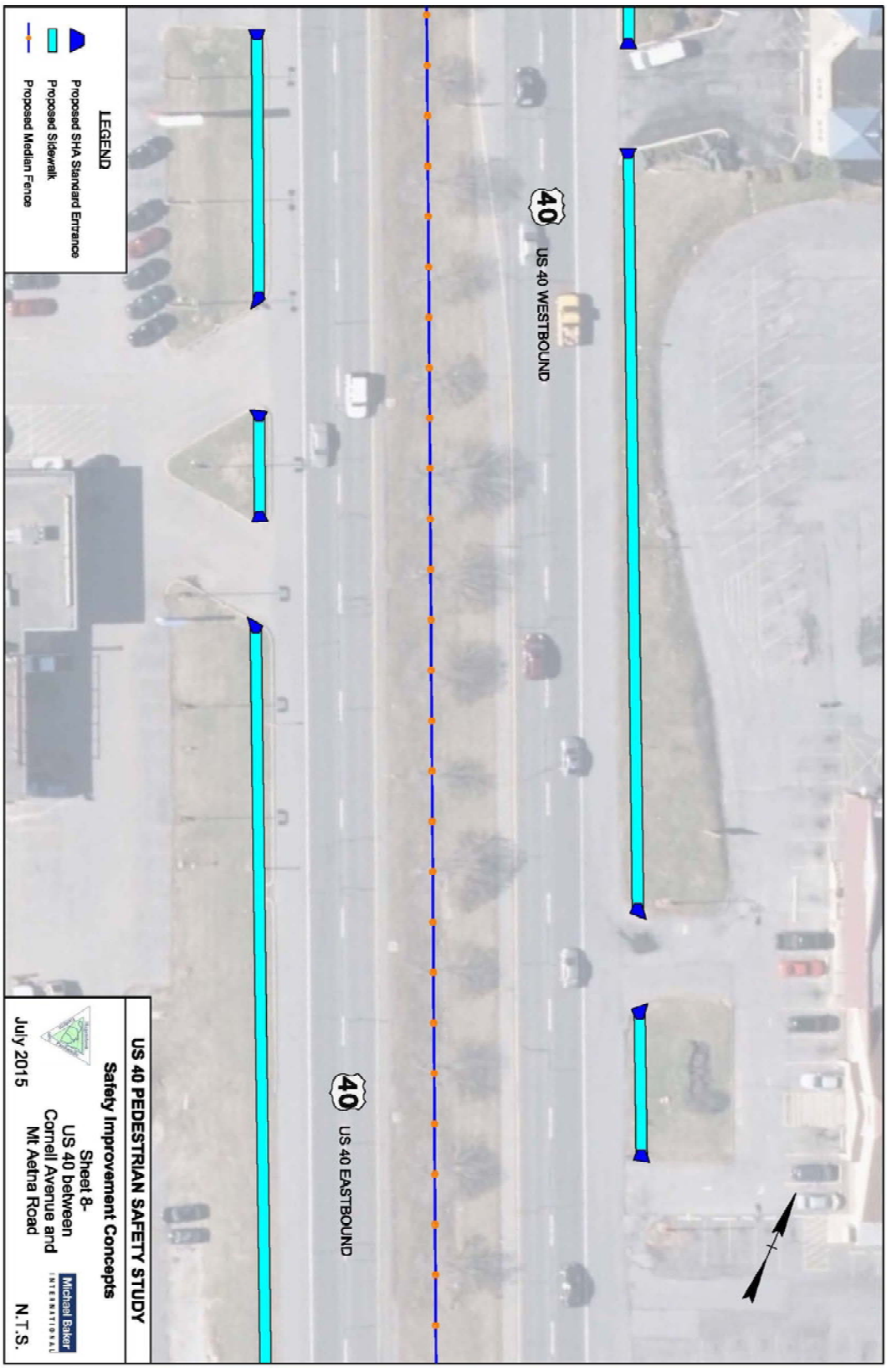


➢ US 40 between Cornell Avenue and Mt. Aetna Road– (Exhibit 30)

On US 40, between Cornell Avenue and Mt. Aetna Road, center median pedestrian fencing is recommended to discourage mid-block crossings. The pedestrian fencing should be installed in conjunction with the improvements to Cornell Avenue and Mt. Aetna Road.

Location	Improvement
Sidewalk / Curb Reconstruction	
Along the eastbound and westbound roadway	- Install sidewalk from S Colonial Drive to Mt. Aetna Road.
Driveway locations	- Install ADA-compliant curb ramps at driveway locations as shown
Miscellaneous	
Along the center median east and west of the intersection	- Install median fencing from the existing guiderail west of Cornell Avenue to the Mt. Aetna Road intersection.

Exhibit 30: Safety Improvement Concept: US 40 Between Cornell and Mt. Aetna Road

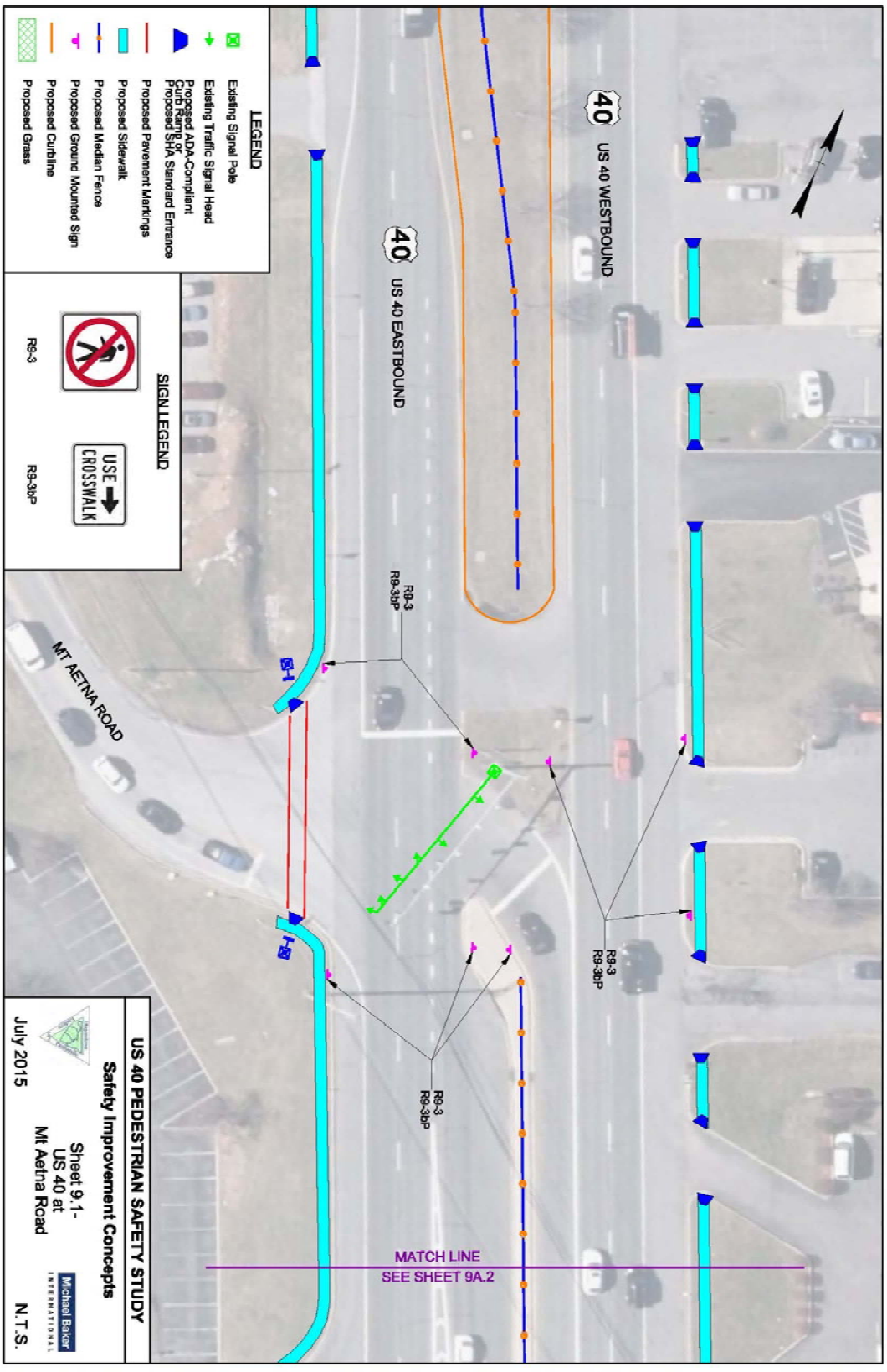


➢ US 40 and Mt. Aetna Road – (Exhibits 31-32)

Improvements to the US 40 Mt. Aetna Road/Birch Knoll Road intersection includes installation of a center median pedestrian fence and signage for pedestrian crossing prohibitions. Pedestrian crossing facilities are recommended for the eastern Mt. Aetna Road intersection with US 40.

Location	Improvement
Pavement Markings	
South leg	- Stripe crosswalk.
Sidewalk / Curb Reconstruction	
At the U-Turn west of the traffic signal	- Install curbs to close the U-Turn facility to the west of the Mt. Aetna Road intersection.
All crosswalk locations	- Install / reconstruct ADA-compliant curb ramps at crossing and driveway locations as shown
Along the eastbound and westbound roadway	- Install sidewalk from S Colonial Drive to Mt. Aetna Road.
Mt. Aetna Road	- On the south side of Mt. Aetna Road, install sidewalk from US 40 approximately 165 feet to the next driveway. - On the north side of Mt. Aetna Road, install sidewalk from US 40 approximately 500 feet to the next driveway.
Signing	
At the intersection of Mt. Aetna Road/Birch Knoll Road and along the center median, east and west of the intersection.	- Install ground mounted R9-3 (no pedestrian crossing), and R9-3bP (use crosswalk) signs to prohibit crossing US 40 at this location.
Miscellaneous	
Along the center median east and west of the intersection	- Install median fencing from the existing guiderail west of Cornell Avenue to the Mt. Aetna Road/Birch Knoll Road intersection.

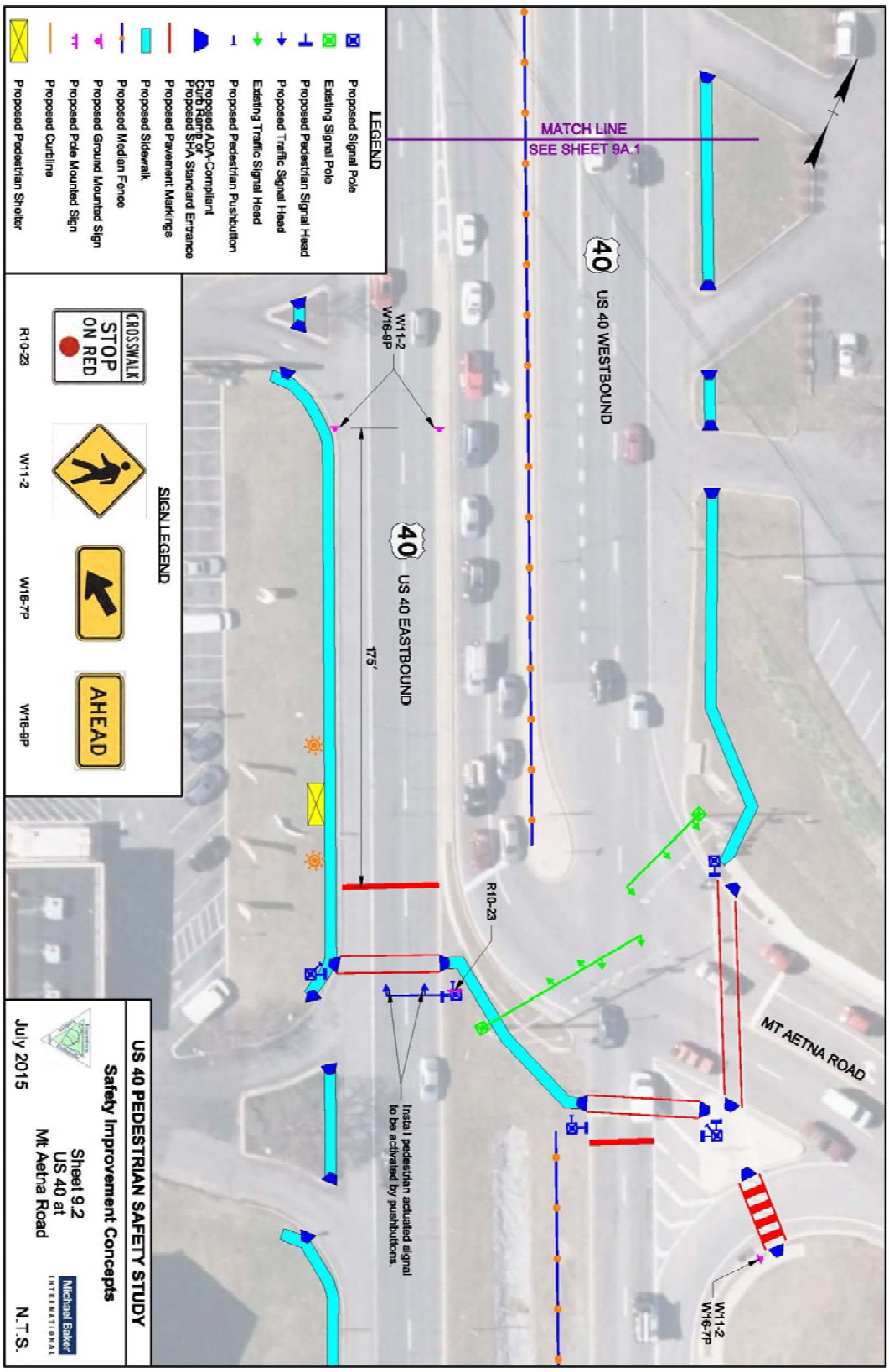
Exhibit 31: Safety Improvement Concept: US 40 and Mt. Aetna Road / Birch Knoll Road



Recommendations for the eastern US 40 and Mt. Aetna Road intersection include ADA and MUTCD upgrades and a high visibility pedestrian signal on US 40 westbound. The pedestrian signal would be coordinated/linked to the upstream signal to limit the impact on traffic conditions at the intersection. When the upstream signal turns red, the pedestrian signal would also turn red if a pedestrian button is pushed. The pedestrian signal would ensure that any vehicles exiting the shopping plaza would stop at the pedestrian crossing.

Location	Improvement
Pavement Markings	
Eastern leg slip ramp	- Install high-visibility crosswalk markings across the slip ramps
Eastern leg	- Install crosswalk across US 40 westbound.
Northern leg	- Stripe crosswalk across Mt. Aetna Road.
Western leg	- Install stop bar and crosswalk across US 40 eastbound.
Sidewalk / Curb Reconstruction	
Along the eastbound and westbound roadway	- Install sidewalk from S Colonial Drive to Mt. Aetna Road.
All crosswalk locations	- Install / reconstruct ADA-compliant curb ramps at crossing and driveway locations as shown
Along the center median east of the intersection	- Install sidewalk in the center median.
Traffic Signals	
Western leg of US 40 eastbound	- Install a Pedestrian Actuated Signal. - Install pedestrian signal heads with countdown timers and Pedestrian Pushbuttons
Signing	
US 40 eastbound	- Install Pedestrian Crossing Ahead signs (W11-2, W16-7P, W16-9P) with flashing amber warning beacons a minimum of 175’ from the stop bar. - Install “Crosswalk Stop on Red” (R10-23) sign
Eastern leg slip ramp	- Install Pedestrian Crossing warning signs (W11-2, W16-7P)
Miscellaneous	
Along the center median east and west of the intersection	- Install median fencing from the existing guiderail to the Mt. Aetna Road intersection.
Eastbound	- Install a pedestrian shelter at the proposed bus turnout - Install pedestrian-scale lighting at the proposed pedestrian shelter

Exhibit 32: Safety Improvement Concept: US 40 and Mt. Aetna Road

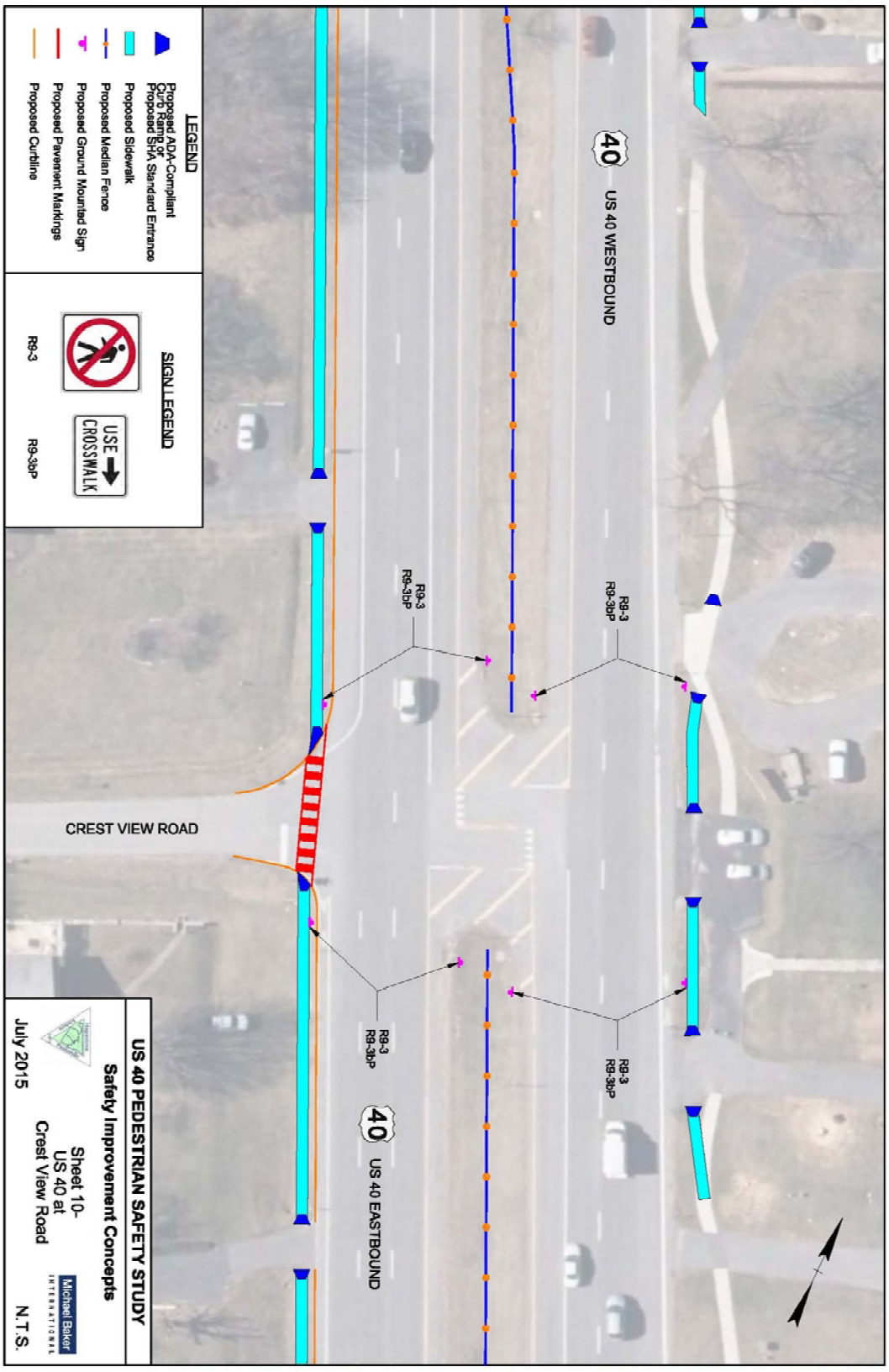


➢ US 40 between Mt. Aetna and Edgewood Drive (Exhibit 33)

On US 40, at Crest View Road, center median pedestrian fencing and signage for pedestrian crossing prohibitions are recommended to discourage mid-block crossings. A high visibility crosswalk is recommended to cross Crest View Road.

Location	Improvement
Pavement Markings	
Southern leg	- Stripe high visibility crosswalk across Crest View Road.
Sidewalk / Curb Reconstruction	
Along the eastbound roadway	- Install sidewalk from Mt. Aetna Road to the 7-Eleven east of N. Edgewood Drive.
Along the westbound roadway	- Install sidewalk to complete pedestrian facilities, from the United Center to 1552 National Pike (US 40).
Signing	
At Crest View Road	- Install ground mounted R9-3 (no pedestrian crossing), and R9-3bP (use crosswalk) signs to prohibit crossing US 40 at this location.
Miscellaneous	
Along the center median east and west of the intersection	- Install median fencing approximately 300 feet in both directions east and west of Crest View Road.

Exhibit 33: Safety Improvement Concept: US 40 Between Mt. Aetna and Edgewood Drive

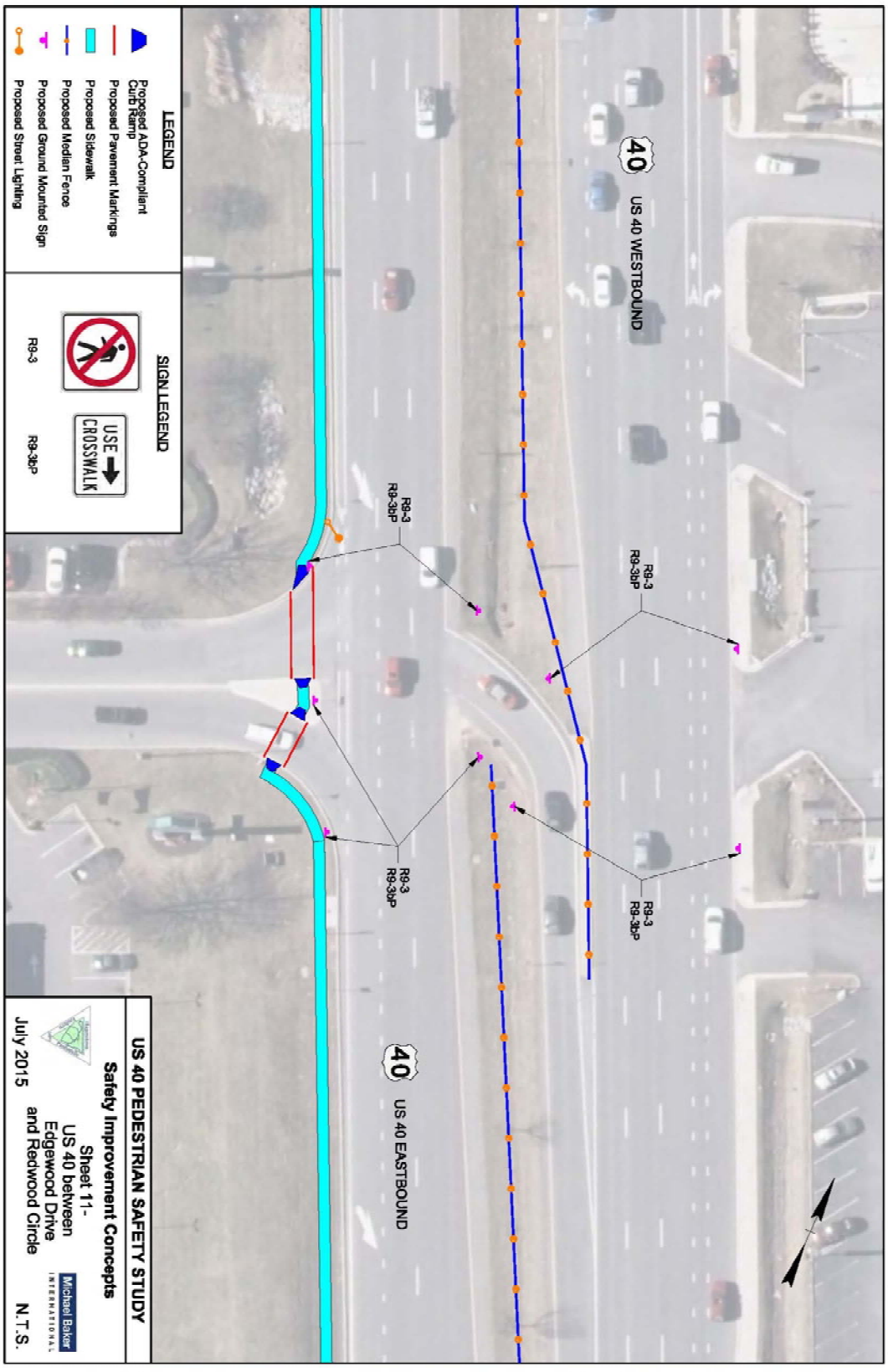


➢ US 40 between Edgewood Drive and Redwood Circle (Exhibit 34)

During field observations and during the PRSA, pedestrians were observed crossing mid-block at this location. Center median pedestrian fencing and crossing prohibitions are recommended for this location. Pedestrians will be directed to use Edgewood Drive or the proposed facilities at Redwood Circle.

Location	Improvement
Pavement Markings	
Eastern leg slip ramp	- Re-stripe high-visibility crosswalk markings across the slip ramps
Western leg across US 40 westbound	- Re-stripe crosswalk across US 40 westbound.
Northern leg	- Re-stripe crosswalk across Mt. Aetna Road.
Western leg	- Re-stripe stop bar and crosswalk across US 40 eastbound.
Sidewalk / Curb Reconstruction	
Along the eastbound and westbound roadway	- Install sidewalk from S Colonial Drive to Mt. Aetna Road.
All crosswalk locations	- Install / reconstruct ADA-compliant curb ramps at crossing and driveway locations as shown
Along the center median	- Widen median by 8 feet accommodate a pedestrian walkway and median barrier with pedestrian fencing.
Traffic Signals	
Western leg of US 40 westbound	- Install pedestrian signal heads with countdown timers and pedestrian pushbuttons.
Northern leg	- Install pedestrian signal heads with countdown timers.
Signing	
Eastern leg slip ramp	- Install Pedestrian Crossing warning signs (W11-2, W16-7P)
Miscellaneous	
Along the center median east and west of the intersection	- Install median fencing from the existing guiderail to the Mt. Aetna Road intersection.
Southwest corner	- Install street

Exhibit 34: Safety Improvement Concept: US 40 Between Edgewood and Redwood Circle

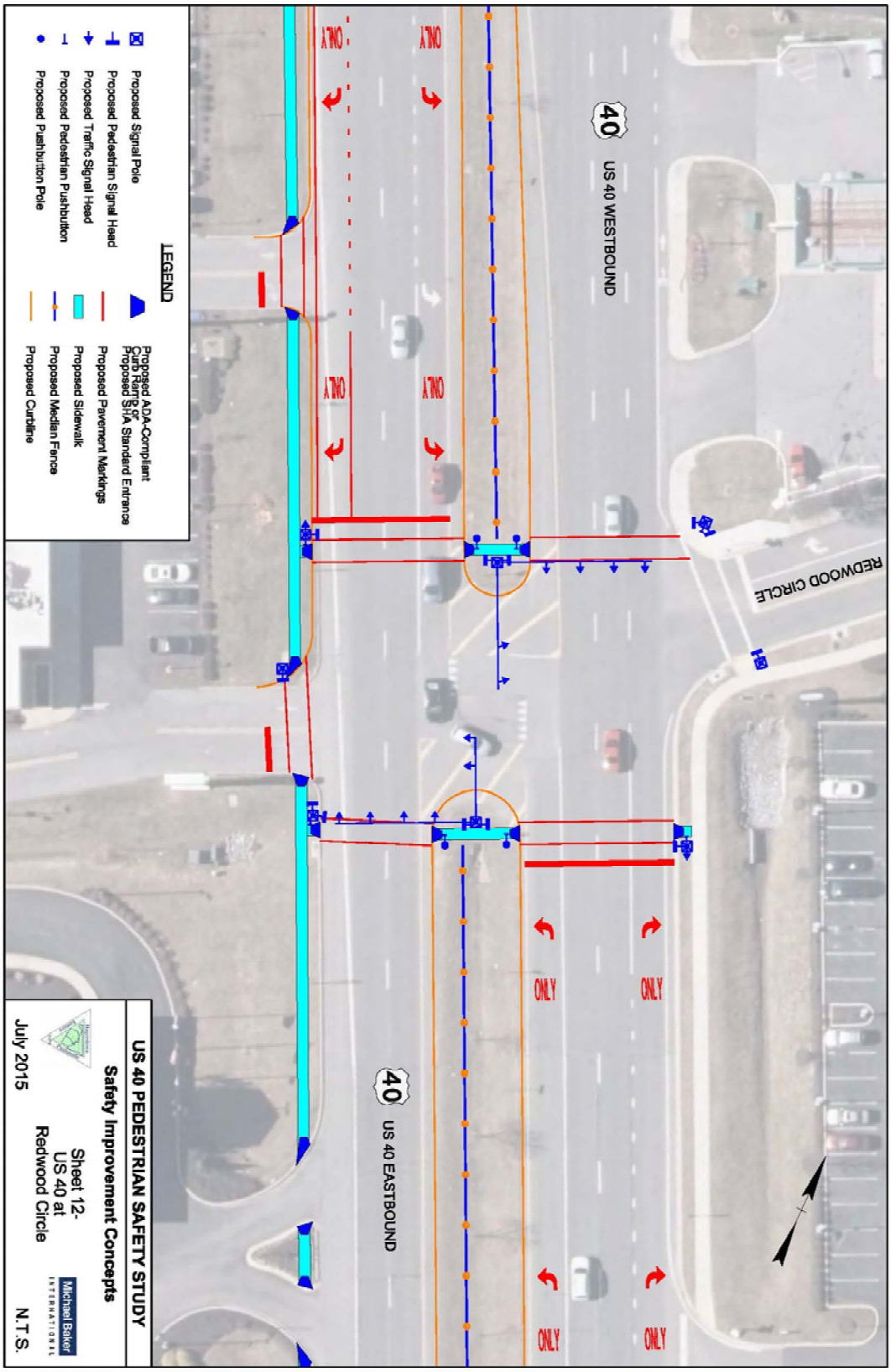


➢ US 40 and Redwood Circle (Exhibit 35)

This recommendation includes the signalization of the US 40 and Redwood Circle intersection to provide pedestrian crosswalks and phasing. An additional intersection may limit the number of mid-block crossings between Edgewood Drive and Redwood Circle. During the PRSA, it was noted that a signal warrant analysis for Redwood Circle was completed approximately one year ago. At that time, this intersection did not yet meet the warrants. In addition, the PRSA team noted some potential issues relating to whether an intersection may be viable at this location. County planning efforts based on anticipated land use growth have noted other potential locations for signalized intersections further east of Redwood Circle.

Location	Improvement
Pavement Markings	
Eastern leg	- Stripe crosswalk across US 40. - Strips stop bar across US 40 westbound.
Western leg	- Stripe crosswalk across US 40. - Strips stop bar across US 40 eastbound.
Southern leg	- Stripe crosswalk and stop bar across Redwood Circle.
Sidewalk / Curb Reconstruction	
Along the eastbound roadway	- Install sidewalk from S Edgewood Drive to Redwood Circle.
All crosswalk locations	- Install / reconstruct ADA-compliant curb ramps at crossing and driveway locations as shown
Traffic Signals	
All Intersection Approaches	- Install traffic signal. - Install pedestrian signal heads with countdown timers and pedestrian pushbuttons.
Miscellaneous	
Along the center median west of the intersection	- Install median fencing from Hagerstown Commons driveway to Redwood Circle. Fence can be extended up to 350feet southeast of the intersection within the median.
Along the center median east of the intersection	- Install median fencing from Redwood Circle to Day Rd.

Exhibit 35: Safety Improvement Concept: US 40 and Redwood Circle



6.3 Project Costs

Using the conceptual designs developed in the previous section, planning-level cost estimates were prepared for each project section to illustrate potential funding needs. **Exhibit 36** provides the cost estimates, which are assumed to represent 2015 dollars. Through the PRSA, several potential state funding sources were identified including SHA Fund 33 (ADA Retrofit) and SHA Fun 79 (Sidewalk Retrofit).

Exhibit 36: Project Cost Estimates by Section

		Cannon		Between Cannon and Cleveland		Cleveland		Between Cleveland and Manor		Manor		Between Manor and Eastern (Option 1)		Between Manor and Eastern (Option 2)	
Description	**Units**	**Cost/Unit**	**Quantity**	**Cost**	**Quantity**	**Cost**	**Quantity**	**Cost**	**Quantity**	**Cost**	**Quantity**	**Cost**	**Quantity**	**Cost**	Quantity	**Cost**
6' Ornamental Fencing	LF	$56.00	0	$0	1,000	$56,000	0	$0	200	$11,200	0	$0	1,220	$68,320	1,475	$82,600
Concrete Sidewalk, 4" Thick	SY	$45.00	304	$13,680	456	$20,520	470	$21,150	0	$0	30	$1,350	0	$0	160	$7,200
9" X 16" Concrete Vertical Curb	LF	$18.00	114	$2,052	248	$4,464	365	$6,570	0	$0	322	$5,796	0	$0	610	$10,980
Detectable Warning Surface	SY	$250.00	19	$4,750	4	$1,000	20	$5,000	0	$0	9	$2,250	10	$2,500	10	$2,500
Traffic Stripe, 4"	LF	$0.50	675	$338	0	$0	1,130	$565	0	$0	632	$316	0	$0	2,000	$1,000
Traffic Markings	SF	$2.50	100	$250	0	$0	540	$1,350	0	$0	0	$0	0	$0	0	$0
Regulatory and Warning Sign	SF	$30.00	0	$0	0	$0	8	$240	0	$0	8	$240	16	$480	0	$0
Foundation, Type SFT	U	$2,000.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
Foundation, Type SPF	U	$1,400.00	6	$8,400	0	$0	10	$14,000	0	$0	6	$8,400	0	$0	0	$0
Foundation, Type STF	U	$3,500.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
Traffic Signal Standard, Aluminum	U	$2,100.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
Traffic Signal Standard, Steel	U	$6,000.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
Pedestrian Signal Standard	U	$900.00	6	$5,400	0	$0	10	$9,000	0	$0	6	$5,400	0	$0	0	$0
Traffic Signal Mast Arm, Aluminum	U	$1,500.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
Traffic Signal Mast Arm, Steel	U	$4,500.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
Traffic Signal Head	U	$1,200.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
Pedestrian Signal Head	U	$1,000.00	20	$20,000	0	$0	12	$12,000	0	$0	8	$8,000	0	$0	0	$0
Push Button	U	$230.00	11	$2,530	0	$0	8	$1,840	0	$0	4	$920	0	$0	0	$0
Lighting Standard Aluminum	U	$1,850.00	0	$0	12	$22,200	11	$20,350	0	$0	4	$7,400	10	$18,500	0	$0
Lighting Mast Arm Aluminum	U	$760.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
Concrete Milling	SY	$2.85	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	625	$1,781
Bus Shelter	U	$5,500.00	0	$0	0	$0	0	$0	0	$0	2	$11,000	0	$0	0	$0
Fertilizing and Seeding, Type A	SY	$6.00	0	$0	0	$0	0	$0	0	$0	1,550	$9,300	0	$0	625	$3,750
				$57,400		**$104,184**		**$92,065**		**$11,200**		**$60,372**		**$89,800**		**$109,811**

		Eastern		Between Eastern and Cornell		Cornell		Between Cornell and Mt Aetna		Mt Aetna		Crest View		Between Edgewood and Redwood Circle	
Description	**Units**	**Cost/Unit**	**Quantity**	**Cost**	**Quantity**	**Cost**	**Quantity**	**Cost**	**Quantity**	**Cost**	**Quantity**	**Cost**	**Quantity**	**Cost**	Quantity	**Cost**
6' Ornamental Fencing	LF	$56.00	0	$0	500	$28,000	0	$0	1,000	$56,000	470	$26,320	530	$29,680	2,000	$112,000
Concrete Sidewalk, 4" Thick	SY	$45.00	340	$15,300	0	$0	430	$19,350	540	$24,300	1,100	$49,500	350	$15,750	1,000	$45,000
9" X 16" Concrete Vertical Curb	LF	$18.00	412	$7,416	0	$0	623	$11,214	72	$1,296	352	$6,336	596	$10,728	200	$3,600
Detectable Warning Surface	SY	$250.00	11	$2,750	0	$0	20	$5,000	12	$3,000	34	$8,500	14	$3,500	19	$4,750
Traffic Stripe, 4"	LF	$0.50	2250	$1,125	0	$0	82	$41	0	$0	500	$250	98	$49	950	$475
Traffic Markings	SF	$2.50	162	$405	0	$0	46	$115	0	$0	200	$500	125	$313	437	$1,093
Regulatory and Warning Sign	SF	$30.00	10	$300	0	$0	8	$240	0	$0	23	$690	16	$480	18	$540
Foundation, Type SFT	U	$2,000.00	0	$0	0	$0	0	$0	0	$0	1	$2,000	0	$0	0	$0
Foundation, Type SPF	U	$1,400.00	1	$1,400	0	$0	0	$0	0	$0	6	$8,400	0	$0	10	$14,000
Foundation, Type STF	U	$3,500.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	2	$7,000
Traffic Signal Standard, Aluminum	U	$2,100.00	0	$0	0	$0	0	$0	0	$0	1	$2,100	0	$0	0	$0
Traffic Signal Standard, Steel	U	$6,000.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	2	$12,000
Pedestrian Signal Standard	U	$900.00	1	$900	0	$0	0	$0	0	$0	6	$5,400	0	$0	10	$9,000
Traffic Signal Mast Arm, Aluminum	U	$1,500.00	0	$0	0	$0	0	$0	0	$0	1	$1,500	0	$0	0	$0
Traffic Signal Mast Arm, Steel	U	$4,500.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	4	$18,000
Traffic Signal Head	U	$1,200.00	0	$0	0	$0	0	$0	0	$0	2	$2,400	0	$0	14	$16,800
Pedestrian Signal Head	U	$1,000.00	6	$6,000	0	$0	0	$0	0	$0	8	$8,000	0	$0	12	$12,000
Push Button	U	$230.00	3	$690	0	$0	0	$0	0	$0	4	$920	0	$0	8	$1,840
Lighting Standard Aluminum	U	$1,850.00	1	$1,850	0	$0	0	$0	0	$0	2	$3,700	0	$0	1	$760
Lighting Mast Arm Aluminum	U	$760.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
Concrete Milling	SY	$2.85	0	$0	0	$0	0	$0	0	$0	120	$342	0	$0	0	$0
Bus Shelter	U	$5,500.00	0	$0	0	$0	0	$0	0	$0	1	$5,500	0	$0	0	$0
Fertilizing and Seeding, Type A	SY	$6.00	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
				$38,136		**$28,000**		**$35,960**		**$84,596**		**$132,358**		**$60,500**		**$258,858**

Section 7: Education and Enforcement Strategies

Through the public survey and PRSA conducted as part of this study, education and enforcement strategies have been stressed as cost-effective methods to reduce pedestrian crashes and fatalities along the US 40 corridor. Recommended strategies have included pedestrian education with a focus on using crosswalks and wearing brighter clothing during evening and night hours. Some education efforts have already been initiated including the distribution of safety vests to pedestrians by the Washington County Sheriff and Hagerstown Police departments. In addition to education, the public survey had a number of responses stressing the need for more enforcement activities focused both on both aggressive driving and unsafe pedestrian activity.

This section provides case study examples of various state and national education and enforcement strategies. In some cases, these strategy examples have resulted in reductions in pedestrian accidents at much lower costs then significant highway improvements. The PRSA has recommended that future review of available case studies be conducted to determine an appropriate education and enforcement program applicable to the project study corridor and Maryland Vehicle Law (see **Exhibit 37** for Maryland Vehicle Law pertaining to pedestrians). The program should include additional media educating the public on safe walking habits especially during darker times of the day. Coordination with local businesses may assist in distributing educational materials or messages. Based on continued monitoring, if corridor does not improve, then additional enforcement measures may be required in coordination with the Washington County and Hagerstown police departments. Some pedestrian facility improvements including improved intersection crosswalks and new sidewalks may be required before pedestrian enforcement activities can be initiated.

Exhibit 37: Maryland Vehicle Law Pertaining to Pedestrians
Source: http://www.sha.state.md.us/OOTS/DriverPedestrianSafety.pdf

21-202(l) ☐	**Failure to obey red traffic signal** Pedestrian facing a steady red traffic signal alone may not enter the roadway
21-203(c) ☐	**Failure to obey pedestrian control signal** Pedestrian may not start to cross the roadway in the direction of a solid "don't walk" or "upraised hand" signal.
21-503(a) ☐	**Failure to yield right-of-way to vehicle** If a pedestrian crosses a roadway at any point other than in a marked crosswalk or in an unmarked crosswalk at an intersection, the pedestrian shall yield the right-of-way to any vehicle.
21-503(c) ☐	**Failure to cross at signalized intersection** Between adjacent intersections at which a traffic control signal is in operation, a pedestrian may cross only in a marked crosswalk.
21-503(d) ☐	**Crossing intersection diagonally** Pedestrian may not cross an intersection diagonally unless authorized by a traffic control device.
21-506(a,b) ☐	**Pedestrian unlawfully on roadway** Where a sidewalk is provided, a pedestrian may not walk along and on an adjacent roadway. Where no sidewalk is provided, a pedestrian may walk only on the left shoulder or on the left side of the roadway, facing traffic.

7.1 Pedestrian and Driver Education

In conjunction with physical improvements, roadway users should be educated so that they can safely share the road and navigate traffic. Widespread education efforts with consistent and positive information can contribute to safer roadways for all users. Educational programs should dispel myths, encourage courteous and lawful behavior, promote safety and health benefits, and enhance awareness of roadway user rules and responsibilities. In order to improve safety for all roadway uses, it is essential to recognize that pedestrian and bicyclist safety is a "shared responsibility". From educating pedestrians, bicyclists and motorists about the rules of the road, to teaching

school-age children safe crossing practices, a number of initiatives are available to improve safety, some with no or little cost. Additionally, there are opportunities to partner with government, business and non-profit entities to convey the pedestrian safety message to local residents and employees.

The Maryland SHA provides a number of educational videos and brochures which focus on pedestrian and bicycle safety. The SHA and MDOT websites provide a number of downloadable resources which promote safe vehicle operations and bicycle and pedestrian behavior[3,4]. As part of the Maryland Strategic Highway Safety Plan, the state has adopted a "*Toward Zero Deaths"* initiative[5], which includes a number of resources to reduce distracted, impaired and aggressive driving, promote seat belt use, and improve pedestrian and motorcycle safety. Through the "*We're on This Road Together, Expect and Respect*" program, SHA focuses on bicycle safety education for both motorists and bicyclists. With each roadway resurfacing project, SHA evaluates the roadway for bicycle markings and amenities. They also provide educational tips and traffic laws for motorists and bicyclists on their website[6].

Drawing upon other initiatives conducted within Maryland and nationally, a pedestrian education program can be developed for the US 40 corridor study area. **Exhibits 38-40** provide case study examples of safety programs conducted by the US Department of Transportation (USDOT), the National Highway Traffic Safety Administration (NHTSA), and other jurisdictions in Maryland.

Exhibit 38: Examples of USDOT Pedestrian Safety Education Efforts

U Drive. U Text. U Pay - http://www.distraction.gov/
DISTRACTION.GOV The USDOT and the NHTSA recently launched the "U Drive. U Text. U Pay." Campaign. The goal of the campaign is to reduce the rate of fatalities attributed to distracted driving. The website provides information such as Public Service Announcements (PSAs), videos, presentations, and posters for teens, parents, educators, employers, and community groups. Information is also available in Spanish.
Pedestrian and Bicycle Safer Journey - http://www.pedbikeinfo.org/pedsaferjourney/
"Pedestrian Safer Journey" and "Bicycle Safer Journey", developed by FHWA, provide educators, parents and others who care about pedestrian and bicycle safety material "to get the conversation started" with children and youth. Videos, in English and Spanish, are available online to teach pedestrians and cyclists how to pick the safest places to walk or ride, and the importance of being alert.
Pedestrian Safety Campaign - http://safety.fhwa.dot.gov/local_rural/pedcampaign/
The FHWA Pedestrian Safety Campaign provides a number of outreach materials for states and communities to customize and use. The goals of the campaign are to educate motorists about the presence of other roadway users, to educate pedestrians about minimizing safety risks, and educate the public about pedestrian facilities and how they are operated. The Campaign's website includes materials that are in both English and Spanish. A step by step guide explaining how to implement the campaign is also available.
Hispanic Pedestrian and Bicycle Safety - http://safety.fhwa.dot.gov/ped_bike/hispanic/materials/
The FHWA provides on their website a list of downloadable materials for the Hispanic population which includes flyers, brochures, and posters to educate pedestrians and bicyclists about the rules of the road, bicycle and pedestrian facilities, and what to expect from motorists.

[3] http://www.roads.maryland.gov/Index.aspx?PageId=376
[4] http://www.mdot.maryland.gov/IncludedContent/New%20MDOT%20Site/tabPages/Safety.html
[5] http://towardzerodeathsmd.com/
[6] http://www.roads.maryland.gov/Index.aspx?PageId=357

Exhibit 39: Examples of NHTSA Highlighted Pedestrian Safety Education Efforts

Drive Well Toolkit -
http://www.nhtsa.gov/Driving+Safety/Older+Drivers/Drive+Well+Toolkit:+Promoting+Older+Driver+Safety+and+Mobility+in+Your+Community
http://www.nhtsa.gov/Pedestrians, http://www.nhtsa.gov/Bicycles

The American Society on Aging (ASA) and the NHTSA developed the Drive Well toolkit to promote driver safety and mobility for older population roadway users. The toolkit includes organization guides, public education programs and training events, steps to build community support in a sustainable manner, advocacy material and printable material. The toolkit also contains evaluation guides to measure the program's success. The NHTSA website provides additional educational resources for pedestrian and bicycle safety which include pedestrian safety information in multiple languages and a pedestrian safety countermeasure guide.

Street Smart NJ - http://bestreetsmartnj.org/

Street Smart NJ is a public education, awareness and behavioral change campaign implemented on a municipal level through the regional MPO. The Street Smart campaign is a collaborative partnership between the Federal Highway Administration (FHWA), the New Jersey Department of Transportation (NJDOT), and the New Jersey Division of Highway Safety (NJDHS). The website has a wide list of resources in English, Spanish, and Portuguese to assist communities in implementing the campaign. Post-campaign evaluation showed significant drops in the rates of non-compliant behaviors among pedestrians and drivers

WalkSafe Curriculum - http://www.walksafe.us/

The WalkSafe Curriculum was developed by the University of Miami's Miller School of Medicine to decrease the number of children injured as pedestrians, increase physical activity, and encourage the use of walkable environments. The three-day program focuses on kindergarten through 5th grade students with material free to teachers and parents. The program has been successful in 13 counties in Florida where the rate of young pedestrians (children aged 5 to 13) hit by car has decreased.

Walking School Bus - http://guide.saferoutesinfo.org/walking_school_bus/

A walking school bus is a group of children walking to school with one or more adults. The Safe Routes to School program (SRTS) provides a guide for parents, teachers, public health educators, bicycle clubs, SRTS coordinators, law enforcement officers, and others to lead a walking school bus program. The guide provides information to educate children who walk and bike to school to do so in a safe manner. The SRTS provides additional educational resources for children, parents, drivers, and neighbors.

Senior Programs -
http://www.eastcentral.aaa.com/home/automotive/driver-education/senior-programs.html#air
http://www.aarp.org/auto/?cmp=RDRCT-GETNGARN_MAR20_015.

AAA offers numerous traffic safety and educational programs such as online training courses and senior educational resources. Additional information and resources include traffic safety education materials with topics related to occupant protection, traffic signs, signals and markings, driving in inclement weather, and older-pedestrian safety. AARP provides online quizzes, online courses, and driving tips to senior citizens to help promote safe driving

Exhibit 40: Examples of Pedestrian Safety Education Efforts in Maryland and Washington D.C.

OC Walk Smart!, Town of Ocean City, MD, 2013 – Present

An illustrated crab, "Crab the Lifeguard," has been placed on Ocean City transit, plane banners, boat billboard messages, roadside billboards, and in local businesses, and has appeared on television and radio public announcements to remind pedestrians, bicyclists, and drivers of safety tips. Also, the Town of Ocean City, the State Highway Administration, and the Maryland Office of Highway Safety increased signage, created more marked crosswalks and more countdown clocks at certain troublesome intersections with longer cross times, and made other safety improvements. In the first year of the campaign, pedestrian related crashes decreased 50 percent from the previous year, including zero fatalities. The campaign expanded to the Delaware beaches in 2014.

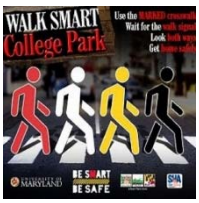
Street Smart, D.C. Metropolitan Region, 2002 – Present

Street Smart, a semi-annual public awareness and education campaign conducted in the Washington, D.C. region, aims to increase pedestrian and bicyclist safety through public awareness and increased law enforcement. Street Smart uses outdoor advertising and sponsorships of traffic reports on local radio stations to reach its target audience. Also, safety events were held around the region to reach people in areas with high pedestrian crash rates. Street Smart has conducted pre- and post-campaign surveys since its inception. For the spring 2013 campaign, 39 percent of those surveyed said they saw an ad. Also, there was a 35 percent increase in respondents identifying Street Smart as a roadway safety program and a 45 percent increase in awareness of police enforcement of pedestrian safety laws.

You Only Live Once (YOLO), Montgomery County Public Schools, MD, 2014 – Present

Using a popular saying and acronym among students, the YOLO campaign was designed to raise awareness of the risks of distracted walking and other risky pedestrian behaviors. It was organized and developed by the Montgomery County Department of Transportation. A toolkit was sent to every high school in the county and included a guidebook on developing a school pedestrian safety education program, ideas for events, campaign posters (similar to those used in the MWCOG campaign *Street Smart*), sample morning announcements, a parent tip sheet in English and Spanish, and a social media plan with graphics and pre-written tweets and posts using the hashtag #YOLOwalksafe. The National Association of Counties awarded the Montgomery County Department of Transportation a 2015 Achievement Award for the campaign in the category of Civic Education and Public Information.

Walk Smart College Park!, College Park, MD, 2014



SHA installed a new pedestrian-activated signal and a median fence, reduced the speed limit, and in partnership with the University of Maryland, the City of College Park and the University of Maryland and Prince George's County Police, introduced the Walk Smart College Park! Campaign. The campaign includes student outreach at on-campus events, print and digital media advertising in the University's newspaper, exit signage at Byrd Stadium, and transit advertising on UMD shuttle buses. Furthermore, posters, banners, floor decals, and coasters are being used by many of the businesses in the corridor.

7.2 Police Enforcement

Police enforcement is a key component in preserving pedestrian right-of-way and maintaining safe travel for all modes of transportation. Even with successful engineering countermeasures, the failure of drivers, pedestrians, and bicyclists to obey traffic laws creates unsafe roadways. Police enforcement can increase knowledge of traffic laws and awareness of the need to share the roadways with other models of travel. Enforcement of right-of-way laws has proven difficult, as police forces have focused attention on more objective violations, such as driving under the influence, speeding, and running red lights, or have not provided sufficient training to police officers. In the past, enforcement campaigns have included increased police presence around school zones and other areas with high pedestrian activity, pedestrian stings with police officers in civilian clothing, and media campaigns to set the public agenda. NHTSA published *Pedestrian Safety Enforcement Operations: A How-To Guide* in November 2014[7]. **Exhibit 41** highlights characteristics of successful practices related to pedestrian safety enforcement as provided in the NHTSA report. The report also includes case studies of implemented programs.

Exhibit 41: Characteristics of Successful Pedestrian Safety Enforcement Programs
(Per NHTSA Report)

- Collaborate with partners in business, civic organizations, and government agencies to expand resources and establish community buy-in.
- Coordinate with the judiciary to alert officials to planned operations and to verify that operations comply with local laws.
- Coordinate with engineering representatives to ensure locations are suitable for operations.
- Establish and nurture relationships with the media to increase the likelihood that positive messages will reach the public.
- Use public outreach (via partners wherever possible) to inform the public of program plans, enhancing public acceptance and increasing pedestrian safety awareness.
- Select appropriate locations for operations based on crash data, community input, logistical, and other considerations.
- Train officers in program goals, objectives, and procedures.
- Encourage integration of the procedures in daily operations.
- Brief all participating officers before operations begin on local laws pertaining to crosswalks and pedestrians.
- Begin a new enforcement effort by primarily issue warnings instead of citations.
- Conduct frequent operations and incorporate pedestrian safety into routine enforcement activities.
- Deploy radar/LIDAR units to collect information on speeding in conjunction with pedestrian infractions.
- Consider using video cameras to record infractions and to provide additional evidence.
- Ensure officers have educational materials to distribute which explain the nature and purpose of the operation.
- Cite both drivers and pedestrians, but focus on drivers, as they are the less vulnerable population.
- Prepare officers and key program personnel to anticipate and respond to complaints.
- Develop evaluation procedures that measure outputs (e.g., citations) and outcomes (e.g., reduced crashes, heightened awareness).
- Communicate results widely with partners, the media, and the public.
- Follow-up with the judiciary to make systematic improvements.
- Follow-up with traffic engineers to make site changes or improvements (e.g., signage, crosswalks).

[7] http://www.nhtsa.gov/staticfiles/nti/pdf/812059-PedestrianSafetyEnforceOperaHowToGuide.pdf

Efforts conducted by the Montgomery County (Maryland) Police Department serve as an in-state case study of innovative pedestrian enforcement methods.[8] The pedestrian safety program was a three pronged approach that included engineering work by the Montgomery County Department of Transportation (MCDOT) and MDOT; pedestrian education by MCDOT and volunteers, and enforcement by the local police department. The enforcement program included a phased approach to warn and then issue citations for illegal pedestrian activity. The efforts included "crosswalk stings" as show in **Exhibit 42**.

Exhibit 42: Montgomery County Pedestrian Safety Enforcement

As noted earlier, some pedestrian facility improvements including improved intersection crosswalks and new sidewalks may be required before pedestrian enforcement activities can be initiated along US 40. Even if such improvements are completed, enforcement of mid-block pedestrian crossings may not be possible at locations where there are not nearby traffic signals per Maryland Vehicle Law 21-503(c) (see **Exhibit 37**). As such, education efforts may be the most appropriate strategies at those locations.

7.3 Automated Enforcement

Automated Enforcement is a tool that can be used by state and local agencies to decrease the frequency of speeding and running red lights, which in turn, improves the roadway safety for all users. Automated enforcement systems are electronic devices that detect these traffic violations and document the vehicle at fault through photo evidence. Studies have shown that these systems substantially reduce the number of injury crashes. However, some studies also show an increase in rear-end collisions at intersections where these systems are located. Because public opinion regarding the use of automated enforcement systems is mixed, implementation should coincide with or follow a strong educational effort to inform the public of the benefits. **Exhibit 43** illustrates several case studies of automated enforcement activities.

In the State of Maryland, speed cameras are only authorized in designated school and work zones[9]. Montgomery County has a more comprehensive speed camera program as they are a Charter Home Rule County, a type of local government which operates under a locally drafted/approved Charter or "constitution". In Washington County, all of the County laws and ordinances must have enabling state legislature first to approve the implementation of the law or ordinance. In 2012, the Hagerstown police department started deploying speed cameras in Hagerstown school zones. Currently, 11 cameras are being used and are hidden in boxes at school zones around the city. However, due to the lack of school zones and the county's laws, speed cameras are not currently a viable option

[8] http://www.mdhighwaysafetysummit.org/uploads/2/0/1/9/20190749/4_bmoreped_presenstationv2.pdf
[9] http://www.ghsa.org/html/stateinfo/laws/auto_enforce.html

on US 40. Red light cameras and enforcement are permitted within the state of Maryland and may be useful to improve the safety of crossing pedestrians along the corridor.

Exhibit 43: Examples of Pedestrian Safety Education Efforts in Maryland and Washington D.C.

Evaluation of Automated Speed Enforcement in Montgomery County, MD, 2008
In 2007, Montgomery County implemented the state's first automated speed enforcement program, with camera use limited to residential streets with speeds limits of 35 mph or less and school zones. Vehicle speeds were measured for six months before and six months after speed cameras were installed. The proportion of drivers traveling more than 10 mph above posted speed limits declined by 70% in locations with warning signs and speed camera enforcement, 39% at locations with warning signs but no speed cameras, and 16% on residential roads with neither warning signs nor speed cameras.
Effects of red light camera enforcement on red light violations in Arlington County, Virginia, 2014
In June 2010, Arlington County installed red light cameras at four heavily traveled signalized intersections. Effects of camera enforcement on red light violations were examined. Consistent with prior research, red light violations at camera-enforced intersections declined significantly. Reductions were greater the longer after the light turned red, when violations are more likely to cause crashes. Spillover benefits were observed only for nearby intersections on travel corridors with cameras and were not always significant.

Section 8: Implementation Summary

This section provides an evaluation of the priority-level of the recommendations listed in **Sections 6-7**. These priorities were determined based on input and comments from the PRSA team. **Exhibit 44** provides general priority levels for each of the strategy types as they apply to the US 40 Dual Highway corridor. Level 1 priorities may be considered the highest priorities or ones that may need to be completed before other strategies are implemented. For example, pedestrian improvements at some intersections (e.g. Mt. Aetna Road) should not be completed until a supporting sidewalk system is built along US 40. Both ADA improvements and lighting are high priorities that may require further study and evaluation. An initial ADA assessment was provided in **Section 4** and some pedestrian-focused lighting improvements are included in the **Section 7** recommendations. Level 2 and Level 3 priority levels represent subsequent priority phasing that may require further evaluation. Some strategies identified as a Level 2 general priority, including pedestrian fences, may still be important strategies in the short term at select locations.

Exhibit 44: General Corridor Priority Level Strategies

Level 1 Priority

- Pedestrian education efforts based on other successful programs
- Address missing sidewalks at locations with higher pedestrian movements
- Improve select intersection crossings with higher pedestrian movements
- Address ADA deficiencies along the corridor at current sidewalk locations
- Further evaulation and improvements for corridor lighting

Level 2 Priority

- Pedestrian fencing to prevent un-safe mid-block pedestrian crossings (limit to needed locations only)
- Address missing sidewalks at locations with lower pedestrian movements
- Improve intersection crossings with lower pedestrian movements
- Designated stop locations for County Commuter bus service

Level 3 Priority

- Police enforcement activities as permitted by Maryland law
- New traffic signals at locations warranted by traffic levels (with pedestrian crossing facilities)
- Enhanced curb extensions to slow traffic and reduce crossing distances
- Other minor design improvements to improve pedestrian safety

Based on the general priority levels shown above, each location-specific design improvement (as shown in Section 6) has been evaluated to determine a priority level as summarized in Exhibit 45. Priority levels for strategies at specific locations may differ from the general priority level based on the needs at that location. Priority levels have been based on planning level assessments of the strategies. As strategies are advanced to design phases, priority levels may change based on specific design considerations, costs, or future changes to land use, traffic and/or pedestrian volumes along the corridor.

Exhibit 45: Priority Levels for Location Specific Design Recommendations

Location	Recommended Strategy	Priority Level
Cannon Avenue	Pedestrian signal heads and Pushbuttons	**Level 1**
	Improved crosswalk markings and ADA accessibility	**Level 1**
Between Cannon Avenue and Cleveland Avenue	Addition of new sidewalks	**Level 1**
	Pedestrian lighting along sidewalks	**Level 1**
	Pedestrian fencing	**Level 2**
	Removal of existing sidewalks at select locations	**Level 3**
Cleveland Avenue	Redesign of pedestrian crosswalks / refuge islands / signing	**Level 1**
	Pedestrian signal heads and pushbuttons	**Level 1**
	Addition of new sidewalks / widening of sidewalks	**Level 1**
	Pedestrian lighting along sidewalks and crosswalks	**Level 1**
	Pedestrian fencing	**Level 2**
Manor Drive	Redesign of pedestrian crosswalks /refuge islands / signing	**Level 1**
	Revisions to pedestrian crossing signal timing	**Level 1**
	Pedestrian Fencing	**Level 1**
	Addition of bus shelters and/or bus stop lighting	**Level 3**
	Curb extensions for bus stop locations / to reduce crossing length	**Level 3**
Between Manor Drive and Eastern Boulevard	Pedestrian fencing and signing	**Level 1**
	Overhead lighting pole at U-turn location	**Level 2**
	Pedestrian lighting along sidewalks	**Level 2**
Eastern Boulevard	Redesign of pedestrian crosswalks / refuge islands / signing	**Level 1**
	Pedestrian signal heads and pushbuttons	**Level 1**
	Additional of raised sidewalk over bridge	**Level 1**
	Pedestrian lighting	**Level 1**
	Pedestrian fencing	**Level 2**

Exhibit 45: Priority Levels for Location Specific Design Recommendations (continued)

Location	Recommended Strategy	Priority Level
Cornell Avenue	Addition of new sidewalks and side street crosswalks	**Level 1**
	Pedestrian fencing and signage	**Level 1**
Between Cornell Avenue and Mt. Aetna Road	Addition of new sidewalks and side street crosswalks	**Level 1**
	Pedestrian fencing	**Level 3**
Mt. Aetna Road	Addition of new sidewalks and side street crosswalks	**Level 1**
	Redesign of pedestrian crosswalks /refuge islands / signing	**Level 2**
	Pedestrian signal heads and pushbuttons	**Level 2**
	Bus shelter and lighting	**Level 3**
Between Mt. Aetna Road and Edgewood Drive	Addition of new sidewalks and side street crosswalks	**Level 1**
	Pedestrian Fencing	**Level 3**
Between Edgewood and Redwood Circle	Addition of new sidewalks and side street crosswalks	**Level 1**
	Pedestrian fencing and signing	**Level 1**
Redwood Circle	Addition of new sidewalks and side street crosswalks	**Level 1**
	Pedestrian Fencing	**Level 1**
	Addition of traffic signal with crosswalks and pedestrian signals	**Level 3**

Section 9: Corridor Monitoring and Evaluation

The process of monitoring conditions, pre and post implementation of the recommended improvements will be essential to document and measure their success. The HEPMPO, County and City should adopt policies and procedures that will allow them to track the impacts and document change. The results should be used to modify recommendations and to justify, support, and fund similar initiatives to make effective improvements. The following is a brief list of potential performance measures to monitor and track pedestrian safety and access that should be considered for US 40.

- Location, number, and severity of pedestrian crashes
- Traffic volumes and intersection turning movements
- Pedestrian volumes
- Conduct future walkability survey