



2020

M
A
Y

HAGERSTOWN

BICYCLE & PEDESTRIAN
PRIORITY AREA PLAN



HAGERSTOWN

BICYCLE & PEDESTRIAN PRIORITY AREA PLAN

PREPARED FOR:

City of Hagerstown &
Maryland Department of Transportation State Highway Administration



May 2020

PREPARED BY:



Table of Contents

1. Introduction	4
1.1 Hagerstown Overview.....	5
1.2 Building on Previous Work.....	8
2. Existing Conditions	11
2.1 Existing Roadways Network.....	11
2.2 Existing Bicycle Facilities	14
2.3 Existing Pedestrian Facilities.....	19
2.4 Crash History	19
3. Stakeholder Workshop	30
4. Recommendations	37
4.1 Site-Specific Recommendations	37
4.2 Best Practices.....	59
4.2.4 Sidewalks	69
5. Appendix - Facility Descriptions	76
Bicycle Facilities.....	76
Pedestrian Facilities	79

1. Introduction

The City of Hagerstown is committed to improving safety and comfort for people who walk or cycle. In recent years, the City has worked with the Maryland Department of Transportation State Highway Administration (MDOT SHA) to update its Bicycle Master Plan and made transportation investments to improve walking and bicycling in downtown Hagerstown. The Bicycle Master Plan was completed by the Hagerstown/Eastern Panhandle Metropolitan Planning Organization (HEPMPO). The City has the potential to create a vibrant walking and cycling network. This plan, led by the MDOT SHA, identifies strategies for Hagerstown to further embody its nickname of the Hub City, becoming a place that people not only want to visit and drive to, but also one where people want to walk and bike.

The concept of Bicycle and Pedestrian Priority Areas (BPPA) was created to emphasize planning for areas with a high potential of bicycling and walking. BPPA's are intended to align local and state bicycle and pedestrian connectivity goals and be developed in a collaborative approach that helps local and state transportation agencies overcome impediments to bicycle and pedestrian travel. BPPA plan development includes: facilitating state, local, and stakeholder coordination; Identifying roadway geometric and operational recommendations to align state and local bicycle and pedestrian planning; and determining feasibility of a proposed bicycle and pedestrian treatments in adopted documents.

Maryland Code, Transportation § 8-204

(c)(1) The Administration shall...

(ii) 1. If there is a State highway within the limits of an area that a local government has designated as a bicycle and pedestrian priority area, make a determination on whether the Administration should also designate the area as a bicycle and pedestrian priority area... and

2. If the Administration and a local government each designate an area as a bicycle and pedestrian priority area, implement a plan developed in cooperation with the local government to increase safety and access for bicycle or pedestrian traffic.

(2) If there is no State highway within the limits of the bicycle and pedestrian priority area, the plan shall be developed by the local government.

(3) A plan for traffic management in a bicycle and pedestrian priority area shall provide for:

(i) Appropriate changes to the location, construction, geometrics, design, and maintenance of the State highway system to increase safety and access for bicycle or pedestrian traffic in the bicycle and pedestrian priority area; and

(ii) The appropriate use of traffic control devices including pedestrian control signals, traffic signals, stop signs, and speed bumps.

In 2019, MDOT SHA introduced *Context Driven – Access and Mobility for all Users*, a new planning and design resource that offers practitioners guidelines focused on creating safe, accessible, and effective multimodal transportation systems. MDOT SHA developed a unique set of six context zones based on the distinctive land use characteristics of Maryland communities. The Hagerstown BPPA lies primarily in the Urban Center context zone, which is characterized by a high diversity of uses, while having a moderately high density of development. The context guide is not designed to be prescriptive. Associated features include a future toolbox of innovative treatments and their effects on the roadway and users based on key performance metrics and a periodically-published set of case studies which will serve as a supplement to this guide.

The project area for the Hagerstown BPPA is in the core area of the City of Hagerstown, bounded by North Avenue on the north, Cleveland Avenue on the east, Memorial Boulevard on the south, and Walnut Street on the west (as shown in **Figure 1**). Focusing on this specific geographic area, this report contains a review of the existing bicyclists and pedestrians' networks and facilities, a crash history, a summary of stakeholder input and site-specific BPPA-wide recommendations to improve bicycle and pedestrian safety and comfort. Recommendations are a combination of site-specific improvements, improvements intended to build-out complete, continuous and connected bicycle and pedestrian networks, and programmatic improvements intended to address safety concerns unique to the study area.

1.1 Hagerstown Overview

Maryland's sixth largest incorporated city, Hagerstown has a population of approximately 40,000 residents across 12.2 square miles. The median age is 35 years old, with 62% of the population between 18 to 64 years old. The city's racial makeup is 67% white, 16% black, 8% Hispanic, and 9% other. The median household income in Hagerstown is \$41,000, which is approximately two-thirds of the regional median income in the Hagerstown-Martinsburg, MD-WV metropolitan area.¹

The Hagerstown BPPA area, a subset of the City, has an estimated population of 5,200 which is 13% of Hagerstown population over 500 acres of land (less than 1 square mile). The race distribution includes 68% white, 20% black, 8% Hispanic, and 4% other. The estimated median household income in the BPPA is \$52,000, which is 27% above the Hagerstown median income. These data relate to residents of the BPPA area, but there is a transient population that is not represented in these data. Many of these are associated with Hagerstown being a County seat with accompanying courts, social services, and other key destinations (See **Figure 2**).

¹ ACS 2017 5-year

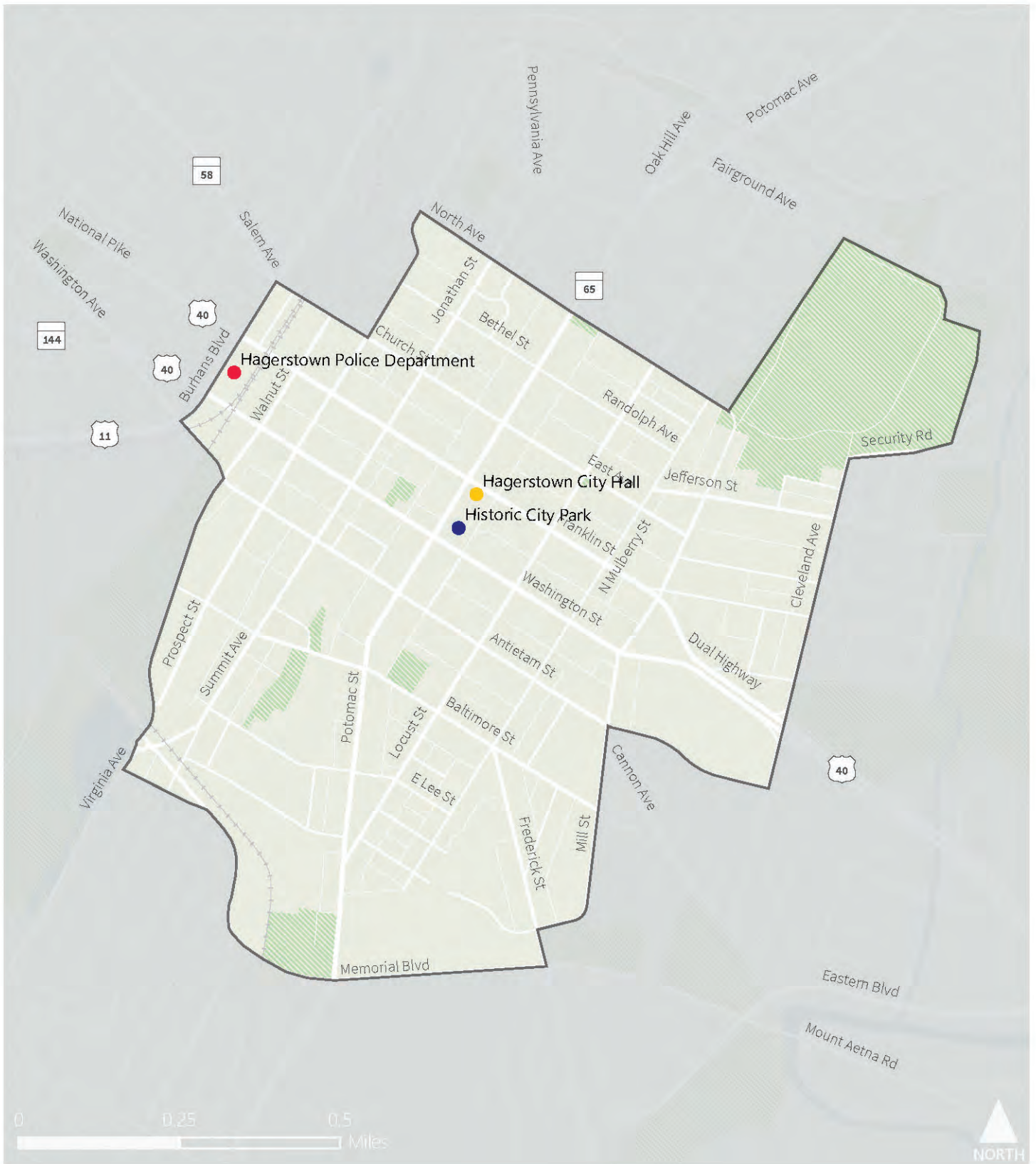
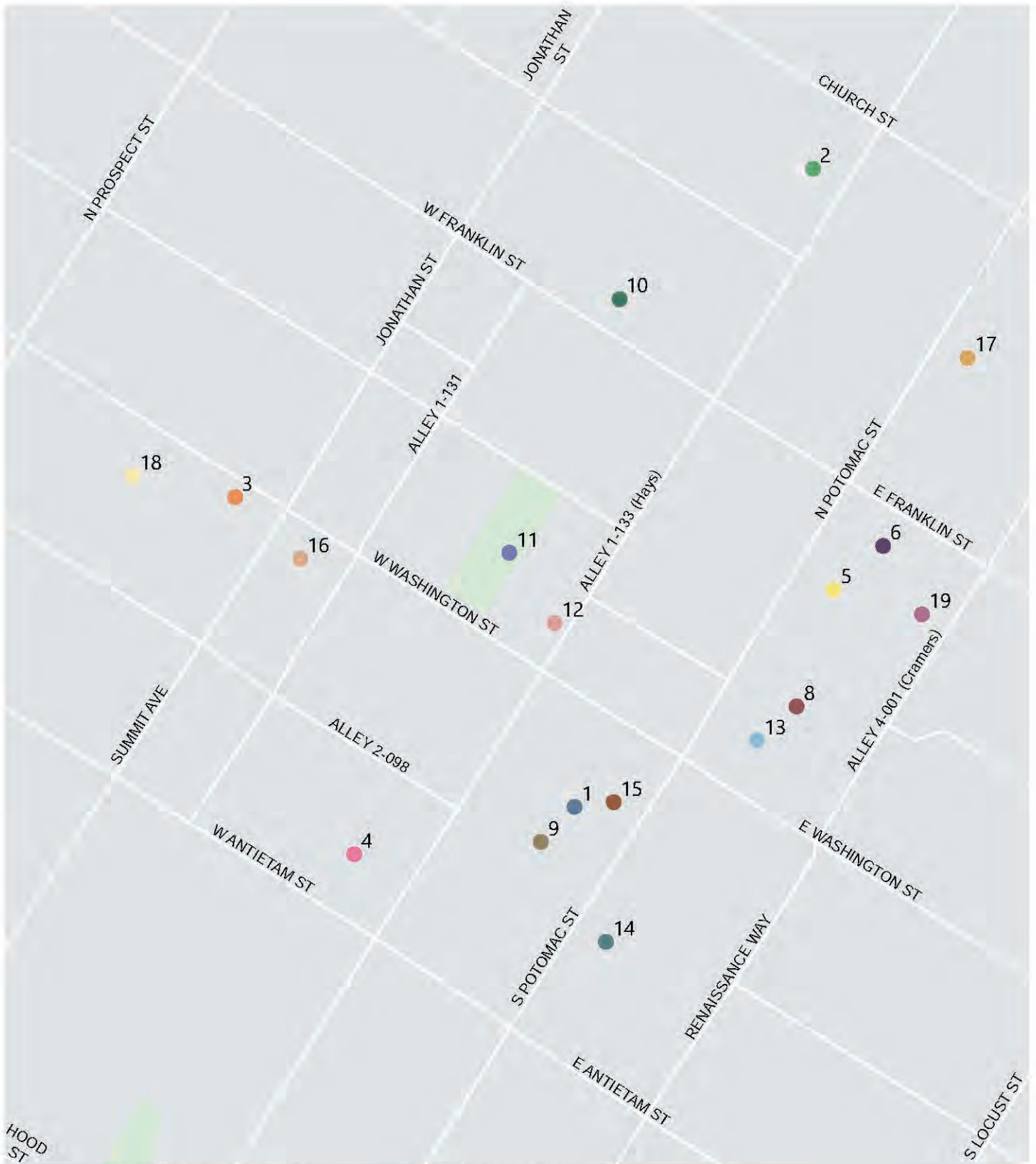


Figure 1. Hagerstown BPPA



- | | |
|---|--|
| 1, Barbara Ingram School | 11, University Plaza |
| 2, City Farmers Market Parkit | 12, University System Of Maryland At Hagerstown |
| 3, Discovery Station At Hagerstown Inc | 13, Washington County Convention & Visitors Bureau |
| 4, District Court for Washington County | 14, Washington County Arts Council |
| 5, Engine Room Art Space | 15, Washington County Chamber of Commerce |
| 6, Hagerstown City Hall | 16, Washington County Circuit Court |
| 7, Hagerstown Police Department | 17, Washington County Dep. of Social Services |
| 8, Historic City Park | 18, Washington County Historical Society |
| 9, Maryland Symphony Orchestra | 19, Washington County Playhouse Dinner Theater |
| 10, United States Postal Service | |



Figure 2. Hagerstown Key Destinations

The Hagerstown and the BPPA primary means of transport to work are shown in **Figure 3**. Auto trips make up 87% of Hagerstown commute trips. Walking comprises 4% of work trips and cycling 1%. Almost the same distribution is seen in the BPPA modes of transportation with more walking trips (6%). There is more walking and bicycling within the area than what is represented in the figures below as non-work trips. Non-work trips tend to be shorter distances such as trips to school, shop, or run other errands and tend to have higher walk and bicycle mode shares than work trips.

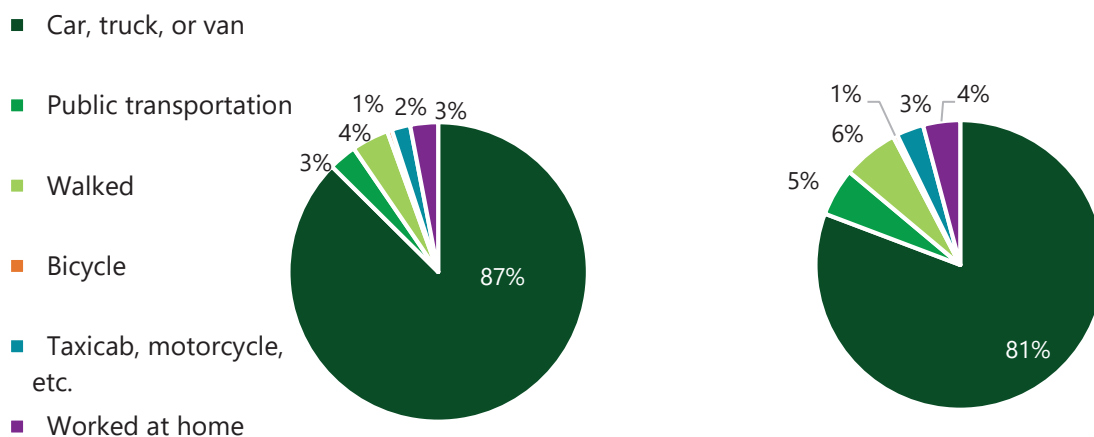


Figure 3. Means of Transport in Hagerstown

Means of Transport in BPPA

Washington County and Hagerstown City services, including County courts, Social Services, Housing Authority as well as University System of Maryland are within the Hagerstown BPPA (**Figure 2**). These services tend to generate pedestrian and bicycle traffic.

1.2 Building on Previous Work

The Hagerstown BPPA Plan builds on the previous Bicycle Master Plan (BMP). The BMP was published in 2010 and updated in 2016 to improve bicycle and pedestrian mobility and accessibility through a combination of public projects and leveraging improvements from private developments. The BMP evaluated the City's existing bicycle safety, connectivity, and policies and proposed new improvements for the next 10 years. From 2010 to 2015, the City added about 10 miles of bicycle facilities such as bike lanes, shared lane markings (sharrows), and multi-use paths.

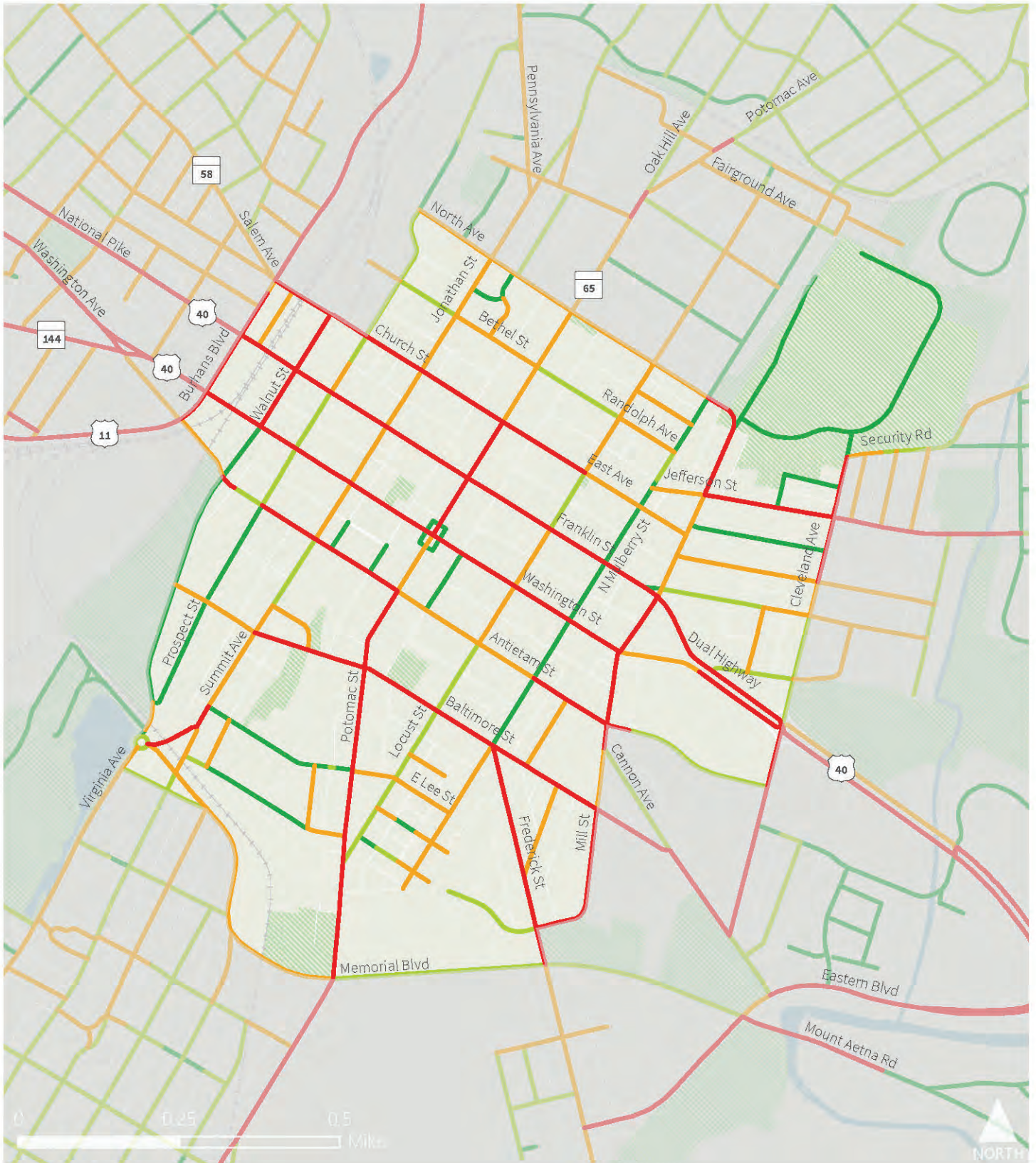
A bicycle level of service (BLOS) tool was developed and used to evaluate bicycle comfort and needs (shown in **Figure 4**). The bicycle level of service is defined based on the 2016 Bicycle Master Plan using six letter grades. A through F shows best to worst levels to approximate the quality of a roadway segment for bicycle travel. BLOS analysis is based on traffic volume (ADT), posted speeds, percent tucks, pavement condition, percent occupied parking, bicycle lane width, and width of the outside lane, number of lanes and degree of separation between cyclists and moving motorized vehicles to identify rider comfort. LOS A to B are considered very good and good, respectively. BLOS C and D are considered fair. BLOS E and F are considered poor. The BLOS results in Hagerstown are noteworthy in that no facility in Hagerstown has a

lower BLOS than LOS D but that all east-west streets through Hagerstown have all or portions that are BLOS D. The 2016 BMP contained a goal to enhance the comfort of cycling in the east-west direction in Hagerstown, something that has not yet been accomplished.

The BMP made several recommendations that have been implemented including:

- Partnering with The Maryland State Highway Administration to implement projects on state-maintained roads
- Implementing bike friendly facilities such as bike boxes
- Creation of bike routes on the Hub City Bicycle Network
- Adoption of a complete streets policy (Hagerstown adopted a Livable Streets Policy and Design Guidelines in 2015)
- Provision of bicycle parking
- Adoption of a Bicycle Advisory Committee to promote education, safety, and monitoring maintenance
- Implementation of road diets on Northern Avenue and South Burhans Boulevard to reduce the number of auto lanes and add buffered bike lanes
- Implementation of safety policy initiatives to increase awareness of pedestrians and cyclists

The BMP prioritized improvements based on proximity to schools, parks, railroads, residential, and commercial areas. The City has long been recognized as a Bicycle Friendly Community by the League of American Bicyclists and a goal of the 2016 BMP was to achieve Silver-Level status, a goal that this BPPA will further.



- A
- B
- C
- D



Bicycle Level of Comfort is based on the 2016 Bicycle Master Plan. It uses six letter grades, A through F (from best to worst), to approximate the quality of a roadway segment for bicycle travel.

Figure 4. Bicycle Level of Service

2. Existing Conditions

Downtown Hagerstown is a historic district with early 20th-century commercial architecture such as Masonic Temple, First Hose Fire Company, and the old Library. The City has a compact urban development form with a traditional grid that has been altered by couplets to increase the capacity of the major thoroughfares. US 40 was constructed in the 1930s and cut through the city in the west-east direction resulting in the high-traffic couplet of Franklin and Washington Streets and creating challenges for building east-west bikeway connections. Downtown Hagerstown roads contain many alleys where access to parking, pick up/drop off, and trash collection occur. These alleys informally serve as circulation routes to automobiles, pedestrians and cyclists.

Downtown Hagerstown has the potential to attract more non-auto trips with more reliable, comfortable, safe, and continuous cycling and walking facilities. In the section below, the City's existing roadway network, including traffic signals and on-street parking, as well as existing bicycle and pedestrian infrastructure and crash history are described in this section to understand the available facilities and opportunities for the bicycle and pedestrian network improvements.

2.1 Existing Roadways Network

Within the study area, MDOT SHA maintains US 40 (Franklin and Washington streets). All other roads are maintained by the City of Hagerstown. Road types can affect bicycle and pedestrian safety and level of service/comfort. Roads with higher speed or traffic volumes may be less comfortable for bicyclists and pedestrians. In addition, higher vehicle speeds can result in more serious injuries when crashes occur.

The Hagerstown BPPA has about 28 miles of roads with alleys, local streets, and minor collectors making up more than half the roads' lengths. Alleys, local streets and minor collectors make up more than half of the roads' lengths (**Figure 5**). Roads that cross the BPPA include City roadways US 11, MD 64, MD 65, and US 40 Alternate. These roads carry a higher traffic volume than local roads and are more likely to carry through traffic to other destination outside of the BPPA. The rest of the roads are mostly city-owned, and a few roads are privately-owned. Posted speeds through the BPPA are 30 mph or below. More than half of the roads have posted speeds of 25 mph, and one-third, mostly alleys, have 15 mph posted speeds.

Hagerstown includes a mix of one-way and two-way streets. Most of the east-west streets are two-way, however major roads including Franklin Street (westbound), Washington Street (eastbound) are one-way couplets. Other couplets are Prospect Street (southbound) and Summit Avenue (northbound), as well as North Mulberry Street (southbound) and Locust Street (northbound). Potomac Street is also one-way southbound.

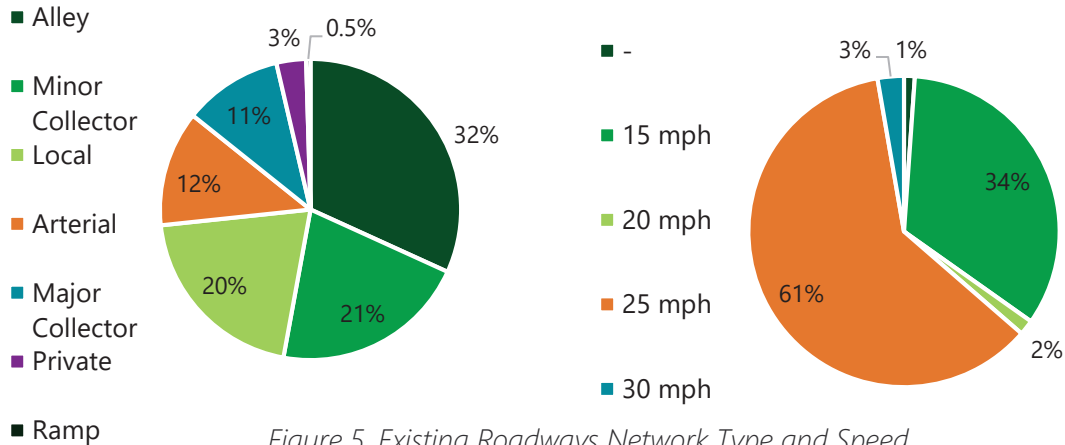


Figure 5. Existing Roadways Network Type and Speed

2.1.1 Intersection

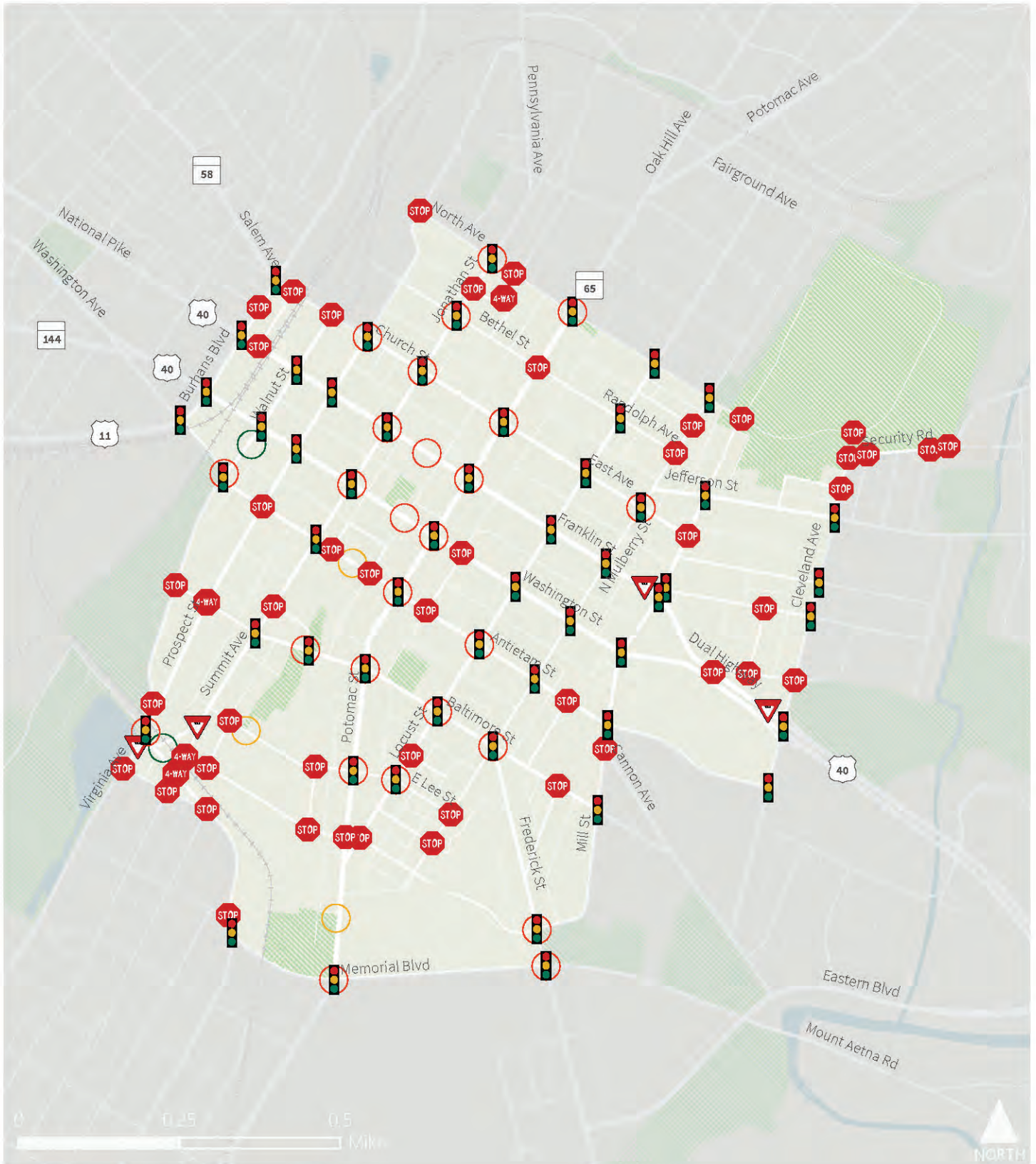
Controls

The type of intersection control plays an important role in cyclist and pedestrian safety, particularly as it relates to conflicts associated with turning vehicles. Intersections along the state roads through the BPPA are generally signalized, while local or city roads mostly have all-way stop signs or minor-street stop signs.

Most of the major intersections have pedestrian signals/indications. There are many examples of best practice pedestrian signalization including crosswalks on all approaches; use of pedestrian indication and audible pedestrian signals (for the blind); leading pedestrian intervals and stop bars in advance of the crosswalk at intersections such as at Franklin Street at Jonathan Street, Potomac Street at Antietam Street, and Baltimore Street at Locust Street. At some locations, crosswalks are enhanced by beacons and rectangular rapid flash beacons (RRFB) as shown in **Figure 6**. There are locations without traffic control, which is common for low volume intersections and effectively results in an all-way yield. One of these locations has experienced a major injury crash - Jefferson Street at Wood Street.

2.1.2 On-Street Parking

There is on-street parking on most streets throughout the BPPA road network; most streets have on-street parking on one or both sides of the street. On-street parking is important to safety because drivers tend to reduce their speeds due to side friction introduced by parking. Some of the major one-way streets with two-sided on-street parking are Prospect Street (southwest of the BPPA), Potomac Street, Washington Street, and most of Franklin Street (**Figure 7**).



- | | | | |
|--|-------------------|--|--------------------------------|
| | Signalized | | Beacon |
| | All-Way Stop | | Rectangular Rapid Flash Beacon |
| | Minor Street Stop | | Pedestrian Signal |
| | Yield | | |



Figure 6. Intersection Control Types



- 2-Sided
- 1-Sided
- None



Figure 7. On-Street Parking Map

Hagerstown is recognized as a bronze-level “Bicycle Friendly Community” (BFC) by the League of American Bicyclists (LAB), making the city one of only six jurisdictions in Maryland with BFC status. The LAB is a not-for-profit national advocacy organization and bases its BFC assessment on factors such as bicycle network mileage, public education outreach, bicycle education offerings in schools, engagement with bicycle advocates, law enforcement practices, and staffing dedicated by improving bicycling. In the future, Hagerstown aims to become one of the first silver-level communities in Maryland². Based on the 2014 LAB assessment of Hagerstown, the primary item the City can improve in working toward a silver-level designation is adding designated bicycle facilities (evaluated as a percentage of arterial streets with bike lanes and percentage of bicycle network coverage).

According to the 2016 BMP, downtown Hagerstown has a low level of comfort for biking, especially in eastbound-westbound direction, due to narrow lanes, high parking occupancy, lack of shoulder, and traffic over 15,000 vehicles per day on streets such as Franklin and Washington Streets.

The BPPA has about 11 miles of existing bicycle facilities. About 35% of bicycle network length is sharrows, where the auto lane is shared with cyclists using pavement marking, and 38% is bike lanes. Bike routes with traffic signage only and no pavement marking are about 25% of the bike network. While some of the northbound-southbound roads such as Prospect Street, Summit Avenue, and Locust Street have

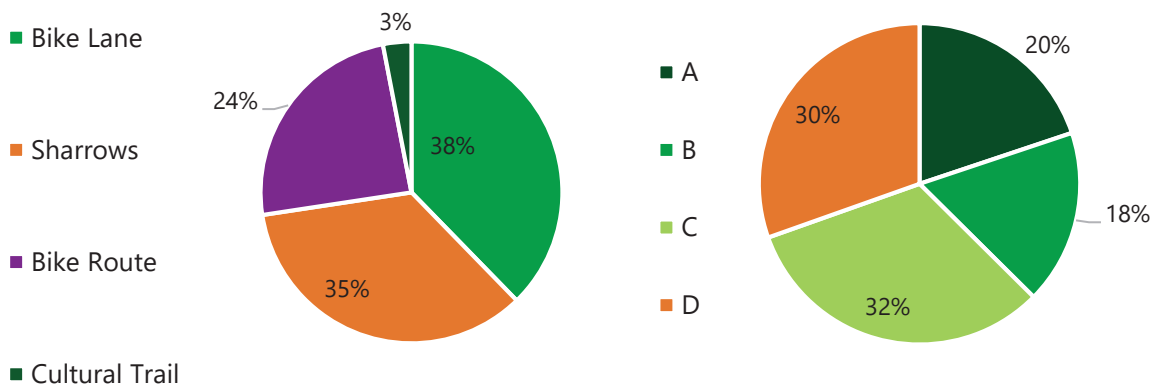


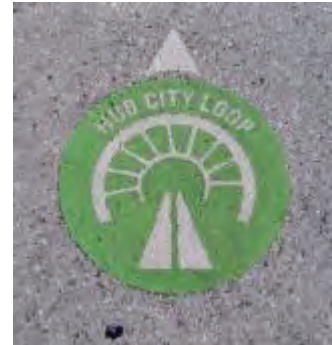
Figure 8. Bicycle Network and Level of Service in BPPA

bike lanes, there are no major roads in the east-west direction with bike lanes except East Lee Street between Summit Avenue and Potomac Street. Bicycle level of service (BLOS) is a useful tool to evaluate cycling comfort. BLOS combined with bicycle demand can identify safety concerns and network gaps where bicyclists are at risk of biking under less desirable conditions.

² City of Hagerstown – Bicycle Master Plan Update, 2016

Less than 40% of roads in BPPA are graded as A or B which are the safe and comfortable enough for more experienced cyclists, while D makes up 30% of roads with poor service for bicycle travel and safety concerns to address (**Figure 8**). Alleys, some of which can be lower stress connections, are not included in this assessment.

The Hagerstown Cultural Trail is a multi-use path that connects the north and south sides of downtown Hagerstown. Not only does it provide a safe corridor for pedestrian and bicycle travel, but it also creates a more vibrant downtown environment, and has become home to several public art installations. The Cultural Trail runs between City Park and Antietam Street, and it was developed as a public/private partnership between Herald-Mail Media, Hagerstown Housing Authority, Ellsworth Electric, and Antietam Paper. Trail crossings are decorative and include rectangular rapid flashing beacons and a full color mid-block signal and several traffic signals.



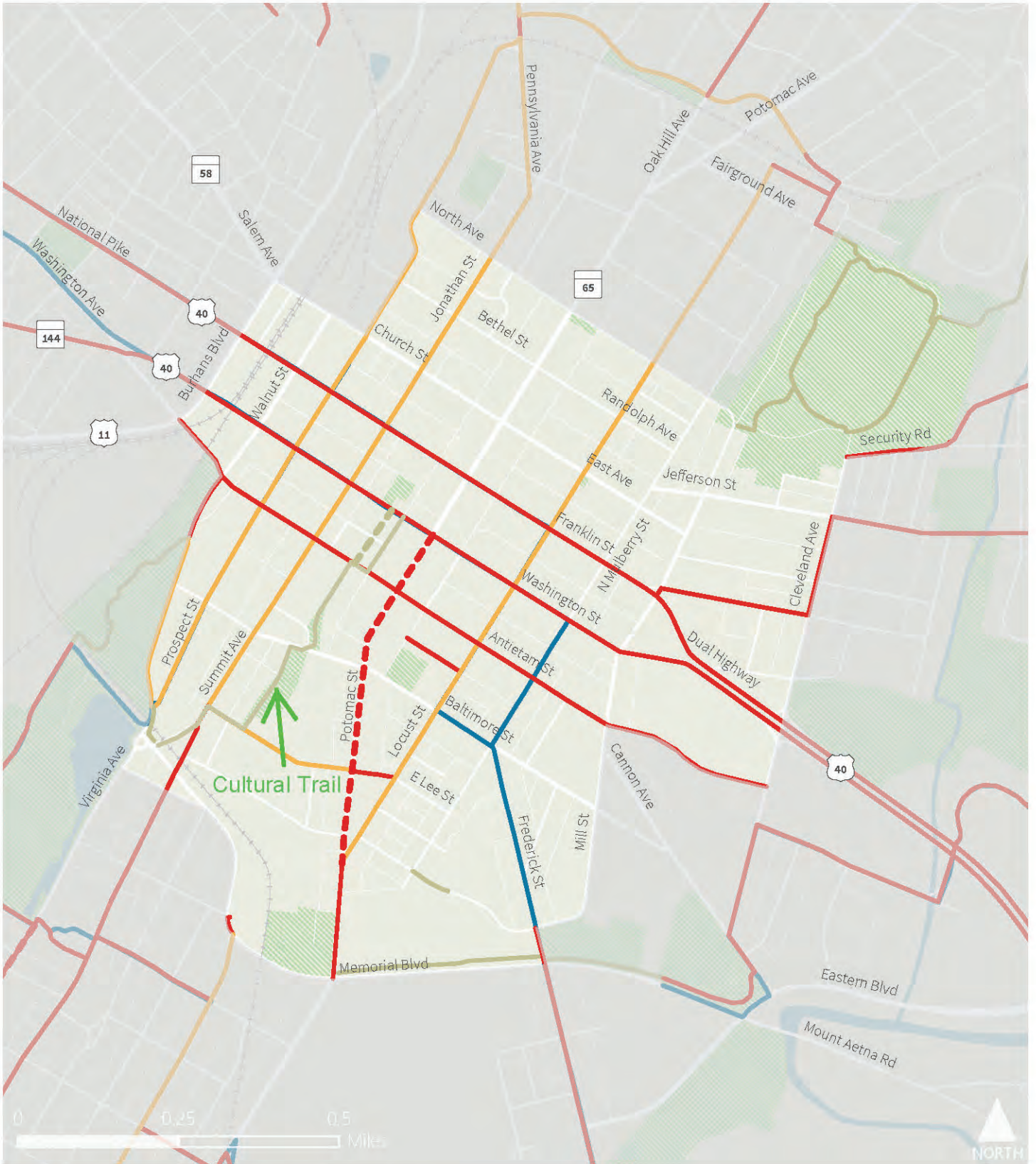
Pavement markings note the location of the Hub City Loop.

The Hub City Loop is a 10-mile bicycle route through Hagerstown (some of which is in the BPPA) that includes off-street paths, on-street bike lanes, and lanes shared with vehicles (**Figure 10**).³



A midblock crossing with high visibility and RRFBs connects two sides of Cultural Trail at Antietam Street.

³ <https://www.hagerstownmd.org/255/Bicycling>





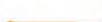

- | Existing | Proposed |
|---|---|
|  Bicycle Route |  Multi-use Trail |
|  Multi-use Trail |  Sharrows |
|  Bike Lane | |
|  Sharrows | |



Figure 9. Existing and Proposed Bikeways



Figure 10. Hub City Bike Loop

2.2 Existing Pedestrian Facilities

The sidewalk network within the study area is largely complete and the City has been diligent about repairing sidewalks that have been damaged. There are many alleys that also serve as major walking routes. Especially when considering alleys, the City's street network features short blocks that are conducive to walking as they make walking trips more direct. In the commercial core, sidewalk conditions are good with wide, mostly unobstructed walking paths, street trees, well-organized street furnishings and decorative pavers. Through many of the residential portions of the study area, the sidewalk environments are constrained by right-of-way limitations and are sometimes obstructed by utility poles, house stoops, and trash receptacles.

Among 158 intersections in the BPPA area, 57% have legal but unmarked crosswalks; 23% have marked crosswalk on all sides; and about 20% of intersections have incomplete marked crosswalks. Most of the unmarked crosswalks occur at unsignalized intersections (**Figure 11**).

2.3 Crash History

In support of the Hagerstown Downtown Bicycle and Pedestrian Priority Area (BPPA) Plan, MDOT SHA evaluated crash data for the BPPA study area covering the approximately five-year study period from January 1, 2015 through August 18, 2019. MDOT SHA provided a spatial database of bicycle- and pedestrian-related crashes for the study period. A total of 30 bicycle crashes and 87 pedestrian crashes were reported within the Hagerstown BPPA study area during the study period from 2015 to 2019. The number of crashes decreased from 29 in 2015 to 23 in 2018. Through August 18, 2019 there were nine (9) crashes in 2019; however, this is an incomplete year of crash data. The following sections summarize trends in the five- year crash history (**Figure 12**).

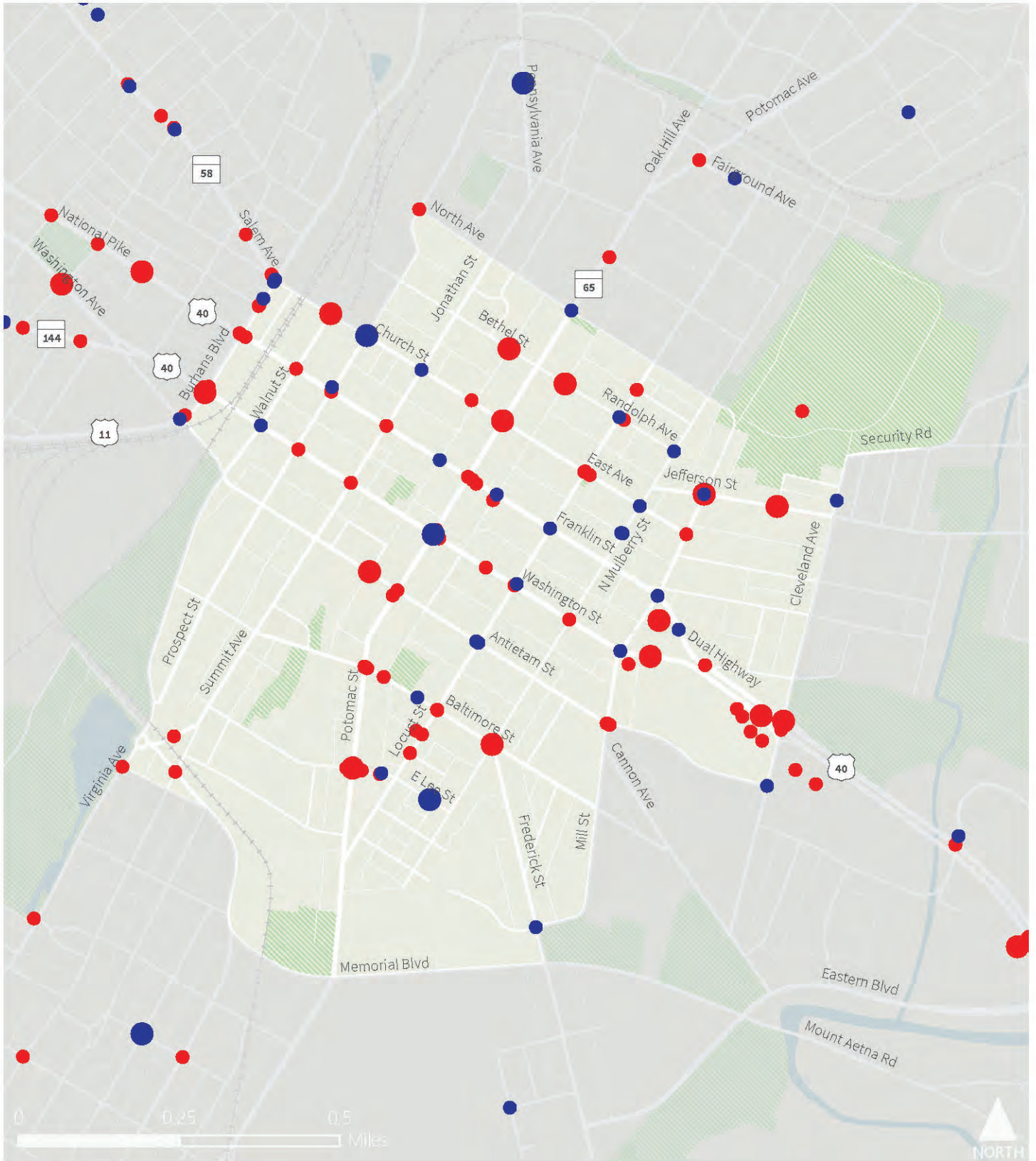


- No Crosswalk
- ◐ One-Sided
- ◑ Two-Sided
- ◒ Three-Sided
- ◓ Four-Sided

Note: Black slices show existing crosswalks per direction and blank slices show missing crosswalks per direction.



Figure 11. Existing Pedestrian Crosswalks



Pedestrian Collisions

- Fatal or Major Injury
- Minor Injury or No Injury

Bicycle Collisions

- Fatal or Major Injury
- Minor Injury or No Injury



Figure 12. Pedestrian and Bicycle Crashes

2.3.1 Crash Severity

The graphs below show the number of reported crashes by year (2015 through 2019 (2019 data is partial year) and by severity of injury of parties involved (property value only (PDO) to fatality). Two crashes resulted in fatalities to two pedestrians. Additionally, 14 reported crashes resulted in major injuries (three bicycle crashes and 11 pedestrian crashes), and another 79 reported crashes resulted in minor injuries (20 bicycle crashes and 59 pedestrian crashes). The remaining 22 reported crashes resulted in property damage only (PDO).

Figure 13 presents the severity of bicycle-related crashes by year. The number of bicycle-related crashes peaked in 2016, then fell each of the following years. Additionally, there were no bicycle-related crashes that resulted in major injuries in 2018 or 2019 (through August 18, 2019).

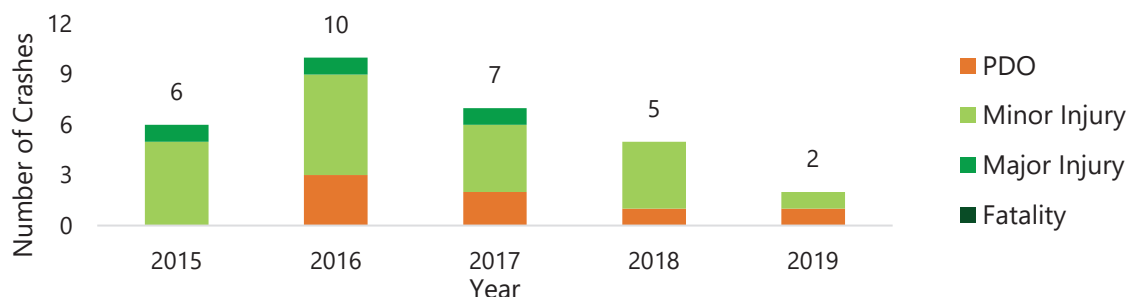


Figure 13. Bicycle-Related Crashes by Severity and Year

As shown in **Figure 14**, the number of pedestrian-related crashes was relatively constant between 18 and 23 reported crashes each year from 2015 to 2018. Through August 18, 2019, there were seven (7) pedestrian-related crashes none of which resulted in major injuries or fatalities.

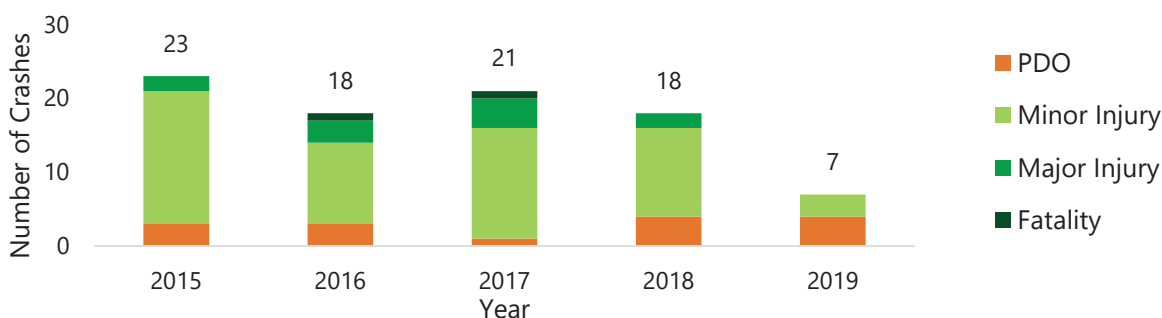


Figure 14. Pedestrian-Related Crashes by Severity and Year

It should be noted that 2019 crash data cover only a partial year; however, there were no bicycle- or pedestrian-related crashes through August 18, 2019 that resulted in major injuries or fatalities.

2.3.2 Time of Day

Approximately 57% of bicycle-related crashes occurred between the hours of 2:00 PM and 7:00 PM. Pedestrian crashes peaked during the hour between 6:00 PM and 7:00 PM. Slightly less than half (49%) of pedestrian-related crashes occurred during the evening hours between 4:00 PM and 9:00 PM (**Figure 15**). The spatial dataset for the study area did not provide detailed information about lighting conditions; therefore, it is difficult to assess whether lighting was a factor in the crashes in the early evening hours. There were no bicycle-related crashes reported during the study period during overnight hours between 10:00 PM and 6:00 AM. During these overnight hours, there were five reported pedestrian-related crashes over the study period.

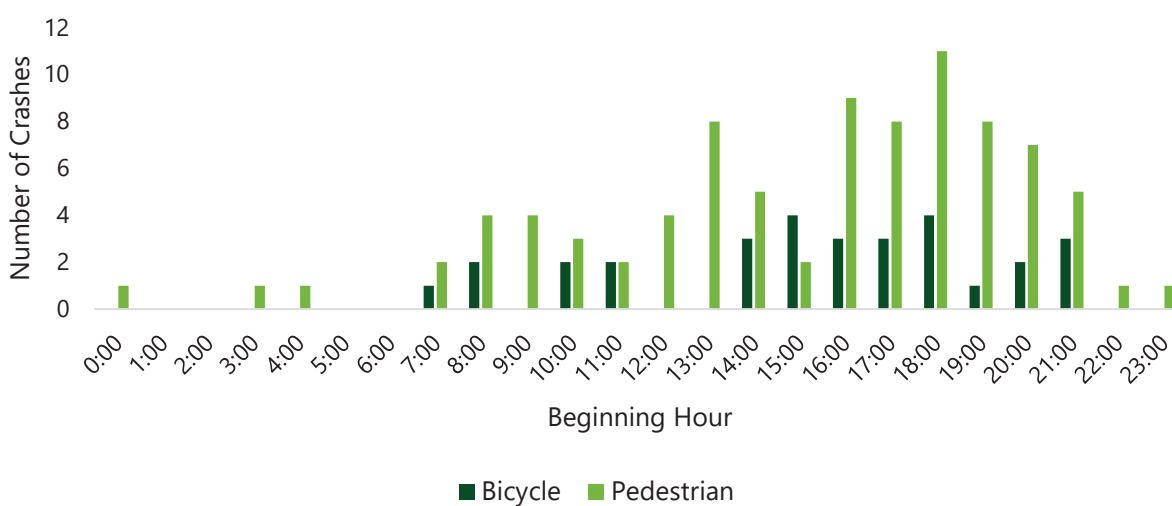


Figure 15. Bicycle- and Pedestrian-Related Crashes by Time of Day

2.3.3 Bicyclist/Pedestrian Age

Two-thirds of all reported bicycle crashes within the study area involved bicyclists between seven and 30 years old. Teenagers (ages 13 to 18) were involved in 27% of all reported bicycle-related crashes during the study period.

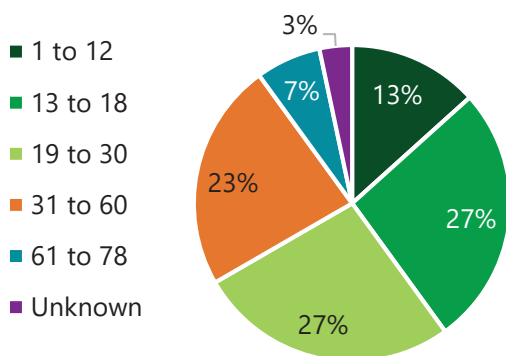


Figure 16. Bicycle-Related Crashes by Bicyclist Age

The percentage of pedestrians between 31 and 60 years old involved in police reported crashes was larger than the percentage of bicyclists in the same age range. Approximately 10% of pedestrian-related crashes involved children 12 years old or younger and another approximately 7% of pedestrian-related crashes involved seniors older than 60.

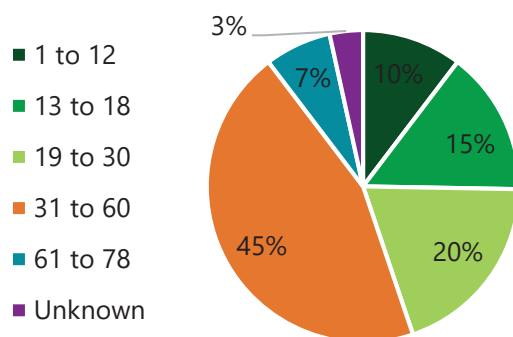


Figure 17. Pedestrian-Related Crashes by Pedestrian Age

Similar to previous noted trends, the greatest number of bicycle- and pedestrian-related crashes were among 31 to 60 year olds, accounting for 39% of all crashes that involved a non-motorist.

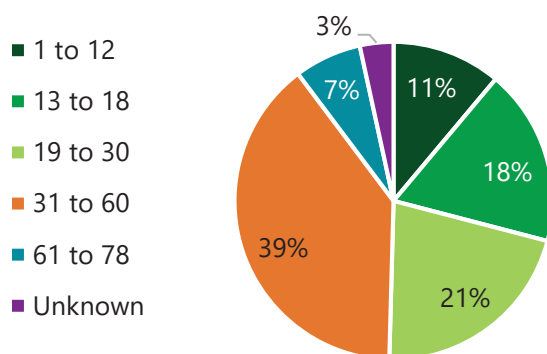


Figure 18. Bicycle- and Pedestrian-Related Crashes by Bicyclist/Pedestrian Age

2.3.4 Party At-Fault

Crash data demonstrates a need to educate bicyclists. Police determined the bicyclist was “at-fault” in more than half (approximately 57%) of reported bicycle-related crashes during the study period. Common causes for these crashes were that the bicyclist ran a red light or failed to stop at an intersection. It should be noted all “at-fault” observations are determined the responding officer.

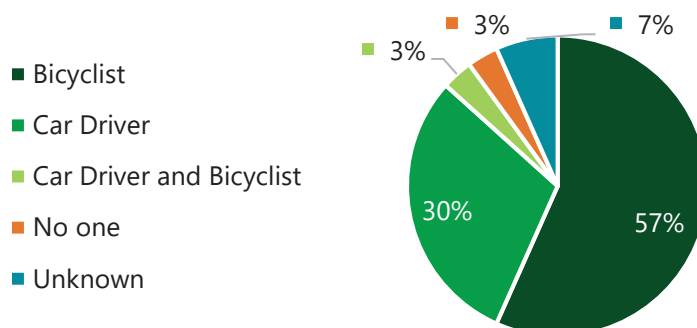


Figure 19. Bicycle-Related Crashes by Party At-Fault

A similar trend exists for pedestrian-related crashes. Police determined the pedestrian was “at-fault” in approximately 55% of pedestrian-related crashes during the study period. The cause was cited as the pedestrian stepping, running, jumping, or darting into the street for 26 of the 87 total police reported pedestrian-related crashes. Other crash causes for which the pedestrian was determined to be “at-fault” included pedestrians crossing not at a crosswalk or initiating contact with the vehicle. As noted above, the party “at-fault” is determined by the reporting officer and in some instances different officers may assign fault to different parties. For example, some officers may consider unmarked crosswalks or crosswalks that do not have pedestrian signals to be “not at a crosswalk” where others would recognize this as a legal crossing location.

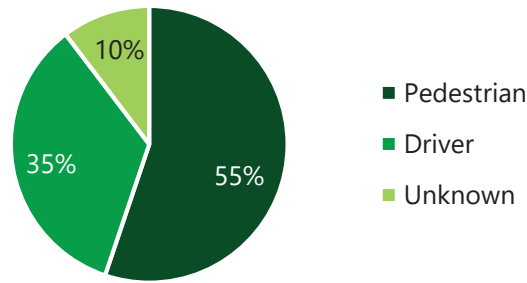


Figure 20. Pedestrian-Related Crashes by Party At-Fault

As noted above, party at-fault data should be viewed critically but seems to indicate that pedestrian and bicycle education could be beneficial as the driver was determined to be “at-fault” in only one-third of all bicycle- and pedestrian- related crashes. Common driver-related causes were drivers turning into bicyclists or striking pedestrians that were crossing the street.

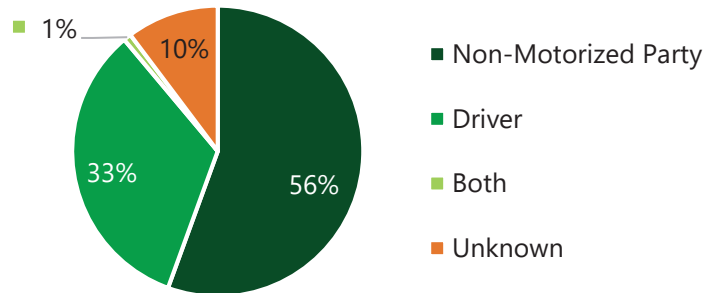


Figure 21. Bicycle- and Pedestrian-Related Crashes by Party At-Fault

2.3.5 Bicycle-Related Crash Trends

2.3.5.1 Infrastructure

Nearly three-quarters of bicycle-related crashes occurred in locations where there was not a bicycle lane, “sharrow” markings, or a crosswalk. It should be noted from above that the bicyclist was determined to be “at-fault” in more than half of police reported crashes and the common cause was bicyclists not stopping at the intersection. The addition of bicycle lanes and sharrows would be expected to draw more attention to the presence of bicyclists and may reduce the occurrence of crashes due to vehicles sideswiping bicycles, parked cars opening doors into bicyclists, or vehicles turning into bicycles at intersections.

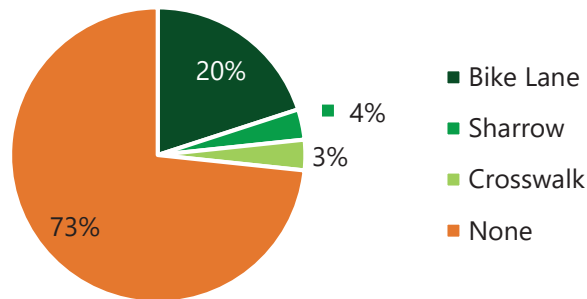


Figure 22. Bicycle-Related Crashes by Bicycle Infrastructure

All three of the bicycle-related crashes that resulted in major injuries during the study period were at locations where there was no bicycle infrastructure. Similarly, 65% of the bicycle-related crashes that resulted in minor injuries (13 of 20) occurred at locations where there was no bicycle infrastructure.

Table 1. Bicycle-Related Crashes by Infrastructure and Severity

Infrastructure	Fatality	Major Injury	Minor Injury	PDO	Total	% Fatal/Major Injury
Bike Lane	0	0	5	1	6	0%
Sharrow	0	0	1	0	1	0%
Crosswalk	0	0	1	0	1	0%
None	0	3	13	6	22	14%
Total	0	3	20	7	30	10%

2.3.5.2 Helmet Use

The vast majority, 87%, of police reported bicycle-related crashes during the study period, the bicyclist was not wearing a helmet.

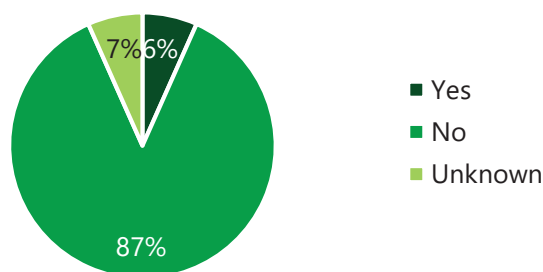


Figure 23. Bicycle-Related Crashes by Helmet Use

Of the bicycle-related crashes in which the bicyclist was wearing a helmet, or helmet use was unknown, only half resulted in minor injuries, with the other half resulting in PDO. In contrast, of the police reported bicycle-related crashes in which the bicyclist was not wearing a helmet, approximately 81% resulted in injuries (major or minor), and 12% results in major injuries. Although a much lower number of crashes

occurred in which the bicyclist was wearing a helmet, or helmet use was unknown, these findings are consistent with numerous past research efforts that indicate that helmet use is expected to reduce the severity of crashes.

Table 2. Bicycle-Related Crashes by Helmet Use and Severity

Helmet Use	Fatality	Major Injury	Minor Injury	PDO	Total	% Fatal/Major Injury
Yes	0	0	1	1	2	0%
No	0	3	18	5	26	12%
Unknown	0	0	1	1	2	0%
Total	0	3	20	7	30	10%

2.3.6 Pedestrian-Related Crash Trends

2.3.6.1 Crosswalks

Approximately 70% of pedestrian-related crashes occurred when pedestrians were not at a crosswalk, according to police reports. Crosswalk markings provide guidance for pedestrians by defining the paths where pedestrians are expected to cross. Crosswalks are typically marked where there are pedestrian generators, such as schools and biker/hiker trails, or where pedestrian crossings might be unexpected, but they are not marked everywhere. For example, crosswalks may not be marked where vehicular traffic stops, either at a stop sign or at a traffic signal that does not include pedestrian signals. Note that the legal definition of a crosswalk is the extension of a sidewalk (precise language is “within the prolongation or connection of the lateral lines of sidewalks...” Maryland SHA Bicycle and Pedestrian Design Guidelines) through an intersection, regardless of whether the crosswalk is marked and that drivers are required to yield to pedestrians at marked and unmarked locations. Police officers may not consistently report crashes as “at a crosswalk” if the crosswalk was not marked. Additionally, the spatial dataset did not contain sufficient information to determine whether pedestrians were crossing at a location with pedestrian signals, and if so, whether those signals were providing a walk indication when the pedestrian was struck.

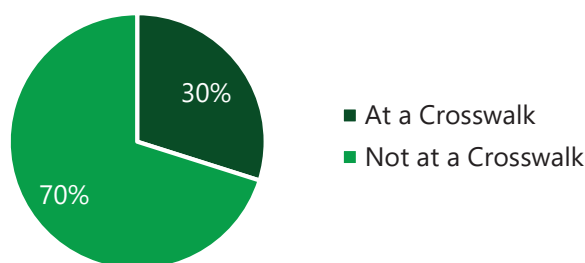


Figure 24. Pedestrian-Related Crashes by Crosswalk Location

The percentage of pedestrian-related crashes that resulted in fatality or injury (major) is much higher for crashes occurring outside of a crosswalk (20% relative to 4%).

Table 3. Pedestrian-Related Crashes by Crosswalk Location and Severity

Crosswalk Use	Fatality	Major Injury	Minor Injury	PDO	Total	% Fatal/ Major Injury
Yes – At a Crosswalk	0	1	20	5	26	4%
No – Not at a Crosswalk	2	10	39	10	61	20%
Total	2	11	59	15	87	15%

3. Stakeholder Workshop

The Hagerstown BPPA workshop took place on October 17, 2019, at Hagerstown City Hall. The main parts of the workshop were an overview of the BPPA program; review of existing conditions; feedback on recent projects; a walking tour; development of a wish list of improvement; and a discussion of next steps.

Workshop participants represented several agencies including MDOT SHA, the City, Hagerstown/Eastern Panhandle MPO (HEPMPO), Washington County Health Dept (WCHD), Hagerstown Bicycle Advisory Committee (HBAC), residents, Bester Community of Hope, as well as consulting companies of RK&K and Fehr & Peers DC.

The workshop started with a question to stakeholders "What is one outcome you're looking for from this plan?" BPPAs are intended to align local and state bicycle and pedestrian connectivity goals; to develop the BPPA plan in a collaborative approach that helps local and state transportation agencies overcome impediments to bicycle and pedestrian travel. BPPA plan development includes: facilitating state, local, and stakeholder coordination; Identifying roadway geometric and operational recommendations to align state and local bicycle and pedestrian planning; and determining feasibility of a proposed bicycle and pedestrian treatments in adopted planning documents.

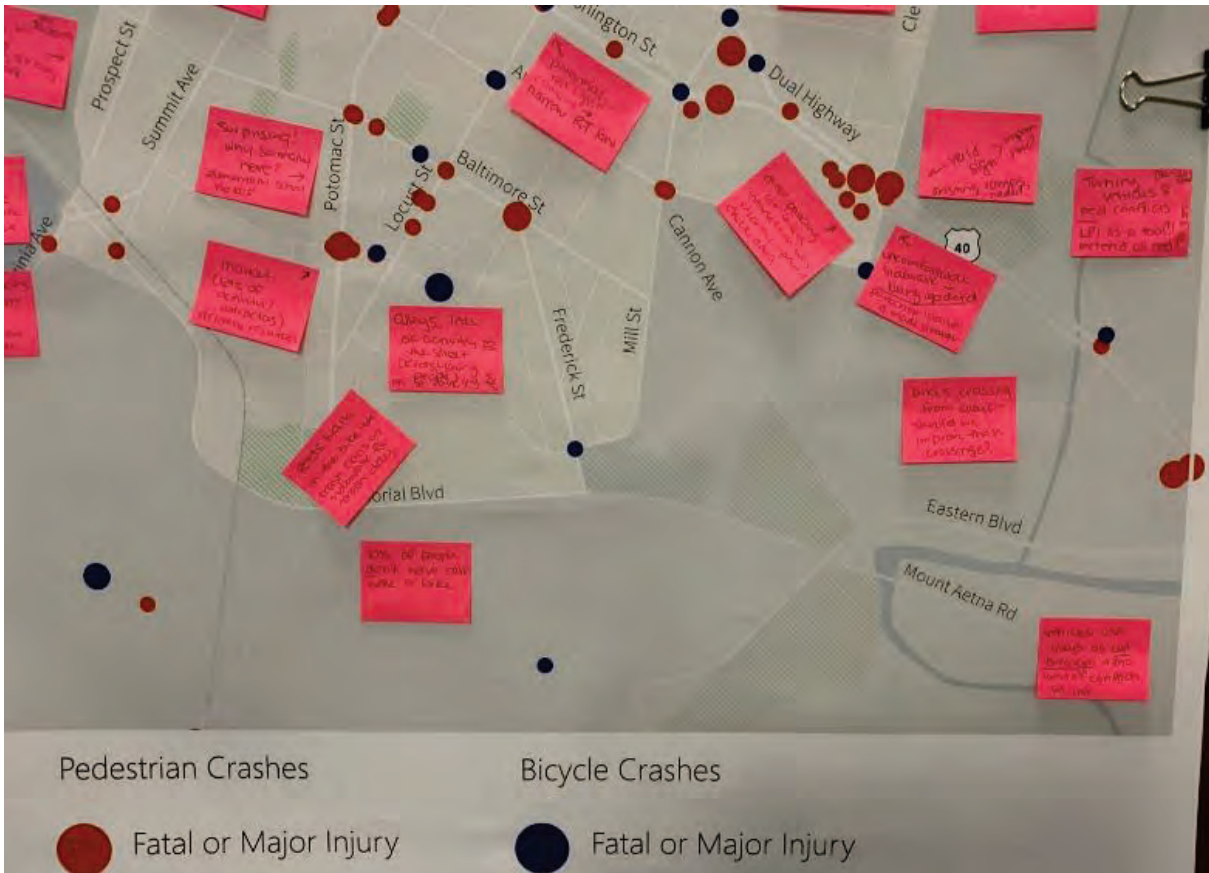
Crash data (presented in the prior section of this report) were summarized in the workshop.

The City presented on recent projects implemented in Hagerstown with the intent of improving bicycle and pedestrian safety. These include the improvements listed below:

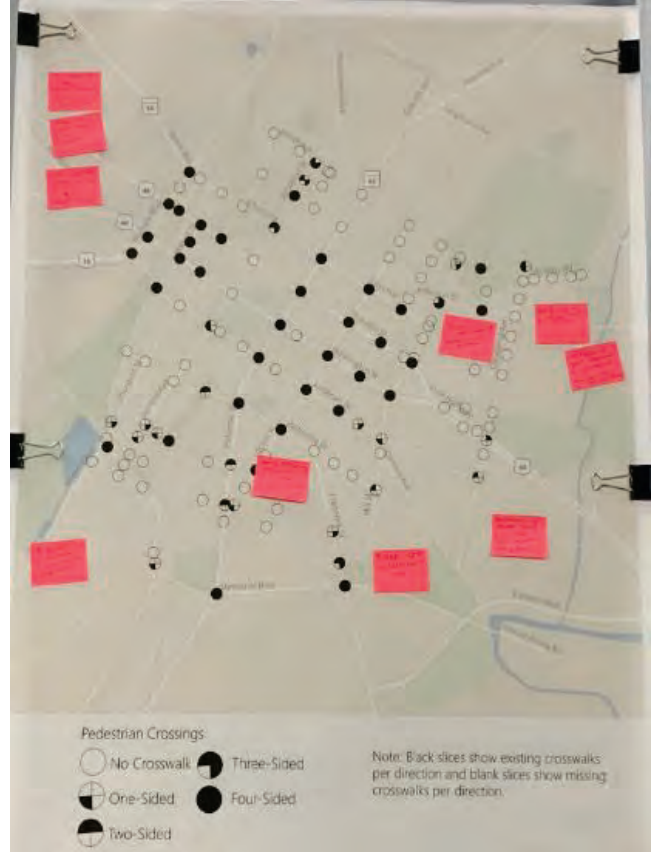
- Park Circle Islands and Crosswalks
- Antietam Street at Walnut Street Accessibility
- Prospect Street Bike Lane
- Prospect Avenue Bike Box
- Cultural Trail Crosswalks and Beacons
- "STOP" for pedestrian signs
- Walnut Towers Mid-Block Crosswalk

Tools and countermeasures were discussed using a set of maps including existing and proposed infrastructure, bicycle level of service (BLOS), crashes, future pavement projects along Locust Street and North Avenue, as well as tree damaged sidewalks. During the workshop, attendees provided their feedback on each map.

The second part of the workshop was a walking tour in downtown (**Figure 25**) to observe several corridors and to identify successes and opportunities for improvement. After the workshop the consultant team of RKK and Fehr & Peers DC conducted a field visit to review areas discussed in the workshop.



Close up of workshop map and attendee mark ups



Marked up maps from workshop attendees



Floor Map and Workshop Presentation

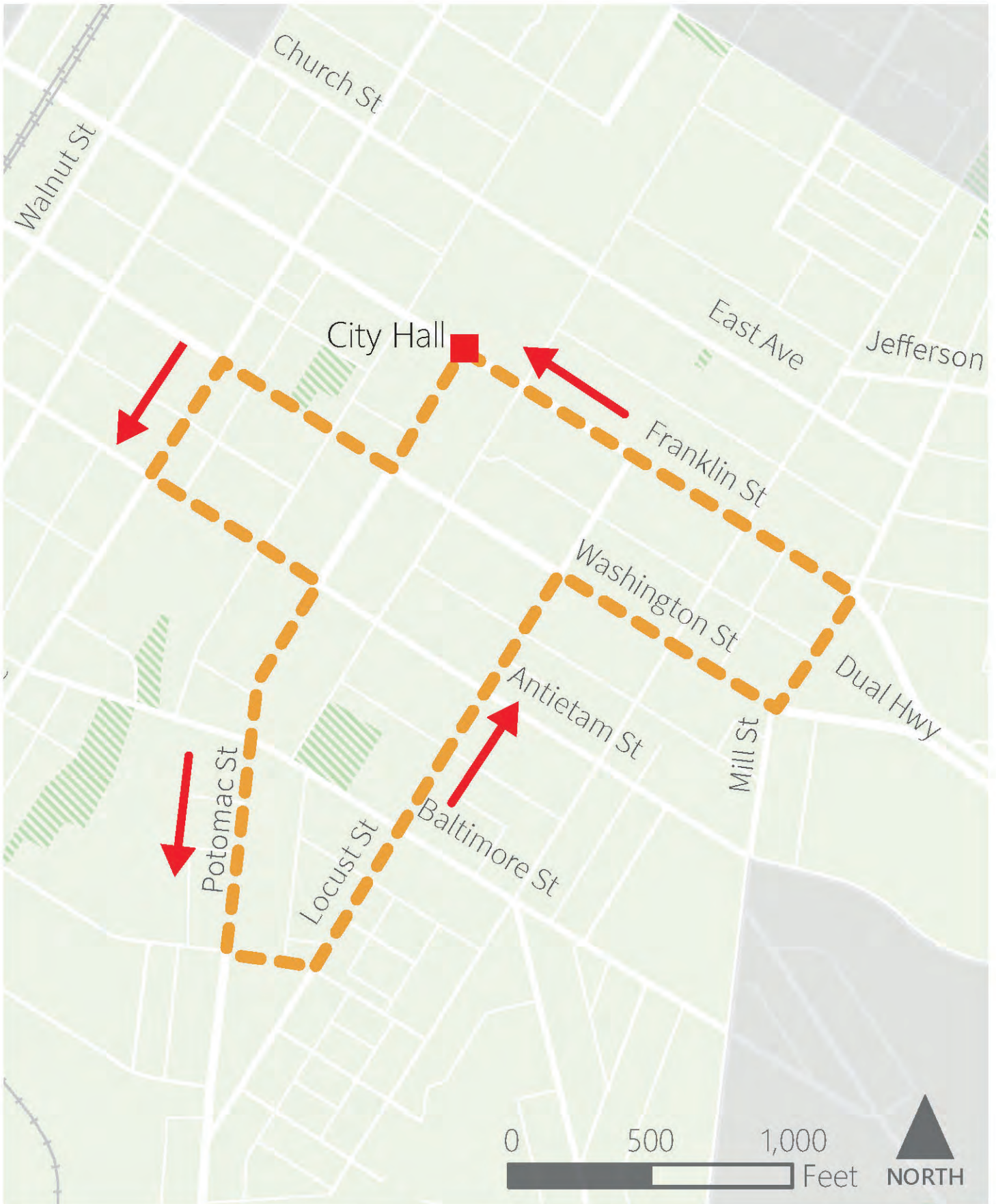
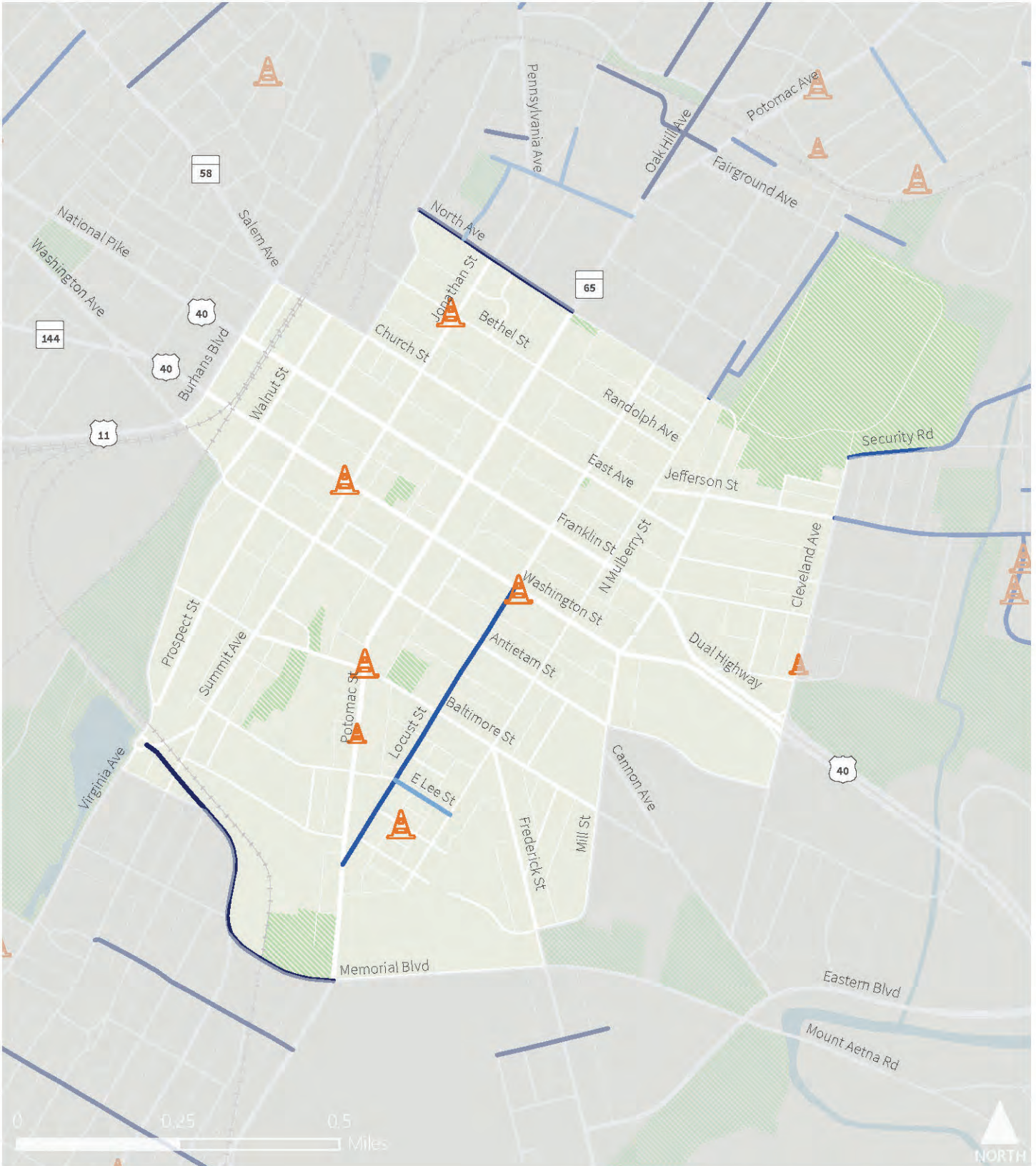


Figure 25. Walking tour map



Workshop attendees on walking tour



- 2020
- 2021
- 2022

A year indicates the time each paving project was expected to advance. Many have been implemented sooner than anticipated

4. Recommendations

The purpose of this BPPA plan is to identify strategies to improve bicycle and pedestrian connectivity and comfort in downtown Hagerstown. This section outlines two sets of recommendations. The first set of recommendations are site-specific improvements, and the second set are more generalized best practices that could be applied in multiple locations throughout the BPPA.

The improvements recommended in this report are conceptual and/or programmatic best practices. Additional evaluation is recommended to determine feasibility prior to implementation, engage the local community and establish cost and budget prior to implementation. These evaluations could include traffic operations analysis, review of crash records, base maps noting utility and other obstacles, improvement designs, specifications and cost estimates, community outreach.

4.1 Site-Specific Recommendations

Seven projects have been identified for site-specific improvements.

- Potomac Street Road Diet (Baltimore Street to Sycamore Street)
- Potomac Street at Baltimore Street Intersection Improvements
- Potomac Street at Lee Street Intersection Improvements
- Potomac Street at Locust Street Intersection Improvements
- Washington Street and Franklin Street Speed Management (East of Cannon Avenue)
- Dual Highway at Cleveland Avenue Intersection Improvements
- Bikeway between Franklin Street and Washington Street

As proposed improvements advance, interim or experimental approvals shall be reviewed and approved through the MDOT SHA Office of Traffic and Safety Traffic Development and Support Division (OOTSD). This includes Rectangular Rapid Flashing Beacons, green colored pavement, bike signals, bike boxes, sharrows with green pavement, and two stage left turn boxes.

This BPPA does not contain a prioritization of site-specific recommendations as additional feasibility, engineering, and cost/benefit analysis would be needed. The following improvements would most improve conditions for pedestrians and bicyclists in Hagerstown:

- Improvements to Dual Highway, including adding new signalized pedestrian crossings east of the McDonalds would improve safety and accessibility and afford the largest benefits to vulnerable populations
- The conversion of Wareham Alley (running east-west between Franklin and Washington Streets) would provide a low stress east-west bicycle connection (and enhance pedestrian circulation), something for which no other solution has been found.

- Intersection improvement at Potomac Avenue at Baltimore Street present the greatest opportunity and an easy win (relatively low cost, high-impact improvement, especially if done with a tactical urbanism approach) to enhance safety within Hagerstown.

These and other improvements are described in the section below. Creating a more formal set of priorities could follow these steps:

- 1) Solicit input on viability – Discuss potential improvements with local committees and commissions and determine interest/enthusiasm.
- 2) Determine feasibility – Additional engineering and cost estimating should be conducted for those improvements that would require civil engineering interventions. Many of the suggested improvements would require approval of MDOT SHA.
- 3) Gauge support – A final step in the process could be to solicit opinions on prioritization from elected and appointed officials in Hagerstown and the general public. This could be done through a workshop process, on-line survey, or gamification exercise.

4.1.1 Potomac Street Road Diet (Baltimore Street to Sycamore Street)

Potomac Street is a southbound one-way street through downtown Hagerstown. North of Lee Street, Potomac Street includes two southbound lanes. Between Lee Street and Sycamore Street (one block), Potomac Street narrows to one lane and then continues southbound. At Locust Street, Potomac Street becomes two-way with one lane in each direction. This project would include narrowing Potomac Street to one lane sooner – at Baltimore or Lee Street – with the intent of reducing speeds. Note that no capacity analysis has been conducted for this segment, but given that the roadway already transitions to one lane immediately to the south and that no congestion is reported in the one-lane section that likely has comparable volumes, it is likely that one lane is sufficient to meet travel demand. In addition, given the current one-block merge, there are often speeding issues as drivers jockey for position. The following images depict Potomac Street under existing conditions.

A narrower street will shorten crossing distances for pedestrians at Lee Street. In addition, reducing the number of vehicle lanes provides opportunities to improve facilities for pedestrians. Given there are north-south bike lanes one block away on each side of Potomac Street (Summit Avenue and Locust Street), bike lanes are not a priority for the reclaimed space.

For pedestrians, the sidewalk could be formally widened, or the pedestrian area could be extended into the street through the use of planters, wheel stops or flex posts as lateral buffers. If flex posts are preferred, an on-street parking demand survey is recommended. No parking occupancy data is available at the time of this report, but if the parking is generally well-utilized, bollards will likely provide enough of a barrier between pedestrians and motor vehicles traveling along Potomac Street. If the parking is not well-utilized, pedestrians may feel exposed or unsafe without a more formal barrier between them and moving traffic.

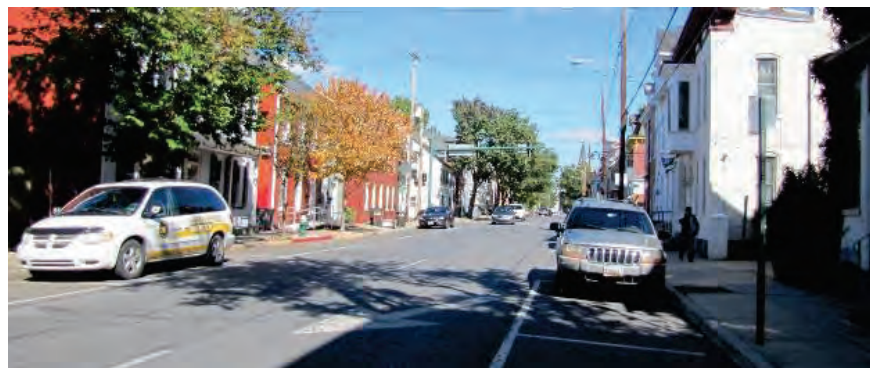
The reclaimed space, which represents 8 to 10 feet as shown in the cross-section image below, could also be used for a community arts project, stormwater management facilities, and/or dedicated corrals for resident’s trash cans.



Potomac Street between Baltimore Street and Locust Street.



Potomac Street as two lanes north of Lee Street.



Potomac Street shifts from two lanes to one lane between Lee Street and Sycamore Street.



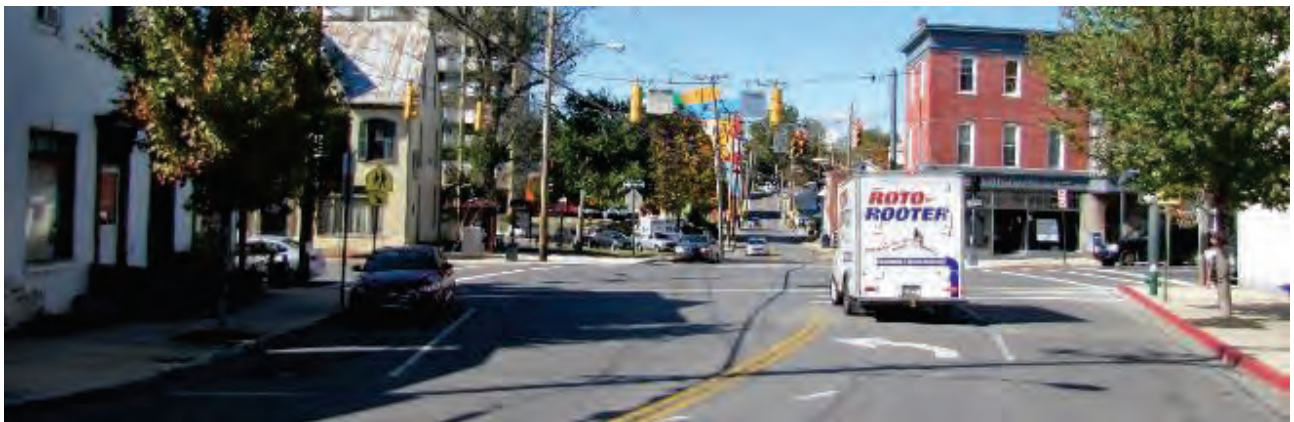
Potomac Street as one lane as it approaches Sycamore Street.

4.1.2 Potomac Street at Baltimore Street Intersection Improvements

In the southern portion of the BPPA, Potomac Street intersects with Baltimore Street. Potomac Street runs one-way southbound, while Baltimore street is a two-way street running east-west. The intersection is signalized and includes a protected left-turn phase for eastbound vehicles on Baltimore Street. There are crosswalks on all legs of the intersection, and there are pedestrian signals heads with countdown timers at all four corners. The southwest corner is home to newly constructed transit shelters.

Between January 2015 and August 2019, four pedestrian crashes occurred at this intersection, all involving left-turning vehicles. In two instances, the pedestrian was struck by a vehicle making a southbound left turn from Potomac Street onto Baltimore Street while the pedestrian had a walk signal across Baltimore Street (during a permitted left-turn phase). The other two crashes occurred during the protected left-turn phase, with pedestrians crossing Potomac Street when they did not have the signal to do so. Of these crashes, two resulted in minor injuries and two resulted in no injuries.

As depicted in the aerial and photo below, the westbound approach along Baltimore Street is far wider than the receiving lanes west of the intersection. This results in skewed crosswalk design and a long pedestrian crossing along the east crosswalk leg. Not only are there pedestrian challenges to this intersection design but it also is an unconventional experience for drivers - vehicles traveling westbound through the intersection must track left in order to end up on the receiving lane west of the intersection.



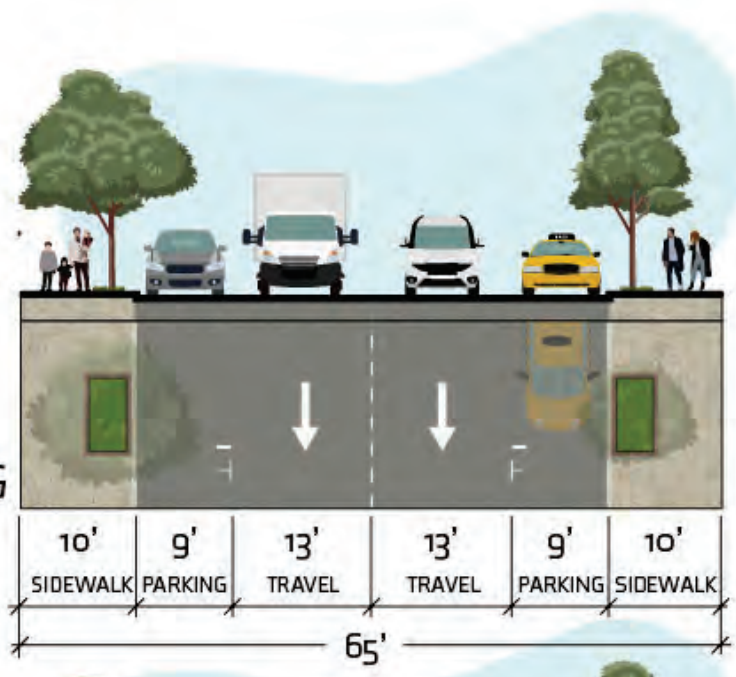
Super wide two-way two-lane Baltimore Street intersects with Potomac Street.

To improve the intersection, it is recommended that both the northeast and southeast corner curbs be modified, either through soft-scaping (flex posts, striping and the like) or hardscaping (raised curbs and the like). In response to the updated curbs, the crosswalks would be realigned. This adjustment would maintain sufficient right-of-way for both the existing westbound left-turn and through lanes, but it would improve safety and comfort for travelers through the intersection. The sketch concept below depicts roughly what the new intersection design could look like.

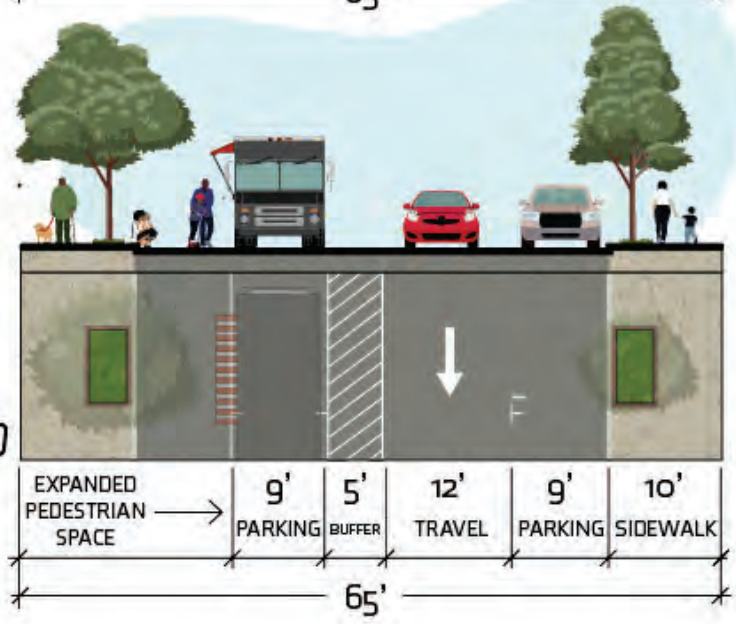
In addition, the reclaimed right-of-way could be developed into a stormwater management project and provide room for ADA ramps that could prevent the need for utility and pole relocation. If signals are not pre-timed, special consideration of push button placement should be taken.

Potential Potomac Street Road Diet Cross-Section

EXISTING



PROPOSED





Satellite image shows Potomac Street at Baltimore Street intersection.



Extending the curb and reducing the crossing distance will improve pedestrian safety and visibility.

4.1.3 Potomac Street at Locust Street Intersection Improvements

South of Locust Street, Potomac Street is a two-way roadway with one lane in each direction. At Locust Street (a one-way northbound street), Potomac becomes a one-way southbound street. The streets intersect at an acute angle, forming a point. There is a cut-through (and resulting porkchop island) just north of the point.

While there is no history of crashes at this location, pedestrians do cross Potomac Street, Locust Street, and the cut-through to access the Locust Point Market and other destinations. There was previously a crosswalk across Locust Street just north of the cut-through. However, drivers utilizing the cut-through had limited time to react when a pedestrian was in the crosswalk. As a result, the crosswalk was moved north to Ray Street (visible in the top of the below satellite image).

The intersection is not signalized, nor are there marked pedestrian crossings. The only permitted movement for northbound travelers on Potomac Street is to continue onto Locust Street. Southbound travelers on Potomac Street may continue southbound along Potomac Street, or make a hard left turn (nearly 180 degrees) into northbound Locust Street.

Two improvements are recommended for future study. Study should include a review of the number of users of the cut-through and, if possible, determining routes they would use if the cut-through were eliminated and working with business owners and residents on changes to traffic flow and parking.

- **Closed Cut-Through with High Visibility Crosswalks:** By closing the cut-through to vehicle traffic, Hagerstown can create a small community meeting space in front of Locust Point Market. This space could be filled with chairs or picnic tables for residents or market patrons. In addition, high-visibility crosswalks are recommended across both Potomac Street and Locust Street, providing a direct crossing across the two roadways. The high-level concept included below provides an example of what revised intersection alignment could look like; a 2-stage crosswalk allowing pedestrians to cross a single lane of traffic.
- **Curb Extension on Locust Street:** Alternatively, or as an additional improvement, a curb extension could be added to the right side of Locust Street where the road curves. By narrowing the lane and shadowing the on-street parking on Locust Street, the movement would feel more constrained for vehicles, requiring them to travel at a slower speed.



Satellite image shows Potomac Street and Locust Street



Closing the cut-through could improve pedestrian safety.



Pedestrians are crossing at Potomac Street and Locust Street.



Lack of crossing marking or signage at Potomac Street and Locust Street can be a potential safety risk.

4.1.4 Potomac Street at Lee Street Intersection Improvements

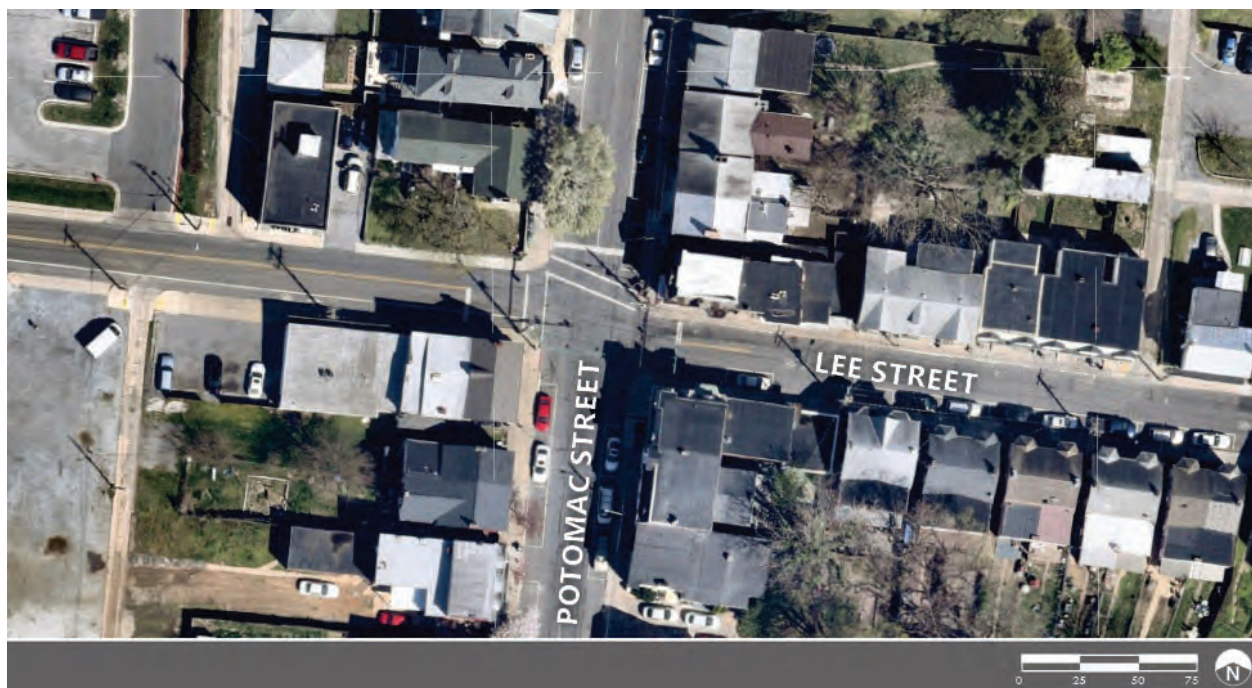
In the southern portion of the BPPA, Potomac Street intersects with Lee Street. Potomac Street runs one-way with two lanes southbound, while Lee Street is a two-way street running east-west. There are two marked crosswalks, across the west and north intersection legs. The intersection is signalized, with pedestrian heads on three corners (southwest, northwest, and northeast corners) for pedestrians in the marked crosswalks.

Between January 2015 and August 2019, six pedestrian crashes occurred at this intersection, resulting in five minor injuries (one crash resulted in no injuries).

At this intersection, several improvements are recommended to improve pedestrian safety:

- Marked crosswalks, with continental striping, where they are currently not present
- Pedestrian signal heads where they are currently not present
- Curb extension on the southeast corner

The curb extension should be designed conscious of the right-of-way and drainage constraints, and it could be designed as stormwater management infrastructure for dual benefits of safety and environmental sustainability.



Satellite image shows Lee Street and Potomac Street showing incomplete crossing at the intersection.

4.1.5 Washington Street and Franklin Street Speed Management (East of Cannon Avenue)

Washington Street is a one-way eastbound street, part of an east-west couplet with Franklin Street, a one-way westbound roadway. Washington Street and Franklin Street cross Cannon Avenue at the eastern edge of downtown Hagerstown, as the roadway transitions from a dense urban street to a high-speed arterial. Not only are there fewer intersections, but the street frontage shifts from tightly packed street-facing homes and businesses to dispersed commercial uses set behind parking lots or several feet from the street.

The intersection of Washington Street and Cannon Avenue is signalized, and there are marked crosswalks on all four crossings. For eastbound vehicles on Washington Street, there is limited sight distance when approaching Cannon Avenue, as Cannon Avenue is the top of a small hill (see photo on the following page).

Between January 2015 and August 2019, there were two crashes just east of the intersection in the right-side shoulder. Both crashes involved a hit and run. The crash involving a bicyclist resulted in a minor injury, while the crash involving a pedestrian resulted in a fatality.

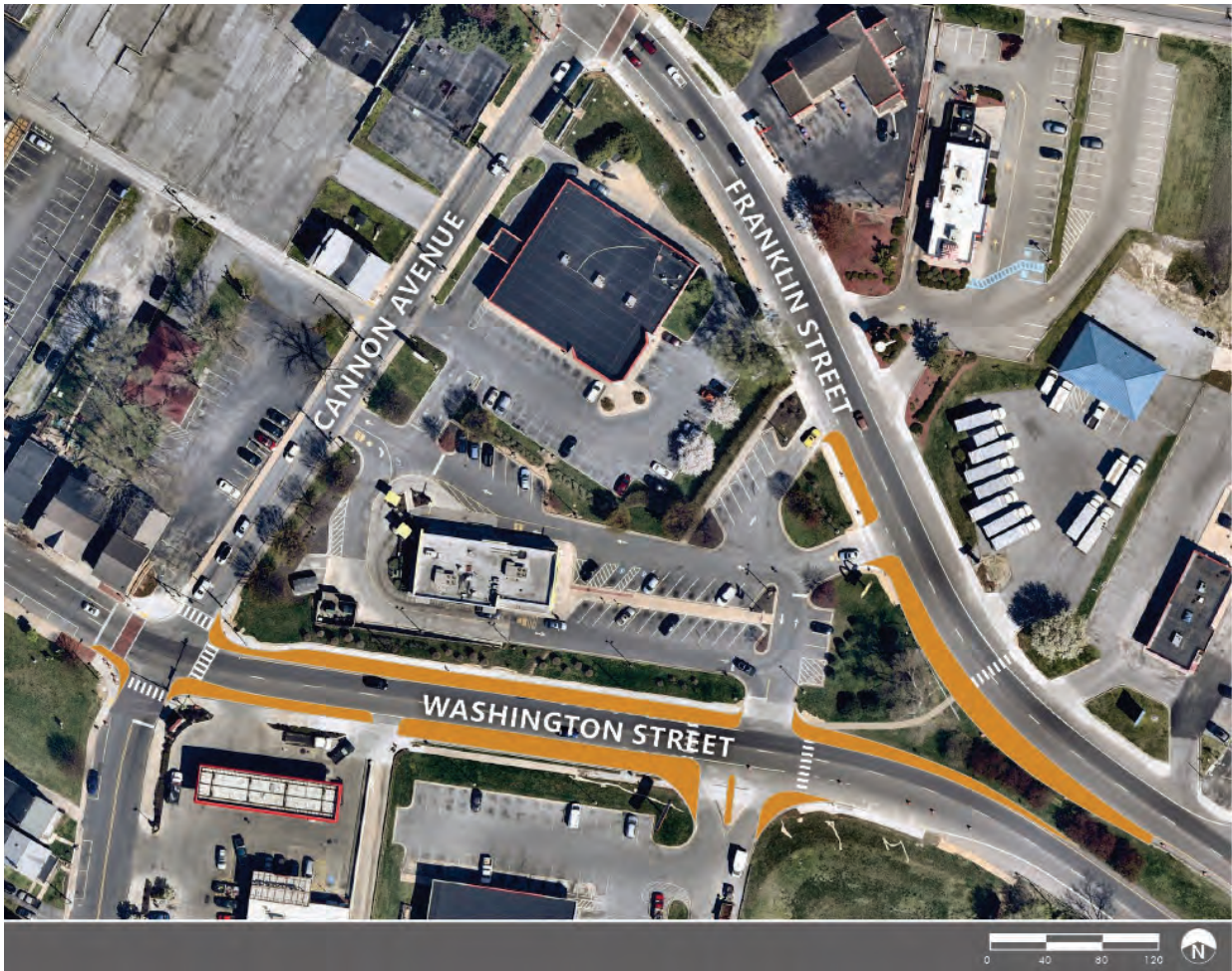
While drivers may anticipate seeing pedestrians on the grid network west of Cannon Avenue, they may not expect to see pedestrians or bicyclists east of Cannon Avenue. The change in block size, fronting improvements, and built form, like building set back from the street, creates a sense that this is an auto-centric place. The sidewalk gap in this area is likely contributing to pedestrians crossing the street through desire lines are also a factor. However, there are several destinations south of Washington Street, north of Franklin Street, and between the two streets that people travel to on foot or by bicycle. To address the safety concerns through this area, the following improvements are recommended:

- Add pedestrian signal heads with countdown timers at intersection of Washington Street and Cannon Avenue.
- Continue context and right-of-way configuration from downtown to east of Cannon Avenue by extending the formal curb to create a wider pedestrian space including both a widened sidewalk and planter strip with trees. These adjustments will adjust driver expectations of how fast they should be moving through the corridor.
- Add mid-block crosswalks, one for each direction of Dual Highway, along pedestrian desire lines. By slowing vehicle traffic through the extension of the urban context, a midblock crosswalk becomes a viable option for this corridor. Given the vehicle volumes on Washington Street and Franklin Street, additional treatments such as a signalization are likely to be warranted at this location.



Satellite image shows Washington Street east of Cannon Avenue intersection.

Maintaining an urban context east of Cannon Avenue will slow vehicles and improve bicycle and pedestrian safety





At East of Cannon Avenue, the roadway context changes from a dense grid with mainly mixed-use development to a high-speed arterial.



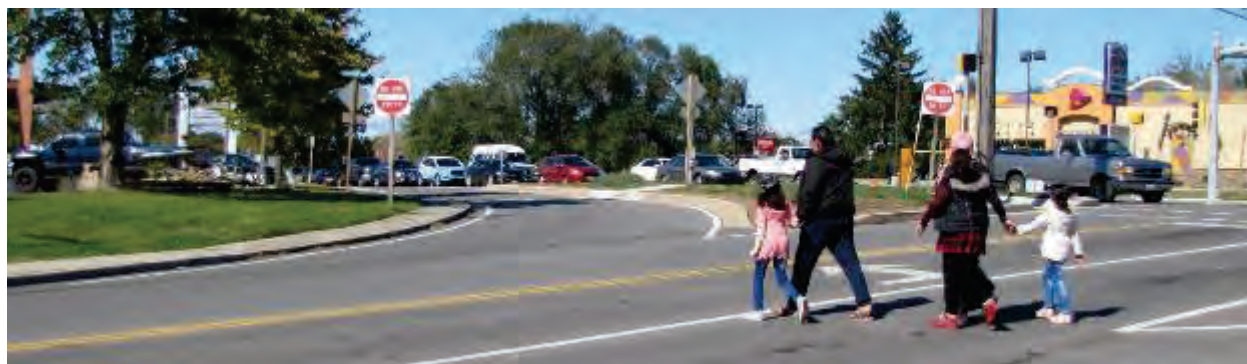
Drivers have poor sight distance over the hill, before the intersection of Washington Street and Cannon Avenue.

4.1.6 Dual Highway at Cleveland Avenue Intersection Improvements

The intersection of Dual Highway and Cleveland Avenue is the signalized intersection east of Cannon Avenue. The intersection was recently upgraded to address safety concerns, including adding marked crosswalks, improvement pedestrian accessibility, and improving connections to the crosswalk itself (through new sidewalks). These changes were implemented in response to multiple pedestrian crashes at the intersection and observations of unsafe crossings across Dual Highway near this intersection.

Even since the recent installation of crosswalks, unsafe crossings have been observed. Pedestrians generally want to take the shortest route possible and do not always use the designated crosswalk. Given the intersection configuration, pedestrians crossing Cleveland Avenue must cross three crosswalks: Cleveland Avenue itself as well as two channelized right-turn lanes (there are channelized right-turn islands at all intersection approaches). Removing the eastbound channelized right-turn has been discussed but has not been prioritized for implementation.

Given that improvements have recently been installed, no specific additional improvements are recommended at this time. However, it is recommended that crossing behavior and crash reports continue to be monitored at this location. Should crashes continue, additional improvements may be warranted.



Pedestrians jaywalk across Cleveland Avenue rather than utilize the new crosswalks.



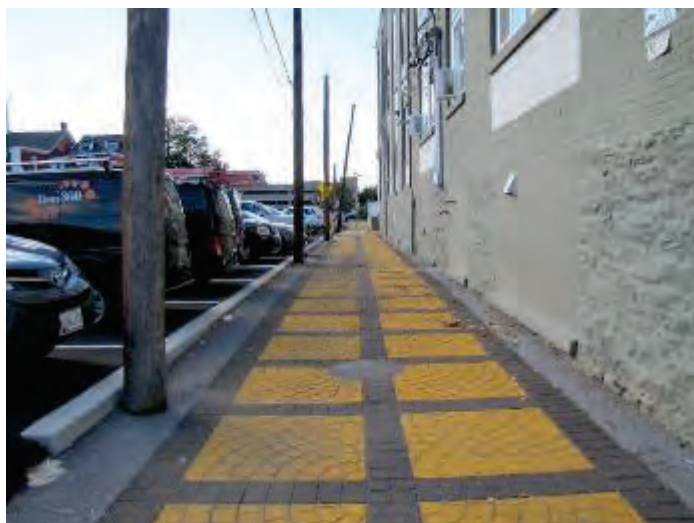
Unsafe mid-block crossing occurs with at Cleveland Avenue near Dual Highway.

4.1.7 Wareham Alley Bikeway between Franklin Street and Washington Street

There are limited east-west bicycle routes across the Hagerstown BPPA. Bicyclists either ride along busy streets like Washington or Franklin Streets, along the various east-west alleys, or they avoid the area. To improve bicycle safety without compromising vehicle mobility along these more major roadways, it is recommended that the Wareham Alley between Washington Street and Franklin Street be evaluated for conversion to a bikeway for the length of the BPPA (between Cannon Avenue and Walnut Street). The east-west bikeway would connect to several existing north-south bike lanes, including those on Mulberry Street, Locust Street, Jonathan Street, and Prospect Street.

To provide a direct connection, the bikeway would run through existing surface parking lots (e.g. between Potomac Street and Locust Street) as well as the existing parking structure between Potomac Street and Hays Alley. Crossing treatments would be implemented, akin to those installed along the Cultural Trail. Similar to the to the Cultural Trail, this bikeway could be branded as a downtown attraction, replete with public art. In addition, pavement markings could be used to signify that the alley is shared with pedestrians and bicyclists, similar to the ally pictured below on Washington Street.

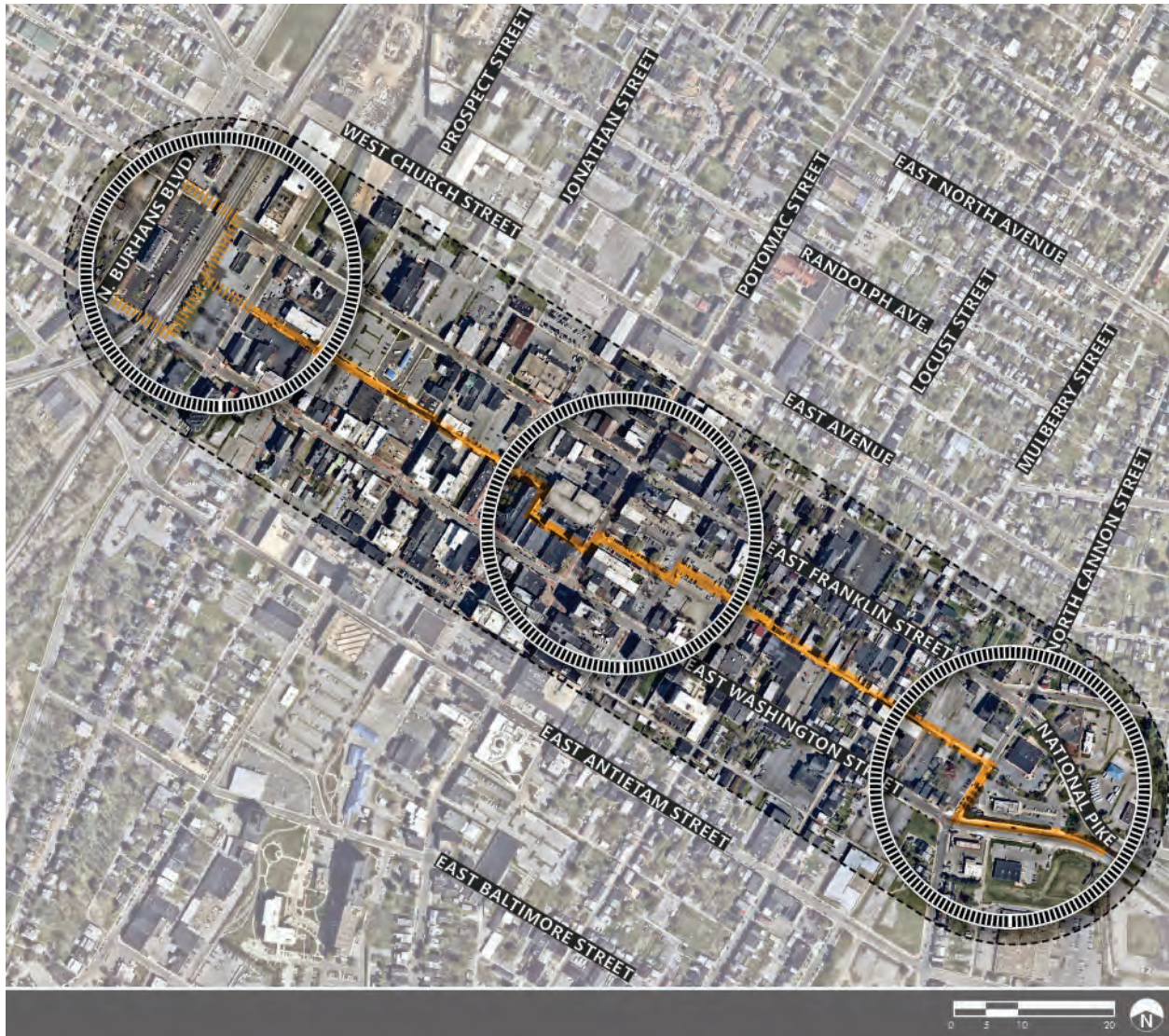
Converting this alley to a bikeway would require additional study prior to implementation. It would be useful to understand existing vehicle volumes through the alley, as well as the different parking lots and land uses vehicles currently access via the alley.



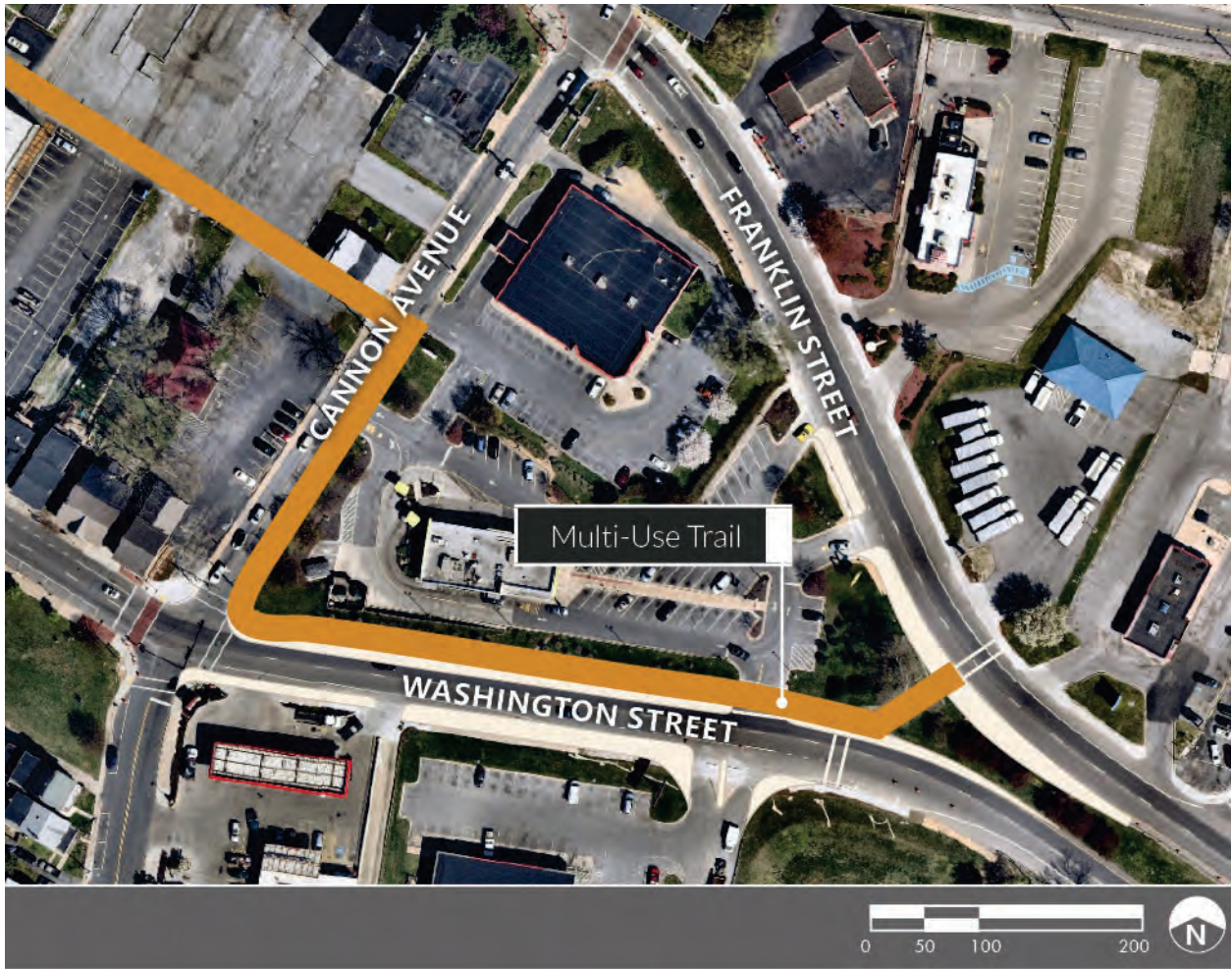
Pavement markings on this alley on Washington Street indicate to vehicles to travel slowly and that pedestrians might be present.



A man walks down Wareham Alley between Cannon Avenue and Mulberry Street.



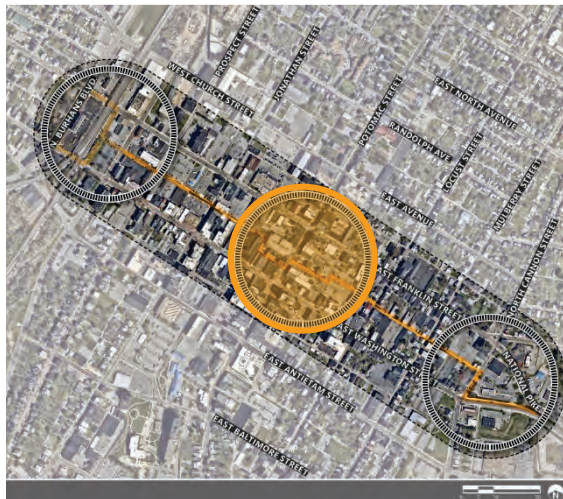
Proposed location for bikeway that runs parallel to Franklin Street and Washington Street.



Proposed Multiuse Trail connecting new, signaled crossings of Dual Highway with Wareham Alley



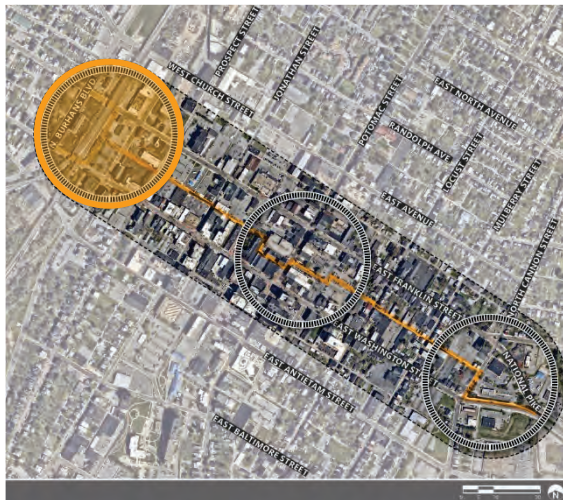
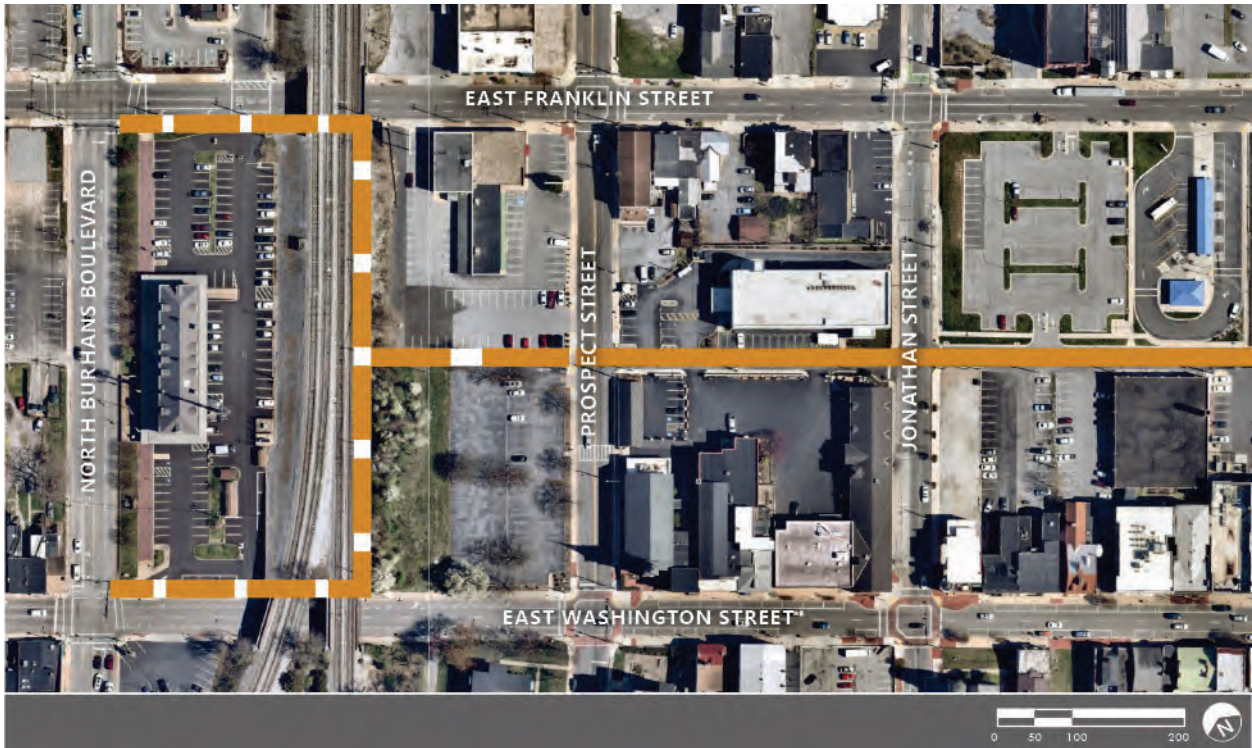
Use pavement colorization or pavers (opportunity to reduce impervious surface of the alley) to demarcate the bike and pedestrian travel route



Travel route through parking areas east of Potomac Avenue



Travel route around the parking garage west of Potomac Street



Alley multiuse facility could terminate at Prospect Avenue, where it will have connected with north-south bikeways, or continue to and beyond Walnut Street

4.2 Best Practices

This section includes systemic recommendations related to pedestrian and bicycle connectivity, comfort, and safety. Some best practices identified below may impact existing traffic operations and should be carefully considered before implementation. For example, leading pedestrian intervals will decrease green time, adding auto delay. Added delay along arterials (Franklin and Washington Streets) may result in diverting traffic onto roads which currently perform well because of lower vehicular volumes. Pedestrian and bicycle safety are a top priority for MDOT SHA but should be balanced with other modes.

There are multiple locations throughout Hagerstown where these recommendations may be appropriate, and each section identifies a few examples of either existing or recommended implementation of the pedestrian or bicycle facility. The best practices are grouped into six categories: signalized pedestrian crossings, crosswalks, alleys, sidewalks, right-of-way design, and off-street parking. A list of all the recommended practices are included in the table below:

Table 4. Best Practices Recommendations

Category	Improvement or Challenge
Signalized Pedestrian Crossings	Pedestrian Signal Head
	Leading Pedestrian Intervals
	Accessible Pedestrian Signals
Crosswalks	Marked Crosswalk
	Signalized Mid-Block Crossing
	Uncontrolled Marked Crosswalk
Alleys	Alley Street Crossings
	Decorative Alley Markings
Sidewalks	Permanent Sidewalk Obstructions
	Trash Cans on Sidewalk
Right-of-Way Design	Left-Turn Lane Redesign
	Marked On-Street Parking
	Bulb Outs/Curb Extensions
Off-Street Parking	Parking Lot Striping
	Bike Parking

While this report focuses on engineering improvements, there are opportunities related to education, enforcement, encouragement and evaluation. Particularly within education, crash patterns support education programs targeting pedestrians and bicyclists behavior.

4.2.1 Signalized Pedestrian Crossings

This section summarizes four pedestrian safety treatments related to signalized pedestrian crossings: pedestrian signal heads, leading pedestrian intervals, and accessible pedestrian push buttons. **Table 5**, on the next two pages, contains a prioritized list of intersection at which signal modifications are recommended. These fall into four categories:

- **Maintenance:** Items that involve striping only and can be implemented as soon as practical by maintenance crews
- **High (H):** Presence of pedestrian signal heads (intersections without heads were prioritized more highly); crossing distance (based on the number of lanes – travel, parking, and bike – that pedestrians are required to cross (this is a measure of exposure); and nearby destinations (a proxy for pedestrian volumes). Locations with no signal heads (shown in red), longer crossing distances (shown in red) and intense nearby destinations (shown in dark green) are the highest priority
- **Medium (M):** Intersections that are a medium priority have two of the three items: pedestrian signal heads absent, longer crossing distances, and high intensity nearby destinations
- **Low (L):** Intersections that are a low priority have only one of the three items.

Missing crosswalk markings, presence of push buttons and qualitative assessment of curb ramps are also presented in Table 5, as are pedestrian and bicycle crashes. This report does not rely on the pedestrian and bicycle crash data to prioritize locations as a more detailed review of the crashes to determine if changes to signalization might have prevented the crash would be advisable before using this criterion.

Table 5. Signal Modification Priorities

Hagerstown BPPA Signal Modification Priorities															
Priority	Justification	Street	Street	Reported Crashes		Ped Signal	Missing Leg				Crossing Distance	Push Button	ADA Ramps	Nearby Destinations	
				Ped	Bike		N	S	E	W					
Maintenance	Ped Served	Church	Jonathan	1	1	Y		X				2 Lane + Bike Lane (NB) 2 Lane (E-W)	Fixed Time	OK Poor (NW)	Downtown
Maintenance	HIB High-Viz and Signage (E-W)	Baltimore	Mill	0	0	N/A	X	X	X			2 Lane (N-S) 2 Lanes + 1 Parking (E-W)	N/A	OK	
H		Franklin	Mulberry	0	0	N						1 Lane + + Bike Lane + 1 Parking (N-S) 3 Lane + 2 Parking (WB)	N/A	OK Poor (NW)	Downtown
H		Franklin	Locust	1	1	N						2 Lane + Bike Lane (N-S) 2 Lane + 2 Parking (WB)	N/A	OK	Downtown - Core
H		Franklin	Jonathan	1	0	N						1 Lane + Bike Lane + 1 Parking (SB) 3 Lane (WB)	N/A	OK	Downtown - Western Gateway
H		Franklin	Walnut	1	0	N						2 Lane + 2 Parking (N-S) 3 Lane (WB)	N/A	OK	Downtown - Western Gateway
H		Washington	Walnut	0	1	N						2 Lane + 2 Parking (N-S) 4 Lane (EB)	N/A	OK	Downtown
H	Poor Sight Distance	Washington	Prospect	1	0	N						2 Lane + Bike Lane + 1 Parking (SB) 1 Lane + Bike Lane + 2 Parking (SB) 2 Lane + 2 Parking (EB)	N/A	OK Poor (SE)	Downtown
H		Washington	Locust	1	1	N						1 Lane + Bike Lane + 1 Parking (NB) 3 Lane (EB) + 1 Parking	N/A	OK	Downtown - Core
H		Washington	Mulberry	1	0	N						1 Lane + Bike Lane + 1 Parking (SB) 2 Lane + 2 Parking (EB)	N/A	OK	Downtown
M		North	Mulberry	0	0	N	X	X	X	X		1 Lane + Bike Lane + Parking (NB) 2 Lane + 2 Parking (E-W)	N/A	OK	City Park
M		East Ave	Locust	4	0	N						1 Lane + Bike Lane + Parking (N-S) 2 Lane + 1 Parking (E-W)	N/A	OK	Greenwalt Park Playground

Table 5. Signal Modification Priorities (continued)

M		Randolph	Locust	2	1	N	X	X	X	X	1 Lane + Bike Lane + Parking (N-S) 1 Lane + 1 Parking (E-W)	N/A	OK (East) Poor (West)	
M	Wide Lanes	Franklin	Cleveland	0	0	N	X	X	X	X	2 Lane + 2 Parking (N-S) 2 Lane + 1 Parking (E-W)	N/A	OK (West) Poor (East)	
M	Wide Lanes, Skew	Antietam	Cannon	2	0	N	X		X		2 Lanes + 2 Parking (N-S) 2 Lanes + 2 Bike Lanes (E-W)	N/A	Poor	Old Hospital Site
M		Antietam	Summit	0	0	N	X				1 Lane + Bike Lane + 1 Parking (NB) 2 Lanes (E-W)	N/A	OK	Downtown
M		Baltimore	Summit	0	0	N	X	X	X	X	1 Lane + Bike Lane + 1 Parking (NB) 2 Lanes + 1 Parking (E-W)	N/A	OK	Church
L		North	Jonathan	0	0	Y	X				1 Lane + Bike Lane	Fixed Time	OK	Rec Center, Head Start, Church (2)
L		North	Potomac	1	1	Y		X			2 Lanes + Parking	Fixed Time	Poor	Bloom Park
L		North	Locust			N	X				1 Lane + Bike Lane	N/A	OK	Food Market
L		Jefferson	Cannon	1	1	N				X	1 Lane + 1 Parking (E-W)	N/A	OK	
L		Church	Prospect	1	1	Y			X		2 Lane + 2 Parking (SB) 2 Lane (E-W)	Fixed Time	OK (North) Poor (South)	
L		Lee	Locust	0	0	Y	X				1 Lane + Bike Lane + 1 Parking (NB) 2 Lanes + 1 Parking (E-W)	Fixed Time	Poor	
L	Wide Lanes	Frederick	Mill	0	1	Y			X		3 Lane (NB) 2 Lane (NB) 3 Lanes + NB Bike Lane (E-W)	APS	OK	New Life World Ministries
Implement in Tandem with		Lee	Potomac	6	0	Y		X	X		2 Lanes + 2 Parking (SB) 2 Lanes + 1 Parking (E-W)		Poor	Liquor Store
Under Construction		Washington	Cannon	0	1	N					2 Lane (N-S) 3 Lane + 1 Parking (EB)	N/A	OK	Downtown - Eastern Gateway
Under Construction	Wide Crossings, Complex Intx	Franklin	Cannon	1	1	N	X	X	X	X	2 Lane + 2 Parking (N-S) 2 Lane + 1 Parking (E-W)	N/A	OK (West) Poor (East)	Downtown - Eastern Gateway

4.2.1.1 Pedestrian Signal Head

A pedestrian signal head provides traffic signal indications exclusively intended for controlling pedestrian traffic. The signal indications generally consist of illuminated symbols of a walking person (symbolizing “walk”) and an upraised hand (symbolizing “don’t walk”). All signalized intersections with marked crosswalks are candidates for pedestrian signal heads.



While there are marked crosswalks at the intersection of Franklin Street and Locust Street, there is no pedestrian signal indicating when pedestrians should cross.

There are a handful of intersections in the BPPA, three or four crosswalks of the four-legged intersection are marked, but there is no pedestrian signal head. These locations, listed below, are candidates for signal modifications including pedestrian signal heads and the addition of crosswalks (where missing).



The intersection of Washington Street and Prospect Street includes a decorative crosswalk. Adding a pedestrian signal head would indicate to pedestrians when it is permitted to cross the street.

4.2.1.2 Leading Pedestrian Interval (LPI)

Leading pedestrian interval gives pedestrian the opportunity to enter an intersection three to seven seconds before vehicles are given a green light. With this head start, pedestrians can better establish their presence in the crosswalk before vehicles try to turn across the concurrent crosswalk movement. The Hagerstown BPPA already includes some intersections with LPIs, such as the intersection of Potomac Street at Washington Street. Other signalized intersections with marked crosswalks and pedestrian signal heads would be candidates for LPIs.



The pedestrian push buttons at Franklin Street and Jonathan Street are co-located and do not have an audible notification to pedestrians.

4.2.1.3 Accessible Pedestrian Signals

The Hagerstown BPPA includes several intersections with accessible pedestrian signals (APS). Accessible pedestrian signals are devices that communicate information about the “walk” and “don’t walk” intervals at intersections with non-visual formats to pedestrians who are blind or who have low vision. According to the Manual on Uniform Traffic Control Devices (MUTCD), APS push buttons should be separated by 10 feet and on two separate poles. The MUTCD continues, “Where two accessible pedestrian signals are separated by a distance of at least 10 feet, the audible walk indication shall be a percussive tone. Where two accessible pedestrian signals on one corner are not separated by a distance of at least 10 feet, the audible walk indication shall be a speech walk message” (Section 4E.11). Some intersections with APS, such as the intersections of Franklin Street at Jonathan Street and

Washington Street at Jonathan Street, do not comply with the MUTCD; these locations should be reviewed and modified to meet state standards.

4.2.2 Crosswalks

This section summarizes three pedestrian safety treatments related to crosswalks: marked crosswalks at intersections, signalized mid-block crosswalks, uncontrolled marked crosswalks.

4.2.2.1 Marked Crosswalks

Marked crosswalks indicate optimal or preferred locations for pedestrians to cross and help designate right-of-way for motorists to yield to pedestrians. There are several signalized intersections in the Hagerstown BPPA that lack marked crosswalks. Some of these intersections already have some crosswalks marked, while others have no marked pedestrian crossings. Some of these intersections include pedestrian signal heads at the existing marked crossings. **Table 5**, above, includes a list of high priority

signal modifications that includes recommendations for adding missing crosswalks at the following locations:

- High Priority
 - Church Street at Jonathan Street (south leg missing)
 - Baltimore Street at Mill Street (north, south and east legs missing)
- Medium Priority Locations
 - Mulberry Street at North Avenue (missing all crosswalks)
 - Randolph Avenue at Locust Street (missing all crosswalks)
 - Franklin Street at Cleveland Avenue (missing all crosswalks)
 - Antietam Street at Cannon Avenue (north and east legs missing)
 - Antietam Street at Summit Avenue (north leg missing)
 - Baltimore Street at Summit Avenue (missing all crosswalks)

As with the signal modifications in Table 5, these locations were prioritized based on pedestrian and bicycle crash history, crossing distances, and nearby destinations. Each of these locations, and potentially others outside of the walk audit locations, should be evaluated for adding marked and signalized, continental striped (such as the crosswalk shown in the image at the top of page 68), crosswalks on all approaches. Where installed, crosswalks should include ADA-accessible curb ramps to accommodate pedestrians with limited mobility. The City should consider using high visibility crosswalks in addition to marking the outside boundaries of the crosswalk with 12-inch white lines.



A person in a wheelchair travels in the bike lane against traffic on Locust Street between Elm Street and Lee Street.

4.2.2.2 Signalized Mid-Block Crosswalks

There are multiple locations in the Hagerstown BPPA where mid-block crosswalks are signalized, specifically on both Franklin and Washington Streets between Jonathan and Potomac Streets. Signalized midblock crosswalks are generally helpful or essential where there is a high demand for pedestrian travel on high volume roadways, where vehicle gaps are infrequent, in school zones, where older pedestrians travel, and where vehicle speeds are high.



On Franklin Street, there is a signalized mid-block crossing in front of the Post Office (between Jonathon Street and Potomac Street).

4.2.2.3 Uncontrolled Marked Crosswalks

There are also multiple uncontrolled marked crosswalks in the Hagerstown BPPA. An uncontrolled pedestrian crosswalk occurs where no traffic control (e.g. traffic signal or stop sign) is present.



There is an uncontrolled marked crosswalk across Locust Street at Ray Street.

There may be some locations where uncontrolled marked crosswalks are appropriate (e.g. T intersections where just the minor approach is stop-controlled, e.g. John Street at North Mulberry Street). Overall, uncontrolled pedestrian crossing locations correspond to higher pedestrian crash rates. These treatments should only be considered along low volume, low speed roadways. On roadways with higher volumes, additional treatments may be appropriate, such as crosswalk visibility enhancements, a raised crosswalk, pedestrian refuge island, pedestrian hybrid beacon, or a rectangular rapid flashing beacon



An uncontrolled marked crosswalk could be added across Mulberry Street at John Street.

4.2.3 Alleys

Hagerstown has a dense alley network; alleys run between most north-south and east-west streets in the BPPA. This section outlines recommended alley improvements, including street crossings and decorative alley markings.

4.2.3.1 Alley Street Crossings

Alley street crossings concern two movements: travelers moving across an alley (while staying on the major street) as well as travelers crossing a major street to continue along an alley. Between January 2015 and August 2019, 11 pedestrian and bicycle crashes were identified within 50 feet of an alley, including 2 non-injury crashes, 6 minor-injury crashes, and 3 major-injury crashes. Multiple crashes occurred along Cramer Alley between Locust Street and Potomac Street. A brief description of those crashes is included below:

- A pedestrian was hit while crossing Franklin Street. While two lanes of vehicle traffic stopped for the pedestrian, the third lane did not, striking the person walking.
- A pedestrian was hit while crossing Baltimore Street
- A pedestrian was hit while walking along Cramer Alley near Randolph Avenue.
- A pedestrian was hit walking across Cramer alley as a vehicle turned into the alley from Franklin Street.

Residents walk down the alley between Locust Street and Potomac Street. This segment is between East Avenue and Franklin Street.



The following recommendations could improve safety at alley crossings:

- Improve signage at alley entrances, notifying motorists that there may be pedestrians traveling in the alleys.
- Implement an education campaign related to pedestrian safety to raise awareness about the different places that pedestrians walk, with a focus on the alley network.
- Daylight (remove sight distance obstacles) at alley intersections to improve visibility of pedestrians who may be crossing the alley entrance or the major street to stay on the alley. The

most frequent form of daylighting is likely to be removal of a parking space prior to the alley crossing location.

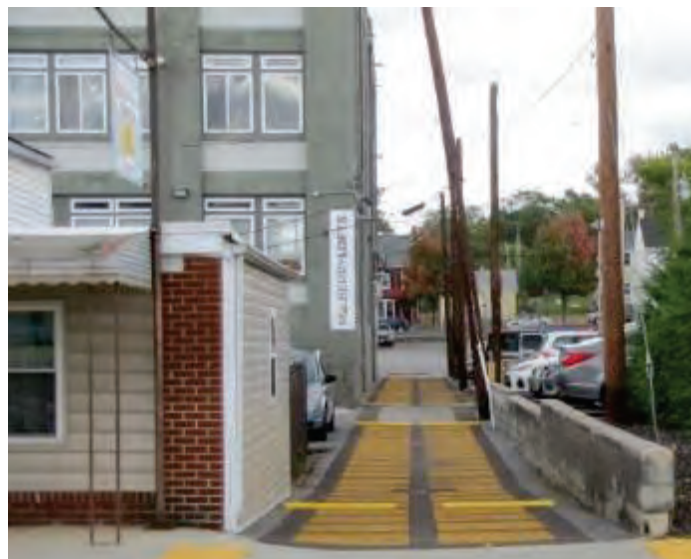
- Install marked crosswalks and, if volumes and speeds are high, install pedestrian crossing enhancements such as pedestrian hybrid beacons. These treatments should be reserved for only the most highly trafficked alley crossings.



Pedestrians are crossing Mulberry Street to stay on the alley between Franklin Street and Washington Street. The crossing is not marked.

4.2.3.2 Decorative Alley Markings

A new development on Washington Street implemented a decorative alley marking, alerting drivers that this space may be shared with pedestrians. Decorative alleys could be implemented in other parts of the BPPA as well, either as part of new development or a city-funded program.



Pavement markings and speed bumps on this alley on Washington Street indicate to vehicles to travel slowly and that pedestrians might be present.

4.2.4 Sidewalks

Sidewalks are paths along the side of the street, vertically separated from the roadway. This section highlights some of the sidewalk challenges and recommended improvements in the Hagerstown BPPA. Sidewalks in Hagerstown vary in width, from relatively narrow sidewalks (5 feet) along some streets to wider sidewalks in the core of downtown (up to 12 feet).

4.2.4.1 Permanent Sidewalk Obstructions

Throughout Hagerstown, there are several sidewalk obstructions, such as residential stoops, street trees, and utility poles. While these obstructions are not independently a pedestrian hazard, they decrease pedestrian mobility when present on an already narrow sidewalk.

A comprehensive review of all sidewalks is recommended to inform a prioritized capital improvement program to address the most critical sidewalk links that are impeded by existing obstructions. It is difficult to prescribe a standard set of improvements to address these deficiencies as each will require a site-specific solution, but solutions might include removing the obstacle (for example relocating a utility pole); use of in-street corrals to which obstacles could be relocated; or widening sidewalks.



Residential stoops encroach on the sidewalk, narrowing space for pedestrians (Lee Street between Locust Street and Potomac Street).



Signs, lamp posts, and trees narrow the throughway for pedestrians (Franklin Street between Mulberry Street and Cannon Avenue).

4.2.4.2 Trash Cans on Sidewalk

In addition to permanent obstructions, trash cans on the sidewalk impede pedestrian movement on several streets throughout the BPPA. Trash pickup occurs in the front of homes, and there is limited space (sometimes none) available between homes for storing the trash cans.

It is recommended that Hagerstown integrate complaints associated with trash can storage into its existing 311 program. In addition, where possible, Hagerstown could consider removing parking spaces to create “corrals” for trash can storage, similar to a bicycle parking corral. Where no physical change can be made, the City could consider the use of paint within the sidewalk environment to better designate where in-sidewalk trash receptacle should be placed so as not to impede pedestrian travel.



Trash cans block sidewalks on Locust Street (left), Potomac Street (middle), Franklin Street (right) limiting space for pedestrians.

4.2.5 Right-of-Way Design

How streets are designed for vehicles impacts the experiences of pedestrians and bicyclists using the roadway. The recommendations in this section aim to improve pedestrian and bicycle safety and comfort, generally through modifications to roadway markings and how vehicles travel. Best practices summarized here include left-turn lane redesigns, marked on-street parking, and bulb-outs (also known as curb extensions).

4.2.5.1 Left-Turn Lane Redesign

Dedicated left-turn lanes remove stopped or queuing vehicles from through traffic, increasing the capacity of many roadways. The length of a left-turn lane or left-turn pocket is dependent on the demand for that turning movement. However, the benefit of left-turn lanes is maximized on two-way streets, where there is a need for left-turning vehicles to wait for a gap in oncoming traffic before turning.

Along Franklin Street, which runs one-way westbound through the BPPA, there are left-turn lanes at almost every intersection, and the left-turn lane often extends hundreds of feet back from the intersection. As a one-way street, there is no oncoming traffic preventing left-turn movements during a green phase. In addition, these left-turn lanes are often very narrow and not meeting design standards. During field observations, vehicles were observed only transitioning into the turn lane just before arriving at the intersection as well as not fully merging into the left-turn lane (instead straddling the solid or dashed white line dividing the through lane from the left-turn lane).



Left-turn lane on Franklin Street between Jonathon Street and North Prospect Street.

It's recommended that Hagerstown review the left-turn lanes along Franklin Street and consider converting these left-turn lanes into on-street parking. On-street parking would slow vehicles on Franklin Street, and it would provide a buffer between pedestrians and vehicles walking along the roadway. This evaluation would include understanding the volumes of the left-turn movements along Franklin Street and the impact to traffic flow of removing left-turn lanes. The City should consider implementing LPIs at these locations as well.



Left-turn lane on Franklin Street between Cannon Street and Mulberry Street.

4.2.5.2 Marked On-Street Parking

There are some locations throughout the BPPA where on-street parking is marked with a full box, while other locations include "T" markings for the corners of on-street parking spaces. In some locations, on-street parking in the BPPA is permitted, but not marked. Unmarked on-street parking is appropriate on low-volume, low-speed streets, such as Baltimore Street between Prospect Street and Summit Avenue. However, when parking is unmarked on high-volume or high-speed streets, it may be perceived as a wide lane where vehicles can speed up. For example, on-street parking is not marked on Franklin Street between Walnut Street and Prospect Street. It is recommended that on major streets through the BPPA that Hagerstown stripe on-street parking. This will narrow the actual (and perceived) lane of vehicle travel, and in turn, could lower vehicle speeds along the corridor.



The wide right lane on Franklin Street may be used for on-street parking (between Walnut Street and Prospect Street).

4.2.5.3 Bulb Outs/Curb Extensions

Bulb outs or curb extensions visually and physically narrow the roadway, which creates shorter and safer crossings for pedestrians while increasing the available space for plantings, street trees, and stormwater management. Several intersections throughout the Hagerstown BPPA have curb extensions. Bulb outs are a cost-intensive pedestrian safety measure, and they are not recommended at all intersection corners. However, they may be well-suited to some locations throughout the BPPA. The City might also consider the use of planters and other low cost, quick build installations either as trials or as permanent installations.

For example, the northwest corner of the intersection of Prospect Street and Franklin Street is a candidate for a curb extension. The northeast corner of the intersection already has a curb extension. As a result, the left side of the north crosswalk does not reach the curb ramp on the northwest corner. In addition, given that vehicles have already navigated around the bulb out on the northeast corner, maintaining the same lane width west of the intersection would not impede vehicle travel or increase delay.



Candidate for bulb out on northwest corner of Prospect Street and Franklin Street.

4.2.6 Off-Street Parking

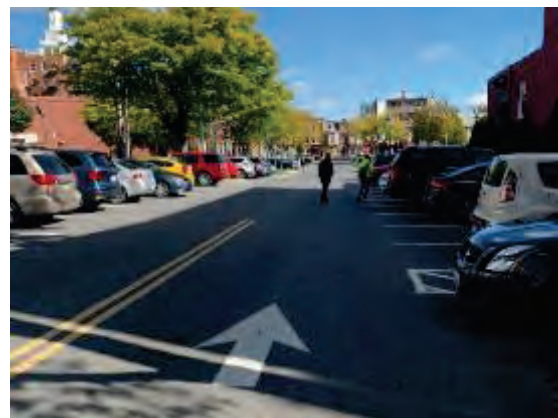
Importance to safety and comfort is not just how people move, but also where and how they park. This section discusses the role of off-street parking in improving the bicycle and pedestrian experience in the Hagerstown BPPA.

4.2.6.1 Parking Lot Striping

There are several surface parking lots in downtown Hagerstown. Some are small, private lots serving an individual business, while others are municipal surface lots. The largest is the municipal “Central Lot”, bound by Potomac and Locust Streets to the west and east and Franklin and Washington Streets to the north and south. The Central Lot is accessible from all four roadways.

It is expected that drivers travel slowly through parking lots, as vehicles search for a spot and navigate around pedestrians walking through the space. There is often a lot of pedestrian activity in parking lots, as people walk to and from their vehicles.

In the Central Lot in the Hagerstown BPPA, there are double yellow lines near the lot entrances and exits. As double yellow lines are typically used on streets to demarcate opposing travel lanes, this may indicate to vehicles that they may travel through the parking lot at a higher speed. This risk is compounded given that vehicles



Centerline striping in the Central Lot may result in higher vehicles speeds.

could cut through some parking lots to access other roadways in downtown Hagerstown.

It is recommended that as new lots are built or redesigned, that the design considers vehicle speed and pedestrian travel through the space. A single centerline or no line may be more appropriate for maintain the expected vehicle speeds through the parking lot.

4.2.6.2 Bike Parking

Bike parking is key to encouraging bicycling. Bicyclists need safe and convenient locations along and at



A bike rack outside Washington County Circuit Court on Washington Street.

the end of most trips. Given that the BPPA is downtown Hagerstown – the area of the city with the most generators and activity – bike parking should be readily available. The recent [BMP Update](#) identified existing bike parking locations (18 in the BPPA area) as well as proposed locations (7 new locations in BPPA area). This plan recommends implementing the proposed bicycle parking.

4.2.7 Other Considerations

4.2.7.1 Bike Lane Enforcement

While installing bicycle facilities is a critical step to improving safety for bicyclists, those safety benefits are only borne out if the bike lanes are unobstructed. During field observations, several vehicles were noted parking or standing in the bike lane. When this occurs, bicyclists must maneuver out of the bike lane into lanes shared with vehicle traffic. Regular enforcement of bicycle lane obstructions could reduce the occurrence of these bicyclist safety challenges. In instances where delivery vehicles are routinely block bike lanes, it may be useful to explore options for providing designated loading zones.



Parking enforcement can reduce parking freight deliveries occurring in the bike lane on Locust Street (left) and Mulberry Street (right).

5. Appendix - Facility Descriptions

Bicycle Facilities

There are several different types of bicycle facilities in the BPPA. Below are definitions of these facilities (from the MDOT SHA Bicycle Policy and Design Guide) as well as local examples of these bikeways.

- **Bikeways** are “any trail, path, part of a highway, surfaced or smooth shoulder or any other travel way specifically signed, marked, or otherwise designated for bicycle travel. Bikeways include bike lanes, shared lanes, shared-use paths, trails, and bike routes.” Bikeway is a catchall term for bicycle facilities.
- **Bike Lanes** are “any portion of a roadway or shoulder which has been designated for single directional flow and includes pavement markings for the preferential or exclusive use of bicyclists.”
- **Bike Routes** are “a system of bikeways connecting two or more points that are deemed most desirable for bicycling. A bike route is designated with guide signs, pavement markings, maps or other means.”



Children are riding on Hagerstown Cultural Trail, near West Antietam Street.



A bike lane runs on the left side of South Locust Street



Bike route sign near West Washington Street points at the beginning of the route on US 40.

- **Shared Lanes/Sharrows** are roadway lanes that are “open to both bicycle and motor vehicle travel, without assigned space for each. Specific pavement markings and/or signs may be used to provide positive guidance for drivers and bicyclists allowing them to share the same lane.”
- **One-Way Cycle Tracks** are ‘exclusive bikeways that are at street level and use a variety of methods for physical separation from motorized vehicle traffic and pedestrians.”



The yellow sign guides drivers to share lanes with bicyclists on the shared lanes.



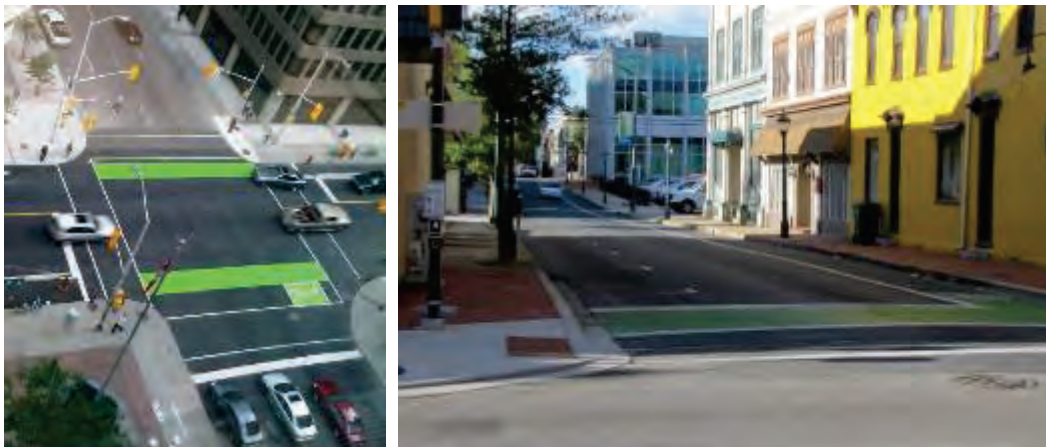
On-way protected cycle track on the left is separated using marking, flexible delineator post at Woodglen Drive cycle track (photo from GGW)

- **Buffered Bike Lanes** are “conventional bicycle lanes paired with a designated buffer space separating the bicycle lane from the adjacent motorized vehicle travel and/or parking lane.”



People are biking on buffered bike lanes where a wide marking separates them from the auto lane on Woodglan Drive, Rockville, MD (photo from MCDOT)

- **Bike boxes** are areas “at the head of a traffic lane at a signalized intersection that provides bicyclists with a safe and visible way to get ahead of queuing traffic during the red signal phase.” A typical form of bike box is a two-stage turn queue box where “bicyclists can safely make left turns at multi-lane signalized intersections from right side.” They can be achieved with hard- and soft-scaping.



*The figure on the left shows an intersection with a two-stage bike box in Ottawa (Nacto).
The figure on the right shows one leg of the bicycle box at West Franklin Street,
Hagerstown.*

Pedestrian Facilities

Different types of pedestrian facilities are listed below as defined in MDOT SHA - Accessibility Policy & Guidelines for Pedestrian Facilities along State Highways. Details of each facility design can be found in the same document.

- **Sidewalks** should be accessible continuous routes for all people including those with disabilities, per ADA citation, to access schools, transit stations, and any other destinations.



Sidewalks are wide and perfectly paved on West Washington Street near University System of Maryland at Hagerstown.

- **Ramps** should provide pedestrians a walkway at intersections with curbs. Maryland has three standard ramp types including paired perpendicular ramps for one corner and two diagonal ramp standards for other skewed intersections.



Maryland standard ramp 655.11 connects a corner of sidewalk to ADA area.

- **Raised medians** are “points of refuge for pedestrians” to reduce the crossing distance access to the opposite side of a road.



- **Driveway crossings** are where “pedestrian pathway crosses a driveway or entrance.”



A driveway crossings connect sidewalks at a parking lot entrance in Hagerstown.

- **Protruding objects** are utility poles, mailboxes, signal poles, signal boxes, signs, and any other objects that “cause challenges to pedestrians specially a person with a disability”.



Trash cans blocking a sidewalk on East Franklin Street.

- **Crosswalks** are connections of sidewalks at a junction of two or more roadways with pedestrian markings.



Crosswalks are located on two sides of East Baltimore Street and Locust Street.

- **Mid-block crossings** are non-intersection pedestrian crossings requiring pedestrians to activate flashing yellow lights.



Mid-block Crossing marking and beacons at Antietam Street is a safe accommodation for pedestrians.

- **Stop lines** are parallel to the crosswalk to ensure visibility for both pedestrians and motorists at intersections.



A car stopped at the stop line ahead of the intersection of East Lee Street and South Potomac Street.

- **Pedestrian signals** are considered at marked crosswalks where “additional passage and/or clearance time is required, where pedestrians must be held to avoid vehicle conflicts, or where pedestrians are given advanced passage time before vehicles being given a green light, and at established school crossings at signalized intersections.”



Pedestrian Signal at West Franklin Street provides pedestrians with crossing time.

- **Accessible pedestrian signals (APS)** provide equal access for people with disabilities according to the American Disabilities Act with several features such as pushbutton locator tones, tactile arrows, audible and vibrotactile walk indications.



A person with disabilities is waiting for the green signal to cross the street.

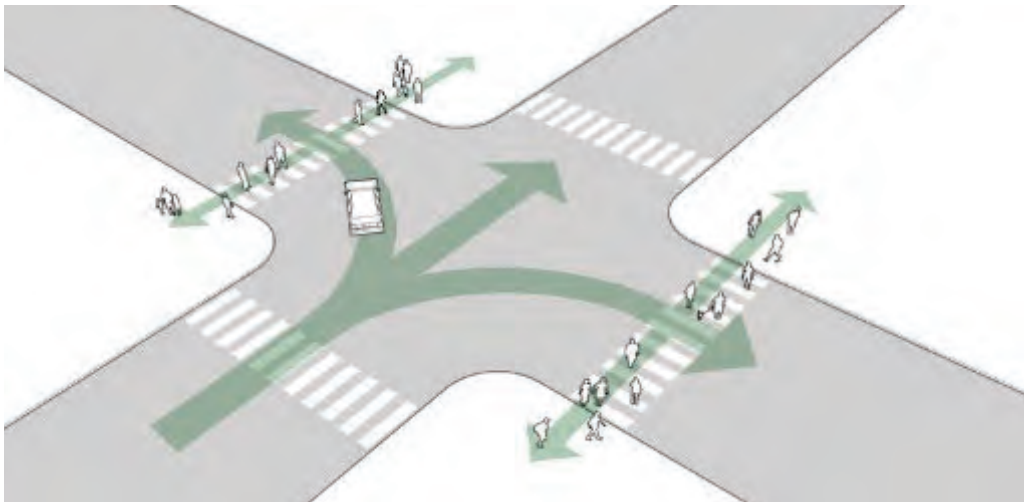
The rest of the definitions are based on the National Association of City Transportation Officials (NACTO) and other resources:

- **High-visibility crosswalks** are recommended in place of transverse lines at uncontrolled crossings because they are more visible to approaching motorists and better emphasize pedestrian crossing areas.⁴



High-visibility crosswalk is painted in different colors at Hood Street and West Baltimore Street.

- **Leading pedestrian intervals (LPI)** “enhance the visibility of pedestrians in the intersection and reinforce their right-of-way overturning vehicles, especially in locations with a history of conflict.”⁵



Leading pedestrian interval schematic where turning traffic yields to pedestrians already in the crosswalk (NACTO)

⁴ McGrane, A. and Mitman, M., 2013. An Overview and Recommendations of High-Visibility Crosswalk Marking Styles.

⁵ <https://nacto.org/publication/urban-street-design-guide/intersection-design-elements/traffic-signals/leading-pedestrian-interval/>

- **Continental Crosswalks** is a pattern of crosswalk striping with large stripes (typically 24" perpendicular to the crosswalk (parallel with the curb)) and is more visible to approaching vehicles than typical crosswalks, which are marked with two 12" stripes parallel to the crosswalk.
- **Curb extensions (bulbouts)** is a general term applied to several treatments. Curb extensions decrease the roadway width to provide a visual cue to drivers. Examples of curb extensions are midblock or choker, gateways, and bus bulbs.⁶



Curb extension at mid-block crossing in New York (Photo: NACTO)

- **Road diet** is a term applied to shrink up streets into leaner ones, more productive and multimodal network. Road diets reduce auto lanes and width to help the safety and efficiency of roads.⁷



Demonstration of Curry Ford Road Diet including protected bike lane at each direction and a crosswalk with high visibility in Orlando, FL (Photo: bungalow.com).

⁶ <https://nacto.org/publication/urban-street-design-guide/street-design-elements/curb-extensions/>

⁷ Burden, D. and Lagerwey, P., 1999. Road Diets. Walkable Communities, pp.1-15.

- **Mini-roundabout** is a form of junction control where vehicles can circulate a white central circular island road marking which is slightly raised like a dome.⁸



A mini roundabout is located at Summit Avenue and Reynolds Avenue, Hagerstown.

- **Speed hump** is a raised area in the roadway pavement surface to reduce the speed as a traffic calming tool for residential local streets.⁹



Speed hump at a residential street makes drivers to reduce their speed (Photo: NACTO).

⁸ Bodé, Christian, & Maunsell, Faber. "Mini-Roundabouts: Enabling Good Practice." European Transport Conference 2006, Association for European Transport, Henley-in-Arden, UK: 2006.

⁹ Parkhill, Margaret, Sooklall, Rudolph, & Bahar, Geni. "Updated Guidelines for the Design and Application of Speed Humps and Speed Tables." ITE Journal, Institute of Transportation Engineers, Washington, DC: 2007.

- **Pedestrian Signal with a Countdown** is designed to count down at the beginning of the clearance interval.¹⁰



Pedestrian countdown signal at Potomac Street and Lee Street.

- **Protected left-turn phase** provides a green arrow for left-turning vehicles while stopping both on-coming traffic and parallel pedestrian crossings to eliminate conflicts.¹¹



Protected left turn signal enforces protected left turns (Photo from Flickr - Benny Mazur)

¹⁰ http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=46

¹¹ http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=51

- **Pedestrian hybrid beacon** consists of a signal-head with two red lenses over a single yellow lens on the major street, and pedestrian and/or bicycle signal heads for the minor street.¹²



New pedestrian signal on MD410 at the entrance to Bethesda Chevy Chase High School (Photo: Bethesda Magazine – Andrew Metcalf).

- **Rectangular rapid flashing beacon (RRFB)** is user-actuated amber LEDs that supplement warning signs at unsignalized intersections or mid-block crosswalks. They can be activated by pedestrians manually by a push button or passively by a pedestrian detection system. RRFBs enhance safety by reducing crashes.¹³



A family is crossing a mid-block with RRFB at Antietam Street.

¹² <https://nacto.org/publication/urban-bikeway-design-guide/bicycle-signals/hybrid-beacon-for-bike-route-crossing-of-major-street/>

¹³ Branyan, George. "DC Experience with the HAWK-Hybrid Pedestrian Signal and Rectangular Rapid Flashing Beacons." District Department of Transportation, Washington, DC: 2010.

- **Complete Streets** Policy was adopted by the City of Hagerstown on April 1, 2015 (shown in the box below) to ensure that streets can accommodate all modes of travel including walking and public transit. The policy states that the livelihood of the neighborhoods depends on safe and connected pedestrian infrastructure.

Livable Streets (or Complete Streets) Policy:

- A. Purpose. The City seeks to create an interconnected network of transportation facilities which accommodate all modes of travel in a manner that is consistent with neighborhood context and supportive of community goals by establishing a Livable Street Policy. This policy will incorporate active transportation into the planning, design, and operation of all future City street projects, whether new construction, reconstruction, rehabilitation, or pavement maintenance. Active transportation attempts to better integrate physical activity into our daily lives through increased emphasis on walking, bicycling, and public transportation. Active transportation improves public health, reduces traffic congestion, enhances air quality, and supports local economic development. Livable Streets are streets that are planned, designed, operated, and maintained to enable safe access for all users, and upon which pedestrians, bicyclists, transit users, persons with disabilities, and motorists of all ages and abilities are able to safely move along and across.
- B. The City Engineer shall include bicycle, pedestrian and transit facilities in all street construction, reconstruction, rehabilitation and pavement maintenance projects conducted by or on behalf of the City, as appropriate, subject to the Design Guidelines and exceptions contained herein.
- C. The City shall plan, design, build and maintain all bicycle, pedestrian, and transit facilities in accordance with accepted federal, state and local standards and guidelines, but will consider innovative and/or non-traditional design options, as appropriate.
- D. The incorporation of bicycle, pedestrian, and transit facilities shall be mandated in all street construction, reconstruction, rehabilitation and pavement maintenance projects undertaken by or on behalf of the City, except under one or more of the following conditions:
- (1) Local residential streets that the Design Guidelines do not specify for Livable Streets techniques.
 - (2) The City Engineer determines there is insufficient space within the right-of-way to safely accommodate such new facilities.
 - (3) The City Engineer determines that establishing such new facilities would require an excessive and disproportionate cost.
 - (4) The City Engineer determines that inclusion of such new facilities would create a public safety risk for users of the public right-of-way.
- E. The City Council shall receive an annual report from the City Engineer on the City's consistency with this Policy with respect to all street construction, reconstruction, rehabilitation and pavement maintenance projects under design or construction by or on behalf of the City.
- F. Planning studies and/or engineering reports for street projects prepared by or on behalf of the City shall include documentation of compliance with this Policy.