



Downtown Amherst, Virginia

Pedestrian Safety and Walkability Study

Study Partners:

Region 2000 Local Government Council

Town of Amherst

Central Virginia MPO

Virginia Department of Transportation

EPR PC

Renaissance Planning

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Executive Summary

Downtown Amherst Pedestrian Safety and Walkability Study

The ability to safely and easily walk between stores, restaurants, businesses, and government offices is a defining feature of most successful downtown areas. As part of ongoing efforts to enhance the vitality of its downtown, the Town of Amherst, Virginia turned its attention to walkability in response to both citizen concerns and the recommendations of its Town Development Area study, which was completed in the summer of 2016.

The primary focus of the Downtown Amherst Pedestrian Safety and Walkability Study was the South Main St (Route 29 Business) corridor between Second St and Route 60. The purpose of this study was to identify practical and effective improvements that could be made to the street corridor to better facilitate pedestrian travel in the downtown area.

The study process included multiple meetings of a citizen steering committee, a general public meeting, traffic data collection and analysis, and an accessibility analysis. The primary concerns that were identified through these efforts included limited pedestrian and crosswalk visibility, high vehicle speeds in the downtown, missing and deficient sidewalk ramps, and numerous sidewalk obstructions.

These and other issues are addressed by the study's improvement recommendations, which have been broken into three phases. Phases 1 and 2 can be implemented in conjunction with the Virginia Department of Transportation (VDOT) Main St repaving project, which is scheduled to occur in mid-2017. The improvements of Phase 3, which can potentially be further subdivided into multiple parts, would occur later in the future and require a separate funding source(s). The study recommendations are summarized below:

Phase 1: Installation of Missing Sidewalk Ramps

Cost: Expenses paid by VDOT general maintenance fund

Phase 2: Pavement Marking Improvements

Cost: Expenses paid by VDOT general maintenance fund

Phase 3: Sidewalk Enhancements and Streetscape Improvements

Estimated Cost: \$1,700,000

Phase 3A: Part 1- Traffic Circle Sidewalk Improvements

Estimated Cost: \$150,000

Phase 3A: Part 2- Corridor Sidewalk Improvements

Estimated Cost: \$1,325,000

Phase 3B: Streetscape Features

Estimated Cost: \$225,000

Part I: Project Description

Introduction

The Town of Amherst is the economic hub of Amherst County. Downtown Amherst is the heart of the town and is the location of the county seat, town hall, and several key businesses and institutions. It is a unique and authentic place with small town charm and a compact network of streets that allow people to easily walk between their homes, stores, jobs, and other daily needs. Downtown is also endowed with several historic buildings that front a classic American Main Street.

As Amherst competes with other towns in the Lynchburg region to attract new jobs and housing, it increasingly sees downtown as a major competitive advantage. As the Downtown Economic Restructuring Plan and Physical Improvement Strategy properly states, “Amherst exists as the only quaint downtown within the region that can also act as a retail center.” Efforts to make this a more pedestrian friendly district, thus attracting new investments, depend on both improving the infrastructure, such as widening sidewalks and shortening crosswalks, and reducing the speed of traffic on Main Street using traffic calming strategies.



South Main St in downtown Amherst, VA

One of the important advantages for Main St is that it is no longer the main north-south traffic artery through the county. For several decades, the Route 29 bypass has diverted traffic from the town center. While this once drew retail business out of the downtown area, it now provides the opportunity to bring business back by allowing more space for pedestrians and taking steps to reduce traffic speeds in the area. As pedestrian accommodations increase, more people will be encouraged to visit and enjoy downtown. Therefore, this study is about more than making it safer and easier to walk; it is ultimately about the economic development and revitalization of downtown.

Previous Studies

This study builds upon the Town Development Area study completed earlier in 2016 by the Town of Amherst. The Town conducted that study to designate Town Development Areas (TDAs) as the focus of compact and mixed use development that embodies traditional town design principles. The Town’s aging population and declining average household size is expected to increase demand for different types of housing rather than the traditional single-family detached house, which accounted for more than two-thirds of the town’s housing stock in 2015. In many towns across Virginia, these trends are leading to the development or revitalization of walkable neighborhoods with a variety of housing types that have easy access to shops, jobs, and entertainment. Enabling this type of development in Amherst supports economic development. Through the study, Amherst determined that portions of the South Main St and Route 60 corridors, including the downtown area, are most appropriate for the TDA designation.

During the TDA study, the Town carefully examined the challenges and opportunities for attracting more investment in the downtown area. Among the most substantial challenges to new development identified through the study are poor walkability, especially near the traffic circle at Route 60 and along portions of South Main St and Second St. Potential walkability improvements called for in the TDA study were:

-
- Enhanced crosswalks with textured paving at Main and Second St
 - New sidewalks on Second St
 - New pedestrian scale lighting throughout downtown
 - A one-way alley and parking area along Kent St
 - New landscaping, particularly in the deep setback at Second and Main St
 - Connecting the sidewalks along North and South Main St through the addition of sidewalks and safe crosswalks at the town traffic circle
 - Curb extensions on Main St to reduce crossing distance at key intersections
 - Wider sidewalks on Main St
 - Pedestrian signals at Second and Main St
 - Accessible curb ramps

These walkability improvements would not only signal to motorists that they are entering a pedestrian district where they should drive more slowly, but also invite them to stop and explore the area. By creating interest in the downtown, ultimately these concepts could lead to new investment in businesses and development of new residential units. These concepts were also a starting point for this study, which sought to further develop these ideas with refined plans and cost estimates.

The town also conducted a wayfinding study in 2016 with support from Region 2000 (a regional planning organization that is responsible for transportation planning in the Lynchburg region). Amherst has several amenities that attract visitors from the broader region and beyond. A system of wayfinding signs with a distinct look that reflects the history and culture of Amherst would help raise awareness of the downtown and other major attractions. The signs can contribute to the town's identity and tell visitors that they have entered a special place in which they might want to linger and explore. The recommendations from the wayfinding study complement the recommendations from this study.

Study Purpose

Walkability is a critical ingredient of a successful downtown. Amherst has many of the components necessary for success, including historic buildings, a mix of uses, and a dense development pattern. But the perception of poor pedestrian safety and lack of connections for pedestrians to residential areas are issues that hold downtown Amherst back from realizing its full potential. This study tackles these issues with concrete recommendations that will not only make downtown more pedestrian friendly, but support its economic development.

This study takes the issues and concepts introduced through the TDA study and translates them into implementable projects. The timing for this study is perfect. Amherst is replacing a water main along Main Street in 2016. Following this project, the street will be repaved by the Virginia Department of Transportation (VDOT). This presents an opportunity to restripe Main Street, narrowing the travel lanes to reduce traffic speed, stripe a bike lane or sharrow (share the lane) markings along the length of Main Street, and fix the accessibility issues at crosswalks. This study provides recommendations that VDOT can implement as part of the repaving. But it goes beyond this relatively short term project and offers recommendations for how the town could transform downtown over time through investments in the streetscape, such as wider sidewalks, curb extensions to cut down on crossing distance, and landscaping. And it also provides a high-level analysis of long-term extension to the town's network of sidewalks. Through these components the study provides the town with a detailed roadmap for improving the walkability of downtown.

Part II: Existing Conditions

The primary focus of this study was the South Main St (Route 29 Business) corridor between Second St and Richmond Highway (Route 60). VDOT has classified this corridor as a minor arterial and reports an Annual Average Daily Traffic (AADT) of 5,000 vehicles.

Several methods were used to assess the existing conditions along this study corridor. These included public meetings, traffic data analysis, and an accessibility study.

Public Meetings

Public input and recommendations were gathered through two citizen steering committee meetings and one general public meeting.

Steering Committee Meetings

The citizen steering committee was comprised primarily of downtown merchants and residents who participate in organizations or committees that are active in the Town of Amherst. Two steering committee meetings were organized during the study effort—the first in August 2016 and the second in September 2016.

Steering Committee Meeting One: Summary

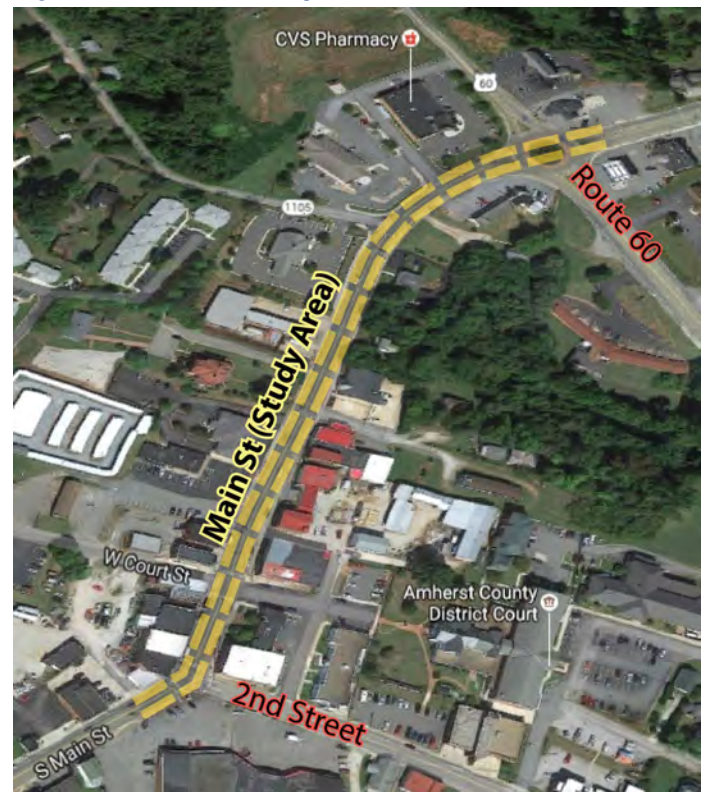
The first steering committee meeting was held on August 26, 2016 in the Town of Amherst's Town Hall. The meeting began with a presentation that explained the purpose and goals of the study, reviewed background information and prior studies relevant to the study effort, and discussed key elements and ideas pertaining to walkability and pedestrian safety.

Following the presentations, steering committee members were asked to participate in three exercises that were designed to identify key issues and improvement needs that could enhance the pedestrian experience in downtown Amherst.

- First, participants were led on a walking tour of Main St., during which they could make notes regarding the conditions that they observed directly along the street corridor.
- Next, the committee returned to the Town Hall and was asked to provide input regarding the conditions of the sidewalk network in the wider downtown area.
- Finally, the committee was asked to identify neighborhoods and districts in the areas surrounding the central business district that could potentially benefit from enhanced connections to and from the downtown area.

The feedback collected through these exercises is documented in Figures 2-4 on pages 9-11. Some of the key issues and concerns that were identified in this meeting included:

Figure 1: Main St Study Corridor



The primary study corridor, defined as S Main St between Second St and Route 60, is highlighted in yellow.

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- **Second St and Main St:** Several issues of concern were noted regarding the intersection of Second St and Main St, including several missing sidewalk ramps, missing pedestrian signal heads, limited crosswalk visibility, the lack of sidewalks on the south side of Second St, and the high rate of speed with which many northbound vehicles make the turn from Main St onto Second St.
 - **Traffic Circle Accessibility (Main St. and Route 60):** Several issues of concern were also noted regarding the traffic circle intersection of Main St and Route 60, including the lack of sidewalks and the problematic arrangement of driveways providing access to the commercial property on the southwest corner of the intersection.
 - **Pedestrian Visibility:** Several committee members expressed the concern that drivers on Main St seem to have a low awareness of pedestrians and often fail to yield to those crossing the street.
 - **Sidewalk Obstructions:** Concerns were shared regarding the number of obstacles present on the existing sidewalks—particularly utility poles and trash cans that obstruct pedestrian movements and render the sidewalks too narrow for disability access (typically defined as a 4ft minimum width).
 - **Sidewalk Ramps:** Participants noted that numerous sidewalk access ramps were missing at street crossings throughout the corridor.
 - **Connections to Second St:** In discussions of the broader sidewalk network in the central business district, several comments were made about the sidewalks on Second St, including large sections of missing sidewalk and the need to enhance connections between Second St and both the shopping center on Route 60 and the Depot St. neighborhood.

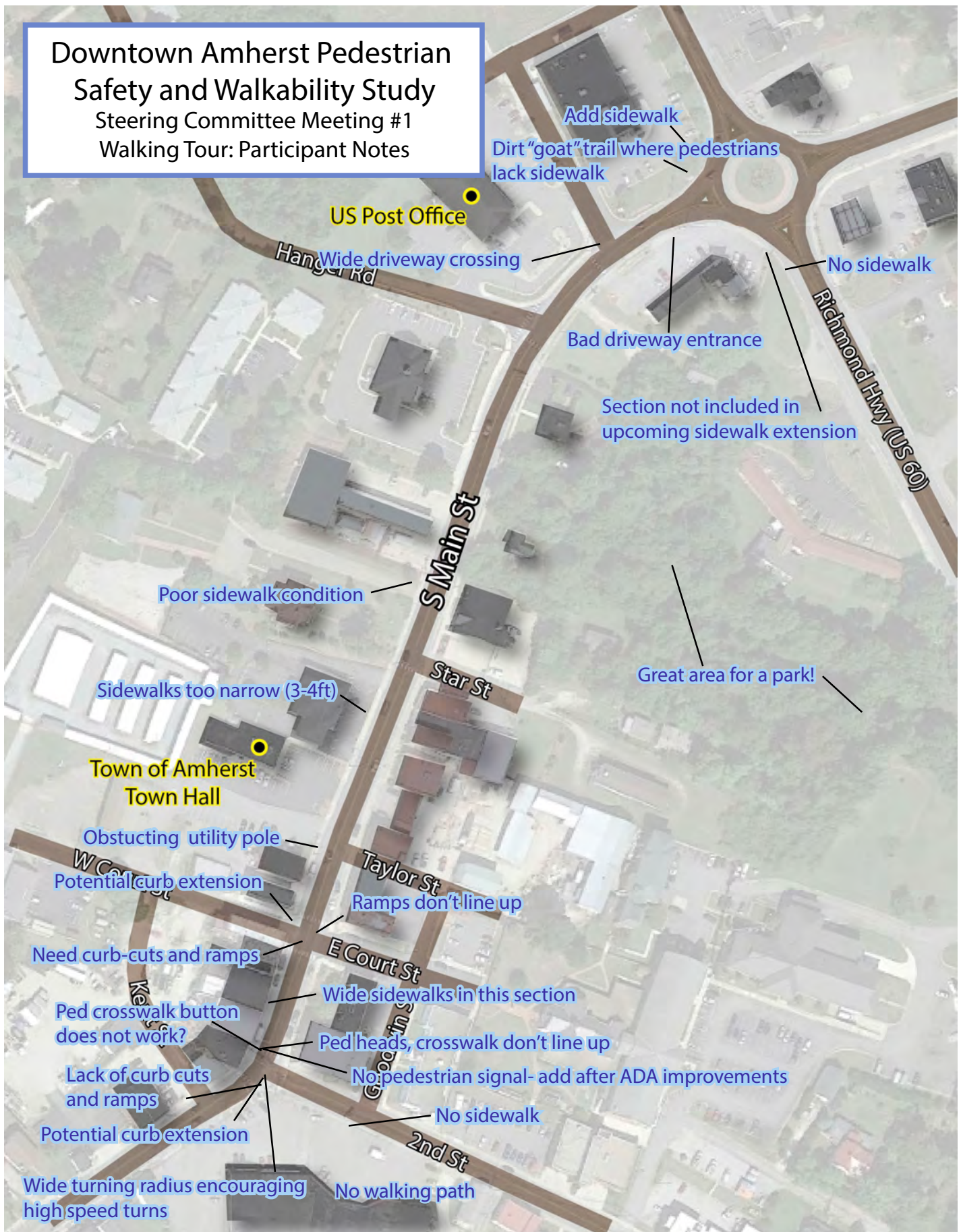
Steering Committee Meeting Two: Summary

The second steering committee meeting was held on September 26, 2016 in the Town of Amherst's Town Hall. The meeting began with a presentation that briefly reviewed the purpose, goals, and background of the study. After this introduction, the study team presented a "toolkit" of road designs and street elements that are commonly used to slow traffic and enhance pedestrian safety.

Following the presentations, the steering committee was given the opportunity to review the draft improvements recommendations that were being proposed by the study for Main St. Two other concerns that were raised during the meeting included:

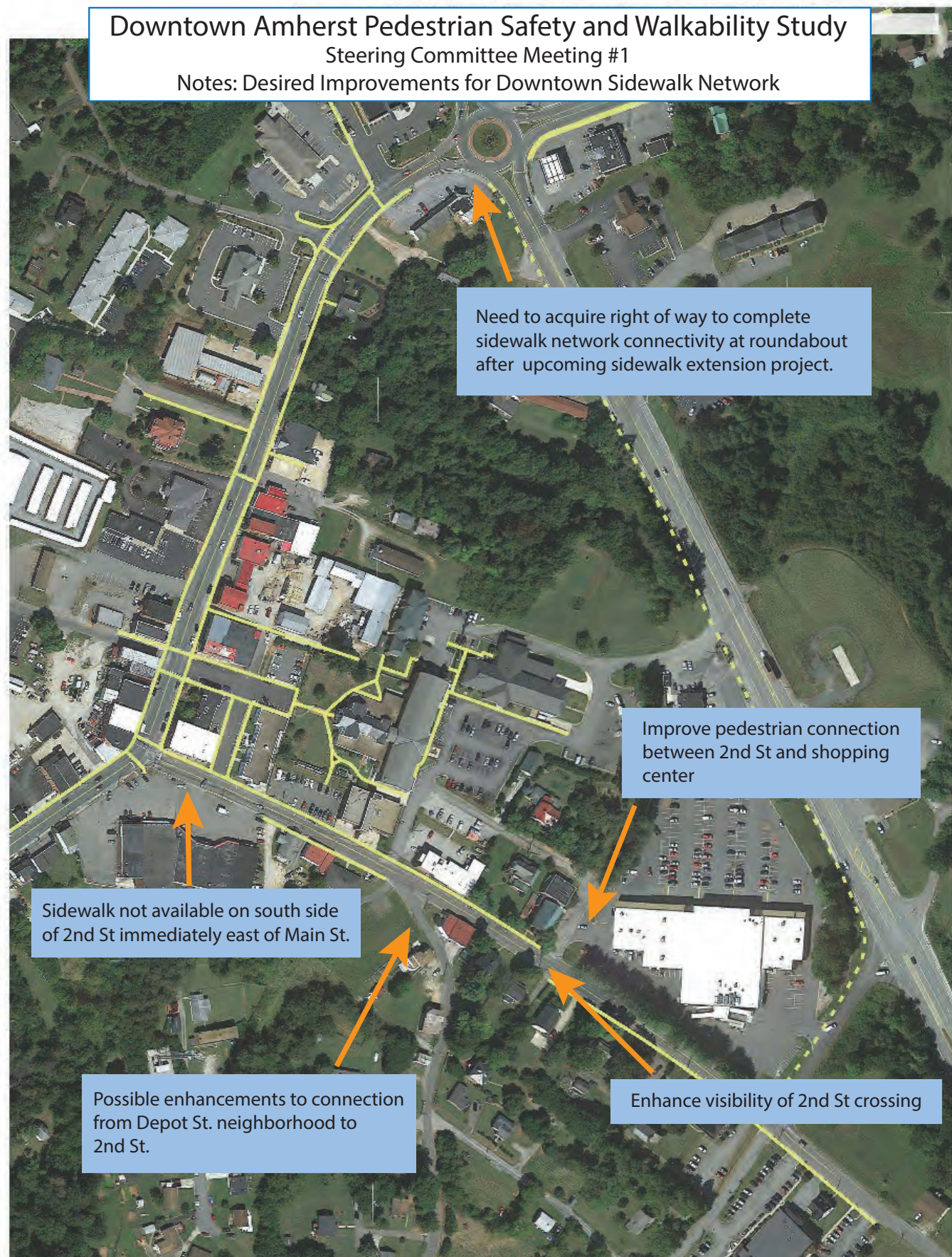
- **Crosswalk Design:** Some steering committee members expressed interest in using artistic or creative crosswalk markings in order to both enhance their visibility and to add aesthetic decoration to the downtown. The study team explained that these designs were restricted to neighborhood or local roads, but that new federal regulations did allow for some limited design variations on primary roads like Main St. Additional information about crosswalk design standards can be found in Appendix 11, with specific design guidelines provided on pages 87-90.
- **Utility Pole Relocation:** Several steering committee members voiced an interest in relocating utility poles or burying utility lines, which both create a sense of "visual clutter" along Main St. and present obstacles to movement on the sidewalks. Study team representatives explained that efforts to bury utility lines are likely to be too expensive to be a viable solution, but that the Town of Amherst could call American Electric Power (AEP) in order to make them aware of their desire to move the utility poles to less obstructive locations on the sidewalk. Some localities have had success with this action in the past.

Figure 2: Main St Walking Tour Notes



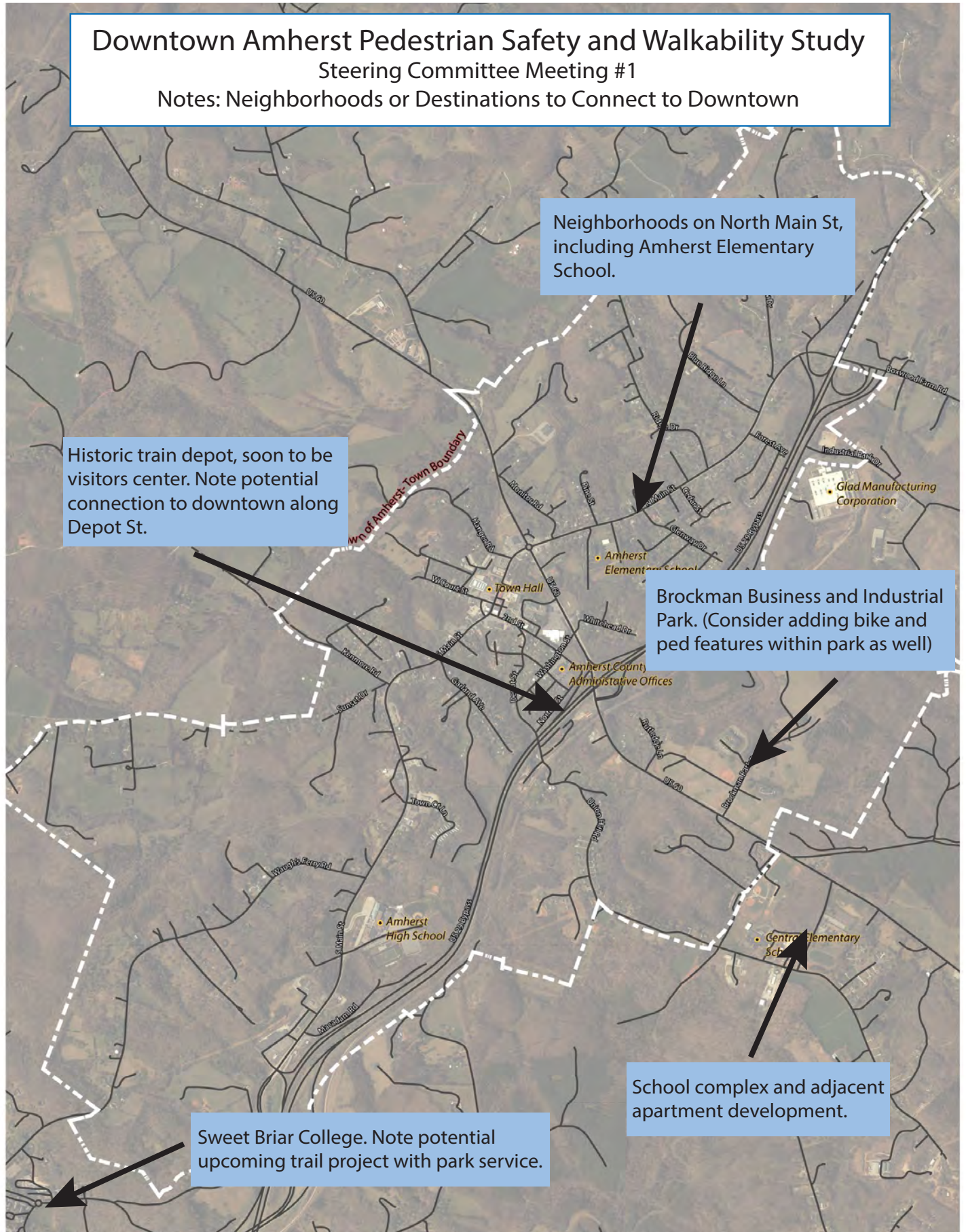
The notes highlighted in blue are a compilation of observations recorded by walking tour participants.

Figure 3: Desired Sidewalk Network Improvements



The notes recorded in the blue boxes are observations made by steering committee members regarding desired improvements to the wider downtown sidewalk network. Existing sidewalks are shown as solid yellow lines.

Figure 4: Potential Downtown Connections



The notes recorded in the blue boxes are observations made by steering committee members regarding neighborhoods or destinations that could benefit from enhanced multimodal connections to downtown.

General Public Meeting

A general public meeting was held on October 18, 2016 in the Town of Amherst's Town Hall. The meeting had an open house format, during which attendees could review poster boards that explained the project recommendations. These recommendations are described in detail in Part III of this report, which begins on page 15.

Public feedback from the meeting was positive. Some concerns were voiced, however, including:

- Ensuring that the sidewalk extensions proposed in Phase 3 do not interfere with the loading zones of downtown businesses.
- Moving utility poles to less-obstructive locations during the sidewalk enhancements proposed during Phase 3, if not before.
- The desire for the town to explore the full range of funding sources for the streetscape improvements proposed for Phase 3, including possible public-private partnerships.



Members of the public review the study's proposed recommendations at the October public meeting.

Traffic Data Analysis

As part of the study effort, 72 hours of bi-directional hourly traffic counts were taken in the middle of the study corridor. Counting equipment was placed 100' north of Star St, just north of the Town Hall building. The counts were taken on a Thursday, Friday, and Saturday-- October 13th through October 15th, 2016. The counts were recorded in a manner that also provided speed and traffic gap information by direction. This information was used to assess mid-block pedestrian crossing possibilities. When examining if mid-block crosswalks should be provided, the primary considerations are the traffic volume and vehicle speeds in each direction, and the number of gaps in the vehicle flow during each hour that offer a sufficient time duration to allow a pedestrian to cross the street.

The results of the data collection effort are as summarized in Figure 5 below:

Figure 5: Traffic Data Collection Results

		Volume (vehicles/day)			Speeds			
Date		SB	NB	Total	85th percentile speeds SB	85th percentile speeds NB	Percent greater than 25mph SB	Percent greater than 25mph NB
Thursday	13-Oct	2579	3000	5579	27	25	31%	23%
Friday	14-Oct	3018	3557	6575	27	25	35%	22%
Saturday	15-Oct	2367	2640	5007	28	26	42%	23%

Per the results, it can be seen that traffic volumes vary considerably from day to day. Overall, however, the volumes are approximately 6,500 vehicles per day or lower. The 85th percentile speeds (that is, the speed that 85 percent of the vehicles travel at or under) are higher than the 25mph speed limit for southbound vehicles entering the downtown, though for the vehicles traveling north out of town the speeds are at or near the posted speeds. By inspection of the gap data (provided in the appendix), there appear to be ample gaps in traffic that exceed the 10 seconds of walk time required to cross Main St. This is based on a 40' wide street and traveling at 4.0 feet per second, a standard walk rate for adults.

Considering the travel speeds, gaps, and volume, it appears that mid-block crossings are acceptable. It is recommended, however, that in the future crosswalk signage be provided and the crossings marked using the high emphasis style pavement crosswalk markings, as illustrated in Figure 6 below.

Figure 6: Mid-Block Crossing Illustration



This image illustrates a proposed mid-block crossing with high emphasis pavement markings.

Accessibility Study

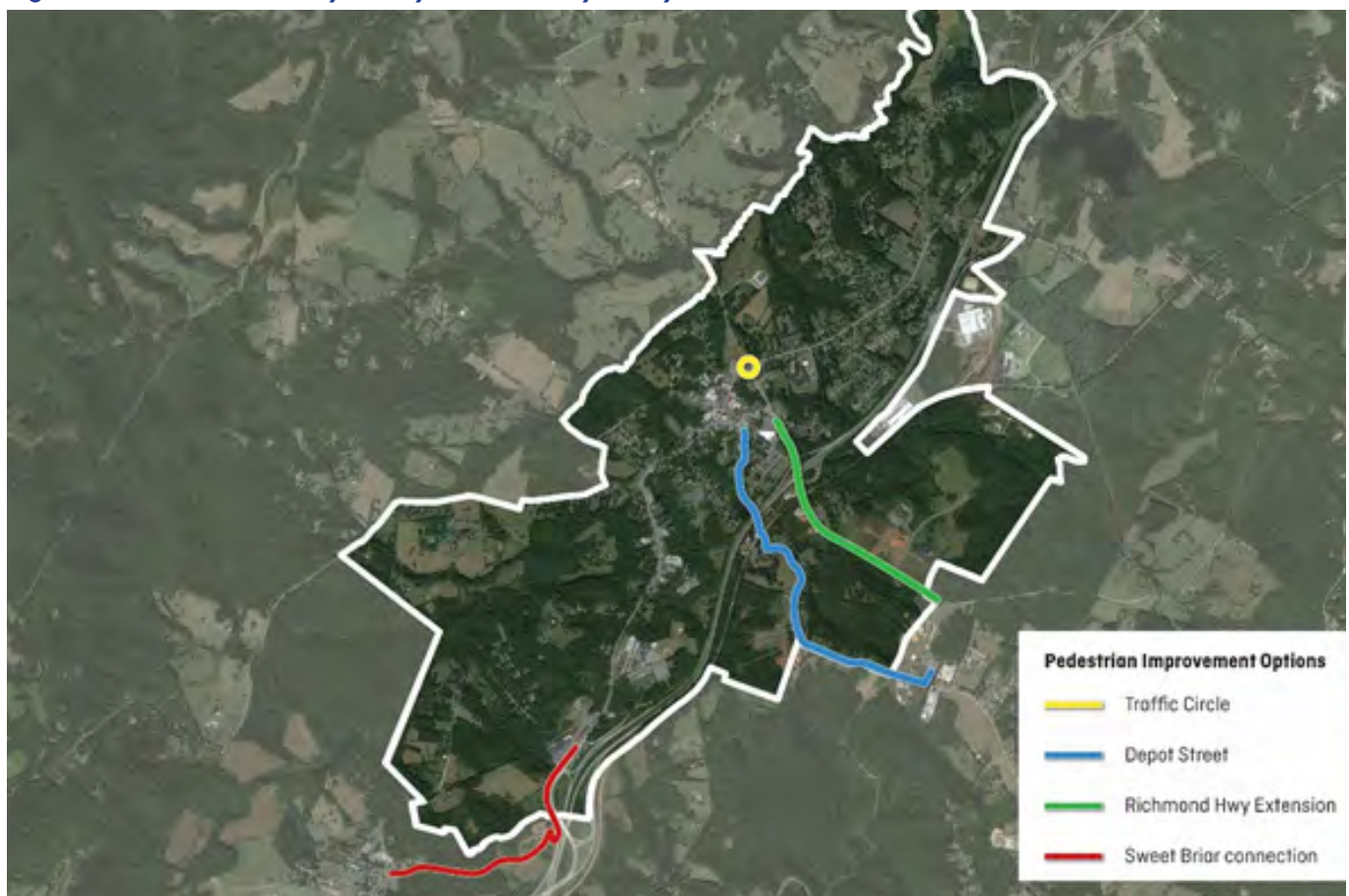
The focus of this study is walkability and pedestrian safety in downtown Amherst. The study also, however, identified potential extensions to the sidewalk network that the town could consider after the recommended downtown improvements.

The consulting team analyzed four potential extensions (see Figure 7 below): A trail from Sweet Briar College to Ambriar Shopping Center (the exact path would require further study), a sidewalk on Depot St from Second St to Central Elementary School, improving pedestrian safety at the Route 60 Traffic Circle by connecting the North and South Main St sidewalks, and a sidewalk on Route 60 from Washington St to Rutledge Hill Apartments.

The consulting team used a Geographic Information Systems (GIS)-based tool that calculates multimodal accessibility (MMA) to examine the benefits of each extension. The MMA tool is used to study how well a transportation project improves access to job centers, such as downtown Amherst. The findings for each extension are listed below. The results indicate the percent increase of total jobs in the town that could be reached on foot by residents within a 30 minute walk after the proposed improvements.

1. **Depot St:** More than a 30% increase
2. **Traffic Circle:** 15 to 30% increase
3. **Richmond Hwy Extension:** Less than a 5% increase
4. **Sweet Briar Connection:** Less than a 5% increase

Figure 7: Extensions Analyzed by Accessibility Study



This map illustrates the four sidewalk network extensions analyzed by the Accessibility Study. Extensions are coded by color, as defined in the map legend.

Part III: Recommended Improvements

Using the information gathered during the study and best practices of transportation design, concepts were developed to enhance the ability to walk and bicycle along Main St in the study corridor. The improvement recommendations are organized into three phases that allow for both short term, low cost improvements, and also longer term, higher cost improvements. Each successive phase builds on the preceding phase. The two initial phases identify improvements that can occur with the pending VDOT repaving project estimated to commence in mid-2017. **These will incur no costs to the town.** The final phase(s) may be five or more years into the future per required time to procure funding, finalize designs, and complete construction.

A description of each phase is as follows:

Phase 1

Pedestrian signalization improvements to the intersection of Second St and Main St (completed during study phase) and sidewalk ramp improvements along Main St

This phase will be completed in coordination with the pending VDOT repaving effort for Main St.

During the study phase the project steering committee conducted a walking tour along the sidewalks on Main St in an effort to identify issues and concerns relative to walkability, as well as to identify opportunities to make the downtown environment more inviting for pedestrians and bicyclists.

During this walk it was noted that the intersection at Second St and Main St did not provide pedestrian signal heads or curb ramps for handicap accessibility to the crosswalk. This concern was communicated to VDOT and in November of 2016 the pedestrian signal equipment was improved to include the pedestrian signal heads. The addition of the missing curb ramps at this intersection and other locations along the study corridor will occur in coordination with the pending VDOT repaving effort in 2017.

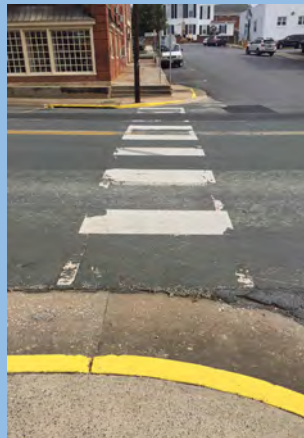
The Phase 1 improvements are illustrated on the following page in Figure 8, which is a summary graphic that was presented in the project community meeting. The cost for these improvements are included in the VDOT maintenance funds to be utilized for the repaving effort. As such, these changes will be made at no cost to the Town.

Missing Sidewalk Ramps

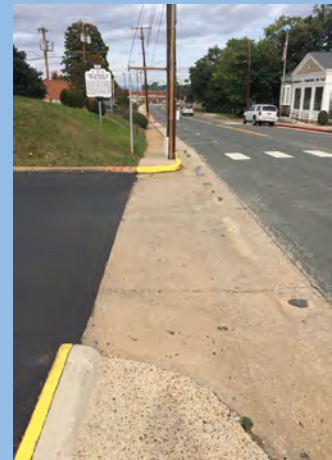
S. Main St
at
2nd St



S. Main St at Court St



S. Main St
(Bank of the James
driveway)



Missing Pedestrian Signals

S. Main St
at
2nd St



These graphics were used during the public meeting to illustrate the location of sidewalk ramp and pedestrian signal improvements that are proposed in Phase 1. The missing pedestrian signals were subsequently added in November 2016.

Phase 2

Pavement marking improvements from the traffic circle at Route 60 to just beyond Second St

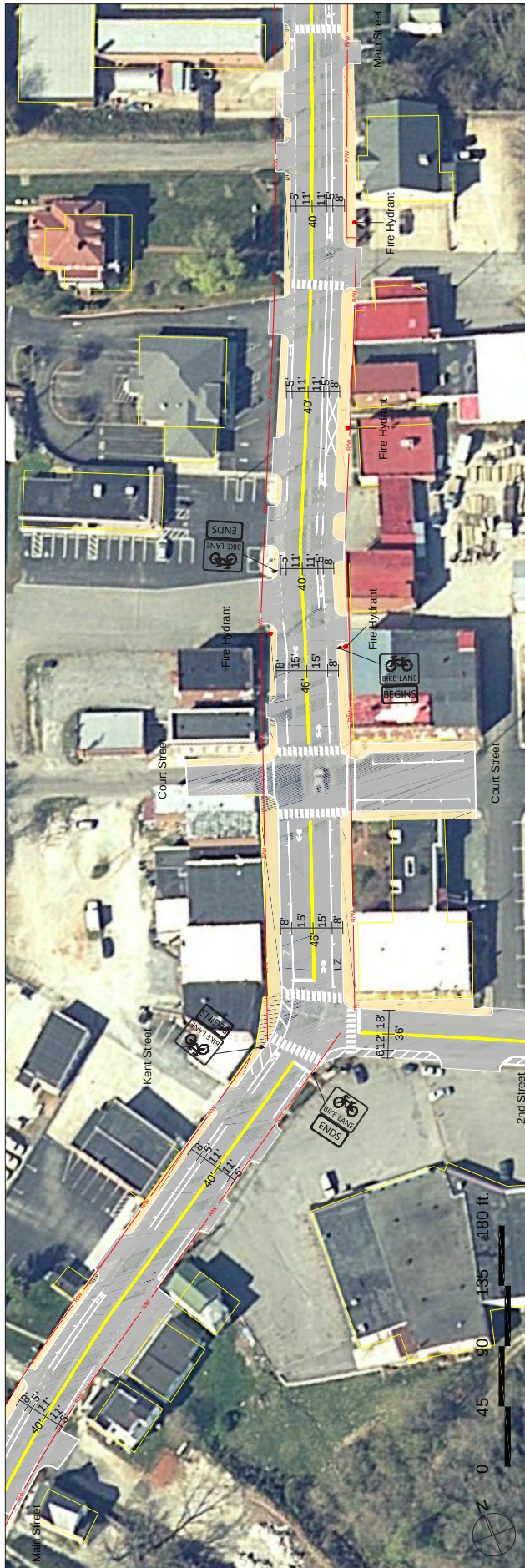
During Phase 2 of the project, the study concept will inform the placement of new pavement markings within the project limits. These improvements will also be made in coordination with the upcoming VDOT repaving effort. At present there are minimal pavement markings in the downtown. This creates an environment where motorists may travel at higher speeds due to what are perceived to be wide travel lanes. The new markings will provide bicycle lanes, formalized parking locations, and 11' wide lanes for vehicular travel. These enhanced markings will help create an environment that is more inviting to bicyclists, while also helping to slow vehicles due to narrower travel lanes. Access to existing fire hydrants will be maintained as required.

At Second St, the northbound turn radius from Main St will be re-marked in a manner that gives a sense of a tighter turning radius in an effort to slow down the turning vehicles. Two loading zones on Main St just north of Second St are preserved. Overall, there is a small impact to the on-street parking supply-- estimated to be a loss of approximately 4 spaces town-wide. Additional markings are shown at the traffic circle to take space that could be used for future sidewalk improvements (shown in Phase 3) while still providing sufficient pavement widths for vehicular movements.

The Phase 2 marking concept is illustrated in Figure 9 on the following page. These images can also be viewed at a larger scale in Appendix 1. The cost for these improvements are included in the VDOT maintenance funds to be utilized for the repaving effort. As such, there will again be no cost to the Town.

Phases 1 and 2 will occur in coordination with the pending VDOT Main St (Route 29 Business) repaving effort. It is important to know that the study corridor constitutes only one portion of this repaving project. The full project will extend from the Route 29 Bypass overpass in the north to approximately Nicewood Pl in the south. As a further improvement to the ability to bicycle along Business Route 29, VDOT is creating pavement marking plans for bicycle lanes to both the north and south of the project study limits. These improvement will create contiguous bicycle lanes from Grandview Dr to the traffic circle along North Main St, and from just south of Second St to the library along South Main St. South of the library, the posted speed limit increases to 45mph. Due to safety considerations, bicycle lanes are typically not provided on roads with these vehicular speeds. As a result, bicycle lanes will not be provided south of the library, though "share the road" signs will be erected.

Figure 9: Recommended Phase 2 Street Markings



This graphic illustrates the pavement markings that are recommended for the study corridor following the upcoming repaving project. The southern half of the corridor is shown in the top image, while the northern half is shown below it. The existing right of way is marked by red lines, and the existing sidewalks are shown in beige.

Phase 3

Curb extensions, traffic circle pedestrian crossing improvements, and streetscaping

Phase 3 is the most transformative and cost intensive phase of the overall plan. Due to cost implications, Phase 3 is broken into a Phases 3A and 3B. Phase 3A includes sidewalk improvements and curb modifications, while Phase 3B includes the addition of streetscaping hardware and landscaping.

Phase 3A

In Phase 3A, the sidewalks will be rebuilt to improve the sidewalk ramps, walking surfaces, and driveway aprons. Where parking does not exist in proximity to intersections, curbs will be extended to create more space for people to gather or walk, while also providing space for streetscape hardware (benches, bicycle racks, trash cans). The curb extensions also create a more inviting place for crosswalks due to the resulting shortened crossing distances and improved sight-lines between pedestrians and drivers.

The design of these improvements will be heavily driven by community input. Typical issues to consider may include:

1. Sidewalk finish (options range from typical sidewalk color, brick banding, pattern stamped red concrete, pavers, etc.)
2. Final locations of curb extensions (considers locations of loading zones and additional widened sidewalk sections for features such as café space)
3. Opportunities to underground utilities (cost intensive but desired by the community)
4. Planning for underground conduits and junction boxes for future lighting (added as Phase 3B)
5. Space for landscaping and street trees (added as Phase 3B)

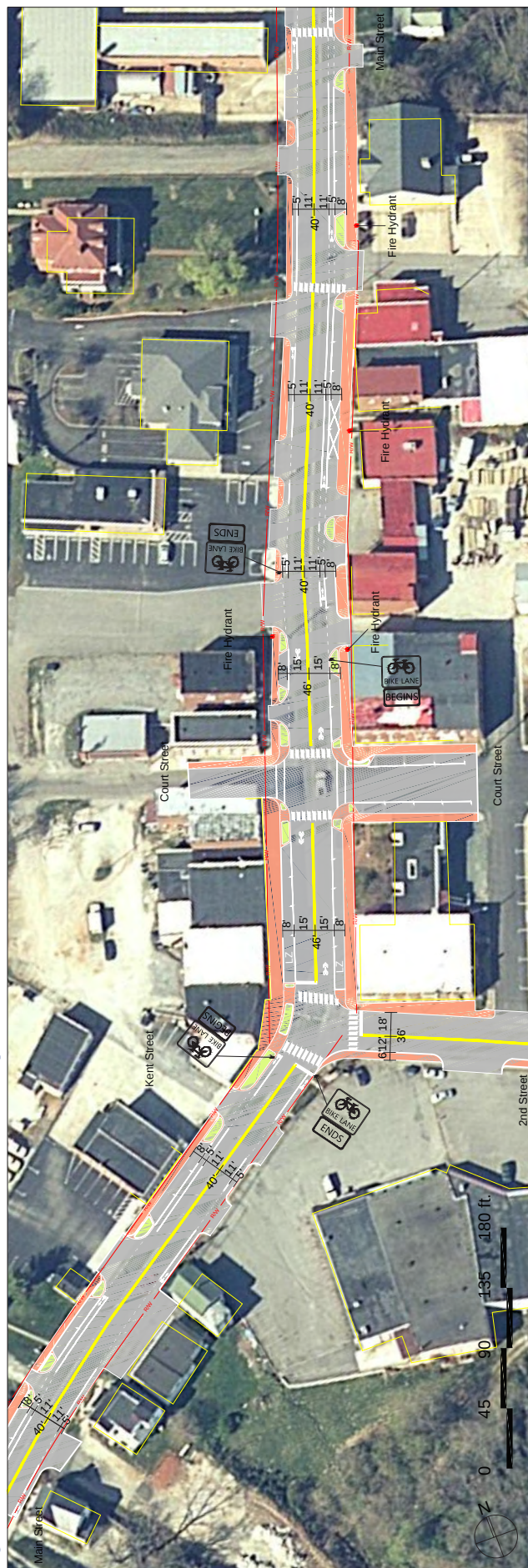
As discussed in the implementation section of this document, it may be advantageous to break out the improvements at the traffic circle as an initial effort in order to compete for federal safety funds. The larger street scape project may require funding from a different VDOT funding source. Funding sources are further discussed in the implementation section of this document.

Another important discussion that will need to be conducted as part of more detailed Phase 3 planning effort pertains to the potential to reduce or remove the presence of overhead utilities from the downtown environment.

Removal of overhead utility lines from Main St is a highly desirable enhancement. It would improve walkability by eliminating utility poles from the sidewalk while also improving the appearance of the town by removing the visual clutter. There are multiple strategies for this type of improvement, including consolidation of the overhead electric and communications lines onto one side of the road, relocation of all of the utility poles to positions behind the buildings or on adjacent blocks, and/or building conduit duct banks for undergrounding of the utilities. Undergrounding and/or relocation of utilities is very expensive and would require a separate study to fully evaluate the options and costs.

The Phase 3 improvements are illustrated in Figure 10 on the following page. These images can also be viewed at a larger scale in Appendix 2. There are several options and strategies that the Town may pursue to obtain funding for this work, which is initially estimated on a planning level to be in the order of \$1,475,000. This cost does not include the undergrounding of utilities, or other unforeseen utility work that may be conducted in coordination with the streetscape project.

Figure 10: Recommended Phase 3 Sidewalk Improvements



This graphic illustrates the sidewalk improvements that are recommended for the study corridor in Phase 3. The southern half of the corridor is shown in the top image, while the northern half is shown below it. New sidewalks and curb extensions are shown in red, but final sidewalk material selections may change in the design process.

Phase 3B

Phase 3B includes the addition of streetscape features to the improvements discussed in Phase 3A. In the study effort's community meeting, various options for hardware styles were presented. Examples ranged from architectural, utilitarian, minimalistic, modern, contemporary, and historical. Representative examples of options are included in Appendix 10 of this document. Typically in historical towns in Virginia, the historical themed streetscape elements are used. It was noted, however, that there could be mix of styles-- such as using a more modern style for bicycle racks-- if this expressed as a preference by the community through the final design process. Final selection of specific streetscape hardware specifications (type and color) will be addressed during the final design phase. A discussion of implementation strategies is presented in the implementation section of the document.

The Phase 3 improvements are illustrated in Figure 11 on the following page, which was also presented in the project community meeting. There are several options and strategies for the Town to pursue to obtain funding for this work, which is initially estimated on a planning level to be on the order \$225,000.

Figure 11: Phase 3B Summary Graphics

S. Main St at 2nd St
(Facing North)



Downtown Amherst Rendering 1 - Scenario 1



Downtown Amherst Rendering 1 - Scenario 2



**Existing
Conditions**



Phase Three



Phase Three "B"

Near S. Main St at Star St
(Facing South)



Downtown Amherst Rendering 2 - Scenario 1



Downtown Amherst Rendering 2 - Scenario 2



The Amherst Town Development Area Study, which was completed in June 2016, included several renderings of possible improvements to the intersection of Main St and 2nd St. These renderings, which are shown below, include many of the same features recommended in Phase Three. Once again, these images are provided for illustrative purposes only.



These graphics were used during the public meeting to illustrate the appearance of Main St with streetscape elements such as benches, landscaping, and pedestrian-scale lighting that are recommended in Phase 3B. The top renderings were created during this study, while those in the blue box at the bottom were created for the Town Development Area study that was completed earlier in the year.

Long Term Considerations

In order to create a truly walkable environment, attention should not only be given to enhancing pedestrian features in destination areas such as downtown Amherst, but also to improving the pedestrian infrastructure along street corridors that connect the downtown area to surrounding neighborhoods and districts. These changes will allow people to safely and comfortably walk from their homes or offices to the downtown for a full pedestrian trip, rather than being required to drive and park before enjoying the walkable downtown environment.

Though the planning of specific improvements of this nature is beyond the scope of this study, there are four project recommendations or endorsements that are made here as considerations for future study and planning by the Town of Amherst. These recommendations are based on public comments and the aforementioned accessibility study described on page 14 of this report.

Second Street

As is shown in Figure 3, several comments were made by residents during the study about the desire to see pedestrian improvements along Second St. These include the addition of missing sidewalks, the enhancement of crosswalk visibility, and the improvement of connections to Depot St and the shopping center. Given the importance of this street in providing access to and between destinations in the downtown area, these improvements are recommended as priorities for the Town of Amherst.

Depot Street

Public comments and the accessibility analysis both indicated that Depot St is an important corridor for providing access to and from downtown Amherst. It connects the downtown with numerous homes, the Town's future Visitor's Center, Central Elementary School, and Amherst Middle School. The accessibility study indicated that multimodal improvements to Depot St would increase the number of jobs accessible within a 30 minute walk by over 30%, which was the largest gain of the four potential connections that were studied. This study strongly recommends the future planning and addition of bicycle and pedestrian infrastructure along this corridor.

Richmond Highway (Route 60)

Improvements to Richmond Highway (Route 60) could enhance multimodal connections to downtown Amherst from several destinations on the east side of town, including the Brockman Business and Industrial Park and the Rutledge Hills Apartments. In particular, this study endorses the proposed addition of sidewalks to the bridge over the Route 29 Bypass if and when it is reconstructed.

Sweet Briar College Trail

This study also endorses the proposed multi-use trail that would connect Sweet Briar College to the Ambriar Shopping Center on South Main St. Though not creating a direct connection between the college and the downtown, the trail would provide safer and more direct access from the College to Main St, as well as increasing the level of multimodal travel in the Town in general.

Part IV: Implementation

Implementation Strategies

Phase 1

Phase 1 recommendations are expected to be implemented immediately preceding or during VDOT's Main St. repaving project that is scheduled for mid-2017. The missing ADA sidewalk ramps will be added to the street as part of this road maintenance project. As noted previously, the missing pedestrian signal heads were added during the study period.

Phase 2

The new pavement markings recommended by Phase 2 of this study are expected to be added to the road immediately following the Main St. repaving project in mid-2017. The official marking plans will be finalized by VDOT, but are expected to be very similar, if not identical, to the concept proposed here. In addition to providing guidance for the new marking scheme, this study has facilitated and satisfied requirements for public review and official Town approval, both of which are required by VDOT for these changes.

Phase 3

The recommendations proposed in Phase 3 will require the Town of Amherst to obtain funding beyond that provided by routine road maintenance. In order to minimize direct costs to the Town itself, it is suggested that the Town pursue transportation improvement grants offered by state and federal funding sources. Due to the size of the overall project, the most feasible funding source may be SMARTSCALE through VDOT (described in greater detail on page 26). Considering the entire Phase 3 effort, the opinion of costs is approximately \$1,700,000, inclusive of the streetscaping elements described as Phase 3B.

The fact that the Town of Amherst has conducted this study and has identified specific strategic improvements will allow this project to be more competitive for these grants. Furthermore, the completed Town Development Area study ensures that the project will be eligible for SMARTSCALE funding. Depending on the availability of funding and the scope of improvements supported by the grant programs, it may benefit the Town to implement Phase 3 in multiple steps.

Phase 3A: Sidewalk Improvements

The core element of Phase 3 is the enhancement of the sidewalks on Main St. This will primarily include improving the sidewalk surfaces and adding curb extensions at strategic locations.

Part 1: Traffic Circle Improvements

Phase 3A could potentially be further divided by pursuing funding for the sidewalk and crossing improvements proposed for the traffic circle intersection of Main St. and Route 60 as a separate project from the sidewalk improvements suggested for the rest of the study corridor. This both reduces the cost of each grant request and could allow the Town to access funding sources that specifically address the context of that intersection, including safety and access improvements to an economic center.

The Highway Safety Improvement Program (HSIP) is a potential funding source and is the same used for the soon to be constructed sidewalk along Route 60. Another option could be to use the Transportation Alternatives Program (TAP) which is specifically aimed at enhancing sidewalk and trail connectivity. TAP includes the Safe Routes to School funding, which may be particularly applicable due to the proximity of the elementary school to the north

of the roundabout. Finally, the project could also be submitted for SMARTSCALE funding in the 2018 grant cycle.

The recommended funding path is through either HSIP or TAP. Coordination with VDOT should occur as soon as possible in order to line up the necessary grant applications. If using the Safe Routes to School (TAP) funding, coordination with Region 2000's Local Government Council and Central Virginia Metropolitan Planning Organization should occur as the CVMPO often assists with the TAP grants.

A critically important step in the funding application process will be the determination if all improvements can be made within existing right-of-way. If right-of-way is needed, such as in northwest quadrant where the existing landscape islands will need to be converted to sidewalk and a crosswalk landing area, advance discussion and coordination with that landowner is advisable. Assuming that there is currently insufficient right-of-way for the improvements, a sidewalk easement or right-of-way as needed for the proposed improvements should be arranged.

An opinion of probable costs was developed based on the planning level work performed to date. Without right-of-way and utility relocations, the investment needed to design and construct the project is approximately \$150,000.

Phase 3B: Streetscaping

Phase 3B includes the addition of streetscape elements such as landscaping, street furniture, and pedestrian scale lighting. These elements can be included in the curb extension effort or added after the initial sidewalk improvements made in Phase 3A. If this work is done as a later phase, the conduits and junction boxes for the lighting should be included in the initial sidewalk work. The Town may possibly utilize revenue share funding as well as explore potential public-private funding arrangements that allow downtown merchants to contribute money to these improvements. The opinion of costs for just the streetscape hardware elements such as benches, lighting, trash receptacles, bicycle racks, and landscaping is estimated at approximately \$225,000.

Undergrounding of Utilities

The idea of undergrounding the existing overhead utilities was discussed in the community meeting and among the project steering committee. Undergrounding of utilities is a complex and expensive effort, and estimating a cost to do so is difficult without information regarding other underground utility conflicts. However, a rule of thumb cost (order of magnitude), which includes relocating the overhead utilities to underground duct banks and access vaults, and also running new service to existing businesses, is approximately \$1,000 per linear foot. The project area from just south of Second St to Route 60 is approximately 1,500 feet. Thus, a cost of approximately \$1,500,000 is estimated for this work.

Cost Estimates

Figure 12: Opinion of Probable Costs

Phase 3	
Phase 3A	\$1,475,000
Phase 3A- Roundabout Improvements	\$150,000
Phase 3A- Remaining Improvements	\$1,325,000
Phase 3B	\$225,000
Phase 3 Total	\$1,700,000
Other	
Undergrounding of Utilities	\$1,500,000

Funding Sources Summary

SMART SCALE

Purpose	SMART SCALE is a statewide program that intends to distribute funding based on a standard and objective evaluation of projects that will determine to how effectively they help the state achieve its transportation goals.
Funding	There are two main pathways to funding within the SMART SCALE process—the construction District Grant Program (DGP) and the High Priority Projects Program (HPPP). A project applying to funds from the DGP is prioritized with projects from the same construction district. A project applying for funds from the HPPP is prioritized with projects statewide. The CTB then makes a final decision on which projects to fund.
Eligible Projects	Projects must address improvements to a Corridor of Statewide Significance, Regional Network, or Urban Development Area (UDA). The Town of Amherst's Town Development Area study qualifies the study area as a UDA. Project types can include highway improvements such as widening, operational improvements, access management, and intelligent transportation systems, transit and rail capacity expansion, and transportation demand management including park and ride facilities.
Eligible Applicants	Projects may be submitted by regional entities including MPOS and PDCs, along with public transit agencies, counties, cities, and towns that maintain their own infrastructure. Projects pertaining to UDAs can only be submitted by localities.
Evaluation Criteria	There are five factors evaluated for all projects: Safety, Congestion Mitigation, Accessibility, Environmental Quality, and Economic Development. MPOs with a population greater than 200,000 are also evaluated by land use policy consistency.
Website	http://www.vasmartscale.org/

Highway Safety Improvements Program (HSIP)

Purpose	Established by the federal transportation legislation MAP-21, this program is structured and funded to make significant progress in reducing highway fatalities and injuries on all public roads.
Funding	The Federal share for highway safety improvements is 90%, with certain types of projects (including, as relevant to this study, maintaining retro-reflectivity of pavement markings and the installation of traffic signs) eligible to be funded at 100%. If project cost is higher than what was originally submitted, the project manager and sponsor will be responsible for identifying sources for funding those estimates.
Eligible Projects	Projects involve the identification of high-crash spots or corridor segments, an analysis of crash trends and existing conditions, and the prioritization and scheduling of improvement projects
Eligible Applicants	Local governments, VDOT District and Regional Staff
Evaluation Criteria	• Evaluated on a statewide basis rather than on a local or district basis • Locations or corridors where a known “substantive safety” problem exists as indicated by location-specific data on severe crashes, and where it is determined that the specific project action can with confidence produce a measurable and significant reduction in the number and/or consequences of severe crashes • To achieve the maximum benefit, the focus of the program is on cost-effective use of funds allocated for safety improvements • Priority will be given to projects having higher total number of deaths and serious injuries
Website	http://www.virginiadot.org/business/ted_app_pro.asp

Transportation Alternatives Program

Purpose	This program is intended to help local sponsors fund community based projects that expand non-motorized travel choices and enhance the transportation experience by improving the cultural, historical, and environmental aspects of transportation infrastructure. It focuses on providing pedestrian and bicycle facilities and other community improvements.
Funding	TAP is not a traditional grant program and funds are only available on a reimbursement basis. It is therefore important to have the necessary funding available to pay for services and materials until appropriate documentation can be submitted and processed for reimbursement. The program will allow a maximum federal reimbursement of 80% of the eligible project costs and requires a 20% local match.
Eligible Projects	• Pedestrian and bicycle facilities such as sidewalks, bike lanes, and shared use paths • Pedestrian and bicycle safety and educational activities such as classroom projects, safety handouts and directional signage for trails (Safe Routes to School) • Preservation of abandoned railway corridors such as the development of a rails-to-trails facility
Eligible Applicants	Any local governments, regional transportation authorities, transit agencies, natural resource or public land agencies, school districts, local educational agencies, or school, tribal government, and any other local or regional government entity with responsibility for oversight of transportation or recreation trails
Evaluation Criteria	• Number of federal enhancement categories • Inclusion in a state, regional, or local plan • Public/private venture-cooperation (multi-jurisdictional) • Total cost and matching funds in excess of minimum • Demonstrable need, community improvement • Community support and public accessibility • Compatibility with adjacent land use • Environmental and ecological benefits • Historic criteria met, significant aesthetic value to be achieved and visibility from a public right of way • Economic impact and effect on tourism
Website	http://www.virginiadot.org/business/prehancegrants.asp

VDOT Revenue Share Program

Purpose	This program provides additional funding for use by a county, city, or town to construct, reconstruct, improve, or maintain the highway systems within such county, city, or town and for eligible rural additions in certain counties of the Commonwealth. Locality funds are matched, dollar for dollar, with state funds, with statutory limitations on the amount of state funds authorized per locality.
Funding	Application for program funding must be made by resolution of the governing body of the jurisdiction requesting funds. Project funding is allocated by resolution of the CTB. Project costs are divided equally between the Revenue Share Fund and locality funding.
Eligible Projects	• Supplemental funding for projects listed in the adopted in the six-year plan • Construction, reconstruction, or improvement projects not including in the adopted six-year plan • Improvements necessary for the specific subdivision streets otherwise eligible for acceptance into the secondary system for maintenance (rural additions) • Maintenance projects consistent with the department's operating policies • New hardsurfacing (paving) • New roadway • Deficits on completed construction, reconstruction, or improvement projects
Eligible Applicants	Any county, city, or town in the Commonwealth
Evaluation Criteria	• Priority 1: Construction projects that have previously received Revenue Sharing funding • Priority 2: Construction projects that meet a transportation need identified in the Statewide Transportation Plan or projects that will be accelerated in a locality's capital plan • Priority 3: Projects that address deficient pavement resurfacing and bridge rehabilitation • Priority 4: All other projects
Website	http://www.virginiadot.org/business/local-assistance-access-programs.asp#Revenue_Sharing

VDOT Road Maintenance

The VDOT Road Maintenance category of funding covers a wide variety of maintenance and operations activities. Road maintenance funds comprise the majority of VDOT's scheduled funding (versus new construction). Road maintenance funding addresses needs having to do with pavement management, signals, pavement markings, signs, stripes, guardrails, and ITS (Intelligent Transportation Systems) assets that are considered to be of critical safety and operational importance. Maintenance funding also addresses operation services comprising ordinary and preventative maintenance work such as cleaning ditches, washing bridge decks, patching pot-holes, debris removal, snow and ice removal, emergency response, incident management, mowing, and equipment management.

Development Proffer

Purpose	Developer contributions, known as proffers, provide one source of funding for capital facilities. Proffers are typically cash amounts, dedicated land, and/or in-kind services that are voluntarily granted to the locality to partially offset future capital facility costs associated with specific land developments. Recent legislation has limited the ability of local governments to receive proffers, but through the rezoning process developers may still consider providing infrastructure improvements.
Funding	The cost of the program can be financed with developer contributions
Eligible Projects	- Rezoning requests that permit residential and/or commercial uses in accordance with this policy - Limited to offsetting impacts that are directly attributable to new development - To "require" a proffer, a county must have completed an exhaustive study to document the real project costs
Eligible Applicants	Any land developers seeking a rezoning

Technical Appendices

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Appendix 1: Phase 2 Improvement Plan

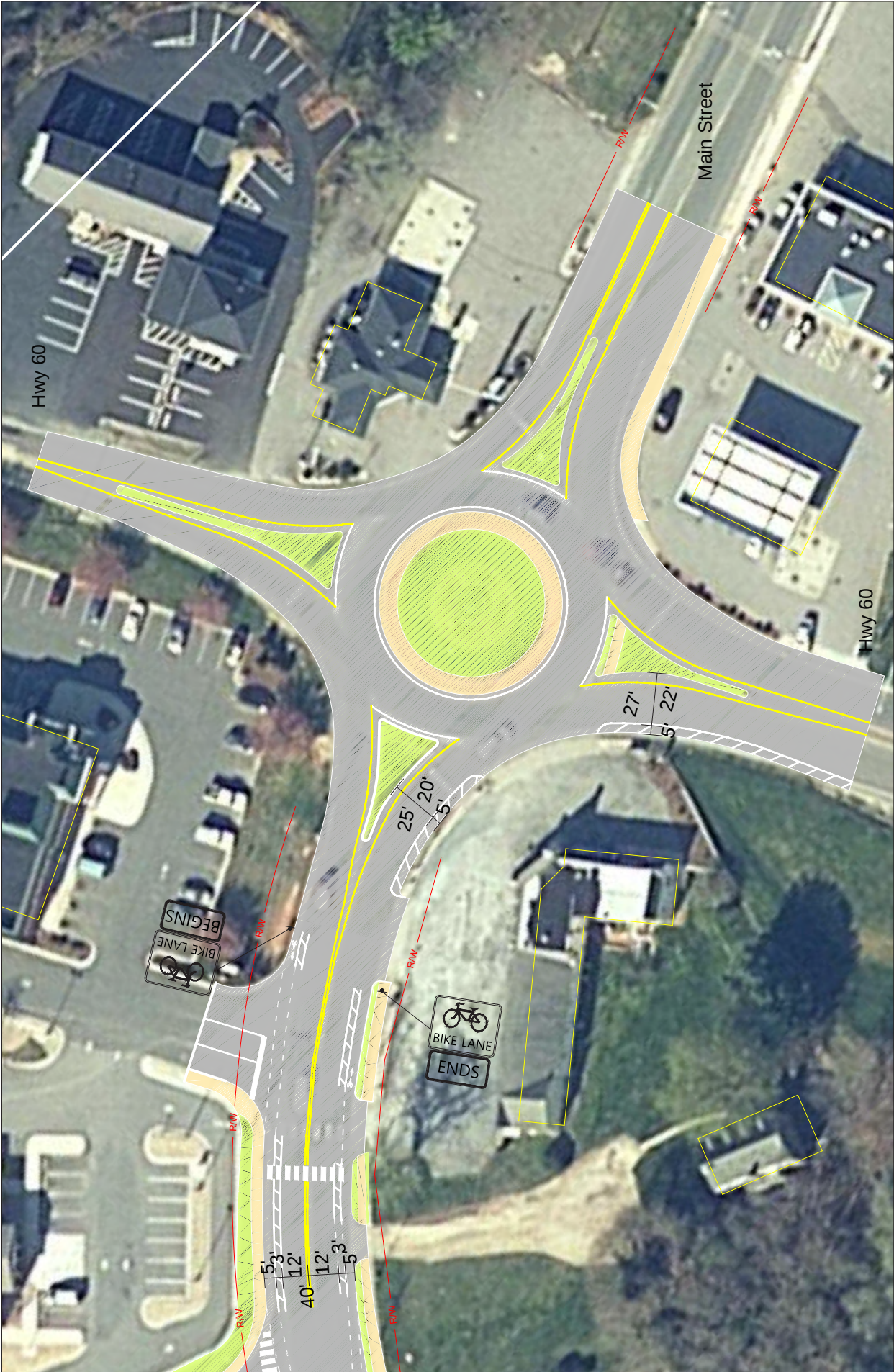


This graphic illustrates the pavement markings that are recommended for the study corridor in Phase 2. The four following pages display this image at a larger scale by dividing it into separate pages corresponding to the numbered red boxes.

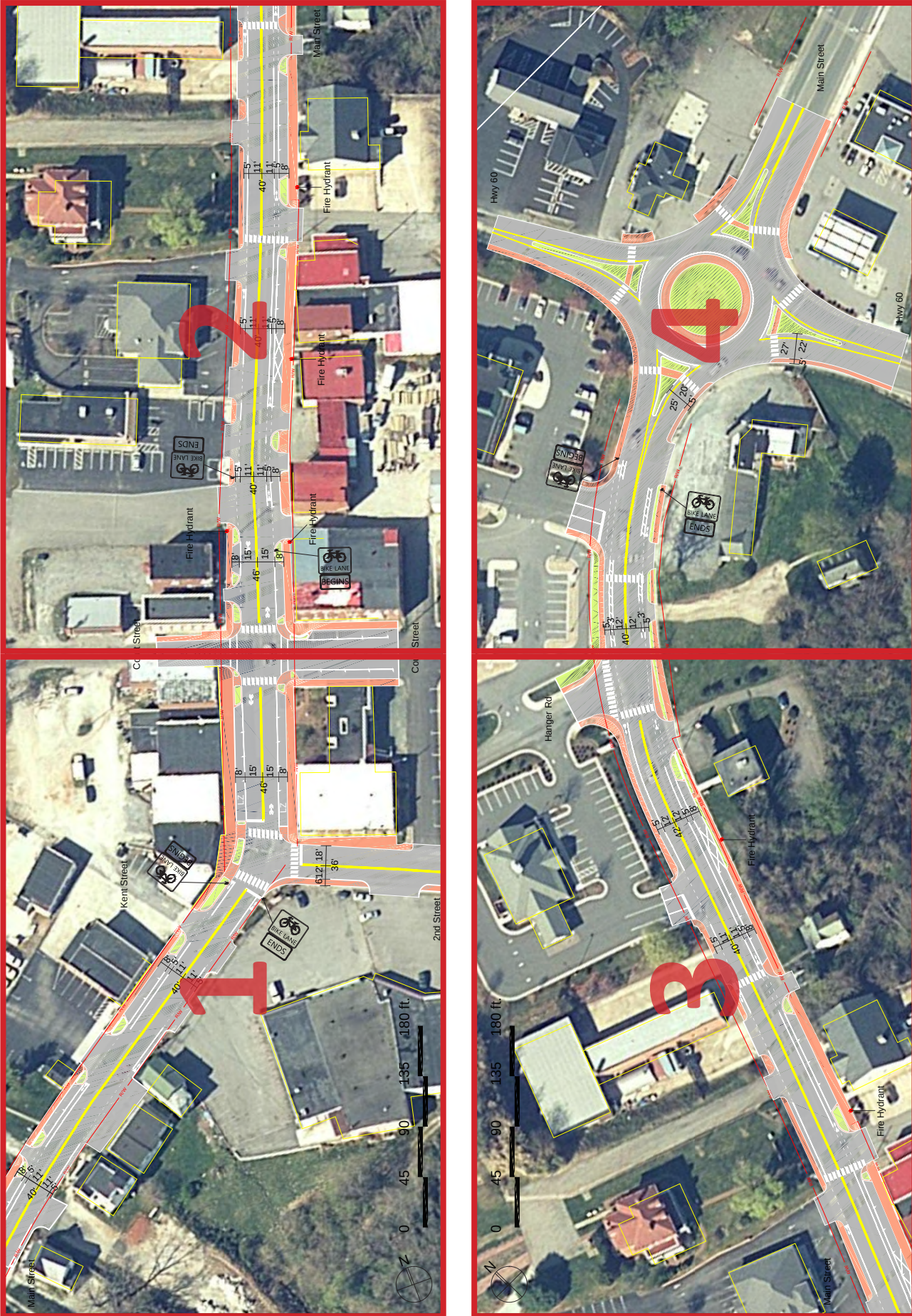




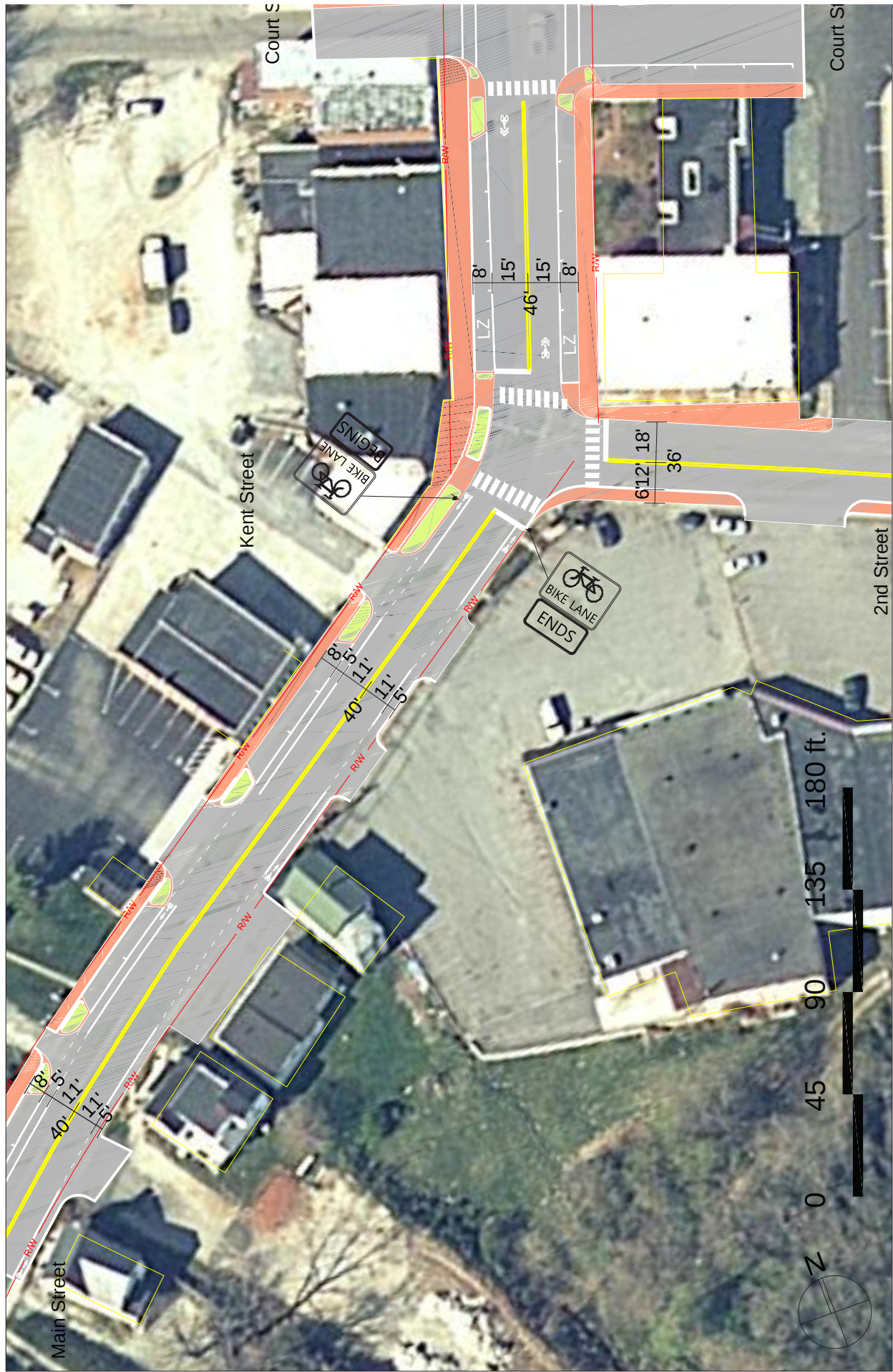




Appendix 2: Phase 3 Improvement Plan

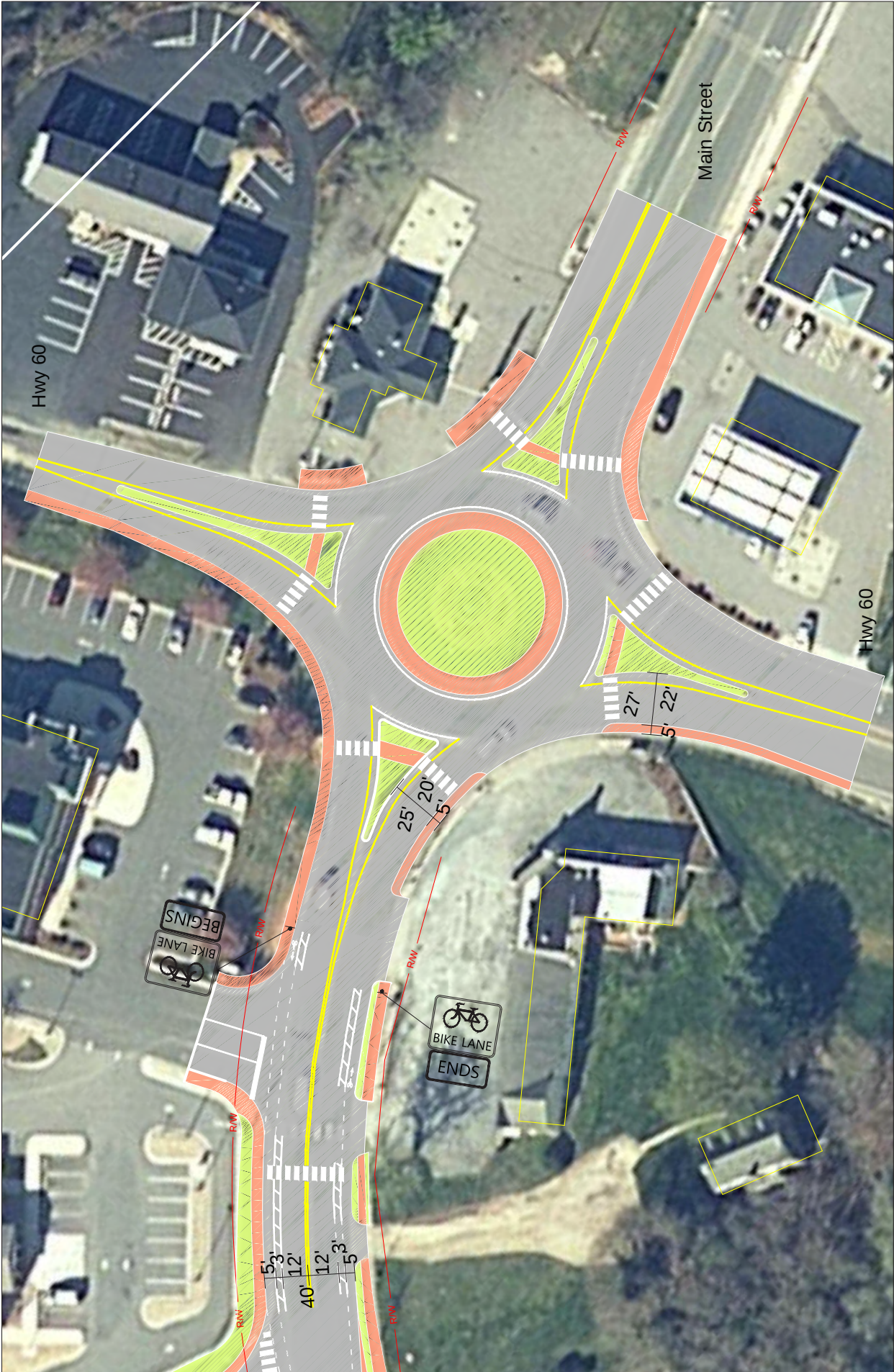


This graphic illustrates the pavement markings that are recommended for the study corridor in Phase 3. The four following pages display this image at a larger scale by dividing it into separate pages corresponding to the numbered red boxes.









Appendix 3: Steering Committee Meeting #1 Summary

WALKABILITY AND MAIN ST. TRAFFIC CALMING STUDY

Town of Amherst

Steering Committee Meeting- Friday, August 26, 2016

Meeting Summary

The first steering committee meeting for the Town of Amherst's Walkability and Main St. Traffic Calming Study was held from 2:00-5:00pm on Friday, August 26, 2016. It was held in the Council Chambers at the Town of Amherst's town hall. The meeting was attended by eight members of the public, as well as representatives from the Town of Amherst, the Virginia Department of Transportation (VDOT), and the Region 2000 Local Government Council.

The Town of Amherst's Town Manager, Jack Hobbs, opened the meeting by describing the purpose and goals of the study. Bill Wuensch of EPR then introduced the project consulting team and asked the meeting attendees to briefly introduce themselves to the group as well. After Mr. Wuensch reviewed the project schedule, Matthew Rehnborg of EPR led a short presentation of background information about the project study area. This was followed by a longer presentation by Mike Callahan of Renaissance Planning Group (RPG) that explained the principles and key elements of walkability and pedestrian safety.

Walking Tour

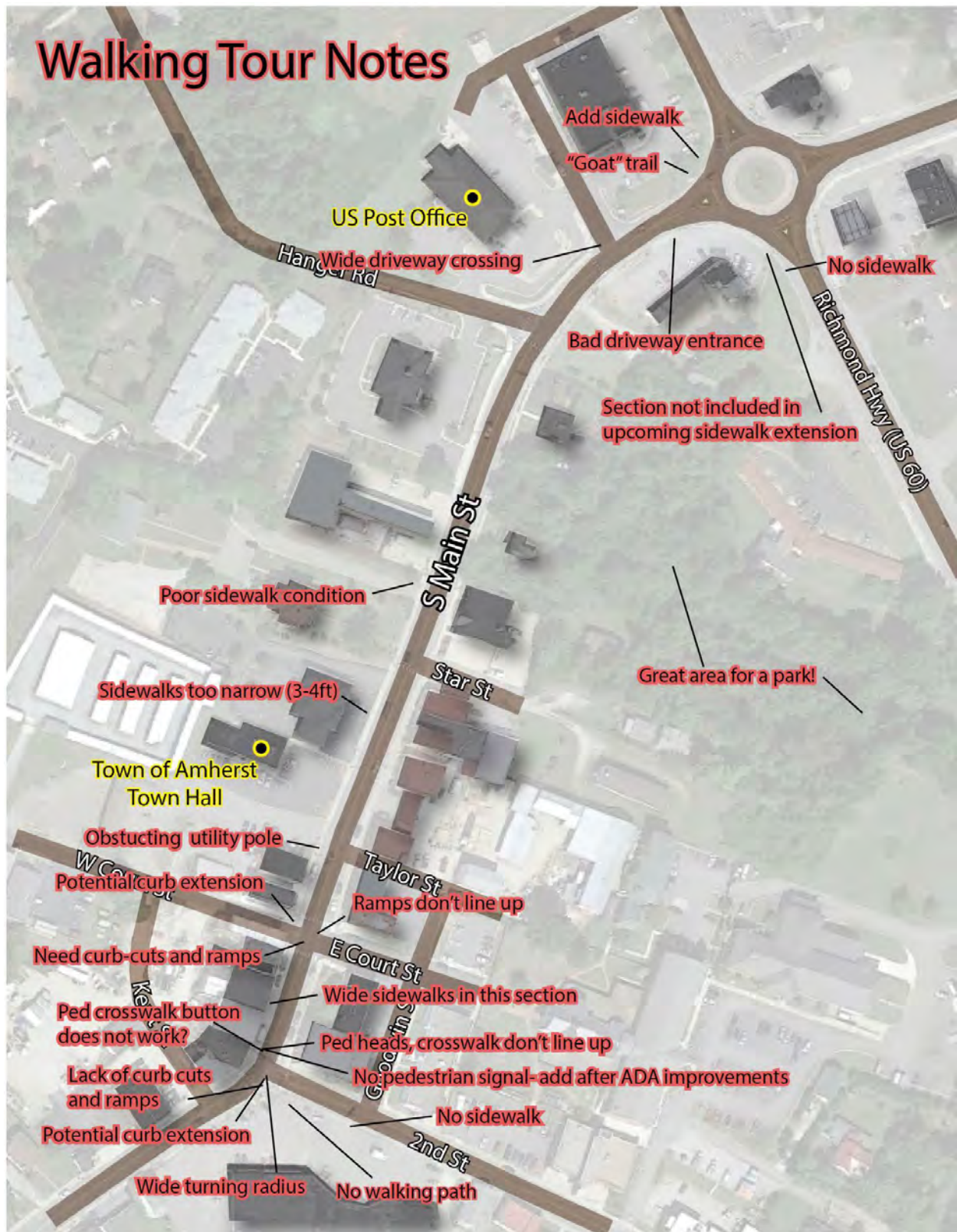
Following these initial presentations, the consulting team led meeting attendees on a walking tour of Main St from the intersection at 2nd St to the roundabout intersection with US 60. Participants were provided with maps, clipboards, and pens, and were asked to record their observations during the tour.

Site-specific observations have been documented in Figure 1 on the following page. Three locations or elements along the corridor received comments from multiple parties. First, many participants noted that the ADA access ramps at the intersections with both Court St and 2nd St needed to be rebuilt—some were poorly aligned with the crosswalks, while others simply were not available.

Secondly, numerous comments were made about the pedestrian crossing buttons for the traffic signal at the intersection of Main St and 2nd St. It was observed that there are no pedestrian signals to indicate when pedestrians should cross after they have pressed the button. Additionally, some participants expressed their doubts as to whether the activation of the pedestrian button did anything to change the signal phasing itself.

Finally, several comments were made about the area around the roundabout intersection of Main St and US 60. These were primarily concerned with the lack of sidewalks on the west and south sides of the roundabout, and the connectivity problems that this presents for pedestrians approaching downtown from the neighborhoods on N Main St.

Figure 1: Walking Tour Notes



In addition to these notes, several participants recorded general observations about the corridor. These included:

- Need for handicapped parking spots
- Need for signage on Main St. with directions to courthouse parking
- Deteriorated sidewalk surfaces
- Sidewalks are too narrow throughout
- Utility poles present obstacles
- Bike lanes desired
- Attention to aesthetics/appearance needed
- Utility poles and powerlines are so unattractive
- Disability access is difficult
- Lack of street trees all around
- Trash cans encroach on sidewalks
- No respect given to pedestrians in crosswalks

Sidewalk Network Connectivity

Following the conclusion of the walking tour and a debriefing discussion during which participants shared their observations from the field, the meeting continued with a discussion about the downtown sidewalk network. Enhancements to walkability on Main St will be most effective if pedestrians can access other destinations nearby the corridor in the town center area. Participants, therefore, were asked to identify sidewalk network deficiencies in the area bounded by Main St, US 60, Washington St, and 2nd St. These responses are documented in Figure 2 on page 4.

Surrounding Destinations

The meeting concluded with a brief discussion about destinations in the Town of Amherst that are not in the downtown area but could benefit from enhanced bicycle and pedestrian connections to the downtown. The study team noted that any specific improvement recommendations beyond the downtown area would be outside the scope of this current study, but would be documented for future consideration in the final report. Participant responses are documented in Figure 3 on page 5.

Figure 2: Sidewalk Network Notes

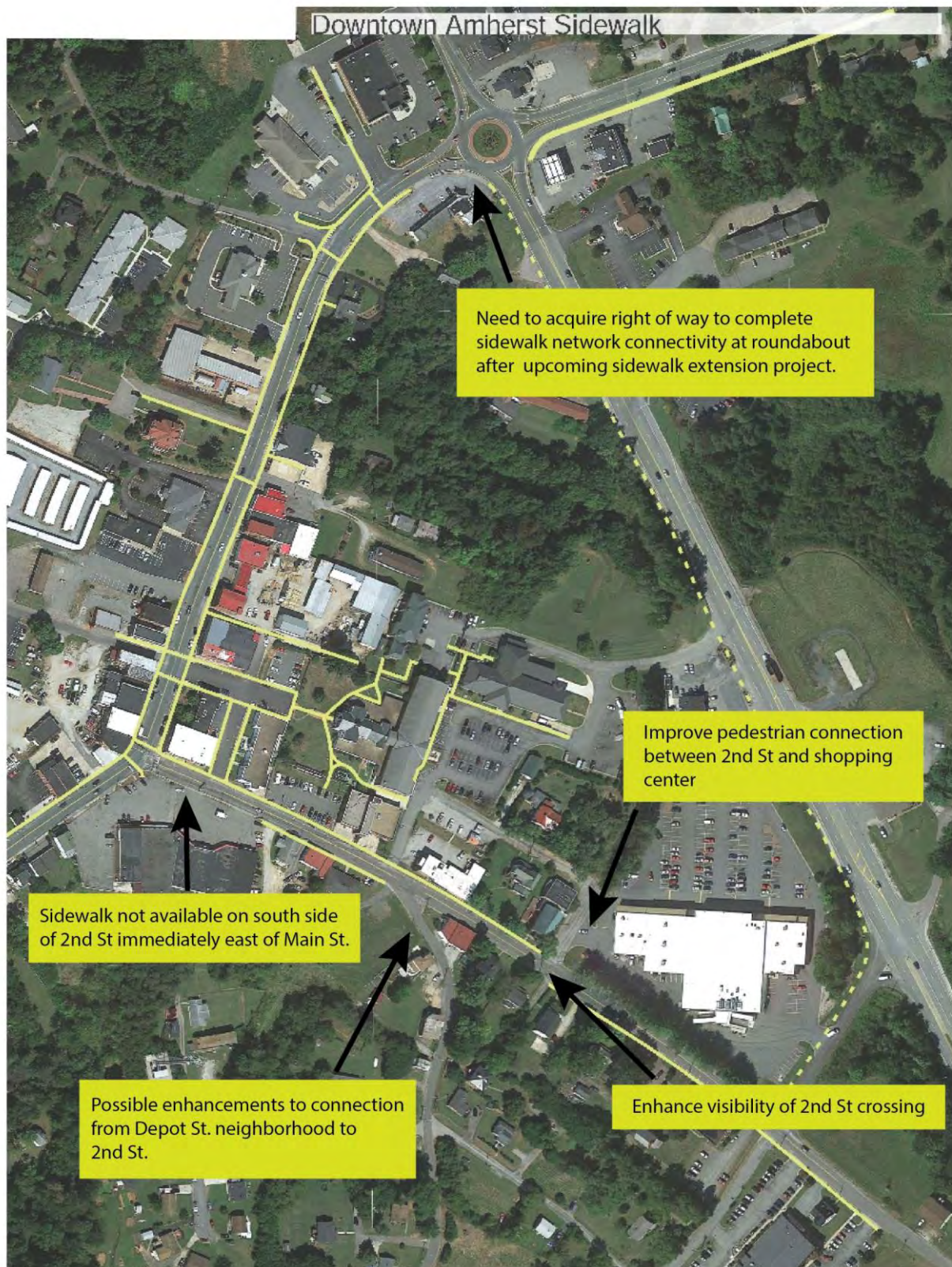
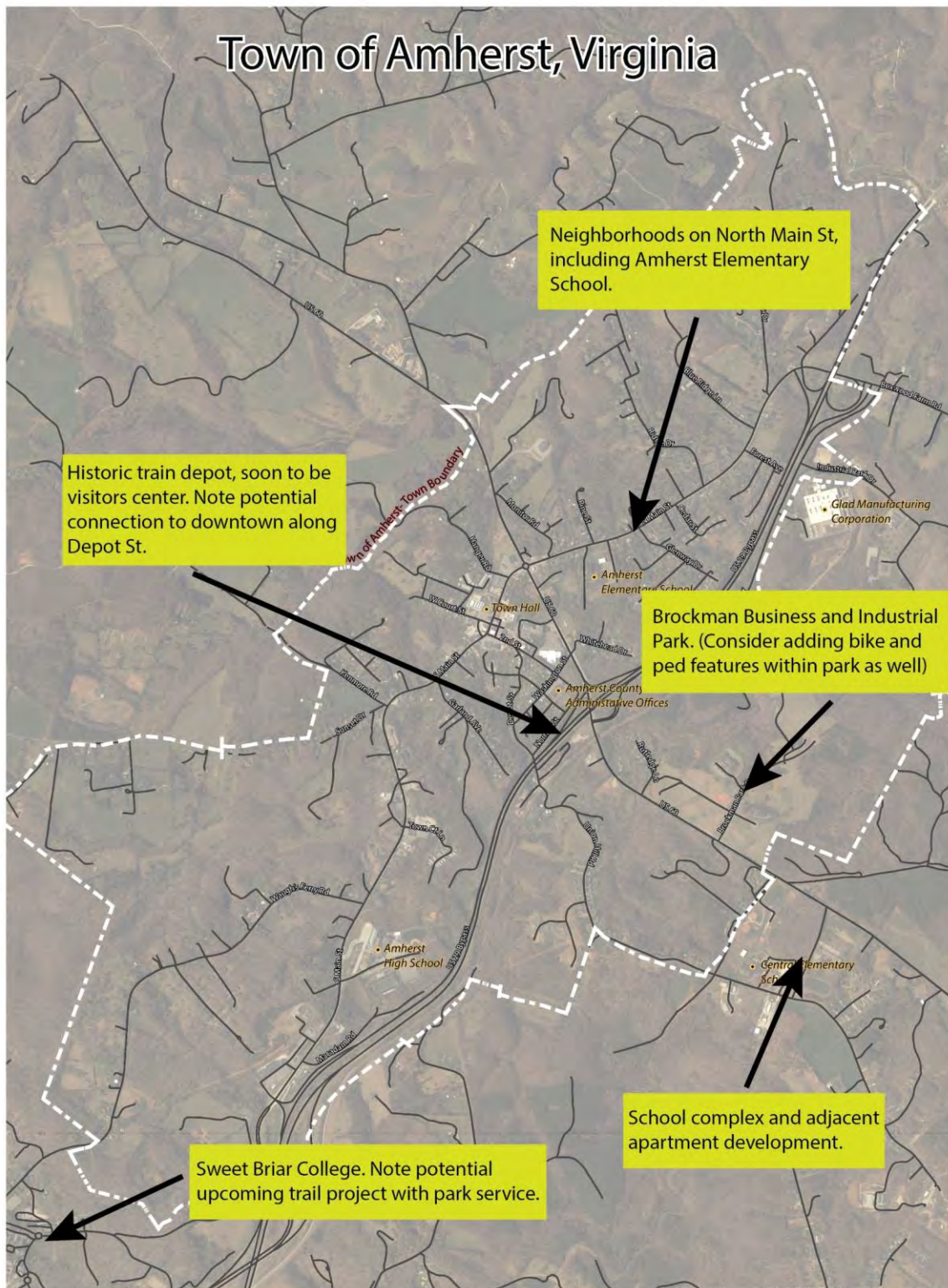


Figure 3: Potential Surrounding Destinations



Appendix 4: Steering Committee Meeting #2 Summary

WALKABILITY AND MAIN ST. TRAFFIC CALMING STUDY

Town of Amherst

Steering Committee Meeting- Monday, September 26, 2016

Meeting Summary

Meeting Summary

The second steering committee meeting for the Town of Amherst's Walkability and Main St. Traffic Calming Study was held from 3:00-5:00pm on Monday, September 26, 2016. It was held in the Council Chambers at the Town of Amherst's town hall. The meeting was attended by five members of the public, as well as representatives from the Town of Amherst, the Virginia Department of Transportation (VDOT), and the Region 2000 Local Government Council.

Bill Wuensch of EPR opened the meeting by briefly reintroducing the purpose and goals of the project, as well as reviewing the schedule of project events. Matthew Rehnborg, also of EPR, then presented background information about the Urban Development Area (UDA) study that preceded this project, followed by a report of the comments and ideas that were shared during the first stakeholder meeting and walking tour.

Bill Wuensch then resumed the presenting role to discuss the primary topic of the day's meeting: pedestrian safety and traffic calming measures. He began by walking the group through a "toolkit" of roadway design modifications that are commonly used to slow traffic and enhance pedestrian safety. These included both "vertical" elements, such as speed humps and speed tables, and "horizontal" elements such as curb extensions and median islands.

After this, Mr. Wuensch concluded his materials by presenting the draft improvement proposals that have been produced by the study team. The proposed recommendations would occur in three phases. Phase I would include improvements to all the ADA ramps along Main St between 2nd St. and US 60, as well as the addition of pedestrian signal-heads at the signalized intersection of Main St. and 2nd St. Phase II would then consist of new pavement markings along the same section of the corridor, including, most notably, the addition of bike lanes in both directions. Phases I and II would both be completed by VDOT during the next repaving of the corridor, which is scheduled to occur in the summer of 2017.

Phase III of the recommendations primarily concerns the addition of curb extensions for crosswalks that cross Main St. Phase III could potentially include a "Phase III-B" that rehabilitates sidewalks, curbs, and drainage structures, and also adds landscaping, street lighting, and signage. Phase III-B elements would be completed as funding was available, but can be pursued independently and later than those in Phase III if necessary.

Following the presentation, attendees were invited to review the proposal graphics, as well as a variety of potential streetscape "themes" that could be recommended in Phase III-B of the project.

Points of Discussion

Crosswalk Design: One attendee brought several images of artistic crosswalk designs to share with the group as potential alternatives to standard white striping markings. These artistic designs, it was argued, would be more effective in capturing the attention of motorists, as well as adding aesthetic beauty to the downtown.

The project team explained that these types of creative crosswalk designs are used on local or neighborhood streets, but are not permitted on state-maintained roads such as Main St. David Cook, of VDOT, explained that new federal regulations permit some variations on crosswalk designs, such as stamped and textured pavements. He offered to bring examples of these alternatives to the next meeting.

Business Community Outreach: A merchant who owns properties in downtown Amherst expressed concerns regarding the lack of participation from other downtown business owners. The study team explained that the businesses had been notified of the meeting, but the participant argued that the time of meetings made it difficult for these owners to participate. In response to this concern, the Town and the project team agreed to display the improvement proposal renderings in the lobby of the Town Hall and to invite the public (and downtown merchants, in particular) to view and comment on the recommendations at their convenience.

Utility Pole Relocation: Several comments were made about the utility poles that obstruct movement on the Main St. sidewalks. The suggestion to bury the utilities underground in conjunction with upcoming road work was offered, but officials explained that the effort required for this task was far beyond any of the upcoming road improvement projects. Additionally, it was explained that the expense of burying utilities is so high that many external funding programs no longer pay for these improvements.

Some alternative improvements were suggested to address the utility poles. An example from the town of Bedford was provided, in which utility lines were moved to streets and alleys behind the buildings in the central business district. It was also explained that AEP, which owns the utility poles, has been cooperative with other localities in past with efforts to move their utility poles to a less obstructive positions along sidewalks. The project team agreed to make further inquiries regarding which public entity would be best positioned to initiate this process and who they would need to contact within AEP.

Project Implementation: A question was asked of how the recommendations of the project were going to be implemented; in particular, how would this project be different than previous studies whose recommendations were never completed. The project team explained that Phases I and II of the recommendations were likely to be implemented in 2017 by VDOT during the scheduled repaving of Main St. The recommendations would inform the final project design implemented by VDOT and are likely to be followed closely due to the participatory public process that is being used to inform and review the proposals. The recommendations of Phase III are likely to require independent financial support through grants or revenue sharing, but the final report will provide detailed information sheets that will provide the Town of Amherst much of the data and materials that will be needed to apply for this assistance.

Sharrows on 2nd St: In conjunction with the proposed bike lanes on Main St, a suggested addition of sharrows on 2nd St was also recommended by an attendee.

Appendix 5: Public Meeting Summary

WALKABILITY AND MAIN ST. TRAFFIC CALMING STUDY

Town of Amherst

Public Meeting- Tuesday, October 18, 2016

Meeting Summary

Meeting Summary

A public meeting for the Town of Amherst's Walkability and Main St. Traffic Calming Study was held from 4:00-6:00pm on Tuesday, October 18, 2016. It was held in the Council Chambers at the Town of Amherst's town hall. The meeting was attended by 15-20 members of the public, as well as representatives from the Town of Amherst, the Virginia Department of Transportation (VDOT), and the Region 2000 Local Government Council.

The meeting was structured in an open-house format with no formal presentations. The purpose of the meeting was to allow members of the public to review to the proposed project recommendations and share questions, concerns, or comments with the study team.

Project information was presented in a series of eight poster boards. These included:

- Board 1: Project Introduction
- Board 2: Phase 1 Description
- Board 3: Phase 2 Description and Plan View
- Board 4: Phase 3 Description and Plan View
- Board 5: Phase 3 Improvement Renderings (Street View)
- Board 6: Accessibility Analysis Description and Results
- Board 7: Potential Streetscape Element Themes
- Board 8: Potential Streetscape Element Themes, continued



Study members were available in the room to answer questions about the study recommendations and record public comments.

Public Comments

The full, unedited record of public comments recorded during the meeting is provided on page three of this meeting summary. Some of the major issues that emerged out of these comments included:

Loading Zones: In the event of Phase 3 Implementation, project engineers need to verify that curb extensions do not interfere with the loading zones of businesses on Main St. The loading zone in front of the antiques store at 2nd St and Main St was specifically identified as one place where this was projected to occur.

2nd St Intersection: In addition to the interference of the proposed curb extensions with the loading zone in front of the antiques store located at this intersection, concern was also expressed regarding the ability of large trucks to successfully complete turns onto and off of 2nd St within the proposed new street dimensions.

Utilities: The interference of utility poles on sidewalks was identified by multiple people as a major concern. Efforts to move the utility poles to less obstructive locations or to consolidate utilities on one side of the street were both suggested as desired improvements.

Phase 3 Funding Sources: Some attendees expressed concern regarding the appropriateness of public funding for the sidewalk improvements recommended in Phase 3, suggesting that the improvements should be financed by town residents themselves. Another attendee cited examples of public-private partnerships in which public funding was used to improve sidewalks, while private businesses funded the purchase of streetscape elements such as lamps, benches, and landscaping.

Fire Hydrants: Comments were made indicating that the Phase 2 and 3 plan-view renderings failed to account for at least one fire hydrant zone in its projected street parking depictions.

Public Comments

Public comments were recorded on a large flip-board note pad, either by study team members or the attendees themselves. A direct record of the comments is provided below:

Page 1

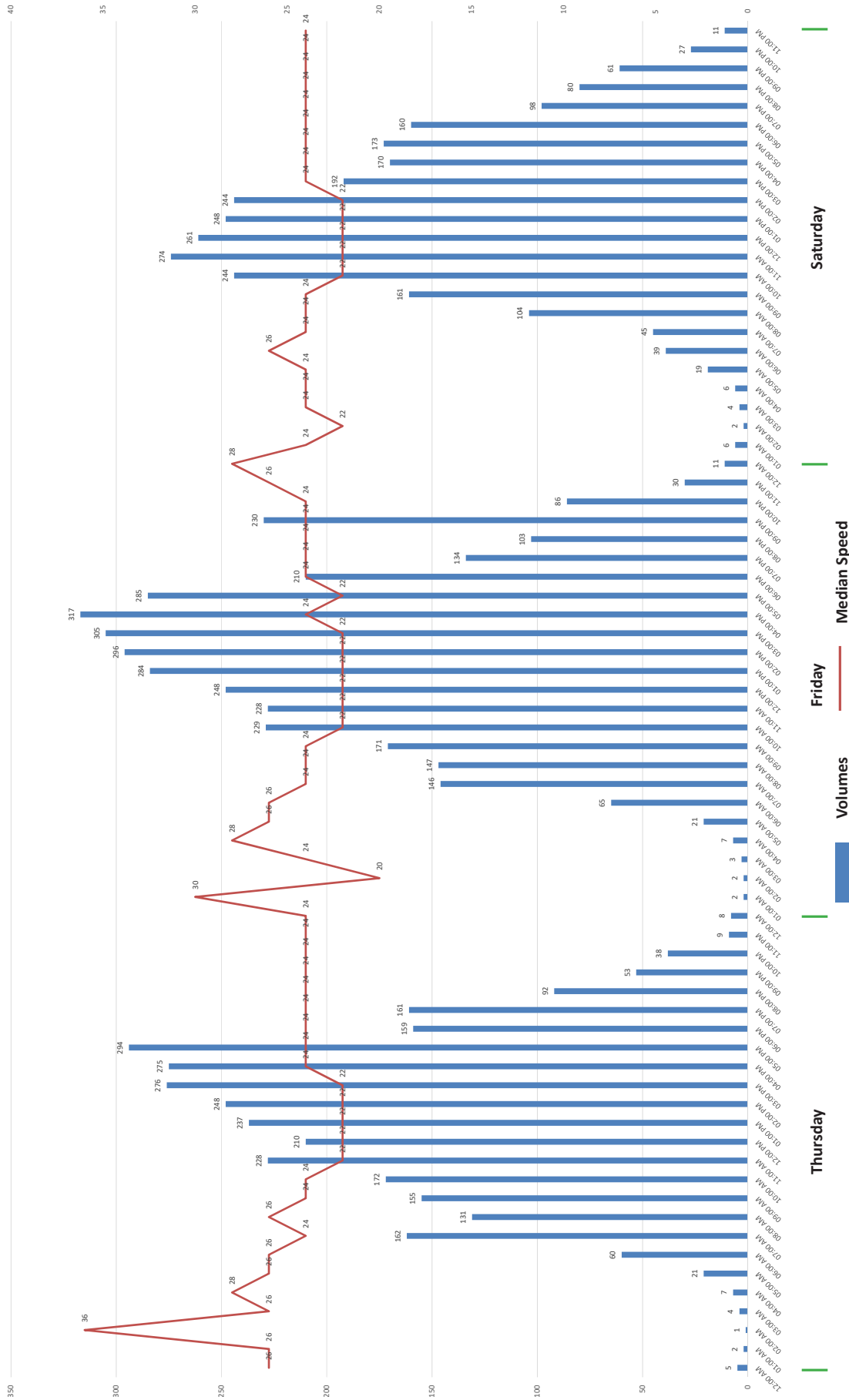
- Streetscaping should remain a priority
- Great project for the town
- Looking forward to bike lanes
- Historical- preference for streetscape elements
- Consider loading zones in the curb extension plan shown in Phase 3
- Check tractor-trailer movements out of 2nd St
- Rework overhead utilities- one side only?
- When US 60 bridge over US 29 Bypass is rebuild, sidewalks should be added (recommended in UDA study, should support in this study also)
- Realign Sweet Briar Connector in graphic to run from Hardees to Dairy Rd, then to campus
- Phase 3 needs to be funded by the local community; ie. fundraisers, private donations, etc.
- Check/verify location of fire hydrants (for parking)
- Encroachment on property with sidewalk expansion?
- Loss of parking with sidewalk or bike lane?

Page 2

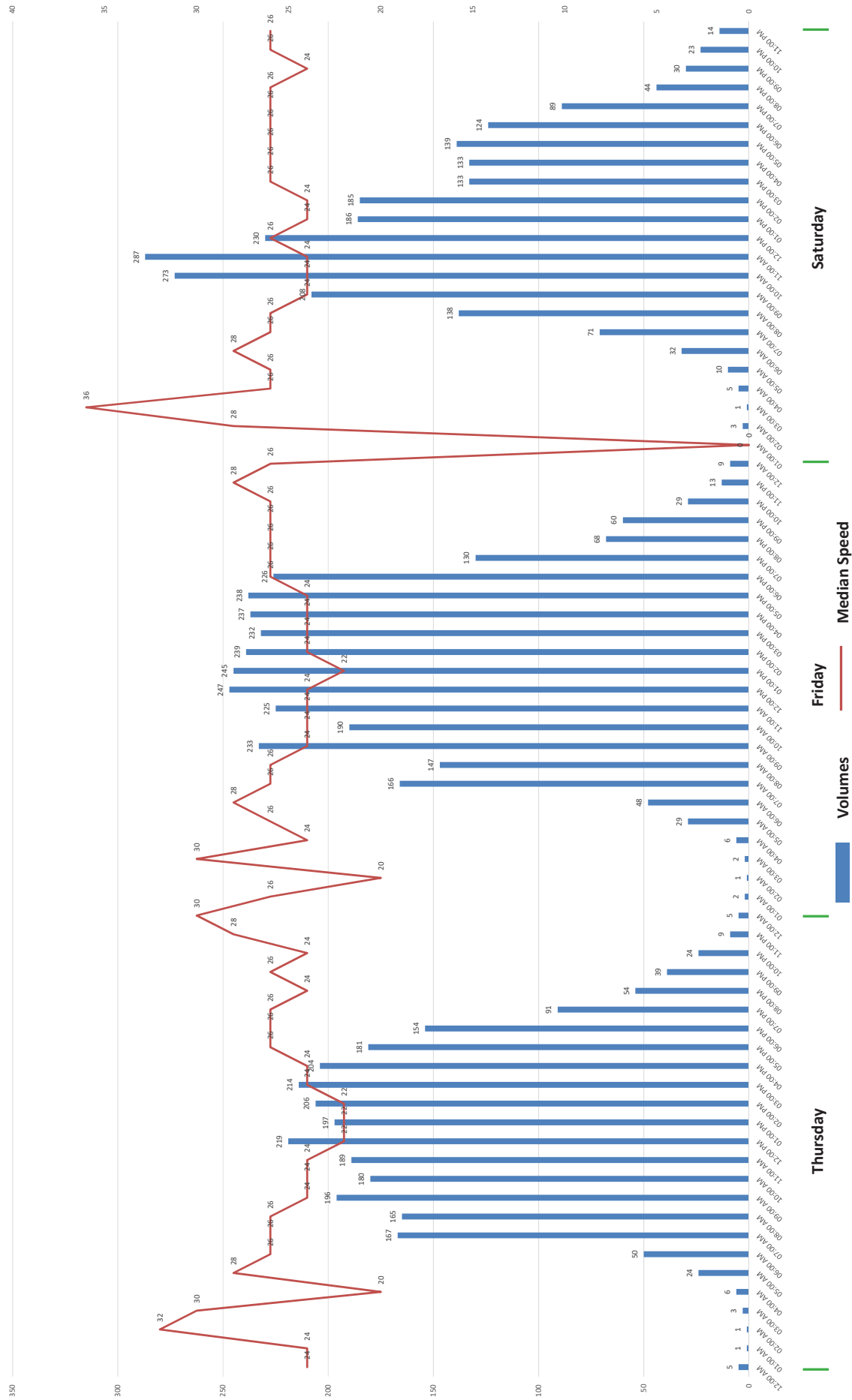
- Identify obstructions that should be relocated.
- Use textured or highly visible crosswalks.
- Fire hydrants- missed some
- Would like sidewalk lighting
- Private funding opportunities for streetscape elements?
- Potential SRTS funding for roundabout improvements and Depot St. improvements.

Appendix 6: Traffic Data Summary Graphs

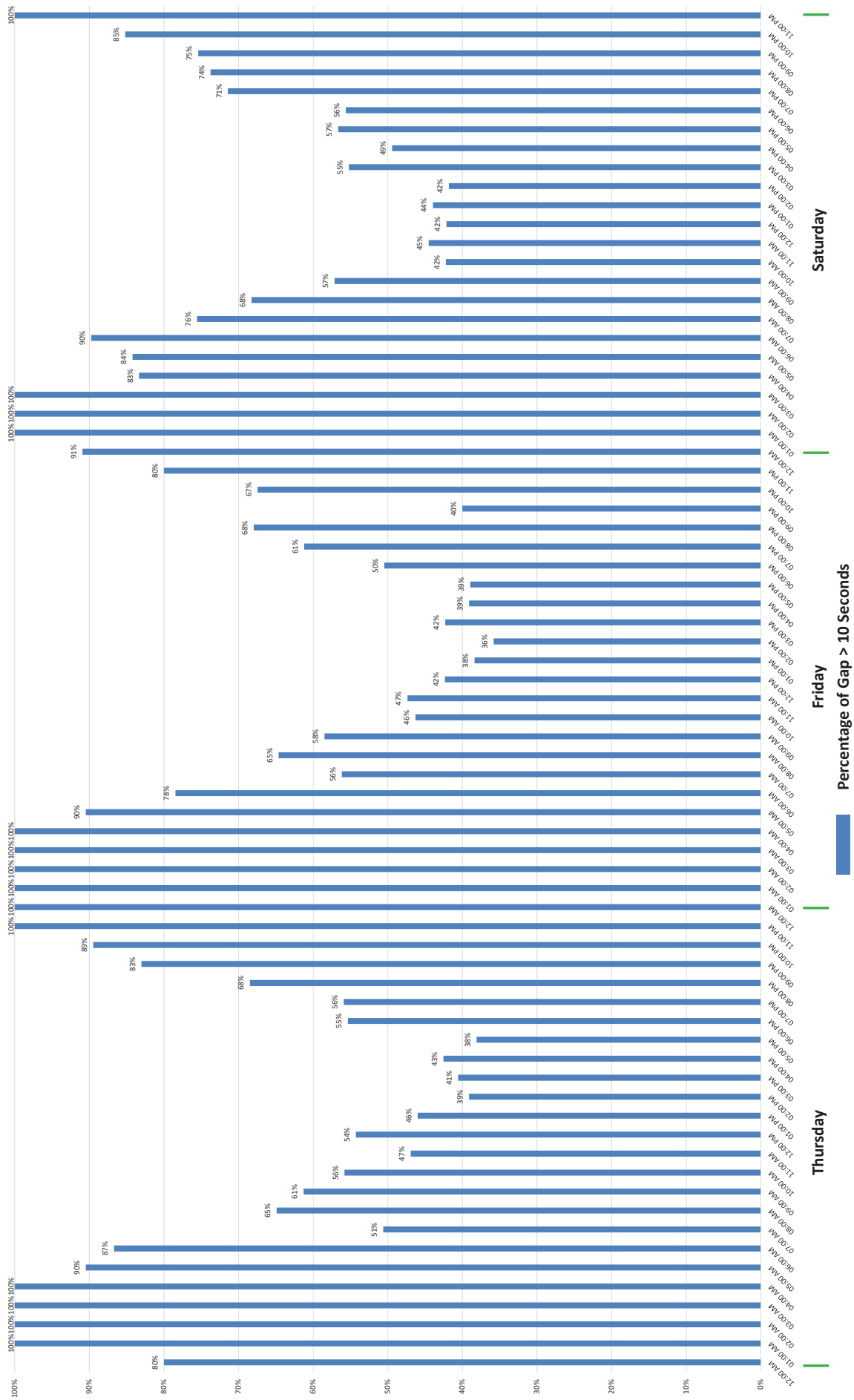
Downtown Amherst Main Street Northbound Traffic Volume and Median Speed



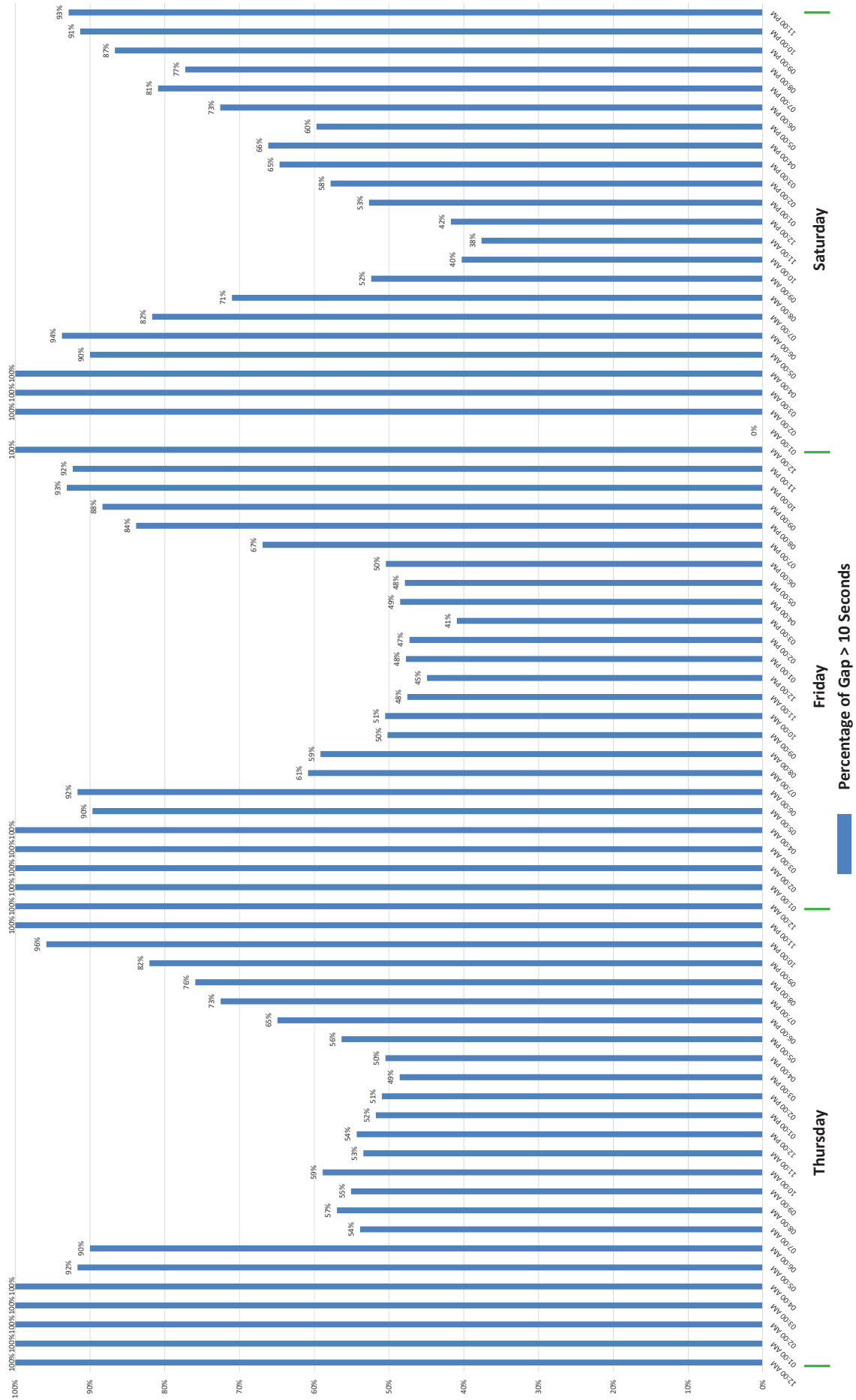
Downtown Amherst Main Street Southbound Traffic Volume and Median Speed



Downtown Amherst Main Street Northbound Gap



Downtown Amherst Main Street Southbound Gap



Appendix 7: Raw Traffic Speed Data

Page 1

Data Collection Group
LSmith@DataCollectionGroup.net

Site Code: 2222
Station ID:
Main St

Approx 100' north of Star St
Latitude: 0' 0.0000 Undefined

SB	1	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63	65	67	Total
Start Time	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	999	
01:00	0	0	0	0	0	0	2	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
02:00	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
03:00	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
04:00	0	0	0	0	0	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
05:00	1	0	0	0	0	2	3	1	4	6	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
06:00	0	0	0	0	0	1	7	10	9	7	10	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50
07:00	4	0	0	0	3	10	26	35	34	25	10	11	5	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	167
08:00	3	0	0	2	5	14	27	27	33	29	17	4	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	105
09:00	9	0	1	3	10	29	38	39	32	22	7	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	196
10:00	5	0	2	6	7	14	28	32	45	24	9	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	180
11:00	13	2	0	8	9	18	35	43	33	17	8	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	189
12 PM	3	2	8	17	24	35	33	40	27	15	9	5	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	219
13:00	3	2	4	16	19	44	34	34	24	10	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	197
14:00	4	3	2	12	17	38	49	41	21	12	4	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	206
15:00	3	1	2	7	11	29	44	40	42	19	9	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	214
16:00	2	1	4	5	8	23	27	40	41	28	15	4	4	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	204
17:00	5	0	2	3	7	9	32	27	35	26	25	4	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	181
18:00	4	0	0	4	1	9	28	30	34	25	12	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	154
19:00	1	0	2	1	3	2	17	17	20	18	8	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	91
20:00	1	0	0	0	0	4	7	15	9	7	4	1	3	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	54
21:00	0	0	0	0	0	1	0	9	6	10	3	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39
22:00	0	0	0	0	0	0	3	5	9	4	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
23:00	0	0	0	0	0	1	1	0	2	2	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
Total	61	11	27	84	127	287	453	489	460	298	164	63	35	13	2	2	2	0	0	0	0	0	0	1	0	0	0	0	0	0	2579

Site Code: 2222

Station ID:

Main St

Approx 100' north of Star St

Latitude: 0' 0.0000 Undefined

SB		Date: 3/30/2025																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Start Time	10/14	1	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	Total																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Site Code: 2222

[illegible]

Site Code: 2222

Station ID:

Main St

Approx 100' north of Star St

Latitude: 0' 0.0000 Undefined

NR	1	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63	65	67	Total
Start Time	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	999
10/14/16	0	0	0	0	0	0	1	2	1	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
01:00	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
02:00	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
03:00	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
04:00	0	0	0	0	0	1	1	0	1	2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
05:00	0	0	0	0	0	1	2	3	5	6	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21
06:00	0	0	0	0	0	3	9	19	9	14	7	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65
07:00	3	0	0	1	3	17	37	39	23	14	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	146
08:00	5	0	0	2	5	9	30	40	27	15	7	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	147
09:00	4	3	1	7	10	22	25	36	36	42	11	11	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	171
10:00	9	1	7	9	20	31	41	45	42	11	11	8	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	229
11:00	9	2	5	10	13	28	48	50	31	18	8	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	228
12 PM	13	4	3	9	22	27	48	57	33	24	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	248
13:00	19	5	10	24	27	51	44	50	31	17	4	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	284
14:00	8	2	11	21	25	53	59	58	38	15	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	296
15:00	13	2	4	14	23	37	76	70	40	16	5	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	305
16:00	12	2	6	17	13	26	69	67	56	30	13	5	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	317
17:00	10	1	0	7	23	51	58	59	39	16	17	2	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	285
18:00	7	3	3	1	20	21	45	38	43	16	10	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	210
19:00	2	0	1	2	4	7	41	34	22	14	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	134
20:00	0	0	2	2	5	8	26	31	14	5	6	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	103
21:00	2	0	1	2	7	34	49	57	48	22	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	230
22:00	0	0	0	0	0	3	18	26	18	10	5	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86
23:00	0	0	0	0	0	1	0	4	7	8	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30
Total	116	25	55	121	226	432	733	789	564	291	136	45	17	3	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3557

Site Code: 2222
 Station ID:
 Main St
 Approx 100' north of Star St
 Latitude: 0' 0.0000 Undefined

NB	1	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63	65	67	Total
Start	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	999
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	72	32	53	92	181	335	521	544	404	218	115	46	19	5	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2640

Gr.	205	84	152	291	594	1151	1841	2023	1471	762	360	121	59	13	5	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	9197
-----	-----	----	-----	-----	-----	------	------	------	------	-----	-----	-----	----	----	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	------

Stats	15th Percentile :	17 MPH
	50th Percentile :	22 MPH
	85th Percentile :	25 MPH
	95th Percentile :	28 MPH
	Mean Speed(Average) :	22 MPH
	Number of Vehicles > 25 MPH :	2060
	Percent of Vehicles > 25 MPH :	22.4%

Appendix 8: Raw Traffic Gap Data

Data Collection Group

LSmith@DataCollectionGroup.net

Page 1

Site Code: 2222

Station ID:

Main St

Approx 100' N of Star St

Latitude: 0' 0.0000 Undefined

SB	1	5	7	9	11	13	15	17	19	21	23	25	27	29
Start Time	4	6	8	10	12	14	16	18	20	22	24	26	28	999
10/13/16	0	0	0	0	0	0	0	0	0	0	0	0	0	5
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	1
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	3
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	6
05:00	1	1	0	0	0	0	0	2	0	0	0	0	0	20
06:00	3	1	0	1	2	2	0	0	1	2	1	0	0	37
07:00	37	16	14	10	7	5	5	7	7	6	2	4	5	42
08:00	36	14	12	9	8	9	8	3	11	3	4	4	6	38
09:00	45	16	14	13	13	8	8	11	6	6	4	10	3	39
10:00	38	11	13	12	11	14	6	12	3	8	4	1	6	41
11:00	43	22	14	9	12	8	5	5	8	0	3	8	3	49
12 PM	47	22	21	10	9	9	17	8	11	4	10	10	8	33
13:00	33	29	18	15	11	9	7	6	9	8	3	6	5	38
14:00	54	21	14	12	15	10	8	7	11	4	3	6	1	40
15:00	48	27	19	16	19	7	15	6	4	9	5	2	2	35
16:00	52	30	13	6	13	10	8	9	1	6	7	4	1	44
17:00	30	26	14	9	8	8	5	6	13	7	6	3	5	41
18:00	25	13	7	9	5	10	9	7	7	3	7	2	6	44
19:00	13	1	4	7	2	6	4	3	3	1	0	2	3	42
20:00	4	1	3	5	2	1	2	0	1	0	1	0	0	34
21:00	1	1	4	1	2	0	1	0	1	2	1	1	0	24
22:00	1	0	0	0	0	1	0	0	0	0	1	0	0	21
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	9
Total	511	252	184	144	139	117	108	92	97	69	62	63	54	687

Site Code: 2222
 Station ID:
 Main St
 Approx 100' N of Star St
 Latitude: 0' 0.0000 Undefined

SB															
Start	1	5	7	9	11	13	15	17	19	21	23	25	27	29	
Time	4	6	8	10	12	14	16	18	20	22	24	26	28	999	
10/14/16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
05:00	1	0	1	1	0	1	0	0	0	0	1	0	0	0	24
06:00	2	1	1	0	3	1	0	4	0	1	0	1	1	1	33
07:00	27	14	15	9	9	9	4	12	10	5	1	5	3	43	
08:00	23	14	12	11	6	5	4	9	6	7	7	2	3	38	
09:00	49	24	26	17	21	5	10	14	10	6	9	5	5	32	
10:00	39	21	19	15	9	9	12	4	3	6	6	4	5	38	
11:00	59	18	16	25	11	13	9	10	8	10	5	6	3	32	
12 PM	58	37	19	22	16	13	5	14	3	9	9	3	4	35	
13:00	61	32	24	11	20	9	11	5	9	12	9	4	8	30	
14:00	57	30	22	17	11	11	16	8	9	3	6	4	8	37	
15:00	65	37	17	18	12	9	13	5	4	6	2	2	6	36	
16:00	51	34	25	12	21	19	6	9	10	9	3	4	5	29	
17:00	64	29	15	16	10	12	14	8	9	7	5	9	6	34	
18:00	58	18	22	14	14	9	15	11	10	7	7	5	4	32	
19:00	15	7	14	7	5	6	6	3	9	3	3	5	2	45	
20:00	5	2	4	0	1	2	5	3	4	2	3	1	2	34	
21:00	4	2	1	0	1	1	5	1	0	4	2	2	1	36	
22:00	1	1	0	0	1	0	0	0	1	0	0	2	0	23	
23:00	0	1	0	0	0	0	0	0	0	0	0	0	0	12	
Total	639	322	253	195	171	134	135	120	105	97	78	64	66	639	

Site Code: 2222
 Station ID:
 Main St
 Approx 100' N of Star St
 Latitude: 0' 0.0000 Undefined

SB															
Start Time	1	5	7	9	11	13	15	17	19	21	23	25	27	29	
	4	6	8	10	12	14	16	18	20	22	24	26	28	999	
10/15/16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
05:00	0	0	1	0	1	0	0	1	0	0	0	0	0	0	7
06:00	2	0	0	0	0	1	1	0	1	0	1	1	2	2	23
07:00	5	3	3	2	2	0	7	2	2	1	0	4	1	1	39
08:00	11	8	9	12	10	10	7	7	2	3	4	4	4	4	47
09:00	43	21	19	16	16	7	9	6	7	3	10	8	7	3	36
10:00	70	39	34	20	16	11	11	7	10	8	8	4	4	4	31
11:00	80	38	32	29	12	14	12	10	12	4	6	10	4	4	24
12 PM	62	35	16	21	14	7	10	10	6	6	4	1	4	4	34
13:00	42	17	15	14	10	9	6	8	6	5	5	4	3	4	42
14:00	37	21	8	12	12	5	9	9	10	3	6	5	5	5	43
15:00	23	9	8	7	7	6	5	6	5	5	7	2	3	4	40
16:00	13	14	8	10	3	3	6	7	3	7	3	6	2	2	48
17:00	19	12	11	14	4	12	4	6	2	4	1	5	2	4	43
18:00	13	8	8	5	9	6	2	2	6	8	2	1	4	4	50
19:00	6	4	3	4	2	2	3	2	1	3	1	2	2	2	54
20:00	2	3	3	2	0	1	2	1	0	0	1	1	0	0	28
21:00	4	0	0	0	0	0	0	0	1	0	1	0	1	1	23
22:00	1	0	1	0	0	0	1	1	0	0	0	0	2	1	17
23:00	0	0	1	0	0	0	0	0	0	0	1	0	0	0	12
Total	433	232	180	168	118	94	95	85	74	60	61	58	50	659	
Grand Total	1583	806	617	507	428	345	338	297	276	226	201	185	170	1985	

Statistics Number of Gaps > 10 Secs. : 4451
 Percent of Gaps > 10 Secs. : 55.9%

Site Code: 2222
 Station ID:
 Main St
 Approx 100' N of Star St
 Latitude: 0' 0.0000 Undefined

NB															
Start	1	5	7	9	11	13	15	17	19	21	23	25	27	29	
Time	4	6	8	10	12	14	16	18	20	22	24	26	28	999	
10/13/16	1	0	0	0	0	0	0	0	0	0	0	0	0	4	
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	7	
05:00	0	0	1	1	1	0	0	0	1	0	0	0	0	17	
06:00	6	2	0	0	2	3	1	1	3	4	1	0	0	37	
07:00	49	15	12	4	13	5	3	8	2	4	4	5	1	37	
08:00	28	6	3	9	6	6	5	2	4	2	4	3	4	49	
09:00	28	9	10	13	10	2	6	10	8	3	3	3	7	43	
10:00	40	19	9	8	10	3	4	5	5	7	3	4	4	51	
11:00	62	27	17	15	8	13	16	12	5	6	7	8	1	31	
12 PM	45	20	18	13	10	8	11	12	8	6	9	5	9	36	
13:00	66	28	21	13	12	12	13	11	4	8	4	5	4	36	
14:00	73	33	25	20	13	6	9	6	5	8	8	8	3	31	
15:00	97	25	25	17	12	15	10	9	7	3	5	7	6	38	
16:00	97	23	20	18	21	11	13	6	6	6	3	11	5	35	
17:00	105	37	21	19	17	17	6	10	8	11	4	7	4	28	
18:00	37	16	11	7	3	5	6	5	4	6	2	5	0	52	
19:00	37	12	14	8	5	5	4	6	5	5	2	4	6	48	
20:00	19	2	5	3	3	5	2	2	2	1	0	0	3	45	
21:00	6	0	2	1	0	1	0	0	0	3	1	0	2	37	
22:00	3	0	0	1	1	1	1	0	0	1	0	0	2	28	
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	9	
Total	799	274	214	170	147	118	110	105	77	84	60	75	61	706	

Site Code: 2222
 Station ID:
 Main St
 Approx 100' N of Star St
 Latitude: 0' 0.0000 Undefined

NB															
Start Time	1	5	7	9	11	13	15	17	19	21	23	25	27	29	
	4	6	8	10	12	14	16	18	20	22	24	26	28	999	
10/14/16	0	0	0	0	0	0	0	0	0	0	1	0	0	7	
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	7	
05:00	1	0	1	0	0	1	0	0	2	0	0	0	0	16	
06:00	7	3	2	2	3	1	2	1	0	0	1	2	1	40	
07:00	40	5	10	9	9	3	2	5	2	5	8	3	3	42	
08:00	28	13	7	4	9	4	10	6	7	4	3	5	2	45	
09:00	38	15	11	7	11	8	6	5	6	4	4	7	4	45	
10:00	66	19	22	16	21	5	6	8	8	8	5	9	4	32	
11:00	53	28	20	19	8	16	6	12	8	4	3	7	4	40	
12 PM	70	27	21	25	16	5	9	6	6	8	3	7	4	41	
13:00	104	30	29	12	9	10	15	7	13	4	6	7	4	34	
14:00	102	47	20	21	13	13	8	8	8	5	10	5	4	32	
15:00	105	35	23	13	17	19	13	13	11	11	6	11	2	26	
16:00	113	32	28	20	27	13	11	13	10	6	6	6	6	26	
17:00	87	34	34	19	16	11	14	11	8	6	8	5	3	29	
18:00	65	21	9	9	5	10	10	7	8	6	6	1	8	45	
19:00	28	9	9	6	5	2	5	4	1	4	4	3	1	53	
20:00	22	5	3	3	7	3	0	4	1	4	1	1	2	47	
21:00	101	20	11	6	10	5	3	7	7	4	4	5	4	43	
22:00	17	4	3	4	4	4	2	0	4	1	5	1	2	35	
23:00	4	1	1	0	0	0	1	0	0	0	1	1	0	21	
Total	1051	348	264	195	190	133	123	117	110	84	85	86	58	713	

Site Code: 2222
 Station ID:
 Main St
 Approx 100' N of Star St
 Latitude: 0' 0.0000 Undefined

NB															
Start Time	1	5	7	9	11	13	15	17	19	21	23	25	27	29	
	4	6	8	10	12	14	16	18	20	22	24	26	28	999	
10/15/16	0	1	0	0	0	0	0	0	0	0	0	0	0	0	10
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
04:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	5
05:00	2	1	0	0	0	0	0	0	0	0	0	1	0	0	15
06:00	2	1	0	1	0	1	0	1	0	2	0	1	0	0	30
07:00	7	2	0	2	1	0	0	0	0	1	1	1	1	1	29
08:00	16	3	5	9	7	2	5	1	2	2	2	4	3	0	43
09:00	37	10	13	9	6	7	6	5	1	7	4	4	4	0	48
10:00	82	25	22	12	15	10	11	5	5	7	3	8	4	0	35
11:00	97	29	15	11	22	16	9	12	5	11	8	4	4	0	31
12 PM	92	31	15	13	17	13	10	9	6	6	6	2	4	0	37
13:00	80	28	20	11	14	15	12	3	11	2	3	5	6	0	38
14:00	80	28	22	12	8	10	8	5	3	8	7	7	7	0	39
15:00	54	11	10	11	5	11	9	7	6	4	4	8	4	0	48
16:00	48	17	15	6	7	3	3	6	6	0	3	3	5	0	48
17:00	44	14	12	5	12	10	6	2	10	6	4	2	6	0	40
18:00	34	12	15	10	12	5	5	3	6	5	3	2	4	0	44
19:00	17	3	4	4	4	4	8	2	1	1	1	6	2	0	41
20:00	9	4	4	4	2	4	1	1	1	1	1	1	3	0	44
21:00	10	2	1	2	3	2	4	1	0	1	2	0	3	0	30
22:00	3	0	1	0	0	0	0	0	0	0	0	1	0	0	22
23:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	10
Total	714	222	175	122	135	113	97	63	63	65	52	60	60	0	699
Grand Total	2564	844	653	487	472	364	330	285	250	233	197	221	179	0	2118
Statistics															
Number of Gaps > 10 Secs. : 4649															
Percent of Gaps > 10 Secs. : 50.5%															

Site Code: 2222
 Station ID:
 Main St
 Approx 100' N of Star St
 Latitude: 0' 0.0000 Undefined

COMBINED

Start Time	1	5	7	9	11	13	15	17	19	21	23	25	27	29
	4	6	8	10	12	14	16	18	20	22	24	26	28	999
10/13/16	1	0	0	0	0	0	0	0	0	0	0	0	0	9
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	3
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	2
03:00	0	0	0	0	0	0	0	0	0	1	0	0	0	6
04:00	0	0	0	0	0	0	1	0	0	0	0	0	0	12
05:00	2	2	3	1	2	0	1	2	1	1	1	0	0	29
06:00	14	5	1	3	6	3	8	2	8	6	4	3	3	44
07:00	118	44	34	23	24	10	13	9	12	3	4	5	4	26
08:00	91	34	24	27	19	11	15	9	13	10	4	6	9	24
09:00	119	50	32	23	32	11	17	15	11	5	5	2	4	25
10:00	116	53	34	31	15	22	8	20	7	9	6	5	6	20
11:00	161	77	40	24	25	14	17	10	7	7	4	7	7	17
12 PM	160	63	46	35	17	21	19	17	12	10	8	6	7	8
13:00	171	78	44	24	27	16	17	9	9	16	2	5	3	13
14:00	185	70	50	38	30	14	13	12	9	6	9	4	4	10
15:00	216	73	60	34	24	19	17	8	7	10	3	6	3	10
16:00	222	69	42	27	31	24	10	11	5	9	7	6	4	12
17:00	213	80	42	30	20	22	13	10	14	9	3	6	4	9
18:00	94	37	28	20	18	23	15	20	9	10	4	5	6	24
19:00	67	22	31	21	11	14	11	6	8	12	2	8	3	36
20:00	39	7	9	9	2	11	7	3	0	1	1	2	1	54
21:00	8	3	6	3	4	3	2	2	1	8	4	1	3	44
22:00	5	0	2	1	1	1	1	1	3	1	0	1	2	43
23:00	0	0	0	0	0	0	0	1	1	1	0	0	0	15
Total	2002	767	528	374	308	239	205	167	137	135	71	78	73	495

Site Code: 2222
 Station ID:
 Main St
 Approx 100' N of Star St
 Latitude: 0' 0.0000 Undefined

COMBINED

Start Time	1 4	5 6	7 8	9 10	11 12	13 14	15 16	17 18	19 20	21 22	23 24	25 26	27 28	29 999
10/14/16	0	0	0	0	0	0	0	0	0	0	1	0	0	12
01:00	0	0	0	0	0	0	0	1	0	0	0	0	0	3
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	3
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	5
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	13
05:00	3	2	4	3	0	2	0	0	2	0	2	1	0	31
06:00	19	4	6	5	5	5	4	5	1	1	5	4	4	45
07:00	100	32	31	22	26	15	10	10	14	7	12	4	4	25
08:00	89	26	27	19	27	8	15	10	11	16	3	8	4	31
09:00	143	57	54	29	24	20	10	14	10	8	5	6	7	17
10:00	165	51	49	36	26	19	9	12	11	10	5	6	3	17
11:00	173	73	47	48	20	22	10	16	7	13	4	5	6	9
12 PM	213	90	45	45	24	15	15	12	7	11	7	2	1	8
13:00	252	88	52	32	28	21	12	7	10	7	2	6	4	8
14:00	256	93	43	28	31	22	20	11	6	4	2	3	3	13
15:00	263	83	48	29	30	24	14	12	8	5	4	5	2	10
16:00	265	87	51	37	40	19	17	12	5	3	4	5	1	8
17:00	238	91	52	32	35	18	17	6	10	2	2	8	4	8
18:00	187	51	43	30	25	15	22	18	8	7	6	8	3	13
19:00	76	20	29	20	15	14	13	10	8	8	6	7	3	35
20:00	36	9	9	11	10	8	9	6	4	15	2	3	4	45
21:00	116	26	21	16	13	9	8	9	10	6	11	10	4	31
22:00	27	10	5	5	4	3	3	1	5	3	1	6	1	41
23:00	4	2	1	1	0	0	1	1	1	0	1	0	1	30
Total	2625	895	617	448	383	259	209	173	138	126	85	97	59	461

Site Code: 2222
 Station ID:
 Main St
 Approx 100' N of Star St
 Latitude: 0' 0.0000 Undefined

COMBINED

Start Time	1	5	7	9	11	13	15	17	19	21	23	25	27	29
	4	6	8	10	12	14	16	18	20	22	24	26	28	999
10/15/16	0	0	2	0	0	0	1	1	0	0	0	0	0	16
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	6
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	5
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	5
04:00	0	0	1	0	0	0	0	0	0	0	0	0	0	10
05:00	2	1	0	1	1	0	1	1	1	0	0	0	1	20
06:00	6	4	0	1	1	5	2	1	3	3	1	3	5	36
07:00	20	7	5	7	4	3	3	7	3	4	3	3	3	44
08:00	56	25	21	20	18	16	8	12	7	10	3	7	5	34
09:00	131	42	44	30	23	17	20	9	5	11	6	3	6	22
10:00	232	86	63	29	28	14	21	9	10	4	5	4	4	8
11:00	269	87	62	31	23	31	20	10	9	9	5	1	1	3
12 PM	237	69	48	36	20	19	17	10	3	4	5	5	3	15
13:00	183	62	44	35	24	16	14	15	7	5	11	3	2	13
14:00	181	59	37	32	22	23	14	12	10	7	2	3	6	21
15:00	124	30	17	24	20	21	15	13	10	10	7	8	0	26
16:00	93	40	28	16	18	14	9	15	11	9	9	6	4	31
17:00	100	42	30	27	19	11	10	9	14	8	5	6	1	30
18:00	81	27	35	20	19	16	10	5	14	6	8	11	6	26
19:00	39	14	11	14	8	11	9	7	5	5	4	7	11	42
20:00	13	8	10	9	3	8	3	4	4	6	3	4	3	46
21:00	15	4	1	3	5	3	4	2	6	1	4	0	4	39
22:00	5	0	2	1	1	0	1	2	0	0	0	1	3	34
23:00	0	0	1	0	0	0	0	0	1	1	2	0	0	20
Total	1787	607	462	336	257	228	182	144	123	103	83	75	68	552
Grand Total	6414	2269	1607	1158	948	726	596	484	398	364	239	250	200	1508

Statistics Number of Gaps > 10 Secs. : 5713
 Percent of Gaps > 10 Secs. : 33.3%

Appendix 9: Opinion of Probable Costs

Phase 3A

Opinion of Probable Costs for Construction of the Amherst Walkability Improvements						
EPR, P.C.						
Oct-16						
ITEM #	DESCRIPTION	UNIT	QTY.	UNIT PRICE	TOTAL	Notes:
1	Mobilization	LS	1	\$10,000.00	\$10,000.00	
2	Maintenance of Traffic	LS	1	\$50,000.00	\$50,000.00	
3	Construction Survey	LS	1	\$20,000.00	\$20,000.00	
3	Demo Existing Concrete Combination Curb and Gutter	LF	4675	\$22.00	\$102,850.00	
4	Sawcut pavement (full depth)	LF	5075	\$5.00	\$25,375.00	
5	Demo Sidewalk/Curbramps/Driveway	SY	5638	\$25.00	\$140,950.00	
6	Demo Of Pavement (asphalt in road)	CY	589	\$15.00	\$8,835.00	
7	Eradicate of Existing Linear pavement Markings	LF	3437	\$2.00	\$6,874.00	
8	Haul Concrete/Debris/asphalt	LS	1	\$14,000.00	\$14,000.00	
9	Earthwork	LS	1	\$6,500.00	\$6,500.00	
10	Utility adjustmtnets	EA	10	\$800.00	\$8,000.00	
11	Utility adjustmtnets (Fire Hydrant)	EA	3	\$2,500.00	\$7,500.00	
12	Inlet Protection	EA	30	\$290.00	\$8,700.00	
13	Detectable Warning Panel with truncated dome (new construction)	SY	31	\$301.00	\$9,331.00	
14	New Concrete Handicap Ramp	SY	93	\$95.00	\$8,835.00	
15	New Concrete Sidewalk 4" Thick	SY	2828	\$109.00	\$308,252.00	
16	New Concrete Sidewalk 7" Thick (through driveway)	SY	281	\$125.00	\$35,125.00	
17	Install Std. Driveway Apron (concrete)	SY	1125	\$55.00	\$61,875.00	
18	Install Std. concrete combination curb and gutter	LF	5175	\$35.00	\$181,125.00	
19	4" Top Soil, Seed and Mulch	SY	738	\$6.08	\$4,487.04	
20	Permanent Seed/Straw	LB	20	\$15.00	\$300.00	
21	Relocate Existing Street Name Sign	EA	10	\$278.00	\$2,780.00	
22	Type B, Class 1 thermoplastic pavement line markings, 24" white (crosswalks)	LF	1140	\$10.50	\$11,970.00	
23	Type B, Class 1 thermoplastic pavement line markings, 4" white (parking markings)	LF	10201	\$2.00	\$20,402.00	
Sub-Total					\$1,054,066.04	
Engineering & CEI (25%)					\$263,516.51	
Contingency (10%)					\$105,406.60	
Grand Total					\$1,422,989.15	

Phase 3A: Traffic Circle Improvements Only

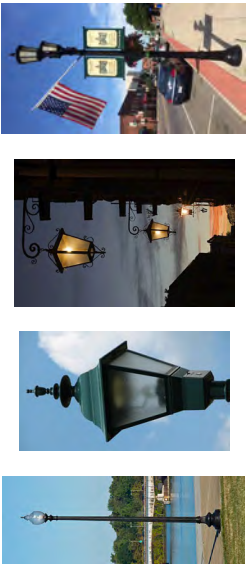
Opinion of Probable Costs for Construction of the Amherst Walkability Improvements						
EPR, P.C.						
Nov-16						
ITEM #	DESCRIPTION	UNIT	QTY.	UNIT PRICE	TOTAL	Notes:
1	Mobilization	LS	1	\$8,000.00	\$8,000.00	
2	Maintenance of Traffic	LS	1	\$12,000.00	\$12,000.00	
3	Construction Survey	LS	1	\$4,000.00	\$4,000.00	
4	Sawcut pavement (full depth)	LF	116	\$5.00	\$580.00	
5	Demo Of Pavement (asphalt in road)	CY	15	\$15.00	\$225.00	
6	Demo Existing Concrete Curb/raised areas	LF	218	\$22.00	\$4,796.00	
7	Demo Sidewalk/Curbramps/Driveway	SY	19	\$25.00	\$475.00	
8	Haul Concrete/Debris/asphalt	LS	1	\$7,500.00	\$7,500.00	
9	Detectable Warning Panel with truncated dome (new construction)	SY	18	\$301.00	\$5,418.00	
10	New Concrete Handicap Ramp	SY	53	\$95.00	\$5,035.00	
11	New Concrete Sidewalk 4" Thick	SY	230	\$109.00	\$25,070.00	
12	Install Std. concrete combination curb and gutter	LF	366	\$35.00	\$12,810.00	
13	Type B, Class 1 thermoplastic pavement line markings, 24" white (crosswalks)	LF	352	\$10.50	\$3,696.00	
Sub-Total					\$89,605.00	
Engineering & CEI (25%)					\$22,401.25	
Contingency (10%)					\$8,960.50	
Grand Total					\$120,966.75	

Phase 3B

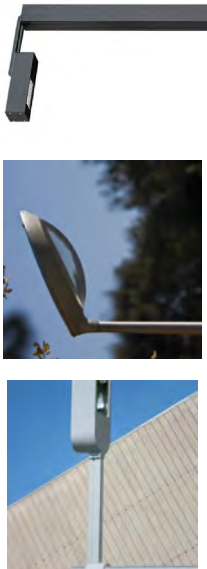
Opinion of Probable Costs for Construction of the Amherst Walkability Improvements - Add-Ons						
EPR, P.C.						
Oct-16						
ITEM #	DESCRIPTION	UNIT	QTY.	UNIT PRICE	TOTAL	Notes:
1	Park bench, cast iron, wood slats, 8' long	EA	10	\$1,500.00	\$15,000.00	
2	Trash receptacles, galvanized steel street basket	EA	4	\$365.00	\$1,460.00	
3	Bike Rack, permanent	EA	4	\$785.00	\$3,140.00	
4	16' Ornamental light poles, cast aluminum, w/ multiple arms	EA	30	\$3,000.00	\$90,000.00	
5	Decorative 22" globe luminaire, LED 32 watt, incl. ballast and lamp, excl pole	EA	30	\$920.00	\$27,600.00	
6	Trees Allowance	EA	20	\$400.00	\$8,000.00	
7	Shrubs Allowance	EA	30	\$100.00	\$3,000.00	
8	Groundcover Allowance	EA	100	\$35.00	\$3,500.00	
Sub-Total					\$151,700.00	
Engineering & CEI (25%)					\$37,925.00	
Contingency (10%)					\$15,170.00	
Grand Total					\$204,795.00	

Appendix 10: Sample Streetscape Element Themes

Historical



Contemporary



Modern

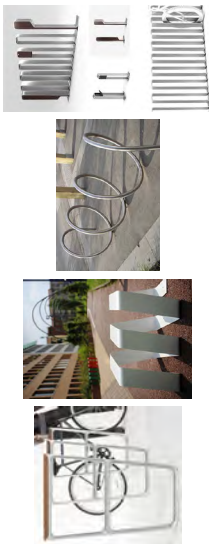
Benches



Streetlights



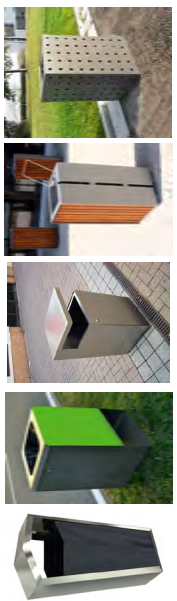
Bike Racks



Bollards

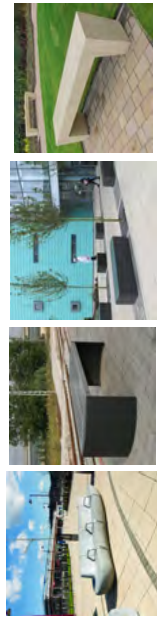


Trashcans



Utility

Benches



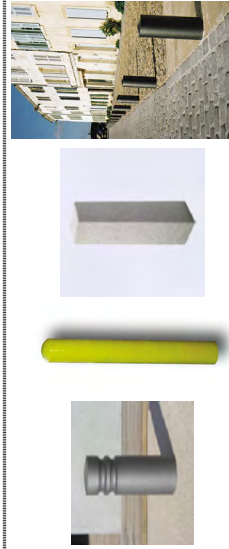
Streetlights



Bike Racks



Bollards



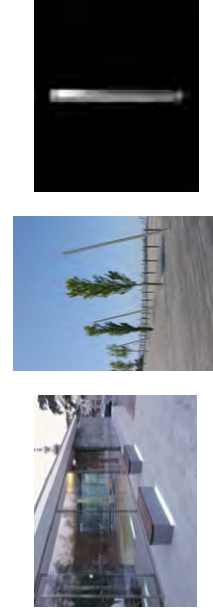
Trashcans



Artistic



Minimalist



Appendix 11: VDOT Pavement Markings Information Memo

VIRGINIA DEPARTMENT OF TRANSPORTATION

TRAFFIC ENGINEERING DIVISION

INSTRUCTIONAL & INFORMATIONAL MEMORANDUM

GENERAL SUBJECT: Pavement Markings Signs Pedestrians		NUMBER: IIM-TE-384.0
		SUPERSEDES: None
SPECIFIC SUBJECT: Pedestrian Crossing Accommodations at Unsignalized Locations		DATE: July 18, 2016
		SUNSET DATE: None
DIRECTED TO: District Location & Design Engineers Regional Operations Engineers/Directors Regional Traffic Engineers District Transportation & Land Use Directors Regional Operations Maintenance Managers Regional Traffic Operations Managers	APPROVAL: /original signed by/ Raymond J. Khoury, P.E. State Traffic Engineer Richmond, VA July 21, 2016	

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Traffic Engineering Division Memorandum IIM-TE-384

Attachments	1
Purpose and Need	1
Effective Date	3

ATTACHMENTS

Attachment A – Unsignalized Marked Crosswalk Standards

Attachment B – Code 46.2-924 Signing and Marking Criteria

Attachment C – Process Flow Charts for Determining Appropriate Pedestrian Crossing Accommodations at Unsignalized Locations

Attachment D – Data Collection Sheets for Pedestrian Crossing Accommodation Studies at Unsignalized Locations

PURPOSE AND NEED

The Commonwealth Transportation Board (CTB) adopted the Virginia Department of Transportation (VDOT) [Policy for Integrating Bicycle and Pedestrian Accommodations](#) in March 2004. That policy establishes that, "Bicycling and walking are fundamental travel modes and integral components of an efficient transportation network." As such, the CTB's adopted policy

requires that all VDOT highway construction projects shall be initiated with the presumption that the facilities “will include accommodations for pedestrians, including pedestrians with disabilities, along with motorized transportation modes in the planning, funding, design, construction, operation, and maintenance of Virginia’s transportation network to achieve a safe, effective, and balanced multimodal transportation system.”

Currently there is significant variation in how crosswalks are utilized in different locations throughout Virginia. This Memorandum provides consistent, uniform guidance to designers for determining when to install marked crosswalks, what type of crosswalk to install, and what other traffic control devices or geometric improvements should potentially be considered in conjunction with the marked crosswalk at unsignalized locations.

Pedestrians typically account for 10 - 15 percent of total highway fatalities in Virginia each year. An assessment of 2012-2014 Virginia pedestrian crashes determined that **86%** of pedestrian fatalities occurred at locations without a marked crosswalk¹. Additionally, about half of Virginia’s pedestrian fatalities occur on Primary system roadways. Some of Virginia’s road segments lack adequate pedestrian accommodations for crossing the road, despite being located in areas where the surrounding land use generates (or has the potential to generate) crossing pedestrian traffic. Pedestrian accommodations include marked crosswalks as well as any facility, design feature, operational change, or maintenance activity that improves the environment in which bicycles and pedestrians travel. Marked crosswalks, by themselves or in conjunction with other traffic control devices and pedestrian accommodations, can provide important safety benefits for crossing pedestrians.

However, studies² have demonstrated that marked crosswalks placed alone at uncontrolled locations, and not in conjunction with geometric pedestrian safety improvements or other traffic control devices, are not always recommended. High-visibility crosswalks (crosswalks marked using longitudinal lines or bar pairs) perform better than standard crosswalks, but often are not used in every situation due to higher installation and maintenance costs.

This Memorandum and the attached Standards replace the previous 2005 *Guidelines for the Installation for Marked Crosswalks* document and the companion 2005 *Guidelines for the Installation of In-Roadway Warning Lights* document, both of which were developed by the Virginia Transportation Research Council (VTRC) for use by VDOT. It provides additional guidance beyond what is in the [2009 Manual on Uniform Traffic Control Devices](#) (MUTCD) and the [2011 Virginia Supplement to the MUTCD, latest version](#).

This document focuses on pedestrian crossing guidance for unsignalized intersection crossings and mid-block crossings, and should be used in conjunction with a separate I&IM (currently under development) which will establish guidance for pedestrian accommodations at signalized intersections.

¹ Cole, Mark A., et. al. *Virginia Pedestrian Crash Assessment* (VDOT: 2015).

² Zegeer, Charles V., et. al. *Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations* (FHWA: 2009), <http://www.fhwa.dot.gov/publications/research/safety/04100/>

EFFECTIVE DATE

Future contracts: This Memorandum shall be effective for all contracts with an advertisement on or after December 1, 2016. The designer may also elect to apply this Memorandum to projects with an advertisement before that date.

Existing contracts: This Memorandum may be applied to projects constructed under existing contracts if the change is approved by the Project Engineer.

Land use permit for private developments: This Memorandum shall be effective for all projects where the final permit plans have not yet been submitted to VDOT. If agreed to by the permittee and VDOT, this Memorandum may also be applied to a previously-approved permit or to a permit currently under review.

Design-Build or PPTA projects: This Memorandum shall be effective for projects in which the design criteria package has not been completed for advertisement as of December 1, 2016. For current Design-Build or PPTA projects, this Memorandum should be implemented where feasible.

Existing marked crosswalks: Existing crosswalks may remain until the end of their useful service life. This Memorandum should be consulted when planning is underway for the roadway's next resurfacing or reconstruction. This Memorandum should also be used when there is a need to prepare a safety evaluation of existing marked crosswalks.

Existing locations without marked crosswalks: Regions should conduct a review of pedestrian accommodations and determine whether new marked crosswalks are needed in accordance with this Memorandum in conjunction with resurfacing or reconstruction projects. This Memorandum should also be used if the need arises to prepare a safety evaluation of a location not scheduled for resurfacing.

CC:

Mohammad Mirshahi, P.E. – Deputy Chief Engineer
Bart Thrasher, P.E. – L&D Division Administrator
Marsha Fiol – Transportation Mobility & Planning Division Administrator
Juliet Brown – Local Assistance Division Administrator
JoAnne Maxwell – Policy Division Administrator
District Engineers/Administrators
Residency Engineers/Administrators
Regional Operations and Maintenance Managers (ROMMs)
Regional Transportation Operations Managers (RTOMs)
Dr. Jose Gomez, P.E. – VTRC Director
Irene Rico – FHWA Virginia Division Administrator
Wayne Fedora – FHWA Virginia Division Acting Administrator

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ATTACHMENT A

Unsignalized Marked Crosswalk Standards

ATTACHMENT CONTENTS

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Unsignalized Marked Crosswalk Standards

1.0 SUMMARY OF REVISIONS

The list below summarizes the major changes to the previous 2005 *Guidelines for the Installation for Marked Crosswalks* document and the companion 2005 *Guidelines for the Installation of In-Roadway Warning Lights* document.

- Establishes additional guidance on when marked crosswalks should or shall be installed at controlled or uncontrolled approaches (e.g. not controlled by a stop sign, yield sign, pedestrian hybrid beacon, or traffic signal) to unsignalized intersections, and at mid-block locations.
 - A separate I&IM (currently under development) details when pedestrian accommodations should be provided at signalized intersections.
- Establishes guidance/standards on when standard or high-visibility crosswalks (longitudinal lines or bar pairs) should be installed.
- Provides guidance on allowable high-visibility crosswalk marking styles.
- Establishes recommended crosswalk widths.
- Removes most guidance for In-Roadway Warning Lights due to their limited use by VDOT.
- Adds discussions on use of Rectangular Rapid Flashing Beacons (RRFBs) and Pedestrian Hybrid Beacons (PHBs).

2.0 BACKGROUND

A crosswalk is generally defined as the portion of roadway designated for pedestrians to use in crossing the street. Crosswalks may be marked or unmarked, as defined in the [Code of Virginia § 46.2-100](#). At intersections, a sidewalk or pedestrian walkway extension across a street can define a crosswalk in addition to crosswalks defined by marked lines in the roadway.

A “pedestrian facility” is a general term denoting locations made to accommodate or encourage pedestrian travel outside the vehicle travelway between road crossings. It typically refers to sidewalks, shared use paths, and curb cuts. It can also refer to wide paved shoulders, or unpaved traversable areas adjacent to the road with a prepared surface, that can be used by pedestrians. An unpaved shoulder with worn-out path in the grass/soil due to pedestrian activity is generally considered a “pedestrian facility”.

There are both advantages and disadvantages of marking crosswalks. Potential advantages of properly marked crosswalks include:

- Helping pedestrians find their way across complex intersections,
- Providing a visible reminder to motorists that pedestrians may be present,
- Directing pedestrians to the location of the recommended crossing path,
- Establishing the legal crosswalk where an unmarked crosswalk does not already exist,
- Reducing the likelihood that drivers will encroach the intersection or block pedestrian traffic when stopping for a STOP or YIELD sign, and/or
- Designating the location of approved school crossings or crossings along recommended school routes.

IIM-TE-384 – Attachment A

Unsignalized Marked Crosswalk Standards

A potential disadvantage of marked crosswalks is that they may create a “false sense of security” for pedestrians (cause the pedestrian to assume that the motorist can and will stop in all cases).

If unnecessary and unwarranted marked crosswalks are installed, drivers may not expect them and may ignore or disregard them, which diminishes the effectiveness of marked crosswalks. Excessive marked crosswalk installation can also lead to increased installation and maintenance costs.

3.0 RELATIONSHIP TO AMERICANS WITH DISABILITIES ACT REQUIREMENTS

3.1 Guidance

The 1990 federal Americans with Disabilities Act (ADA) requires that pedestrians with disabilities be accommodated in the design, planning, and maintenance of pedestrian facilities. The ADA requirements are based on the understanding that a wide range of people, including people with disabilities, will be using the pedestrian facilities and relying on them for their daily travel.

The need for ADA improvements to be programmed or constructed in conjunction with marked crosswalk improvements depends on whether the action is a **maintenance activity** or an **alteration**, as defined in the latest effective version of [IIM-TE-376](#).

3.2 Maintenance Activities

Examples of maintenance activities related to crosswalks include:

- Striping a marked crosswalk at an unsignalized intersection if the crossing is already a crosswalk (albeit an unmarked one) as defined by the Code of Virginia,
- Changing the striping pattern of an existing marked crosswalk, and
- Signing improvements.

There is no requirement for ADA assessments or improvements when maintenance activities are performed.

When an existing unmarked crosswalk is converted to a marked crosswalk, it is recommended that the Region or District assess and functionally rate the existing curb ramps (if present) in accordance with IIM-TE-376. At locations where curb ramps are not present (Grade D) or are not fully functional (Grades B or C), future upgrades should be considered based on funding availability in accordance with the latest effective version of [IIM-TE-377](#).

3.3 Alterations

Examples of alterations related to crosswalks at unsignalized locations include:

- Rectangular Rapid Flashing Beacon (RRFB) or Pedestrian Hybrid Beacon (PHB) installation,
- Resurfacing of the crosswalk area, and

IIM-TE-384 – Attachment A

Unsignalized Marked Crosswalk Standards

- Establishing marked crosswalks at a location that would not currently be considered an unmarked crosswalk, such as at a midblock location.

When an alteration is being performed, the procedures required by IIM-TE-376 shall be followed.

4.0 APPLICABLE SECTIONS OF THE CODE OF VIRGINIA

[Section §46.2-100](#) of the Code of Virginia defines a crosswalk as “*that part of a roadway at an intersection included within the connections of the lateral lines of the sidewalks on opposite sides of the highway measured from the curbs or, in the absence of curbs, from the edges of the traversable roadway; or any portion of a roadway at an intersection or elsewhere distinctly indicated for pedestrian crossing by lines or other markings on the surface.*”

Note that the definition of “crosswalk” encompasses both marked and unmarked crosswalks. At locations where an unmarked crosswalk would not otherwise exist, and a crosswalk is present as a result of markings, the crosswalk only exists when the markings “distinctly indicate” the location of such crosswalk. This means that when such a marked crosswalk has degraded to the point where it is not sufficiently visible to the approaching motorist, it would no longer be considered a legal crosswalk. Moreover, marked crosswalks must meet the minimum requirements of the MUTCD (e.g., crosswalk width, line thickness, color) in order to be considered a marked crosswalk in Virginia.

[Section §46.2-904](#) states that bicyclists have all of the same rights and responsibilities as pedestrians within crosswalks.

[Section §46.2-923](#) states that pedestrians shall cross, wherever possible, only at intersections or marked crosswalks and shall not “carelessly or maliciously interfere” with traffic. If no marked crosswalks are available at an intersection, then pedestrians are not negligent if they cross by the most direct route at such an intersection.

[Section §46.2-924A](#) states that drivers must yield the right-of-way to pedestrians at:

- Any “clearly” marked crosswalks,
- Any unmarked crosswalks at “the prolongation of the lateral boundary lines of the adjacent sidewalk at the end of the block,” or
- Any intersection where the approach has a speed limit of 35 mph or below.

[Section §46.2-924B](#) sets forth the responsibilities of drivers and pedestrians. Pedestrians have the responsibility to avoid entering or crossing an intersection “in disregard of approaching traffic,” however they have the right-of-way over vehicles making turns. Drivers are required to “change their course, slow down, or stop” if necessary to permit pedestrians to cross.

[Section §46.2-924C](#) allows certain localities in Northern Virginia to establish ordinances imposing fines on drivers who fail to yield the right-of-way to pedestrians at locations where signs are installed and requires VDOT to establish criteria for this required signage in order to establish those fines. VDOT’s signing criteria is included as **Attachment B** to this Memorandum.

5.0 WHEN TO INSTALL MARKED CROSSWALKS AT UNSIGNALIZED INTERSECTIONS

5.1 General Guidance

As with any installation of traffic control devices, engineering judgment should be used for determining when installation of a crosswalk is justified. When considering whether to mark a crosswalk, the land uses adjacent to the roadway provide invaluable information to help indicate if the crosswalk is needed. Pedestrian-oriented land uses and transit stops will generate pedestrian crossings regardless of whether a marked crosswalk exists or not. When pedestrian-generating land uses exist adjacent to roadways where pedestrian crossings are legal, it is VDOT's responsibility to provide adequate safe pedestrian crossing opportunities and to direct pedestrians to those locations.

The presence of shared use paths can justify the installation of a marked crosswalk even if the adjacent land uses are not pedestrian-oriented.

Marked crosswalks should not be installed at the intersection of two low-speed roadways functionally classified as "local", such as at the intersection of two subdivision streets.

In addition, marked crosswalks should not be installed where neither "pedestrian facilities" (defined previously) nor pedestrian-oriented attractors/generators are present on both sides of the crossing. Examples of pedestrian attractors/generators include schools, university campuses, libraries, hospitals, senior centers, major shopping centers, recreational areas, large employment centers, rail stations, bus transfer centers, hotels, residential developments of at least moderate density, parking garages or large parking lots, etc. Pedestrian attractors/generators should be considered as a factor if they are within reasonable walking distance of the crossing.

If neither pedestrian facilities nor pedestrian-oriented land uses currently exist on both sides of the crossing, the designer should consult with the District Planner or locality to assess whether there is a potential for pedestrian activity in the near future, and if so design the location to allow for future crosswalk installation to the extent possible (such as by setting the marked stop line or yield line, if present, at a location where it won't conflict with a future marked crosswalk). Installing marked crosswalks in areas where there is minimal likelihood of existing or future pedestrian activity (based on adjacent land uses) is not recommended.

To the extent possible, marked crosswalks should match pedestrian desire lines by connecting pedestrian generators and attractors. In some rare circumstances, an unusually heavily used unsignalized crosswalk can adversely impact a roadway's vehicular capacity. In these rare cases, engineering judgment should be used to balance locating the crosswalk along pedestrian desire lines while avoiding a substantial impact to roadway vehicular capacity.

A flow chart illustrating the general decision-making process for installation of crosswalks at unsignalized locations is shown in Figure C1 of Attachment C.

Note that if there is a STOP sign or YIELD sign immediately downstream of the crossing (for example, where a Shared Use Path (SUP) runs parallel to the main road and crosses the side

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road such that drivers on the side road have the stop sign immediately downstream of the SUP), the approach is considered a controlled approach for the purposes of this IIM.

5.2 – When to Install Marked Crosswalks Across Stop-Controlled or Yield-Controlled Approaches

Marked crosswalks should be installed if pedestrian facilities or pedestrian-oriented attractors/generators exist on both sides of the crossing and any of the following statements are true, unless precluded by the recommendations in Section 5.1 or the Regional Traffic Engineer approves an exception to this recommendation:

- The crossing is part of a walking route approximately ¼ mile or less between a residential development of moderate or heavy density and a school or recreational area,
- The crossing is connected by pedestrian facilities to a rail transit stop or major bus transfer station within walking distance of approximately ¼ mile or less,
- The crossing is part of a shared use path or trail,
- The crossing is across a yield-controlled approach at an off-ramp junction or channelized right turn lane, or
- The crossing is within a downtown Central Business District area, and/or is in an area of known pedestrian activity and pedestrian-oriented land-use.

A flow chart illustrating the decision-making process for crosswalks at stop or yield-controlled locations is shown in Figure C2 of Attachment C.

5.3 – When to Install Mid-Block Marked Crosswalks or Marked Crosswalks Across Uncontrolled Approaches

An engineering study shall be performed before crosswalk markings are installed across uncontrolled locations (which includes both crosswalks at mid-block locations and crosswalks across uncontrolled intersection approaches). Data collection templates to facilitate crosswalk engineering studies are provided in Attachment D of this memorandum.

The satisfaction of the criteria within this section does not in and of itself require the installation of a marked crosswalk across an uncontrolled location.

Crossings of uncontrolled roadway approaches shall not be marked unless all of the following are met:

- 1) The crossing is on a direct route between significant pedestrian generator(s) and attractor(s), where engineering judgment determines that the crosswalk would likely see a minimum of 20 pedestrians/bicyclists using the crosswalk in an hour. That threshold may be reduced to 10 pedestrians per hour if the crossing is expected to be used by a high number of vulnerable pedestrians (pedestrians who are disabled, age 65 and over, or age 15 and under), or if the reduced volume is met for three consecutive hours.
- 2) The location is 300 feet or more from another marked crosswalk across the same road, or engineering judgment determines that sufficient demand and pedestrian desire lines exist to justify both crosswalks.

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- 3) Drivers will have an unrestricted view of the entire length of the crosswalk, including the waiting areas at either end of the crosswalk. If possible, this unrestricted view should be equal to or exceeding the Stopping Sight Distance (SSD) requirements shown in **Table 1** and as per the latest effective version of VDOT's Road Design Manual. If the SSD requirements cannot be met and the crosswalk cannot be relocated to a place where SSD requirements will be met, warning signs shall be used. (Warning signs may be omitted on downtown urban streets with speed limit < 35 mph if justified by documented engineering judgment.)
- 4) The required engineering study determines that the introduction of a marked crosswalk will not produce an unacceptable safety hazard.

A flow chart illustrating the decision-making process for crosswalks at uncontrolled locations is shown in Figure C3 of Attachment C.

Marked crosswalks across uncontrolled approaches should be avoided at locations that are unlit (roadway lighting not present) and higher speed (40 mph or greater) unless a high visibility crosswalk marking style and appropriate advance warning devices are utilized.

Table 1 – Stopping Sight Distance Requirements Approaching Mid-Block Crosswalks or Crosswalks at Uncontrolled Intersection Approaches (feet)

Operating Speed *	Level Grade	Downgrades			Upgrades		
		-3%	-6%	-9%	+3%	+6%	+9%
25 mph	155	158	165	173	147	143	140
30 mph	200	205	215	227	200	184	179
35 mph	250	257	271	287	237	229	222
40 mph	305	315	333	354	289	278	269
45 mph	360	378	400	427	344	331	320
50 mph	425	446	474	507	405	388	375
55 mph	Crosswalks should not be marked across uncontrolled approaches with operating speed of 55 mph or greater.						

(Source: VDOT Road Design Manual, Chapter 2D. This table is provided for convenience and is current as of June 2016. Any subsequent revisions to the Road Design Manual override the values provided in this table.)

*Operating speed can refer to actual 85th percentile speed, if speed data is available. Otherwise, operating speed can be estimated as the posted speed limit plus 7 mph, or based on documented engineering judgment. For operating speeds not in 5 mph increments, users should interpolate from this table to find the minimum SSD requirements.

As per Section 3B.18 of the 2009 MUTCD, if a marked crosswalk is installed, pedestrian crossing warning signs should be installed in advance of non-intersection crosswalks and on-street parking should be prohibited where it will impede adequate visibility of the crosswalk and waiting areas.

The R1-5 "Yield Here to Pedestrians" sign may be used in advance of a marked mid-block crosswalk across a multi-lane (i.e. two or more travel lanes per direction) uncontrolled approach to direct vehicles to yield in advance of the crosswalk. This is done to minimize the risk of a vehicle in one lane from blocking the view of a crossing pedestrian from a vehicle approaching in the other lane. If used, the R1-5 sign should be placed 20 to 50 feet in advance of the

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crosswalk as per Section 2B.11 of the 2009 MUTCD and FHWA's [Official Interpretation 2\(09\)-86](#). Yield line ("shark's teeth") pavement markings may be used in conjunction with the R1-5 sign, as per Section 3B.16 of the 2009 MUTCD.

If a marked crosswalk is to be installed across an uncontrolled approach, **Table 2** should be used to determine if additional enhancements may be necessary to facilitate safe crossing at uncontrolled locations. A flow chart illustrating the use of Table 2 is shown in Figure C4 of Attachment C.

Treatments to inhibit pedestrian crossings (such as landscaping or fences) should only be considered where existing crosswalks are located within 300 feet and an additional crossing would create an unsafe condition, or where pedestrian demand exists but the natural pedestrian desire line results in unsafe crossings, such as locations where visibility (for pedestrians or motorists) is obstructed and the obstruction cannot be reasonably removed.

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Table 2. Recommendations for Considering Marked Crosswalks and Other Needed Pedestrian Improvements Across Uncontrolled Approaches

Roadway Configuration	Roadway ADT and Speed Limit															
	1,500 to 9,000 VPD				9,000 to 12,000 VPD				12,000 to 15,000 VPD				More than 15,000 VPD			
	≤ 30 MPH	35 MPH	40 MPH	≥ 45 MPH	≤ 30 MPH	35 MPH	40 MPH	≥ 45 MPH	≤ 30 MPH	35 MPH	40 MPH	≥ 45 MPH	≤ 30 MPH	35 MPH	40 MPH	≥ 45 MPH
2 Lanes (undivided two-way street or two-lane one-way street)	A	A	B	B	A	A	B	B	A	A	B	B	B	B	B	C
3 Lanes with refuge island OR 2 Lanes with raised median*	A	A	B	B	A	B	B	B	A	A	B	B	B	B	B	C
3 Lanes (center turn lane)	A	A	B	B	A	B	B	B	A	B	B	C	B	C	C	C
4 Lanes (two-way street with no median)	A	B	C	C	B	B	C	C	B	C	C	D	C	C	C	D
5 Lanes with refuge island OR 4 lanes with raised median*	A	A	B	B	A	B	B	C	B	B	C	C	B	B	C	D
5 Lanes (center turn lane)	A	B	C	C	B	B	C	C	C	C	C	D	C	C	C	D
6 Lanes (two-way street with* or without median)	A	B	D	D	B	B	D	D	D	D	D	D	D	D	D	D

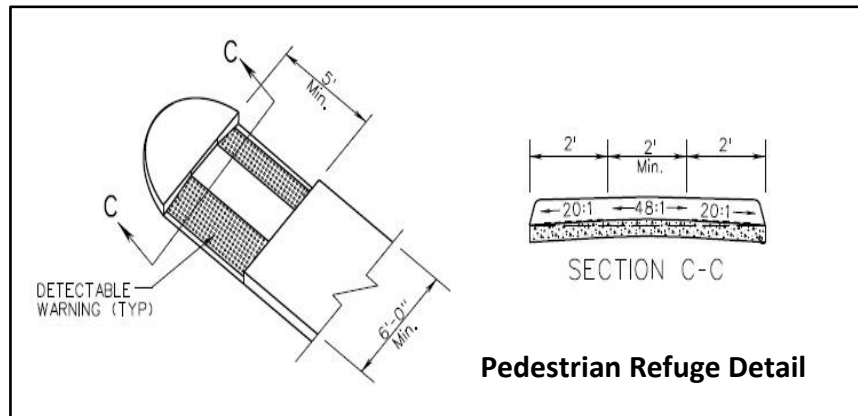
Source: Guidance for Installation of Pedestrian Crosswalks on Michigan State Trunkline Highways (Michigan Department of Transportation, 2014)

Condition A	Candidate site for marked crosswalk alone (standard if speed limit is 30 MPH or less, high-visibility if speed limit is 35 MPH or greater). Evaluate need for advance signing
Condition B	Potential candidate site for marked crosswalk. Location should be monitored & consideration given to providing a high-visibility crosswalk and/or warning signs (see Section 7.2)
Condition C	Marked crosswalks alone are insufficient. The crosswalk shall use a high-visibility pattern and other improvements (warning signs and/or geometric/ traffic calming improvements) (see Section 7.2) <u>will likely be necessary.</u>
Condition D	Marked crosswalks <u>shall not</u> be installed

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* The pedestrian walkway through a refuge island shall be at least 5 feet wide (6 feet width or greater is preferred) and at least 6 feet long to be considered a safe refuge area (see detail on the bottom right from VDOT Standard Drawing CG-12). A raised median generally provides greater pedestrian-vehicle crash reduction benefit than a flush (painted) median, however the presence of a painted median can also provide advantages to the crossing pedestrian over an undivided road.



6.0 CROSSWALK DESIGN

6.1 – Crosswalk Width and Location

In general, crosswalks should be the same width as the pedestrian facility on either side of the roadway, subject to the following requirements:

- Crosswalks shall be at least six feet wide as per the MUTCD, and
- Crosswalks should be at least seven feet wide in order to allow two wheelchairs, parents with strollers, etc. to pass each other.

Wider crosswalks than described above should be provided at locations with heavy pedestrian volumes during peak periods, to avoid creating situations where pedestrians are “crowded out” of the crosswalk. The width should not exceed 10 feet except when necessary to accommodate peak pedestrian periods at locations with exceptionally high pedestrian activity. Crosswalks that are part of a shared use path should be at least as wide as the path (ten feet recommended) to accommodate bicyclists passing in both directions.

Unnecessarily wide crosswalks can result in the stop lines having to be placed further back from the intersection which in turn can have an adverse impact on driver's sight distance.

Crosswalks shall start and end at curb ramps where curb is present. Crosswalks shall be straight and not kinked, except that crosswalks may change direction from within a refuge island. If existing curb ramps are present on a project involving alterations, then it might be necessary to reconstruct/relocate existing curb ramps and/or modify existing raised medians in order to provide crosswalks at a logical location.

6.2 – Crosswalk Marking Patterns

Marked crosswalk patterns can be divided into two basic categories: standard and high-visibility. Standard crosswalks use the transverse lines (two parallel lines) pattern. High-visibility crosswalks have bar-pairs, ladder, longitudinal lines, or zebra patterns. Permissible crosswalk marking patterns that may be used on VDOT-maintained roadways are shown in **Table 3**.

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According to [an FHWA study](#)³, high-visibility crosswalks can have up to double the detection distance (for drivers approaching the crosswalk) compared to standard crosswalks - an 8 second increase in detection distance for a 30 mph approach. However, high-visibility crosswalks are also more expensive (as much as five times the cost) - both for initial installation and future maintenance. Some high-visibility crosswalk marking materials can also become slick when wet, potentially resulting in a loss of traction for vehicles (particularly motorcyclists and bicyclists) in the travel lanes as well as for pedestrians crossing the crosswalk. High-visibility crosswalks can lose some of their enhanced effectiveness if they are used too often.

Standard crosswalks should be used for all marked crosswalks except at locations meeting the below criteria.

A high-visibility crosswalk pattern shall be utilized where any of the following conditions exist:

- The crossing is at an uncontrolled roadway approach and meets Condition C (orange area) of the selection chart in **Table 2**,
- The crossing is located across a multilane roundabout approach or exit from a multi-lane roundabout,
- The crossing is part of a shared use path and crosses an uncontrolled roadway approach with a speed limit > 25 mph, or
- The crosswalk is part of a Pedestrian Hybrid Beacon (PHB) crossing.

High-visibility marked crosswalks should be installed at locations where all of the following conditions exist:

- The speed limit is > 25 mph,
- The crossing is across an uncontrolled roadway approach, and
- One or more of the following special conditions apply:
 - The crossing meets Condition B (yellow area) of the selection chart in **Table 2**,
 - The crossing is not illuminated by nearby roadway lighting,
 - Engineering judgment determines that the pedestrian crossing volume is expected to be very high⁴,
 - The crossing is part of a walking route approximately ¼ mile or less between a residential development of moderate or heavy density and a school or recreational area,
 - The crossing is connected by pedestrian facilities to a rail transit stop or major bus transfer station within walking distance of approximately ¼ mile or less,
 - The crosswalk is within a downtown Central Business District area, or
 - The crosswalk is in a location where the surrounding land use is indicative of walking as a transportation mode.

³ Fitzpatrick, K., et al. *Crosswalk Marking Field Visibility Study* (FHWA: 2010), <http://www.fhwa.dot.gov/publications/research/safety/pedbike/10067/10067.pdf>

⁴ The designer should use local knowledge and site context to determine if current or anticipated pedestrian crossing volume could be considered “very high.” A crossing with very high pedestrian volume usually is expected to have pedestrian activity during most 15-minute daytime periods when weather conditions are conducive to walking. [EXPLANATION FOR MY EDIT: even in areas with tons of pedestrian movements like, say, right in front of the Metro stop, you probably have fairly light pedestrian volumes at certain hours. For example, 7:15 on a Sunday morning]

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Unsignalized Marked Crosswalk Standards

In addition, marked crosswalks across single-lane roundabout approaches and exits should use a high-visibility marking pattern.

High-visibility crosswalks may also be installed where engineering judgment determines that they are necessary to increase driver recognition distance to help compensate for other factors such as roadway geometry, visual clutter in the surrounding environment, crash history, and/or traffic and pedestrian volume patterns.

Table 3 –Permissible Crosswalk Types on VDOT-maintained Roadways

Type	Class	Design details	Sketch
Transverse Lines (two parallel lines)	Standard	- The transverse lines shall be between 6" and 12" in width. - Typically, VDOT uses 6" width, however 8", 10", or 12" widths can be used to increase the visibility of the lines as they become worn over time.	
Longitudinal Lines ("continental")	High-Visibility	- Refer to PM-3 standards for details of longitudinal line widths and placement. - Longitudinal lines should be spaced to avoid the wheel paths of through vehicles.	
Bar Pairs	High-Visibility	- Identical to Longitudinal Lines crosswalk, but uses pairs of 8" lines with 8" gap (8/8/8 pattern) in lieu of a 24" longitudinal line. - Spacing between the 8/8/8 bar pairs shall be the same as the requirements of PM-3 for spacing between Longitudinal Lines. - The bar pairs should be spaced to avoid the wheel paths of through vehicles.	

Source: 2008 VDOT Road and Bridge Standards, Section 1330.33

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Other high-visibility marking patterns, such as “ladder” or “zebra” markings, should not be used except when necessary to match the pattern of other adjacent marked crosswalks.

Bar Pairs crosswalks have several advantages over Longitudinal Lines crosswalks:

- [An FHWA study](#) of the Bar Pairs pattern concluded that it behaves comparably with the Longitudinal Lines pattern in terms of driver recognition and behavior,
- Similar cost as Longitudinal Lines crosswalks (although installation is slightly more complicated, the Bar Pairs crosswalk uses less marking material),
- Easier for motorcyclist/bicyclist traffic to avoid traveling over the pavement marking material, which may be slick when wet, and
- Easier for pedestrians to avoid stepping directly on the pavement marking material, which may be slick.



If an existing standard crosswalk is upgraded to a high-visibility crosswalk independent of a roadway resurfacing project, the transverse lines may be retained to eliminate the need for pavement marking eradication. The transverse lines should not be restored when the roadway is resurfaced.

6.3 – Aesthetic Treatments Between Crosswalk Lines

Localities may request the use of aesthetic treatments, such as stamped concrete, brick pavers, or thermoplastic patterned inlays, between the crosswalk lines. Such requests will be evaluated as per the latest edition of L&D Instructional & Informational Memorandum [IIM-LD-218](#). Such aesthetic treatments by themselves do not constitute a marked crosswalk; they must be edged by transverse white lines to legally establish the marked crosswalk and also to provide visual contrast between the pavement and the aesthetic treatment.

As per Section 3G.01 of the 2009 MUTCD, aesthetic or colored pavement between crosswalk lines should not use colors or patterns that degrade the contrast of the white transverse crosswalk lines or that might be mistaken by road users as a traffic control application.

7.0 OTHER PEDESTRIAN CROSSING SAFETY TREATMENTS

7.1 Pedestrian or School Regulatory and Warning Signs

Pedestrian/school regulatory and warning signs, when used, shall be located and installed in accordance with the MUTCD and the Virginia Supplement to the MUTCD.

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Unsignalized Marked Crosswalk Standards

7.2 Geometric/Traffic Calming Improvements

There are many options available to designers to modify or construct new roadway geometry to improve the safety of crossing pedestrians by achieving one or more of the following goals:

- Reducing the crossing distance length (which reduces the pedestrian's exposure to traffic),
- Increasing the visibility of pedestrians who are crossing or waiting to cross, or
- Encouraging drivers to drive at slower speeds.

These options include:

- Installing corner or midblock bulb-outs,
- Installing median refuge islands and "choker" islands,
- Reducing corner radii,
- Increasing the intersecting angle of channelized turn lanes,
- Installing raised crosswalks, and/or
- Installing mini-roundabouts.

These design elements should be designed in accordance with Appendix B(2) of the latest effective version of VDOT's [Road Design Manual](#) and DRPT's [Multimodal System Design Guidelines](#).

Traffic calming improvements on residential streets, such as raised crosswalks or choker islands, should be planned and designed in accordance with the latest effective version of VDOT's [Traffic Calming Guide for Local Residential Streets](#).

7.3 Midblock Pedestrian Signals and Pedestrian Hybrid Beacons

Vehicular traffic signals may be used to control a midblock pedestrian crossing if the traffic signal is warranted based on the Pedestrian Volume Warrant in Section 4C.05 of the 2009 MUTCD.

Pedestrian Hybrid Beacons (PHBs) may be used to control a midblock pedestrian crossing if warranted, designed, and operated as per Chapter 4F of the 2009 MUTCD. As per [Official Interpretation 4\(09\)-14\(I\)](#), a red clearance interval is permissible and should be considered between the start of the steady red phase and the start of the pedestrian walk interval, and then again between the end of the pedestrian walk interval and the end of the alternating flashing red interval. The duration of the flashing yellow interval should be as per [Official Interpretation 4\(09\)-32\(I\)](#).

PHBs shall not be installed where the crossing volume is less than 20 pedestrians per hour.



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7.4 Rectangular Rapid Flashing Beacons (RRFBs)

If Condition B (yellow area) or C (orange area) is met in **Table 2**, RRFBs may be considered as an appropriate additional crossing treatment to supplement marked crosswalks.

RRFBs, similar to In-Roadway Warning Lights (IRWLs), rely on lights that flash upon pedestrian activation to alert drivers to the likely presence of pedestrians within or waiting to cross the crosswalk. However, RRFBs are mounted on the sign posts (or, less often, overhead) and therefore have lesser long-term maintenance costs than the in-pavement IRWLs which are subjected to vehicular wear, snowplows, and pavement resurfacing.

RRFBs are not currently included in the 2009 MUTCD and may only be used per the requirements of FHWA's Interim Approval. In 2011 VDOT received Interim Approval from FHWA to operate RRFBs on VDOT maintained roads. Localities that maintain their own roads must separately apply for and receive Interim Approval from FHWA prior to installing RRFBs.

FHWA's MUTCD [Interim Approval website](#) lists several Official Interpretations that clarify and/or amend the initial RRFB approval. These interpretations shall be followed when planning, designing, and operating RRFB installations. This website should be monitored periodically for updated Interpretations. Note that existing installations do require retrofits should new requirements come out after initial activation. As of the date of this revised IIM, the following interpretation subjects include:

- Overhead Mounting, 2009
- Flash Pattern, 2010, 2012, 2014
- Use with W11-15 Sign, 2010
- Light Intensity, 2012
- Dimming during Daytime Hours, 2012
- Flashing Extensions and Delays, 2013
- Placement of Units above Sign, 2016

RRFBs should not be used indiscriminately. Overuse of RRFBs in the roadway environment could decrease not only the effectiveness of the RRFBs but those crossings without RRFBs.

7.4.1 Visibility

The sign and light components of the RRFBs should be prominently visible to approaching vehicles, and the RRFBs should have side indication lights informing pedestrians when the flashers are activated.



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An RRFB assembly should be placed on the median or on an overhead mast arm at crossings with obstructed visibility for side-mounted traffic control devices (e.g. near side transit stops, trees, visual clutter, roadway geometry, large volume of heavy vehicles, and etc.).

If a median is present and the RRFBs are post-mounted, both right hand and median mounted RRFBs should be installed.

Advance RRFBs should be considered for any crossings that have excessive surrounding visual clutter, steep vertical and/or sharp horizontal roadway curvature.

7.4.2 Speed

There may be conditions that necessitate the installation of pedestrian crossings where speeds are higher and special consideration is warranted (B and C Conditions in **Table 2** where speed limit is > 35 mph). Consideration should also be given to installing advance RRFBs on higher speed (> 35 mph) roadways even if there is adequate SSD on both approaches. See **Figures 1 and 2** for additional guidance on low speed (≤ 35 mph) and high speed (> 35 mph) roadways.

Vehicle and Pedestrian/Bicycle Volume

RRFBs should not be installed unless there are a minimum of 20 pedestrians/bicyclists using the crosswalk in an hour. That threshold may be reduced to 10 pedestrians per hour if the crossing is expected to be used by a high number of vulnerable pedestrians (pedestrians who are disabled, aged 65 and over, or aged 15 and under), or if the reduced volume is met for three consecutive hours.

RRFBs shall not be installed if pedestrian and vehicular volumes fall outside the limit lines shown in **Figures 1 and 2**, unless approved by the Regional Traffic Engineer (RTE). RRFBs may not be appropriate in locations where there is a combination of both high traffic volumes and high pedestrian volumes (above the RRFB upper thresholds in the below figures). At such locations there may be an increase in crashes and/or traffic delay that make the use of RRFBs inappropriate. At such locations, PHBs, pedestrian traffic signals, or grade separated crossings should be considered. The colored lines in Figures 1 and 2 depict the warrant requirements for PHBs as per Section 4F.01 of the MUTCD.

Engineering judgement should take into account the proximity of adjacent signals.

If PHBs are considered, Section 4F of the 2009 MUTCD contains warranting guidelines that utilize traffic, automobile speeds, and pedestrian crossing distance.

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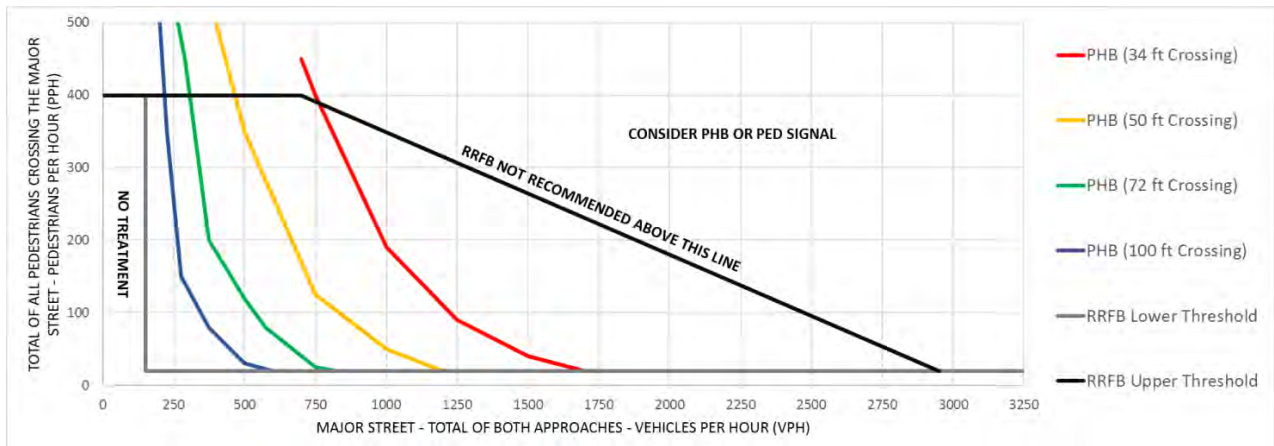


FIGURE 1 – Installation of RRFBs and PHBs on Low Speed Roadways (speed limit ≤ 35 mph)

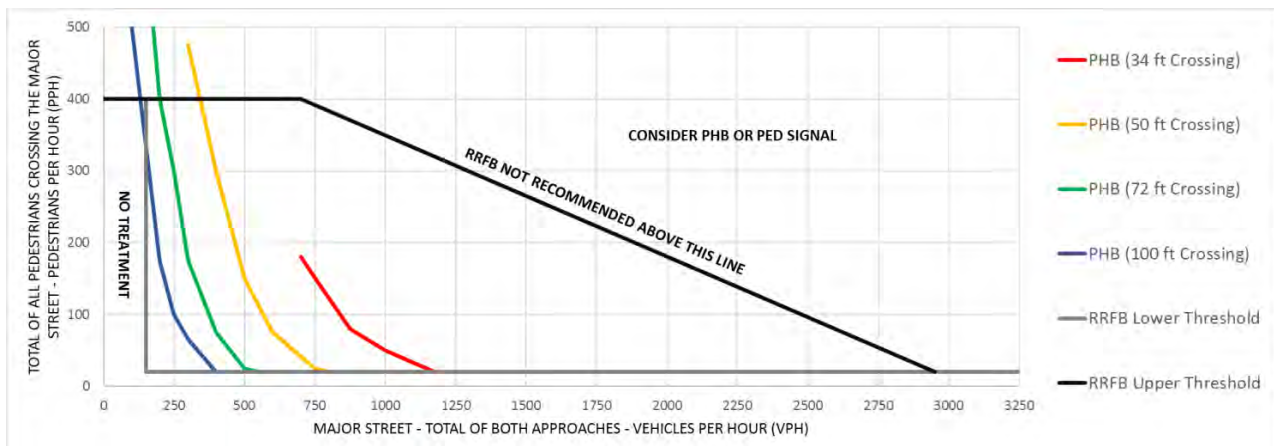


FIGURE 2 – Installation of RRFBs and PHBs on High Speed Roadways (> 35 mph)

Source: 2009 MUTCD, Section 4F and Pedestrian Crossing Treatment Installation Guidelines, City of Boulder

7.5 In-Roadway Warning Lights (IRWLs)

IRWLs rely on lights embedded in the pavement that flash upon pedestrian activation or detection to alert drivers to the likely presence of pedestrians within or waiting to cross the crosswalk.

It is recommended that RRFBs or other treatments be considered in lieu of IRWLs due to their long-term maintenance costs.

8.0 UNCONVENTIONAL LOCATIONS

8.1 T and Offset Intersections

At closely spaced T and offset intersections, it might not be prudent or necessary to mark all legal crosswalks. At T intersections, it may be appropriate to only mark one of the two crossings

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across the through road. This decision should be based on pedestrian demand volumes and the volume of left- and right-turning traffic from the stem of the T.

8.2 Roundabouts

Pedestrian crossings at roundabouts should be located and designed as per the latest effective version of VDOT's [Road Design Manual](#), Chapter 2D, [Roundabouts: An Informational Guide, 2nd Edition](#) (NCHRP Report 672), and the 2009 MUTCD, Section 3C.05.

The Code of Virginia's definition of where unmarked crosswalks exist at intersections does not necessarily apply to roundabout intersections. In order to establish that a crosswalk exists, and also for safety reasons, marked crosswalks shall be provided across all legs of a roundabout (both entrances and exits) where there are adjacent pedestrian facilities on both sides of the leg, unless the Regional Traffic Engineer or designee concurs that a significant operational or safety concern prevents their use.

Marked crosswalks at single-lane roundabouts should use a high-visibility marking pattern. Marked crosswalks across multilane roundabout approaches or exits shall use a high-visibility marking pattern.

Note that neighborhood traffic circles that do not meet the design criteria for a modern roundabout (e.g. lack of splitter islands) need not have marked crosswalks. Unmarked crosswalks are typically sufficient for neighborhood traffic circles and other subdivision streets.

8.3 Interchanges

Due to high-speed merging and diverging traffic that may be present on the cross road at interchanges, it may be desirable to limit the pedestrian pathway through the interchange to just one side of the cross street. Pedestrian pathways through interchanges need to be carefully planned to take into account conflicts from merging and diverging traffic. At free-flowing or YIELD controlled ramps, the crosswalk should be installed perpendicular to the ramp at a location where sight distance is optimal, even if this location is further away from the parallel roadway.

For interchanges with multiple merging and diverging ramps, such as cloverleaf interchanges and Diverging Diamond Interchanges (DDIs), it may be desirable to provide a pedestrian pathway through the median of the cross road to minimize pedestrian-vehicle conflict if space for a pedestrian facility in the median exists.

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9.0 REFERENCE

- [VDOT Policy for Integrating Bicycle and Pedestrian Accommodations](#)
- [2009 MUTCD with Revisions](#)
- [2011 Virginia Supplement to the MUTCD With Revisions](#)
- [VDOT Road Design Manual \(latest effective version\)](#)
- [2008 VDOT Road and Bridge Standards](#)
- [DRPT Multimodal System Design Guidelines](#)
- [Instructional & Informational Memorandum IIM-LD-218, Latest Revision](#)
- [Roundabouts: An Informational Guide, 2nd Edition](#)
- [City of Boulder Pedestrian Crossing Treatment Installation Guidelines](#)
- [MDOT Guidance for Installation of Pedestrian Crosswalks on Michigan State Trunkline Highways](#)
- [FHWA Crosswalk Marking Field Visibility Study](#)

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ATTACHMENT B

Complete Section

Virginia Code 46.2-924 Signing and Marking Criteria

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Code 46.2-924 Signing and Marking Criteria

BACKGROUND:

- Virginia Code [Section §46.2-924](#) Part 3C states that certain localities in Northern Virginia District may impose a fine for drivers who fail to yield the right-of-way to pedestrians crossing or attempting to cross the highway, provided the following:
 - The fine is enacted by ordinance and the crosswalk is marked
 - There are standard highway signs informing drivers of their duty to yield to pedestrians at each and every crossing location covered by the higher fines ordinance
- This document provides VDOT's "criteria for the design, location and installation of such signs" as required by [§46.2-924](#).
- These criteria are based primarily on the FHWA Manual on Uniform Traffic Control Devices ([MUTCD](#)), the [Virginia Supplement](#) to the MUTCD and traffic engineering best practices.
- Localities that maintain their own roads shall still abide by these criteria and by the MUTCD. They may also choose to adopt the [Virginia Supplement](#) to the MUTCD.
- The current edition of the [MUTCD](#) and [Virginia Supplement](#) became effective January 1, 2012 and should be followed as outlined in both manuals.

CRITERIA:

- The crosswalk marking pattern and dimensions shall be as per this IIM, preferably with high-visibility marking patterns.
 - An R1-5 or R1-5A "Yield Here to Pedestrians" sign shall be placed approximately 20-50 feet upstream of the near crosswalk edge in both directions, as per [Section 2B.11](#) of the MUTCD.
 - Signs that read "Stop for Pedestrians" shall not be used, as the Code requires drivers to "yield" to pedestrians.
 - A R2-6P "Fines Higher" or R2-6bP "\$XXX Fine" sign shall be placed below the R1-5/R1-5a signs, as required by [Section 2B.17](#) of the MUTCD.
 - On multilane approaches, the R1-5/R1-5a sign should be coupled with yield line markings ("shark's teeth") [MUTCD Markings Requirements](#) Section 3B.16, Figures 3B-16 and 3B-17, or other approved markings.
 - Alternatively, the locality may modify the R1-6 "State Law Yield to Pedestrians Within Crosswalk" or overhead R1-9 "State Law Yield to Pedestrians" sign to add a "Fines Higher" or "\$XXX fine" message, using black all-caps text on white background.
 - As per [Section 2B.12](#) of the MUTCD, modified R1-6 signs shall not be post-mounted on the left or right side of the highway.
- Standard signs shall be erected and maintained by localities. On VDOT-maintained roads, the VDOT Regional Traffic Engineer or designee shall approve these sign locations.



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ATTACHMENT C

Process Flow Charts for Determining Appropriate Pedestrian Crossing Accommodations at Unsignalized Locations

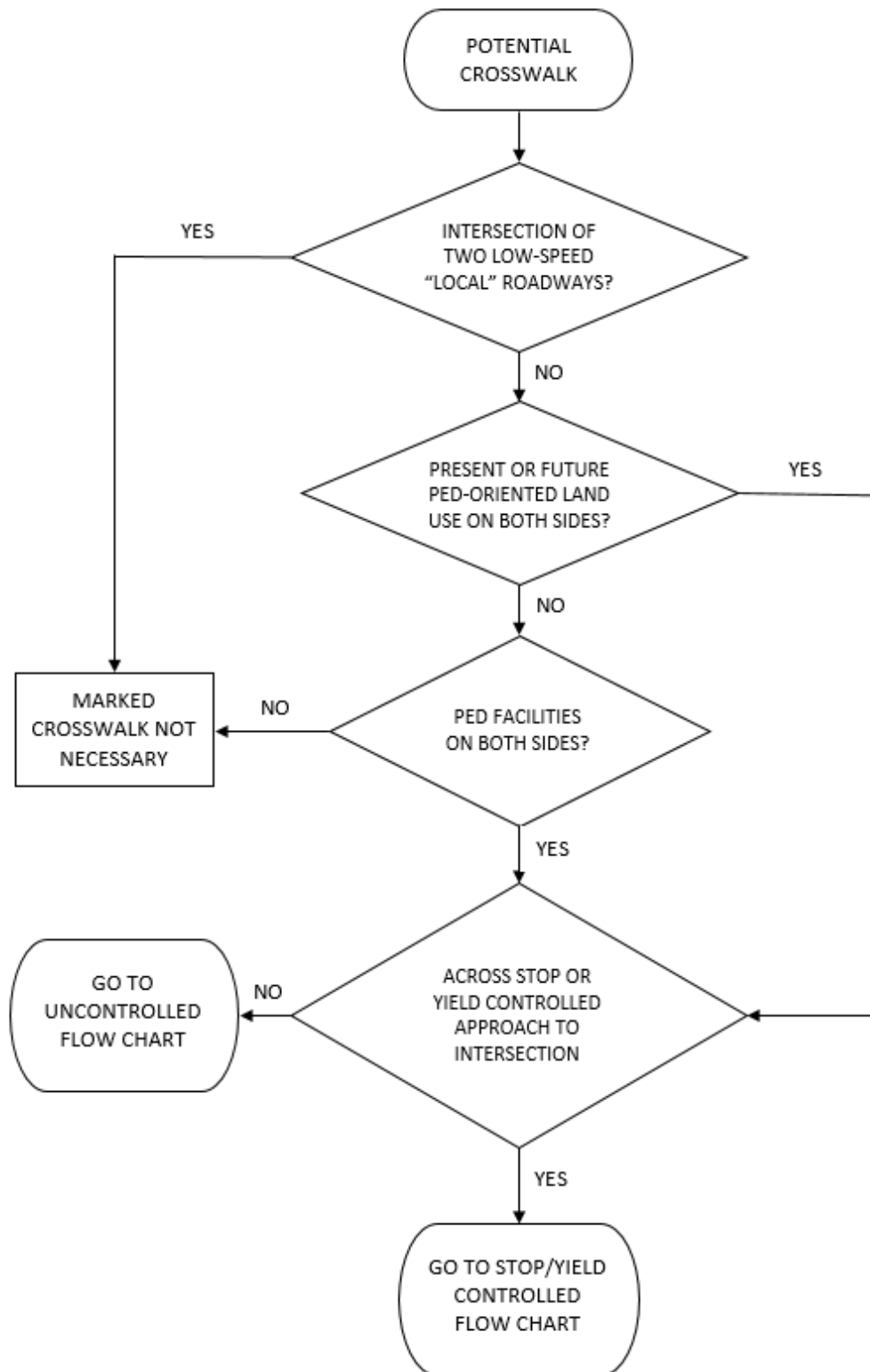
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Figure C1. Potential Crosswalk Flow Chart	C1
Figure C2. Stop or Yield Controlled Flow Chart	C2
Figure C3. Uncontrolled Approach Flow Chart	C3
Figure C4. Table 2 Flow Chart	C4

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Reference Flow Charts for Pedestrian Crossing Accommodations at Unsignalized Locations

889 **Figure C1. Potential Crosswalk Flow Chart**

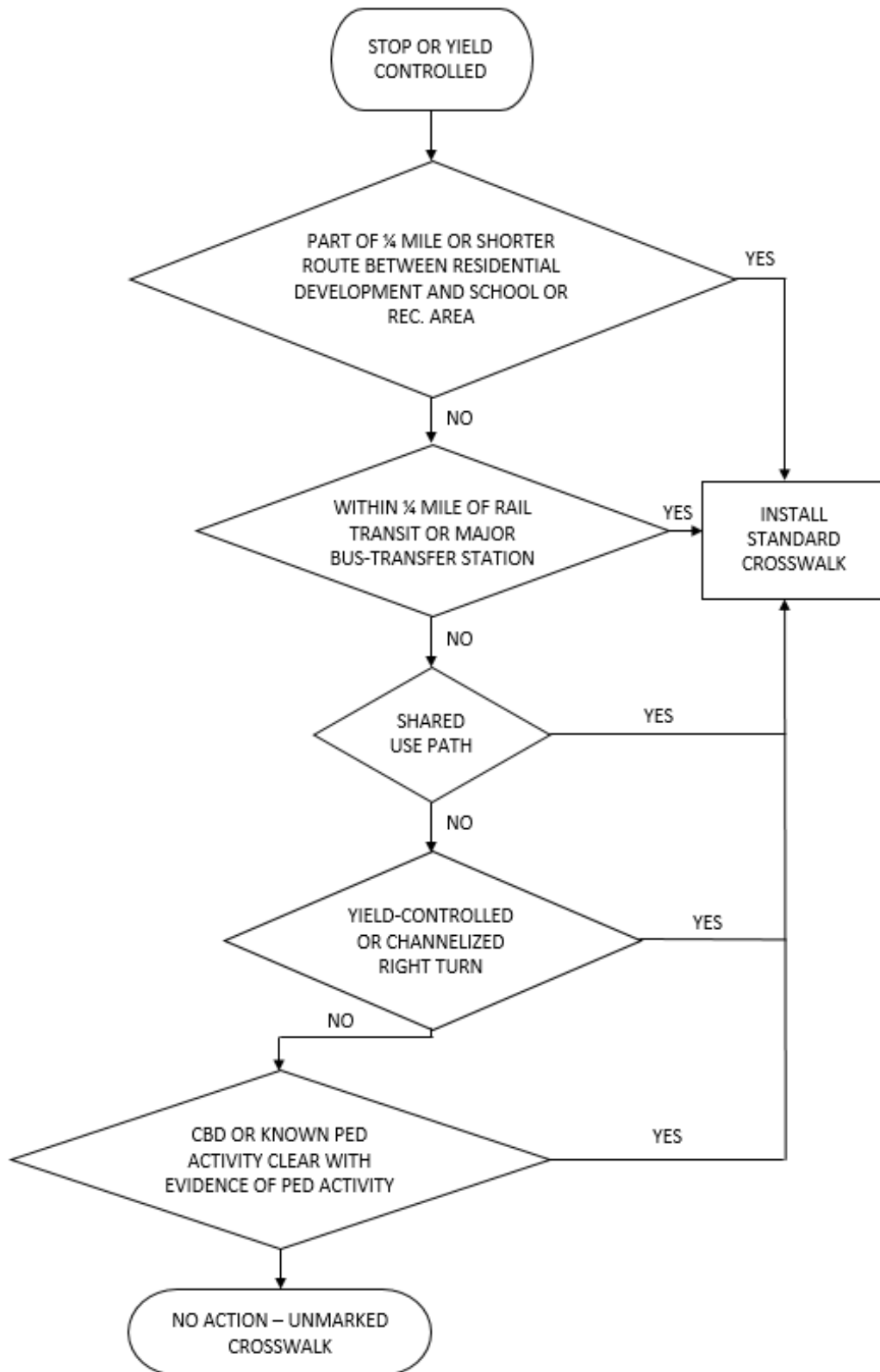


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Reference Flow Charts for Pedestrian Crossing Accommodations at Unsignalized Locations

892 **Figure C2. Stop or Yield Controlled Flow Chart**

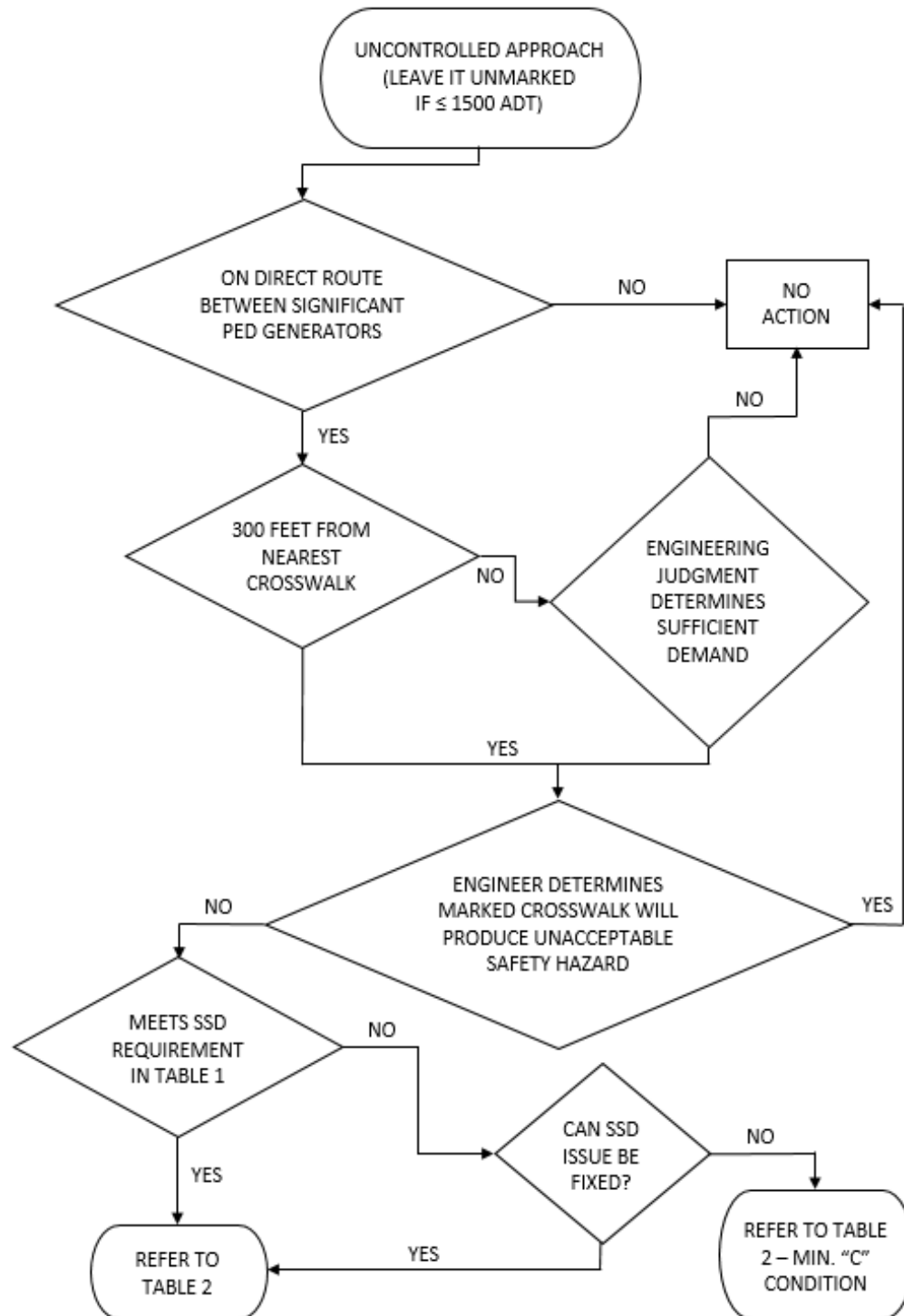


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Reference Flow Charts for Pedestrian Crossing Accommodations at Unsignalized Locations

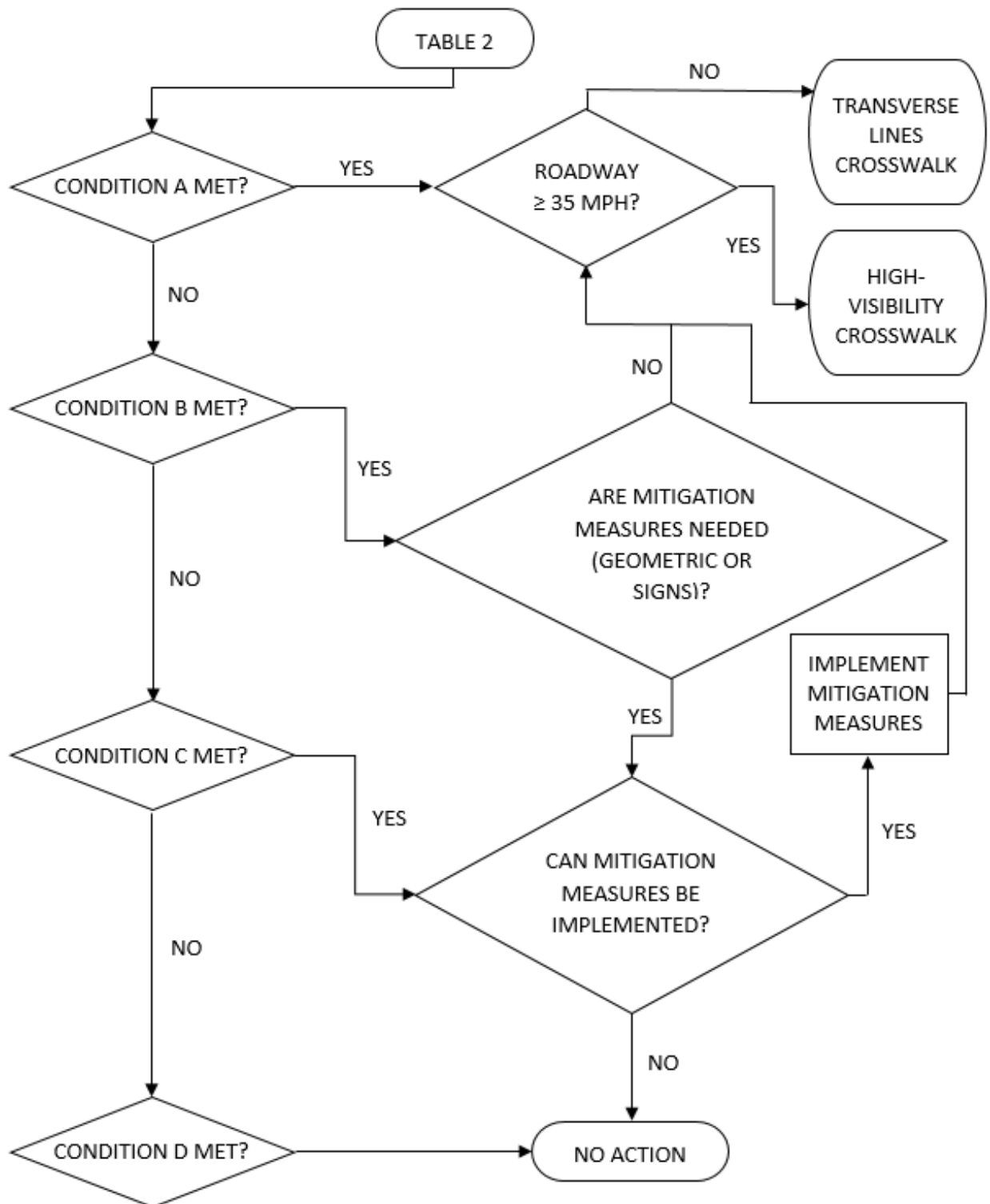
894 **Figure C3. Uncontrolled Approach Flow Chart**



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IIM-TE-384 – Attachment C **Reference Flow Charts for Pedestrian Crossing Accommodations at** **Unsignalized Locations**

897 **Figure C4. Table 2 Flow Chart**



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ATTACHMENT D

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Data Collection Sheets for Pedestrian Crossing Accommodation Studies at Unsignalized Locations

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ATTACHMENT CONTENTS

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914 Data Collection Sheet: Location Description Part 1 D1

915 Data Collection Sheet: Location Description Part 2 D2

916 Data Collection Sheet: Traffic Data D3

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Sample Data Collection Sheet for Pedestrian Crossing Accommodations at Unsignalized Locations

LOCATION DESCRIPTION – PART 1	
Name of Data Collector: _____	
Date of Data Collection: _____	
Locality/District of Study Location: _____	
1) Crossing Location: ☐ Unsignalized Intersection ☐ Mid-block	
If crossing is (or will be) at unsignalized intersection location, define intersecting streets:	
Major Street	
Name: _____	Posted Speed Limit: _____ MPH
Functionality: ☐ Arterial ☐ Collector ☐ Local	
Minor Street	
Name: _____	Posted Speed Limit: _____ MPH
Functionality: ☐ Arterial ☐ Collector ☐ Local	
If crossing is (or will be) at mid-block location, define location on major street:	
Major Street	
Name: _____	Posted Speed Limit: _____ MPH
Functionality: ☐ Arterial ☐ Collector ☐ Local	
Location Description (e.g. 500 ft East of Main St.): _____	
2) Is this a shared-use path (e.g. bicycles) crossing? ☐ Yes ☐ No	
3) Existing Nearby Pedestrian Generators and Attractors (e.g. moderate density residential developments, schools, parks, commercial establishments, transit stops):	
North/East of crossing: _____	
South/West of crossing: _____	
4) Existing Traffic Control: ☐ Stop/Yield Sign ☐ Uncontrolled	
5) Is there Another Marked Crosswalk across the same roadway within 300 feet of the Crossing Location? ☐ Yes ☐ No	
6) Existing Crossing Treatments (if any) (e.g. standard crosswalk, curb ramps, and etc.):	

7) (for stop/yield controlled locations only) Is the Crossing Location Across a Yield-controlled Approach at an Off-ramp Junction or Channelized Right Turn Lane? ☐ Yes ☐ No	

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IIM-TE-384 – Attachment D

Sample Data Collection Sheet for Pedestrian Crossing Accommodations at Unsignalized Locations

LOCATION DESCRIPTION – PART 2	
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8) Roadway Configuration:

- ☐ 2-Lanes (one-way street)
- ☐ 2-Lanes (two-way street with no median)
- ☐ 2-Lanes with raised median
- ☐ 3-Lanes with refuge island
- ☐ 3-Lanes (center turn lane)
- ☐ 4-Lanes (two-way street with no median)
- ☐ 4-Lanes with raised median
- ☐ 5-Lanes with refuge island
- ☐ 5-Lanes (center turn lane)
- ☐ 6-Lanes (two-way street with or without median)
- ☐ Other:

9) Crossing Distance by Direction:

Total: ft

(if applicable) From one end to the median: _____ ft, Direction: _____

(if applicable) From other end to the median: _____ ft, Direction: _____

10) Nearest Marked or Protected Pedestrian Crossing: _____ Distance to: _____ ft

11) Could the Crossing Contain a Crosswalk of at Least 6 ft in Width? ☐ Yes ☐ No

12) (for uncontrolled locations only) Stopping Sight Distance (SSD):

ft, Direction: _____

ft, Direction:

Can SSD be improved? ☐ Yes ☐ No ☐ Other:

13) Potential Safety Hazard within Crossing Location (if any):

14) Sketch/Photo of the Crossing Location:

IIM-TE-384 – Attachment D **Sample Data Collection Sheet for Pedestrian Crossing** **Accommodations at Unsignalized Locations**

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STEP 3 – TRAFFIC DATA																																		
What are the peak period(s) for pedestrian activity? ☐ AM ☐ PM ☐ Midday ☐ Other: _____ Major Street Vehicular Volume (ADT): _____ vehicles/day (if applicable) Minor Street Vehicular Volume (ADT): _____ vehicles/day (Complete where appropriate) Pedestrian Crossing Volumes / Bicycle Crossing Volumes: <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 30%;"></th> <th style="width: 15%;">AM</th> <th style="width: 15%;">Mid-day</th> <th style="width: 15%;">PM</th> <th style="width: 15%;">Other</th> </tr> </thead> <tbody> <tr> <td style="text-align: right;">Time:</td> <td>to</td> <td>to</td> <td>to</td> <td>to</td> </tr> <tr> <td style="text-align: right;">Date / Day of Week:</td> <td>/</td> <td>/</td> <td>/</td> <td>/</td> </tr> <tr> <td style="text-align: right;">Major Street Vehicular Volume (Hourly):</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: right;"># of Bicyclists (if known)</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: right;"># of Pedestrians (if known)</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> Is a significant proportion of the pedestrians at this location expected to be young (middle school students or below), elderly, or disabled? ☐ Yes ☐ No Describe: _____						AM	Mid-day	PM	Other	Time:	to	to	to	to	Date / Day of Week:	/	/	/	/	Major Street Vehicular Volume (Hourly):					# of Bicyclists (if known)					# of Pedestrians (if known)				
	AM	Mid-day	PM	Other																														
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