

# Re-Imagining Greene Street

A Complete Streets Study of Greene Street in Cumberland, Maryland



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# CHAPTER ONE | EXECUTIVE SUMMARY



## Data Collection and Walking Tour

Reviewing previous planning studies provided insight for the development of the corridor. This review provided the consultant team and Steering Committee with important parameters such as the importance of maintaining accommodations for truck traffic along the corridor.

The Walking Tour provided the Steering Committee and consultant team with an opportunity to discuss challenges in the field while observing user behavior. Critical circulation patterns like running routes, bicycle connections to the YMCA, and access to Sheetz revealed the need to provide safe crossings and sidewalks along Greene Street as well as along perpendicular streets.

## Public Input Tactics

The key component of the first round of public input was for the consultant team to *listen* to the needs and desires of city staff, business owners, and residents. Also important is providing a venue for collaboration and consensus by fellow residents. Providing a forum for discussion strengthens the opportunities generated during Workshops.

This Study reflects the input of numerous members of the public, private business owners, city staff, and public officials who participated in the following events:

- A stakeholder kickoff meeting and walking tour was held on October 28, 2014. The meeting consisted of discussing general themes of the study and walking the corridor to identify opportunities and constraints at key locations.
- A public workshop was held on February 10, 2015 to gather feedback from the general public. The “Reimagine Greene Street” workshop introduced the project to the public and recorded participants’ thoughts on challenges, opportunities, key destinations, places where they feel safe, and places where they do not feel safe. The public was also asked to develop short and long-term vision statements and redesign sections of the corridor.
- A follow-up Steering Committee Charrette was held on February 11, 2015 to discuss the results of the Public Workshop and begin finalizing the conceptual design alternatives throughout the corridor.



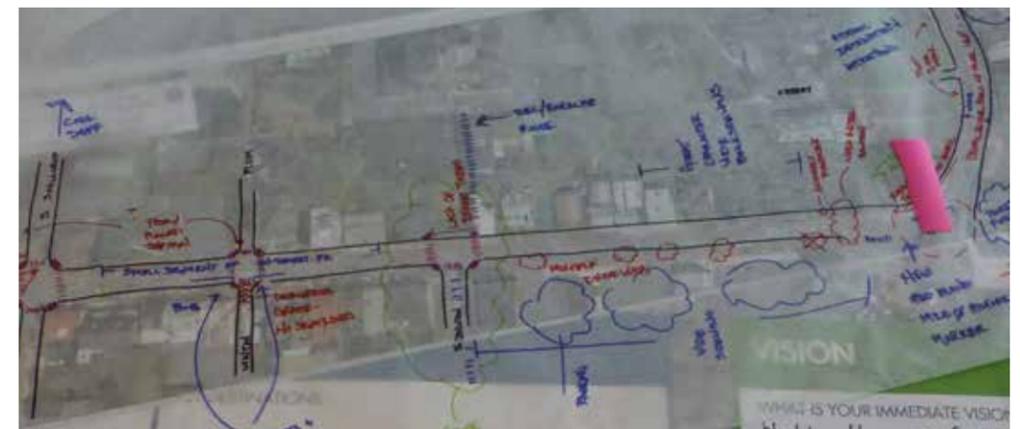
Stakeholders joined the project team to conduct a walking tour of the corridor and identify opportunities and challenges.



The “Reimagine Greene Street” public workshop provided a forum for discussion among community members, business owners, and city staff.



The presence of an elementary school along the corridor elevates the priority to create a safe walking environment for users of all ages and abilities.



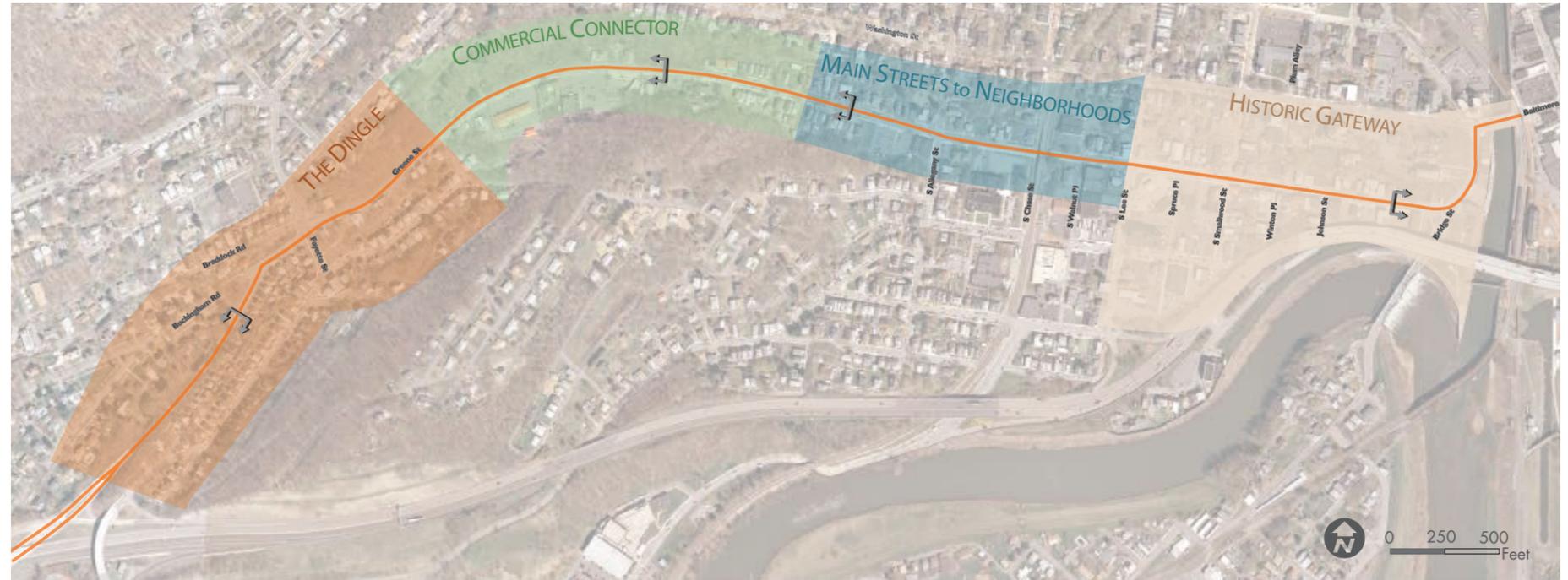
The Steering Committee worked together to rebalance the corridor with a focus on pedestrian safety while maintaining circulation patterns for vehicles.

## EXISTING CONDITIONS

An existing conditions analysis was conducted to serve as the foundation for development and evaluation of conceptual design alternatives for Greene Street. Opportunities and constraints were evaluated on several levels. Data analysis and mapping provided an understanding for how Greene Street functions within the context of Cumberland. Existing land use, crash data, destinations, parks and trails, parking, and transit were analyzed to determine how complete streets strategies can strengthen character and improve connectivity and safety.

Field analysis was conducted from multiple perspectives: vehicular and pedestrian. First, a driving tour was conducted to experience the corridor from a “windshield” perspective. Then, a walking tour with the Steering Committee provided an opportunity for the group to evaluate sidewalk conditions, crossing experiences, exposure to sun, and character.

The corridor has four distinct zones where land use, function, and character change. Each of the four zones was analyzed to determine which types of recommendations would be suitable to enhance the appropriate experience for each zone.



**CORRIDOR ZONES:** The study area was segmented into four distinct zones where character and land use change. Gray lines on the map above indicate the location of the section drawings in the zone descriptions below and to the right.

### THE DINGLE

A Transitional zone with some industrial uses and a concentration of residential areas. Accommodations should be made for pedestrians near homes and across intersections. Gateways should be considered to announce the arrival to Cumberland.



SAMPLE CROSS SECTION (MAY NOT BE REPRESENTATIVE OF THE ENTIRE CORRIDOR)

### COMMERCIAL CONNECTOR

A mostly commercial zone that would benefit from pedestrian safety accommodations. Driveways should be designed to improve visibility of pedestrians. The addition of street trees will enhance aesthetics, provide a barrier from the roadway, and shade the sidewalk.



SAMPLE CROSS SECTION (MAY NOT BE REPRESENTATIVE OF THE ENTIRE CORRIDOR)

## MAIN STREETS TO NEIGHBORHOODS

An area with a mixture of uses and users. Sidewalks in this area are overgrown and should be maintained to restore the width and create an ADA accessible surface. Vehicles parking on the sidewalk should be removed. Cumberland should consider programs and assistance to restore homes and blighted buildings. Safety is particularly critical near the West Side Elementary school - where currently there are no indicators that vehicles are entering a school zone. Intersections in this zone are in need of high visibility crosswalks and audible pedestrian signals.



## HISTORIC GATEWAY

The zone is the transition from downtown to Greene Street and serves as a welcoming gateway to downtown for those entering Cumberland via I-68. Character in this zone should reflect the historic character of downtown. Storefronts should respond to the sidewalk environment with the addition of signage, awnings, and lighting. The pedestrian zone is currently lacking street trees, benches, transit stops, planters, and bicycle parking. These elements will enhance the sense of place and comfort and create a desire to linger within the corridor.



## RECOMMENDATIONS SUMMARY

When crafting design recommendations for the “movement” and “placemaking” zones of a corridor, it is imperative to understand *who* uses the street. Along this corridor, people of various ages and abilities circulate by foot, bike, transit, and car. Therefore, it is important to understand the design needs of children (West Side Elementary School, Children’s Medical Group), seniors (The Kensington), physically challenged individuals (Blind Industries and Services of Maryland), residents, employees, and visitors. It is also key to remember this route carries truck traffic, links bicyclists and pedestrians to the Great Allegheny Passage, provides access to the YMCA, and is a place where people live and work. All of these users and functions must be balanced to create an environment that is safe and efficient.

The vision developed for this plan was to: **create a safe and accessible corridor that acts as a catalysts for economic development and invokes pride and ownership for the City.**

The photo simulations to the right illustrate how Complete Streets elements can transform the existing environment into a safe and economically viable corridor. A map on pages 1-8 and 1-9 detail the recommendations for Greene Street. The corridor is segmented into four zones: The Dingle, Commercial Connector, Main Street to Neighborhoods, and Historic Gateway. For each of the zones, additional maps are included in the Recommendations Chapter with photos to clarify treatments for how Greene Street can become a safe, comfortable, thriving Complete Street.



GREENE STREET UNDERPASS - BEFORE



GREENE STREET UNDERPASS - AFTER



HISTORIC GATEWAY - BEFORE

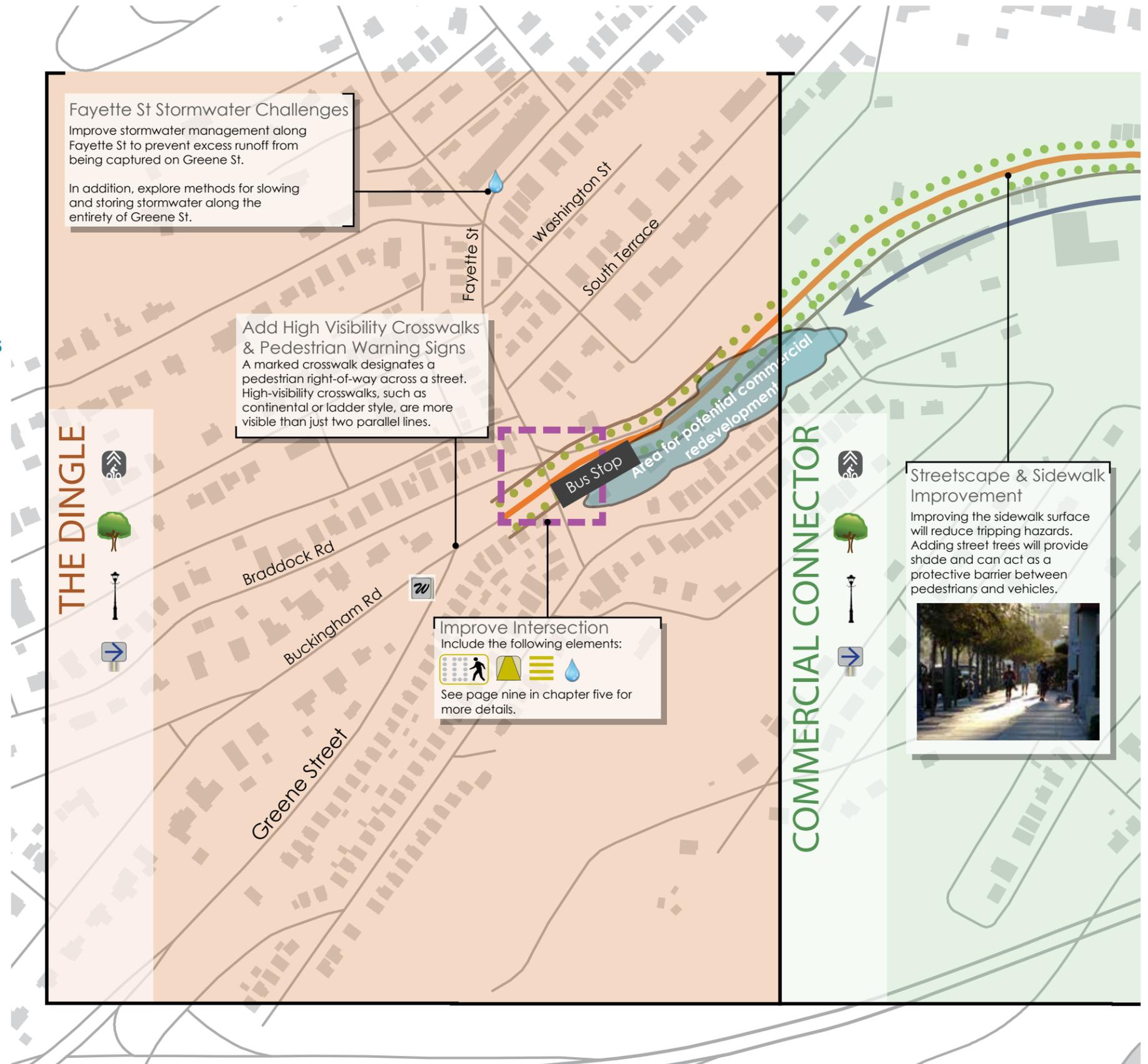


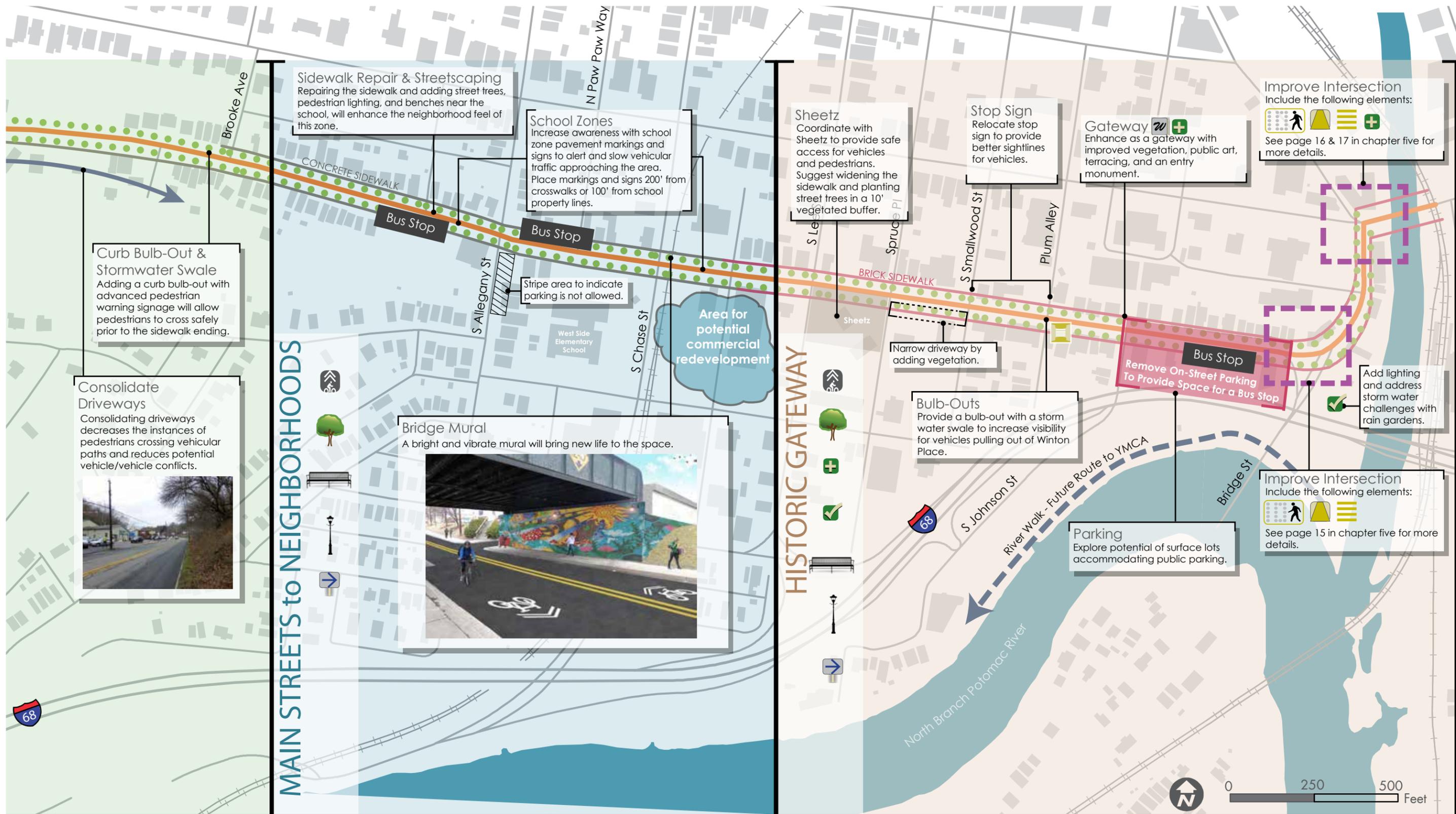
HISTORIC GATEWAY - AFTER

RECOMMENDATIONS KEY

INTERSECTION IMPROVEMENTS

- 
**Crosswalks**  
 A marked crosswalk designates a pedestrian right-of-way across a street.
- 
**Audible Countdown Signals**  
 Countdown signals provide time information in seconds.
- 
**Curb Ramps**  
 Curb ramps provide better access for wheelchair users, people pushing strollers, and pedestrians with mobility or other physical impairment.
- 
**Bulb-Outs**  
 Curb bulb outs help slow traffic, increase visibility of pedestrians, and reduce crossing distances.
- 
**Shared Lane Markings & Bike May Use Full Lane Signs**  
 Shared lane markings, sometimes referred to as sharrows, are road markings used to indicate a shared lane environment for bicycles and automobiles.
- 
**Park Improvements**  
 Improvements to existing parks will create more inviting, accessible spaces that enhance the overall corridor.
- 
**Pocket Parks**  
 Pocket parks are recommended for parcels that are vacant. These small spaces can create gateways into downtown and enhance a sense of place.
- 
**Entry Monuments**  
 Gateway monuments would provide a clear, grand message of entrance into Cumberland for visitors.
- 
**Directional Wayfinding**  
 Wayfinding signage can encourage visitation, reflect the character of Cumberland, and guide residents and visitors to key attractions.
- 
**Street Trees & Planters**  
 Large street trees provide shade for pedestrians and can act as buffers to vehicular traffic.
- 
**Street Furnishings**  
 Benches, planters, and bicycle parking can reflect the character of Cumberland and will create a more comfortable pedestrian experience.
- 
**Lighting**  
 Lighting added along streets and sidewalks increases user safety and visibility to vehicular traffic.
- 
**Stormwater Treatment**  
 The use of best practices for stormwater management will help alleviate flooding and will add texture, color, and habitat to the street environment.





**Curb Bulb-Out & Stormwater Swale**  
 Adding a curb bulb-out with advanced pedestrian warning signage will allow pedestrians to cross safely prior to the sidewalk ending.

**Consolidate Driveways**  
 Consolidating driveways decreases the instances of pedestrians crossing vehicular paths and reduces potential vehicle/vehicle conflicts.



**Sidewalk Repair & Streetscaping**  
 Repairing the sidewalk and adding street trees, pedestrian lighting, and benches near the school, will enhance the neighborhood feel of this zone.

**School Zones**  
 Increase awareness with school zone pavement markings and signs to alert and slow vehicular traffic approaching the area. Place markings and signs 200' from crosswalks or 100' from school property lines.

Stripe area to indicate parking is not allowed.

Area for potential commercial redevelopment

**Bridge Mural**  
 A bright and vibrant mural will bring new life to the space.



**Sheetz**  
 Coordinate with Sheetz to provide safe access for vehicles and pedestrians. Suggest widening the sidewalk and planting street trees in a 10' vegetated buffer.

**Stop Sign**  
 Relocate stop sign to provide better sightlines for vehicles.

**Gateway**  
 Enhance as a gateway with improved vegetation, public art, terracing, and an entry monument.

**Improve Intersection**  
 Include the following elements:  
 See page 16 & 17 in chapter five for more details.

**Bulb-Outs**  
 Provide a bulb-out with a storm water swale to increase visibility for vehicles pulling out of Winton Place.

**Remove On-Street Parking To Provide Space for a Bus Stop**

Add lighting and address storm water challenges with rain gardens.

**Improve Intersection**  
 Include the following elements:  
 See page 15 in chapter five for more details.

**Parking**  
 Explore potential of surface lots accommodating public parking.

MAIN STREETS to NEIGHBORHOODS

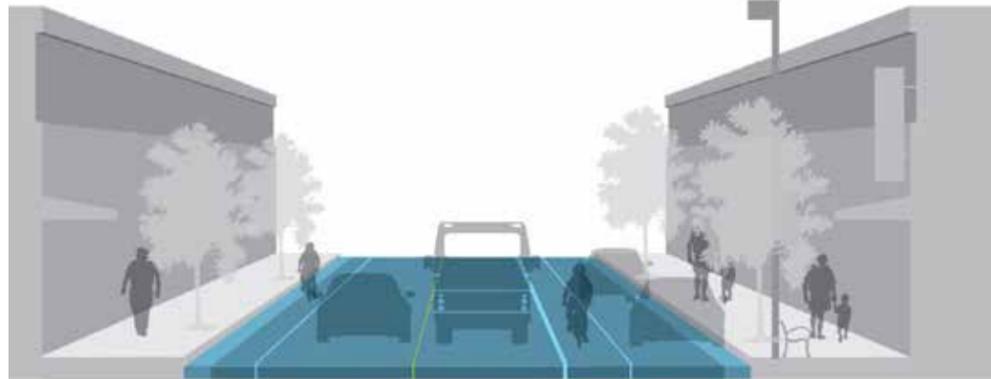
HISTORIC GATEWAY



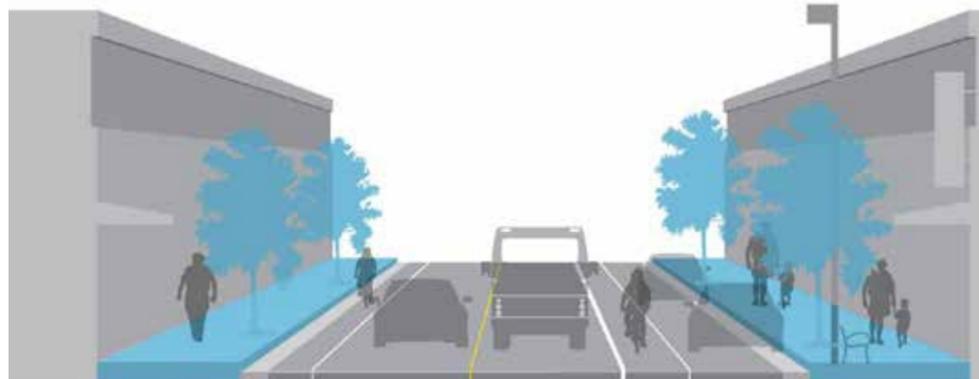
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## CHAPTER TWO | WHAT ARE COMPLETE STREETS?



*Movement zone of a street - this zone focuses on traffic flow for vehicles, transit, and bicyclists.*



*Placemaking zone of a street - this zone is responsible for developing the character of a street, acting as social space, and facilitating pedestrian movement.*



*Complete Streets enable safe, convenient, and comfortable travel and access for users of all ages and abilities.*

## WHAT MAKES A STREET COMPLETE?

A street serves as a place and as a link. A majority of roadways in the United States have been designed with the primary function of serving as a link for automobile travel. Roadways designed in this fashion typically function as efficient conduits for motor vehicle travel, but are often poor links for other modes of transportation. Additionally, roadways also have the ability to function as a social space by establishing a relationship to the places where people live, work and play. Treating streets simply as links for automobiles often ignores the other important contexts and functions that streets should address.

The Complete Streets design philosophy is an approach that enhances our current streets by enabling safe, convenient, and comfortable travel and access for users of all ages and abilities regardless of their transportation mode. It is a person-oriented design philosophy that seeks to facilitate safe travel and a sense of place for those walking, bicycling, driving an automobile, or riding public transportation - thus creating a Complete Street for all users and their mode of choice. It will be important to consider both the movement zone and the placemaking zone when designing Greene Street as a complete street.



## COMPONENTS OF A COMPLETE STREET

There are many considerations that factor into the design of a Complete Street. This chapter explains the elements that comprise a Complete Street and the various design considerations for each component.

### Pedestrian Design

The transportation network should accommodate pedestrians with a variety of needs, abilities, and possible impairments. Age is one major factor that affects pedestrians' physical characteristics, walking speed, and environmental perception. Children have low eye height and walk at slower speeds than adults. They also perceive the environment differently at various stages of their cognitive development. Older adults walk more slowly and may require assistive devices for walking stability, sight, and hearing.

The Manual of Uniform Traffic Control Devices (MUTCD) recommends a normal walking speed of three and a half feet per second when calculating the pedestrian clearance interval at traffic signals. Typical walking speeds can drop to three feet per second in areas with older populations and persons with mobility impairments. While the type and degree of mobility impairment varies greatly across the population, the transportation system should accommodate these users to the greatest reasonable extent.

### SIDEWALKS

Sidewalks are the most fundamental element of the walking network, as they provide an area for pedestrian travel that is separated from vehicle traffic. Sidewalks are typically constructed of concrete and are separated from the roadway by a curb and gutter and preferably a landscaped planting strip area. Sidewalks are a common application in both urban and suburban environments. Attributes of well-designed sidewalks include the following:

**Accessibility:** A network of sidewalks should be accessible to all users. Roadway crossing distances and distances between crossings should be minimized to integrate and encourage

pedestrian travel. ADA accessibility, such as curb ramps, is a necessary requirement to improve the accessibility of the mobility impaired.

**Adequate width:** Two people should be able to walk side-by-side. Different walking speeds should be possible. In areas of intense pedestrian use, sidewalks should accommodate the high volume of walkers.

**Safety:** Design features of the sidewalk should allow pedestrians to have a sense of security and predictability. Sidewalk users should not feel they are at risk due to the presence of adjacent traffic.

**Continuity:** Walking routes should be obvious and should not require pedestrians to travel out of their way unnecessarily.

**Landscaping:** Plantings and street trees should contribute to the overall psychological and visual comfort of sidewalk users, and be designed in a manner that contributes to the safety of people.

**Drainage:** Sidewalks and curb ramps should be designed so that standing water is minimized.

**Social space:** There should be places for standing, visiting, and sitting. The sidewalk area should be a place where adults and children can safely participate in public life.

**Quality of place:** Sidewalks should contribute to the character of neighborhoods and business districts.

**SIDEWALK ZONES**

The sidewalk area can be broken down into four distinct zones. The concept of sidewalk zones should be strictly followed for a sidewalk to function properly and provide safe passage for all users. This is especially important for users with visual or physical impairments to be able to effectively navigate the corridor.

Other considerations such as sidewalk obstructions, driveways, width and access through construction areas are important to consider as well.

**INTERSECTIONS**

Intersections are also an important piece of the pedestrian realm. Attributes of pedestrian-friendly intersection design include:

**Clear Space:** Corners should be clear of obstructions. They should also have enough room for curb ramps, for transit stops where appropriate, and for street conversations where pedestrians might congregate.

**Visibility:** It is critical that pedestrians on the corner have a good view of vehicle travel lanes and that motorists in the travel lanes can easily see waiting pedestrians.

**Legibility:** Symbols, markings, and signs used at corners should clearly indicate what actions the pedestrian should take.

**Accessibility:** All corner features, such as curb ramps, landings, call buttons, signs, symbols, markings, and textures, should meet accessibility standards.

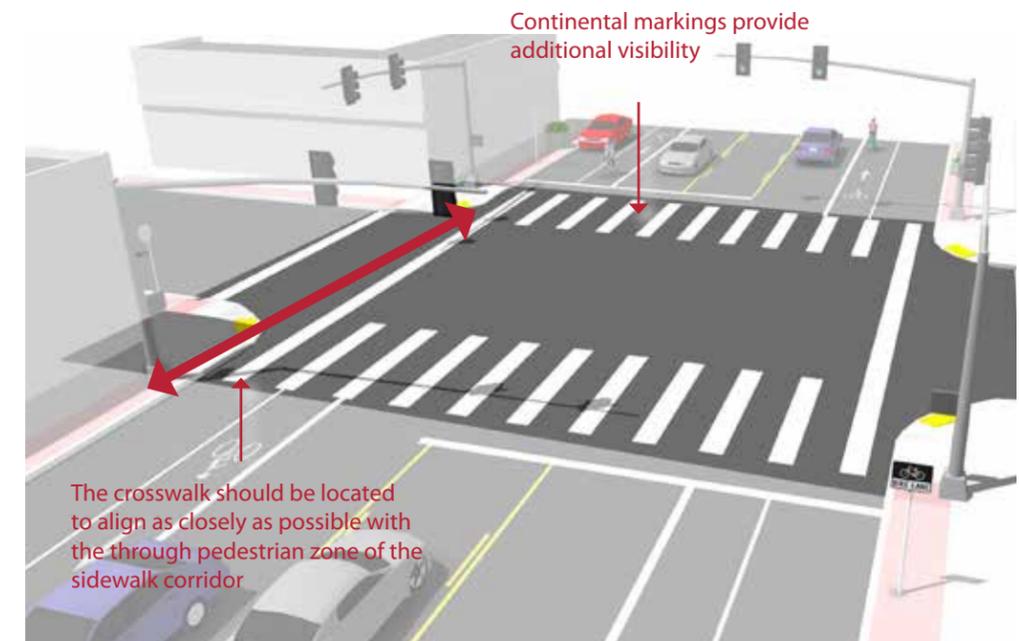
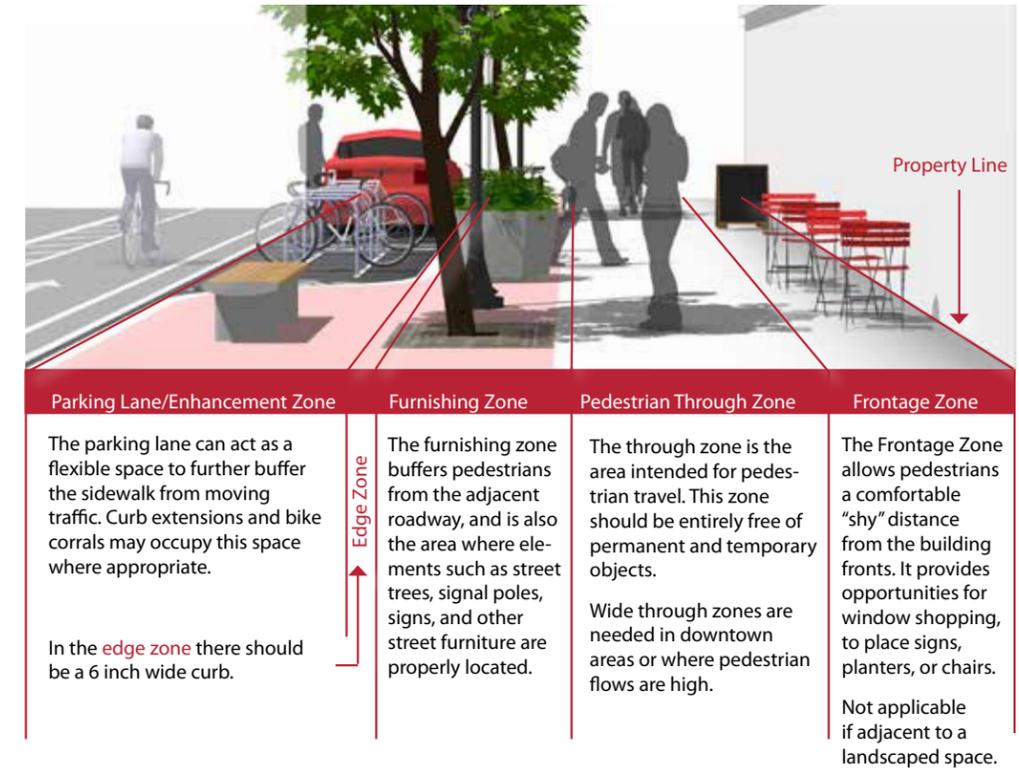
**Separation from Traffic:** Corner design and construction should be effective in discouraging turning vehicles from driving over the pedestrian area. Crossing distances should be minimized.

**Lighting:** Good lighting is an important aspect of visibility, legibility, and accessibility.

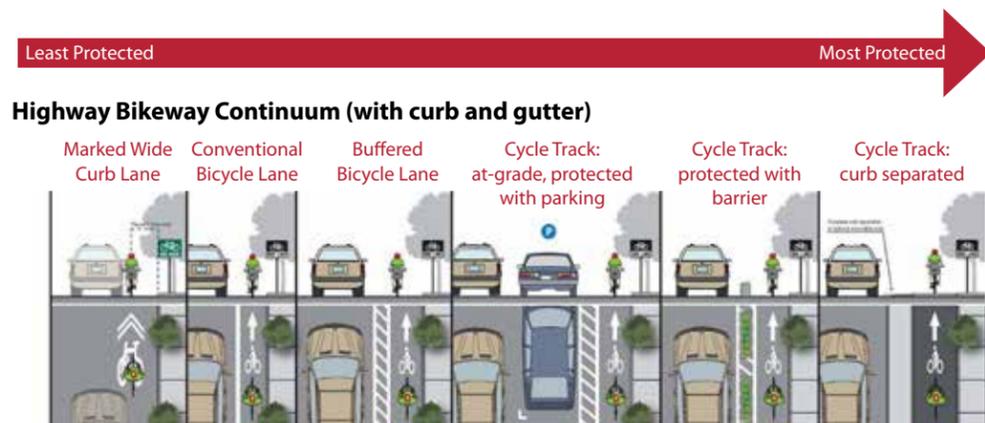
These attributes will vary with context but should be considered in all design processes. For example, more remote intersections may have limited or no signing. However, legibility regarding appropriate pedestrian movements should still be taken into account during design.

**PARKLETS**

A parklet repurposes part of the street into an extension of the sidewalk to provide amenities and green space for people using the street. It is typically the size of several parking spaces and is intended as aesthetic enhancements to the streetscape in an economical package. Parklets offer a place to stop, to sit, and to rest while taking in the activities of the street. A parklet may also provide greenery, art, or some other visual amenity.



*The consideration of pedestrian movement on sidewalks and across intersections is a critical component to developing a Complete Street. Standardizing sidewalk and crossing guidelines along Greene Street will create a predictable, comprehensive pedestrian element.*



The following range of bicycle facilities need to be considered on, and the roads connecting to, Greene Street. Facility application will depend on roadway type and desired degree of separation.

Typical Distribution of Bicyclist Types



It's important to consider bicyclists of all skill levels when designing a Complete Street. Bicycle infrastructure should accommodate as many user types as possible, with decisions for separate or parallel facilities based on providing a comfortable experience for the greatest number of people.

## Bicycle Design

Bicyclists, by nature, are much more affected by poor facility design, construction and maintenance practices than motor vehicle drivers. Bicyclists lack the protection from the elements and roadway hazards provided by an automobile's structure and safety features. By understanding the unique characteristics and needs of bicyclists, a facility designer can provide quality facilities and minimize user risk.

Similar to motor vehicles, people that use bicycles and their bicycle exist in a variety of sizes and configurations. These variations occur in the types of vehicle (such as a conventional bicycle, a recumbent bicycle, or a tricycle), and behavioral characteristics (such as the comfort level of the bicyclist). The design of a bikeway should consider reasonably expected bicycle types on the facility and utilize the appropriate dimensions.

It is important to consider bicyclists of all skill levels when creating a non-motorized plan or project. Bicyclist skill level greatly influences expected speeds and behavior, both in separated bikeways and on shared roadways. Bicycle infrastructure should accommodate as many user types as possible, with decisions for separate or parallel facilities based on providing a comfortable experience for the greatest number of people.

The bicycle planning and engineering professions currently use several systems to classify the population, which can assist in understanding the characteristics and infrastructure preferences of different bicyclists. The most conventional framework classifies the "design cyclist" as Advanced, Basic, or Child<sup>1</sup>. A more detailed understanding of the US population as a whole was developed by planners in Portland, OR<sup>2</sup> and supported by data collected nationally since 2005. This classification provides the following alternative categories to address varying attitudes towards bicycling in the US:

**Strong and Fearless** (approximately 30% of population) – Characterized by bicyclists that will typically ride anywhere regardless of roadway conditions or weather. These bicyclists can ride faster than other user types, prefer direct routes and will typically choose roadway connections – even if shared with vehicles – over separate bicycle facilities such as shared use paths.

**Enthused and Confident** (60% of population) - This user group encompasses bicyclists who are fairly comfortable riding on all types of bikeways but usually choose low traffic streets or shared use paths when available. These bicyclists may deviate from a more direct route in favor of a preferred facility type. This group includes all kinds of bicyclists such as commuters, recreationalists, racers and utilitarian bicyclists.

**Interested but Concerned** (approximately 5-10% of population) – This user type comprises the bulk of the cycling population and represents bicyclists who typically only ride a bicycle on low traffic streets or multi-use trails under favorable weather conditions. These bicyclists perceive significant barriers to their increased use of cycling, specifically traffic and other safety issues. These people may become "Enthused & Confident" with encouragement, education and experience and higher level facilities, such as buffered and protected bike lanes.

**No Way, No How** (approximately 1% of population) – Persons in this category are not bicyclists, and perceive severe safety issues with riding in traffic. Some people in this group may eventually become regular cyclists with time and education. A significant portion of these people will not ride a bicycle under any circumstances.

<sup>1</sup> Selecting Roadway Design Treatments to Accommodate Bicycles. (1994). Publication No. FHWA-RD-92-073

<sup>2</sup> Four Types of Cyclists. (2009). Roger Geller, City of Portland Bureau of Transportation. <http://www.portlandonline.com/transportation/index.cfm?&a=237507>

### BICYCLE FACILITY TYPES

Consistent with bicycle facility classifications throughout the nation, the facility types presented in the figures below identify classes of facilities by degree of separation from motor vehicle traffic. In general, the wider the roadway, the higher the traffic volume, and the greater the traffic speed, the more separation is necessary to provide safe and comfortable riding conditions for bicyclists. The most common bicycle facility types are as follows:

**Shared Roadways** are bikeways where bicyclists and cars operate within the same travel lane, either side by side or in single file depending on roadway configuration. The most basic type of bikeway is a signed shared roadway. This facility provides continuity with other bicycle facilities (usually bike lanes), or designates preferred routes through high-demand corridors.



**Shared Roadways with Pavement Markings** Shared roadways may also be designated by pavement markings, signage and other treatments including directional signage, traffic diverters, chicanes, chokers and /or other traffic calming devices to reduce vehicle speeds or volumes. Such treatments often are associated with Neighborhood Greenways (also known as Bicycle Boulevards).



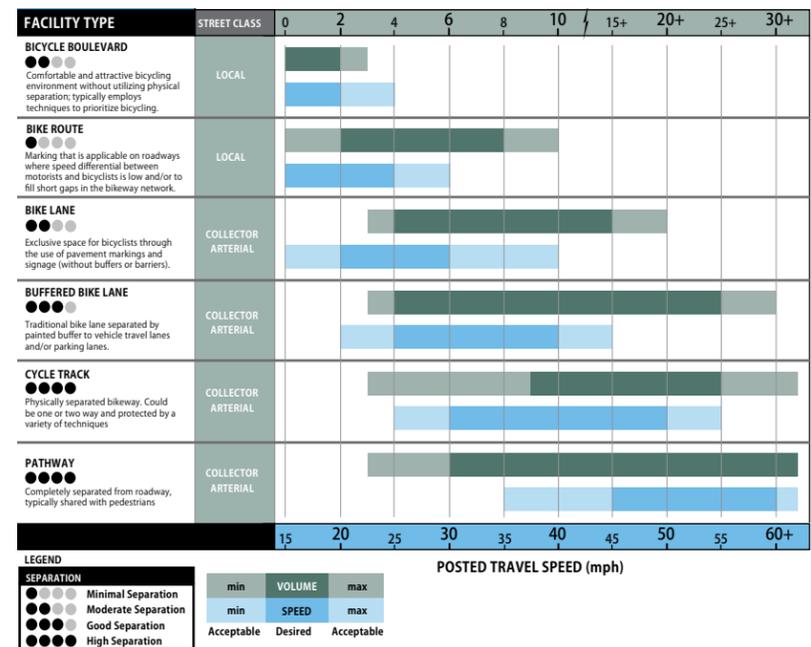
**Separated Bikeways**, such as bike lanes and buffered bike lanes, use signage and striping to delineate the right-of-way assigned to bicyclists and motorists. Bike lanes encourage predictable movements by both bicyclists and motorists.

**Cycle Tracks** are exclusive bike facilities that combine the user experience of a separated path with the on-street infrastructure of conventional bike lanes. These are also referred to as protected bicycle lanes.

**Shared-Use Paths** are facilities separated from roadways for use by bicyclists and pedestrians. Sidepaths usually refer to shared use paths immediately adjacent to the roadway.

### BICYCLE PARKING

Bicyclists expect a safe, convenient place to secure their bicycle when they reach their destination. This may be short-term parking of two hours or less, or long-term parking for employees, students, residents, and commuters. In order to encourage bicycling in Cumberland, plentiful, convenient and attractive bicycle parking must be provided.



Consider the above chart to account for multiple factors that influence bicycle users' comfort and safety.



Separated Bikeways are exclusively designed for bicycle travel, and are most appropriate on streets with higher traffic volumes and speeds.



Cycle Tracks are physically separated from motor traffic and distinct from the sidewalk, providing a higher level of comfort and attracting a larger user base.



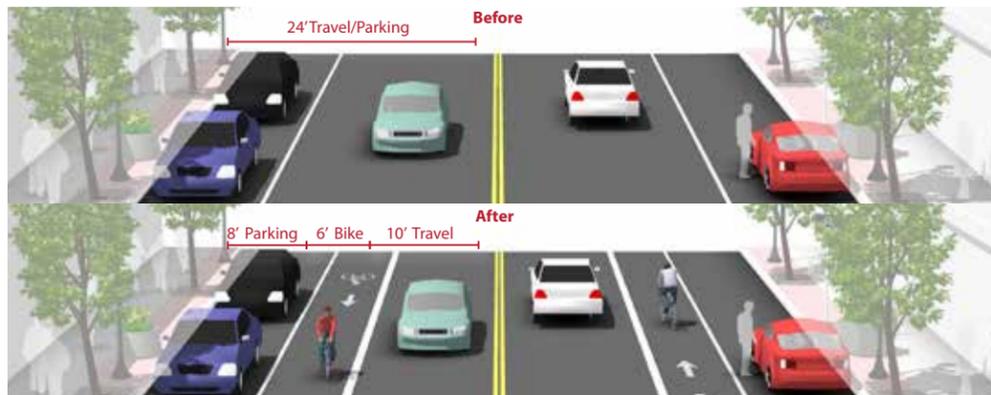
Shared-Use Paths provide a desirable facility for users of all skill levels preferring separation from traffic, particularly for recreation.



Speed Humps are a form of hard traffic calming that are effective at reducing vehicular speeds, improving the comfort and safety of all road users.



Chicanes are a horizontal element of hard traffic calming that reduce vehicle speeds by requiring motorists to shift laterally through narrowed travel lanes.



Road Diets, or lane narrowing, utilize excess roadway space to accommodate separated bicycle facilities.

## Vehicle Design

### TRAFFIC CALMING DESIGN

Motor vehicle speeds affect the frequency at which automobiles pass bicyclists as well as the severity of bicycle and pedestrian crashes that can occur on a roadway. Slower vehicular speeds also improve motorists' ability to see and react to non-motorized users, minimize conflicts at driveways and other turning locations and in many cases can improve vehicular throughput. Maintaining slower motor vehicle speeds and reducing traffic in areas where pedestrian and bicycle traffic is regularly expected greatly improves comfort and safety for non-motorized users on a street.

This section presents an overview of traffic calming treatments that can be applied to Greene Street. Traffic calming treatments can be divided into two different types:

**“Hard” traffic calming** are engineering measures taken with the sole intent of slowing traffic and reducing conflict.

**“Soft” traffic calming** includes placemaking design measures that have the added effect of traffic calming, as well as educational and enforcement measures.

Not all treatments listed here are appropriate for all roadways. The treatments are as follows:

### HARD TRAFFIC CALMING TREATMENTS

**Speed limit reduction** - A reduction in speed limit is a simple way to make the roadway a safer place for pedestrians and bicyclists. Statistically, eighty percent of pedestrians struck by a car going 40 mph will die; at 30 mph the likelihood of death is 40 percent. At 20 mph, the fatality rate drops to just 5 percent (The National Highway Traffic Safety Administration).

**Road diet** - Road diets are a reduction in the number of lanes along a roadway. Typically, these are four lane roads reduced to three lanes (although larger road diets are done as well), often with the addition of bike lanes. This not only improves conditions for bicyclists, but it enhances the pedestrian environment and often improves traffic flow and vehicle-on-vehicle collision rates as well.

**Lane narrowing** - Lane narrowing is when an excessively large lane is reduced through the striping of a shoulder or the addition of bike lanes. This helps reduce traffic speed and adds dedicated space for bicyclists.

**Speed humps/Speed tables** - Speed humps are raised areas usually placed in a series across both travel lanes. Longer humps reduce impacts to emergency vehicles. Some speed hump designs can be challenging for bicyclists, however gaps can be provided in the center or by the curb for bicyclists and to improve drainage. Speed humps can also be offset to accommodate emergency vehicles as seen in the image above.

**Traffic Diversion** - Motor vehicle traffic volumes affect comfort for bicyclists and pedestrians on local streets. Higher vehicle volumes reduce bicycle and pedestrian comfort and can result in more conflicts. Traffic diversion treatments reduce motor vehicle volumes by completely or partially restricting through traffic on select neighborhood streets such as bicycle boulevards.

**Pinchpoints/neckdowns** - These are curb extensions placed on both sides of the street, narrowing the travel lane and encouraging all road users to slow down. When placed at intersections, pinchpoints are known as chokers or neckdowns. They reduce curb radii and further lower motor vehicle speeds.

**Chicanes** - Chicanes are essentially curb extensions arranged in an alternating pattern that require cars to oscillate along a roadway to avoid them. These are effective on long-straight neighborhood streets where speeding is an issue.

*SOFT TRAFFIC CALMING TREATMENTS*

**Setback reduction** - Large setbacks in roadside development are a result of car-oriented development practices which typically locate a large parking lot in the front of the building. Redeveloping these properties with little or no setback creates a sense of enclosure, adds visual stimuli, and creates a pedestrian friendly environment, all of which help to slow traffic.

**Street trees**, landscaping and other aesthetic elements - Street trees, landscaping and other aesthetic elements such as art or banners produce a feeling of enclosure and add visual stimuli along a roadway corridor. Green elements often have added environmental benefits as well.

**Street material** - Textured street material, such as the use of pavers, creates visual stimuli and a feeling of a special district or pedestrian-oriented area which can help to calm traffic.

**Appropriately scaled street lighting** - Appropriately scaled street lighting can provide a safer, more inviting and more visible environment for all roadway users. Pedestrian scaled street lighting along with other improvements such as street trees can alert motorists to a potential presence of pedestrians and bicycles, slowing down traffic in these areas.

**Enforcement and awareness measures** - Enforcement and awareness measures such as signage, speed traps and educational programs can help to reduce speeding in problem areas. However, the effectiveness of these programs depends on adequate frequency and duration.

**Transit Design**

According to the South Florida East Coast Corridor (SFECC) Transit Analysis: Station Design Guidelines<sup>3</sup>, successful transit design depends on 6 elements. These include:

**Integration into the contextual fabric** - ensuring that transit stops are coherent with surrounding visual themes and that transit stops serve transit-compatible land uses such as day-cares, shopping areas, employment areas and schools.

<sup>3</sup> [http://www.sfeccstudy.com/draft\\_docs/\(3.4.1.2\)Station%20Design%20Guidelines%20Final%20122309.pdf](http://www.sfeccstudy.com/draft_docs/(3.4.1.2)Station%20Design%20Guidelines%20Final%20122309.pdf)

**Accessibility via multiple modes** - making sure that transit stations and routes connect other modes such as pedestrians, bicyclists, park and ride centers, and airports.

**Functional simplicity** - Transit stops should provide users with clear and informative system information and provide easy access and payment options.

**Security** - Transit stops and systems should look, feel and be clean and secure. This can be accomplished through a number of methods including call boxes and lighting.

**Comprehensive systems sustainability** - The design of transit should be environmentally conscious and be a tool to promote sustainable development.

**Articulation of form and identity** - Transit stops should respond to public art or community landmarks; or local, relevant art should be incorporated into the stops and stations themselves.

**The incorporation of arts in transit** - Incorporating art and design into all aspects of the transit system will provide users with an attractive place to wait for transit and may increase user traffic.

In most cases, transit shelters and waiting platforms should be placed in the Enhancement or Furnishing Zone. Transit stops can be incorporated into curb extensions where appropriate. It is important to also consider the accommodation of bicycles at transit stops. Designs that reduce bicycle travel/bus stop conflict, include secure bicycle parking, and provide ample loading space for bicycles on bus-mounted bicycle racks are all part of bicycle-friendly transit system design.

The location and design of transit stops along a block are important considerations. Where feasible, transit stops should be located immediately after the intersection to reduce conflict with turning vehicles and resolve sight line issues at the intersection. Bus stops should be designed so that busses can pull out of the vehicular travel lane when stopping to preserve traffic flow, especially on major streets.



*Street Trees provide visual stimuli, encourage reduced speeds, and provide added environmental benefits along the corridor.*



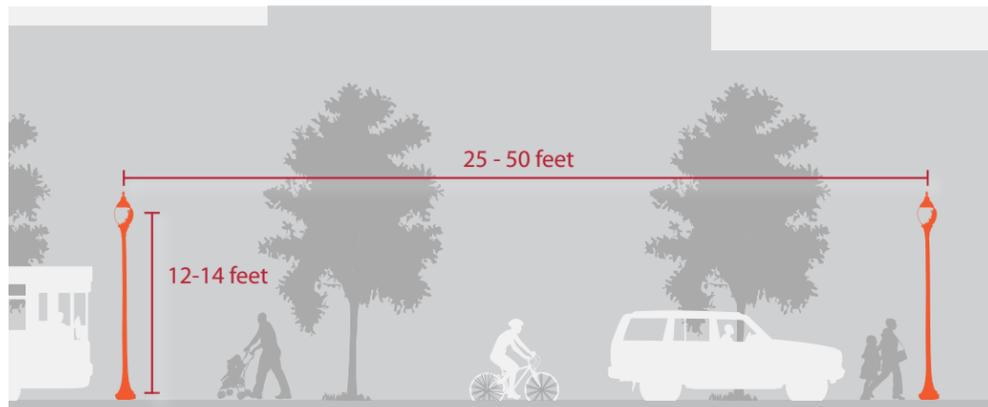
*Street Material, such as pavers or bricks used in crosswalks, create a visual and tactile distinction from the roadway and signal that it is a separate element.*



*Transit Design and stop location are dependent on ease of operation, pedestrian transfer situations, space availability, and traffic operation.*



*Street Trees provide important aesthetic, comfort, and environmental components to placemaking.*



*Pedestrian Scaled Lighting improves personal and traffic safety and is crucial in areas where people will walk after dark.*



*Site Furnishings such as benches provide a place to rest and encourage social and economic interaction at key points along a corridor.*

## Street Furnishings

The furnishing zone of a sidewalk buffers pedestrians from the adjacent roadway and is an important area for pedestrian and placemaking amenities such as street trees, signal poles, and street furniture.

### STREET TREES

A robust tree canopy is one of the great contributors to a healthy and livable urban landscape. Trees provide many benefits in terms of stormwater flow regulation and water quality treatment. Mechanisms for these benefits include interception, transpiration, and increased infiltration. Additional benefits provided by trees include enhancing the visual and spatial character of a place; improving air quality; reducing noise and light pollution; traffic-calming and reducing the heat island effect. Trees provide numerous habitat benefits, including refuge from predators, food and nesting resources and habitat patches. Trees enhance the quality of open space and provide visual relief within the urban environment, leading to stress reduction and other health benefits. A healthy urban forest also increases property values. Because trees can take fifteen years or more to develop a full canopy, preserving healthy existing trees wherever practicable is a cost effective and efficient way to obtain the most value from trees.

### LIGHTING

Pedestrian scale lighting improves visibility for both pedestrians and motorists - particularly at intersections. Pedestrian scale lighting can provide a vertical buffer between the sidewalk and the street, defining pedestrian areas. Pedestrian scale lighting should be used in areas of high pedestrian activity.

Pedestrian scale lighting should be located in the furnishing/utility zone so as not to impede pedestrian traffic in the through area. Lamp fixtures should be at height of about 12-14 feet, and poles should be spaced approximately 25-50 feet apart depending on the intensity of lights. Lamp fixtures should be shaded so as to project light downward

and provide sufficient illumination of the sidewalk while limiting excess light pollution. Illumination should be warm and moderate, rather than dim or glaring, and provide a balanced coverage of the corridor and surrounding area for comfort and security.

### SITE FURNISHINGS

Site furnishings are critical components of a socially and economically vibrant streetscape, accommodating a wide range of needs and activities. Providing benches at key rest areas and viewpoints encourages people of all ages to use the walkways by ensuring that they have a place to rest along the way. Bike racks accommodate bicyclists travelling to their destinations and trash and recycle receptacles promote cleanliness and sustainability. Landscaped planters and movable furniture also offer aesthetic and placemaking benefits to the sidewalk.

## Green Streets

Green streets is a term associated with a range of stormwater management techniques that convert impervious street surfaces into landscaped green spaces that capture and filter stormwater. Conventional stormwater solutions operate by collecting the groundwater and directing it to adjacent water bodies or sewage treatment plants. The collected stormwater can cause infrastructure problems and transfer pollutants from the street into local water bodies. Green streets convert stormwater into a resource that replenishes groundwater supplies.

### BIORETENTION

Bioretention facilities use amended soils and vegetation to absorb, hold, evaporate and clean polluted runoff from the streets. By reducing the peak rate and the total runoff volume, these facilities decrease the negative downstream or downslope impacts of storm events. With the right underlying geologic conditions, bioretention systems can be designed to clean stormwater then allow it to infiltrate, thus decreasing transport of some pollutants and recharging

groundwater supply. In the right-of-way, bioretention systems can be integrated into site design as linear features (e.g. bioretention swales) or as cells (e.g. rain gardens and stormwater planters). Additional community benefits from bioretention facilities can include improved property values, increased habitat, a better environment for walking, and traffic calming.

Opportunity areas for using bioretention systems in streets include within traffic calming curb bulb outs, in roadside bioswales, and in place of standard landscape plantings on streets.

**BIORETENTION CELLS/BIORETENTION SWALES**

Bioretention cells are shallow planted depressions that utilize climate-appropriate plants and soils to retain and treat stormwater. Bioretention cells promote transpiration of stormwater through the vegetation; detention of stormwater in the pores of amended and native soils; cleansing of stormwater through various mechanisms that include sedimentation, filtration, adsorption, and phytoremediation; and retention of stormwater via infiltration into native soils.

Bioretention cells may have underdrains to help convey excess water below the soil surface. Conveyance may be a secondary, but not the primary purpose for bioretention cells. All bioswales perform some amount of conveyance, but those considered to be bioretention systems also allow infiltration of stormwater into surrounding soils.

Bioswales have been shown to remove 70% of total suspended solids, 30% of total phosphorus, 25% of total nitrogen, 50-90% of certain metals, and 67-93% of oil and grease pollutants in stormwater (Davis & McCuen 2005, p. 236). Bioswales are recommended for use adjacent to drive lanes, in place of conventional in-road features (such as curbs and gutters) and as vegetated buffers between vehicular and pedestrian areas.

Rain gardens are typically designed with a ponding depth of less than 18" in order to meet small scale flow control

and water quality requirements and may be formed in any shape. An overflow, either piped or natural, is typically included to manage higher flows and convey runoff to a public storm drain, channel or natural outlet. The area of a rain garden is generally sized to equal 5% of the area being treated. They can be particularly effective at heavy metal removal; reductions of up to 95% of lead, copper and zinc, and 70-85% of total phosphorus and nitrogen have been noted (Davis & McCuen 2005, p. 241). Rain gardens are useful strategies for managing stormwater in areas adjacent to parking, such as within tree islands, along pedestrian zones, in center roadway medians, and in unused open space, including front yards.

**BIORETENTION PLANTERS**

Bioretention planters are similar in design and function to rain gardens, but have a more defined shape and vertical sides, and may employ an impermeable bottom layer or enclosure. The planters are often constructed of concrete, making them well-suited for urban applications where water needs to be directed away from building foundations. Stormwater planters consist of a planter box made of sturdy material, amended soils, a gravel drainage layer, and plants. An overflow is incorporated to manage higher flows and convey runoff to the public storm drain system, either via a perforated pipe or via surface flow. Although stormwater planters can be designed without a bottom to allow infiltration, they are typically designed to focus on flow control and attenuation to the public storm drain system. They are particularly effective at handling low intensity storms.

In the right-of-way, stormwater planters are recommended adjacent to buildings, sidewalks and pedestrian plazas where flow control is a significant concern and space is at a premium. Planters can also be designed to serve a conveyance function in the right of way where there is insufficient width to provide sloped sides (i.e., a swale) or the grade would be too steep. Stormwater planters provide aesthetic benefits and, depending on plant selection and design, can provide water, food and nesting materials for birds.



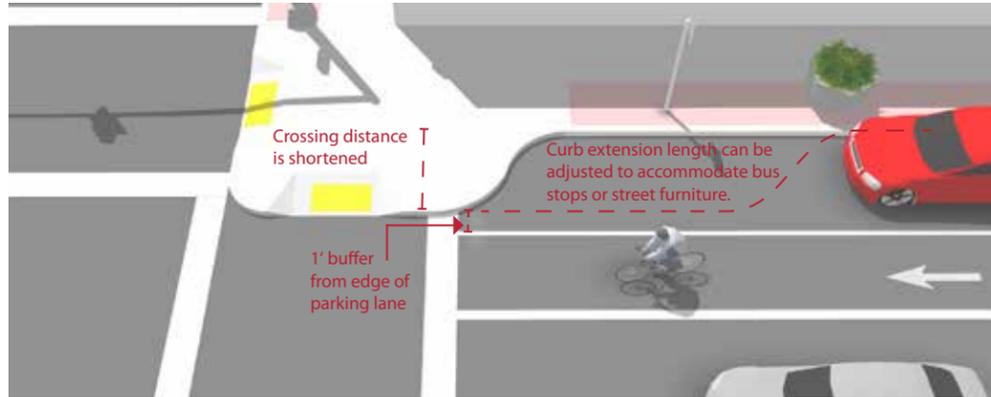
*Green Streets use a range of stormwater management techniques to establish point-source filtration and mitigate infrastructure problems from pooling.*



*Bioswales remove silt and contaminants from surface water runoff and are commonly implemented near parking lots where vehicle pollution is aggregated.*



*Bioretention Planters combine engineered stormwater control with aesthetic landscaping to collect and absorb runoff from nearby paved surfaces.*



*Curb Extensions shorten the crossing distance and minimize pedestrian exposure on the roadway.*



*Continental Crosswalk Markings should be used at crossings with high pedestrian use or where vulnerable pedestrians are expected.*



*Traffic Circles are much smaller than modern roundabouts and are typically used in residential neighborhoods to slow traffic speeds and reduce accidents.*

## Intersection Improvements

The quality of treatments at an intersection can significantly affect the efficiency, comfort, and safety of all modes as they pass through the area. The treatments needed to improve an intersection will depend on factors such as vehicle traffic, the importance of the connection, and the age and abilities of the users. Special attention should be paid to the design and material treatments to provide comfortable and safe bicycle and pedestrian crossings. Intersection improvements include:

**Minimize curb radius** - The size of a curb's radius can have a significant impact on pedestrian comfort and safety. A smaller curb radius provides more pedestrian area at the corner, allows more flexibility in the placement of curb ramps, results in a shorter crossing distance and requires vehicles to slow more on the intersection approach. During the design phase, the chosen radius should be the smallest possible for the circumstances. One effective way of minimizing the curb ramp radius is by adding curb extensions.

**High-visibility crosswalks** - A marked crosswalk signals to motorists that they must stop for pedestrians and encourages pedestrians to cross at designated locations. Installing crosswalks alone will not necessarily make crossings safer, especially on multi-lane roadways. However, high-visibility crosswalks make crossings more visible to motorists and add a sense of security for pedestrians. High-visibility crosswalks should be combined with advanced stop bars and other tools to increase safety. At mid-block locations, crosswalks can be marked where there is a demand for crossing and there are no nearby marked crosswalks.

**Median pedestrian refuge** - Median pedestrian refuges at intersections provide pedestrians with a secure place to stand in case they are unable to walk the entire distance of the crossing in one movement. This is especially important for young, elderly and disabled users in areas where crossing distances are great.

**Raised crosswalks and intersections** - A raised crosswalk or intersection can eliminate grade changes from the pedestrian path and give pedestrians greater prominence as they cross the street. Raised crosswalks should be used where a special emphasis on pedestrians is desired.

**Traffic circles** - Traffic circles are a type of Horizontal Traffic Calming that can be used at minor street intersections. Traffic circles reduce conflict potential and severity while providing traffic calming to the corridor.

**Bicycle intersection treatments** - Designs for intersections with bicycle facilities should reduce conflict between bicyclists (and other vulnerable road users) and vehicles by heightening the level of visibility, denoting clear right-of-way and facilitating eye contact and awareness with other modes. Intersection treatments can improve both queuing and merging maneuvers for bicyclists, and are often coordinated with timed or specialized signals.

The configuration of a safe intersection for bicyclists may include elements such as color, signage, medians, signal detection and pavement markings. Intersection design should take into consideration existing and anticipated bicyclist, pedestrian and motorist movements. In all cases, the degree of mixing or separation between bicyclists and other modes is intended to reduce the risk of crashes and increase bicyclist comfort. The level of treatment required for bicyclists at an intersection will depend on the bicycle facility type used, whether bicycle facilities are intersecting, and the adjacent street function and land use.

**Curb extensions/bulb outs** - Curb extensions minimize pedestrian exposure during crossing by shortening crossing distance and giving pedestrians a better chance to see and be seen before committing to crossing. They are appropriate for any crosswalk where it is desirable to shorten the crossing distance and there is a parking lane adjacent to the curb.

**Intersection parking control** - Parking control involves restricting or reducing on-street parking near intersections with high pedestrian activity. Locating parking away from the intersection improves motorist's visibility on the approach to the

intersection and crosswalk. Improved sight lines at intersections reduces conflicts between motorists and pedestrians. This can be accomplished in part through the use of bulb outs.

**ADA compliant curb ramps** - Curb ramps are the design elements that allow all users to make the transition from the street to the sidewalk. There are a number of factors to be considered in the design and placement of curb ramps at corners. Properly designed curb ramps ensure that the sidewalk is accessible from the roadway. A sidewalk without a curb ramp can be useless to someone in a wheelchair, forcing them back to a driveway and out into the street for access.

**Roundabouts** - Roundabouts are circular intersections designed with yield control for all entering traffic, channelized approaches and geometry to induce desirable speeds. They are used as an alternative to intersection signalization. It is important to indicate to motorists, bicyclists and pedestrians the right-of-way rules and correct way for them to circulate, using appropriately designed signage, pavement markings, and geometric design elements.

### MID-BLOCK CROSSING TREATMENTS

**Median pedestrian refuge island** - Median refuge islands are located at the mid-point of a marked crossing and help improve pedestrian safety by allowing pedestrians to cross one direction of traffic at a time. Refuge islands minimize pedestrian exposure by shortening crossing distance and increasing the number of available gaps for crossing. These can be combined with curb extensions for added traffic calming.

**Active warning beacons** - Active warning beacons are pedestrian or bicyclist actuated illuminated devices designed to increase motor vehicle yielding compliance at crossings of multi lane or high volume roadways. Types of active warning beacons include conventional circular yellow flashing beacons, in-roadway warning lights, or Rectangular Rapid Flash Beacons (RRFB).

**In-street pedestrian crossing signs** - In-street pedestrian crossing signs reinforce the presence of crosswalks and remind motorists of their legal obligation to yield for pedestrians in marked or unmarked crosswalks. This signage is often placed at high-volume pedestrian crossings that are not signalized. This is a low-cost treatment that has shown significant improvements to driver slowing and yielding rates at crosswalks.

### BICYCLE AND PEDESTRIAN SIGNALIZED CROSSINGS

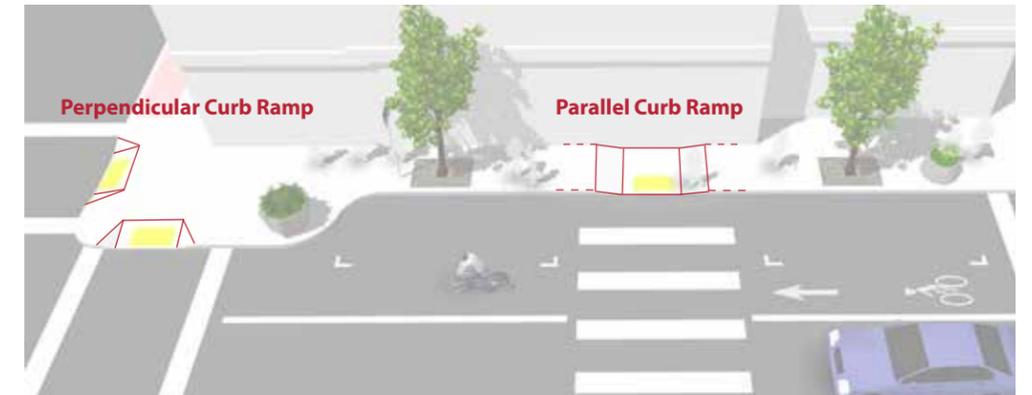
**Countdown pedestrian signals** - Pedestrian signal indicators demonstrate to pedestrians when to cross at a signalized crosswalk. Ideally, all traffic signals should be equipped with pedestrian signal indications except where pedestrian crossing is prohibited by signage.

Countdown pedestrian signals are particularly valuable for pedestrians, as they indicate whether a pedestrian has time to cross the street before the signal phase ends. Countdown signals should be used at all signalized intersections. Designers should allow greater signal timing for crossing along large roadways, areas with a high frequency of pedestrian crossing and areas where seniors or disabled persons are expected.

Accessible pedestrian signals should be used in locations where visual or hearing impaired individuals can be expected. Also consider utilizing a leading pedestrian interval, where pedestrians are allowed in the intersection 3 seconds in advance of vehicles, in areas with frequent motor vehicle and pedestrian traffic

**Hybrid Beacons** - A hybrid beacon, previously known as a High-intensity Activated Crosswalk (HAWK), consists of a signal-head with two red lenses over a single yellow lens on the major street, and pedestrian and/or bicycle signal heads for the minor street.

Hybrid beacons are primarily applied at mid-block pedestrian or trail crossings where non-motorized crossing volumes and crossing distance and/or motorized traffic volumes and speeds raise significant safety and accessibility concerns. Hybrid Beacons are also sometimes used to improve non-motorized crossings of major streets at intersections where side-street volumes do not support installation of a conventional traffic signal (or where there are concerns that a conventional signal will encourage additional motor vehicle traffic on the minor street).



ADA Compliant Curb Ramps will be marked with a tactile and color contrasting material to alert people with visual impairments to changes.



Mid-Block Crossings use a combination of refuge islands, active warning beacons, hybrid beacons, or high visibility/raised material to maximize safety.



Push Buttons should be located so that someone in a wheelchair can reach the button from a level area and marked so it is clear which signal is affected.

<sup>4</sup> Safe Routes to School National Partnership, Quick Facts (2012). <http://www.saferoutespartnership.org/resourcecenter/quick-facts>.



Wayfinding signage is often designed to reflect the unique local character and history of a city or location.

## Wayfinding

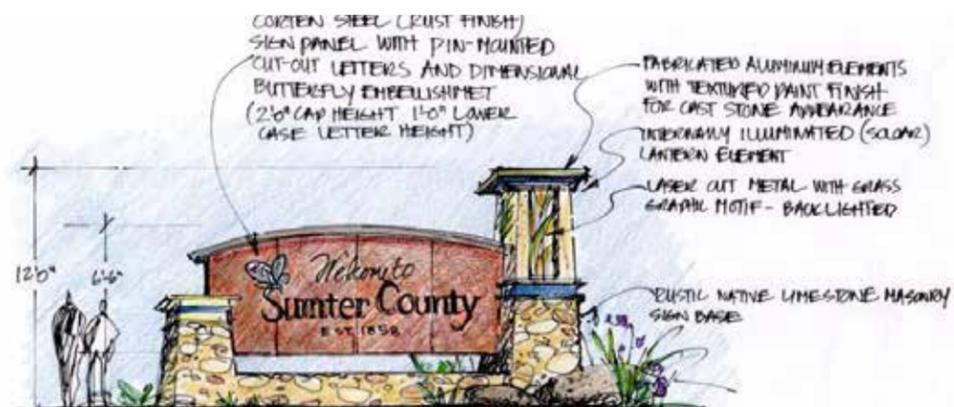
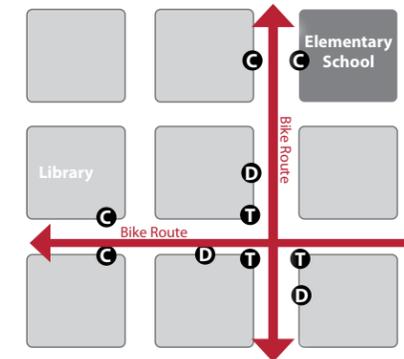
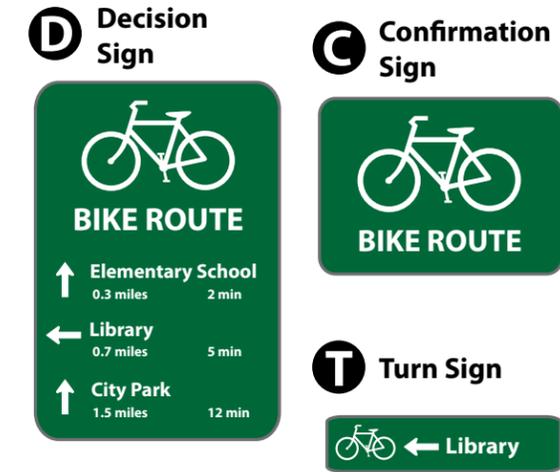
The ability to navigate through a city is informed by landmarks, natural features, and other visual cues. Signs along a corridor exist to raise awareness of a topic and to provide wayfinding for all modes. Wayfinding signage should indicate the location of destinations, the travel distance/time to those destinations, and the location of travel. Wayfinding signage can also improve the safety and awareness of bicyclists and pedestrians by alerting motorists that they are driving along a bicycle route or pedestrian-trafficked area.

Wayfinding signs are typically placed at key locations leading to and along important transportation routes. It is recommended that these signs be posted at a level where the intended users may best view the information. As such, pedestrian, bicyclists, and motor vehicle wayfinding signs will be posted at various levels.

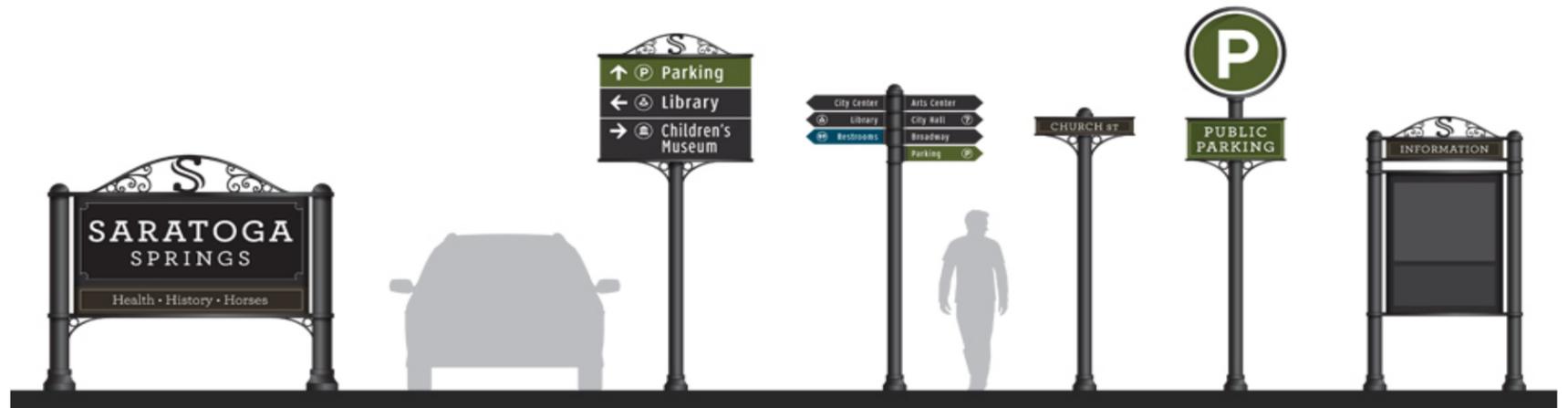
Gateway signage is also an important component to a wayfinding system. A gateway sign reflects the City's brand and should be designed to reflect the historical aspects of Cumberland. A family of sign types based on the gateway logo and color palette can also be created to establish an easily-recognizable theme to complement streetscaping elements and wayfinding clarity.



A Bicycle Wayfinding System consists of comprehensive signing and/or pavement markings to guide bicyclists to their destination.



Gateway signage should be placed at key access points and be designed to reflect the image of the city or location.



Wayfinding signs placed along important transportation routes help users navigate to key destinations.

## BENEFITS

The benefits of Complete Streets within communities are numerous and have been documented by planners, engineers, state legislatures, non-profit coalitions, state and county health departments, and others. The National Complete Streets Coalition ([www.completestreets.com](http://www.completestreets.com)) has published fact sheets on the many direct and indirect benefits Complete Streets provide. Some of the benefits that Cumberland can expect to realize in the implementation of the Complete Streets Plan and include the following:

### Healthy and Livable Communities

Today, many local governments and businesses are facing a crisis as they attempt to cope with the growing healthcare costs associated with chronic diseases, many of which are preventable. Obesity and sedentary lifestyles are major contributors to chronic disease for both adults and children.

The public health community recognizes that nonmotorized or "active" travel helps citizens meet recommended levels of physical activity, thereby reducing the risk of chronic disease and associated health care costs<sup>4</sup>. In 2009, the Centers for Disease Control and Prevention (CDC) released Recommended Community Strategies and Measurements to Prevent Obesity in the United States, a report recommending Complete Streets policy adoption as a strategy for obesity prevention<sup>4</sup>. Complete Streets are a way of providing an environment that will encourage and promote healthier, more active lifestyles for residents.

### Air Quality

Reducing congestion along a roadway results in less vehicle idle times, thus reducing smog and ground level ozone, which are both large contributors of greenhouse gases. Complete Streets-designed corridors improve traffic flow by lessening the stop-and-go pace of vehicular traffic, help regulate vehicle speeds to appropriate levels for the corridor's function, and reduce the number of cars on the road as some motorists become choice pedestrians, bicyclists, and transit riders.

### Improved Safety

Streets without safe places to walk, cross, catch a bus, or bicycle put people at risk. The National Complete Streets Coalition publishes some sobering national statistics:<sup>6</sup>

"Pedestrian crashes are more than twice as likely to occur in places without sidewalks; streets with sidewalks on both sides have the fewest crashes. Of pedestrians killed in 2007 and 2008, more than 50% died on arterial roadways, typically designed to be wide and fast. More than 40% of pedestrian fatalities occurred where no crosswalk was available...Speed reduction has a dramatic impact on pedestrian fatalities. Eighty percent of pedestrians struck by a car going 40 mph will die; at 30 mph the likelihood of death is 40 percent. At 20 mph, the fatality rate drops to just 5 percent."

Roadway design and engineering approaches commonly found in complete streets create long-lasting speed reduction. Such methods include enlarging sidewalks, installing medians, and adding bike lanes. All road users - motorists, pedestrians and bicyclists - benefit from slower speeds.

### Improved Access

Access to jobs, education, grocery shopping, healthcare, and other destinations is vital in our urban areas. In Cumberland, about 17.3% of households do not own a car. In addition, many seniors and disabled residents are limited in their ability to drive. Creating safe streets allows access and travel by pedestrians, wheelchair users, cyclists, transit users and builds a more livable, accessible community for people of all ages, abilities, and income levels.

### Changing Demographics

America's young people, including the 'Generation Y' and the maturing 'Millennials', are decreasing the amount they drive and increasing their use of transportation alternatives<sup>7</sup>. National Household Transportation Survey Data compared between 2001 and 2009 has shown that America's 16-34 year olds are driving less and walking, bicycling and taking transit more.



*A combination of Complete Street elements are required to balance the placemaking, safety, and accessibility of a corridor.*



*Complete Streets encourage alternative forms of transportation through enhanced accessibility and safety treatments.*



*Complete Streets are designed for all ages and abilities.*

<sup>5</sup> Keener, D., Goodman, K., Lowry, A., Zaro, S., & Kettel Khan, L. Recommended community strategies and measurements to prevent obesity in the United States: Implementation and measurement guide. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. [http://www.cdc.gov/obesity/downloads/community\\_strategies\\_guide.pdf](http://www.cdc.gov/obesity/downloads/community_strategies_guide.pdf)

<sup>6</sup> National Complete Streets Coalition, Fact Sheets (2012). <http://www.completestreets.org/complete-streets-fundamentals/factsheets/>

<sup>7</sup> Davis & Dutzik, Transportation and the New Generation, Frontier Group & U.S. PIRG Education Fund (2012). <http://www.uspirg.org/sites/pirg/files/reports.pdf>.



*Curb Extensions shorten the crossing distance and minimize pedestrian exposure on the roadway.*



*Continental Crosswalk Markings should be used at crossings with high pedestrian use or where vulnerable pedestrians are expected.*



*Traffic Circles are much smaller than modern roundabouts and are typically used in residential neighborhoods to slow traffic speeds and reduce accidents.*

Young people's transportation priorities and preferences differ from those of older generations. Preferences for living in places where they can easily walk, bike or take public transportation are clearly exhibited by a recent study by the National Association of Realtors. Environmental consciousness is also becoming more evident with nearly twice as many 18 to 34 year olds stating that they drive less to protect the environment than older generations (16 percent versus 9 percent). The trend toward reduced driving among young people is likely to persist as a result of technological advancements that reduce the need to travel and increased legal and financial barriers to driving.

## Economic Development

Improving the safety, access, and placemaking through complete streets design has been shown to spur private investment, raise property values, and generally stimulate the local economy. Improvements to pedestrian and bicycle infrastructure creates a more welcoming environment that encourages increased foot traffic along the corridor. In Mountain View, California, the addition of space for sidewalk cafes and a redesign of the street for pedestrians were followed by private investment of \$150 million, including residential, retail and offices, resulting in a vibrant downtown destination.<sup>8</sup> In a survey of 15 real estate markets, a one-point increase in the walkability of a neighborhood as measured by WalkScore.com increased home values by \$700 to \$3,000.<sup>9</sup>

In addition to pedestrian improvements, bike paths add value to neighboring properties as well. One North Carolina neighborhood saw property values rise \$5,000 due to a nearby bikeway, while research showed that bike paths in Delaware could be expected to add \$8,800 to neighboring home values.<sup>10</sup> Even design elements like street trees can raise property values. Having trees on the street in front of homes in Portland, Oregon added more than \$7,000 to selling prices.<sup>11</sup>

## NYC Case Study of Complete Street Improvements - Retail Sales at Improvement Site Versus Comparison Site<sup>12</sup>



<sup>8</sup> Local Government Commission Center for Livable Communities (n.d.). The economic benefits of walkable communities. PDF.

<sup>9</sup> CEOs for Cities (2009, August). Walking the walk. Retrieved 2012, August 8, from <http://www.ceosforcities.org/research/walking-the-walk/>.

<sup>10</sup> Smith, R. (2011, May 3) Local bike paths mean higher house prices. Crikey. Retrieved 2012, August 8, from <http://blogs.crikey.com.au/rooted/2011/05/03/local-bike-paths-mean-higher-house-prices/>.

<sup>11</sup> Jaffe, E. (2011, September 30) The economics of urban trees. The Atlantic Cities. Retrieved 2012, August 8, from <http://www.theatlanticcities.cohousing/2011/09/where-trees-rule-real-estate/223/>.

<sup>12</sup> NYCDOT. The Economic Benefits of Sustainable Streets. <http://www.nyc.gov/html/dot/downloads/pdf/dot-economic-benefits-of-sustainable-streets.pdf>



## CHAPTER THREE | OPPORTUNITIES AND CHALLENGES

## OVERVIEW

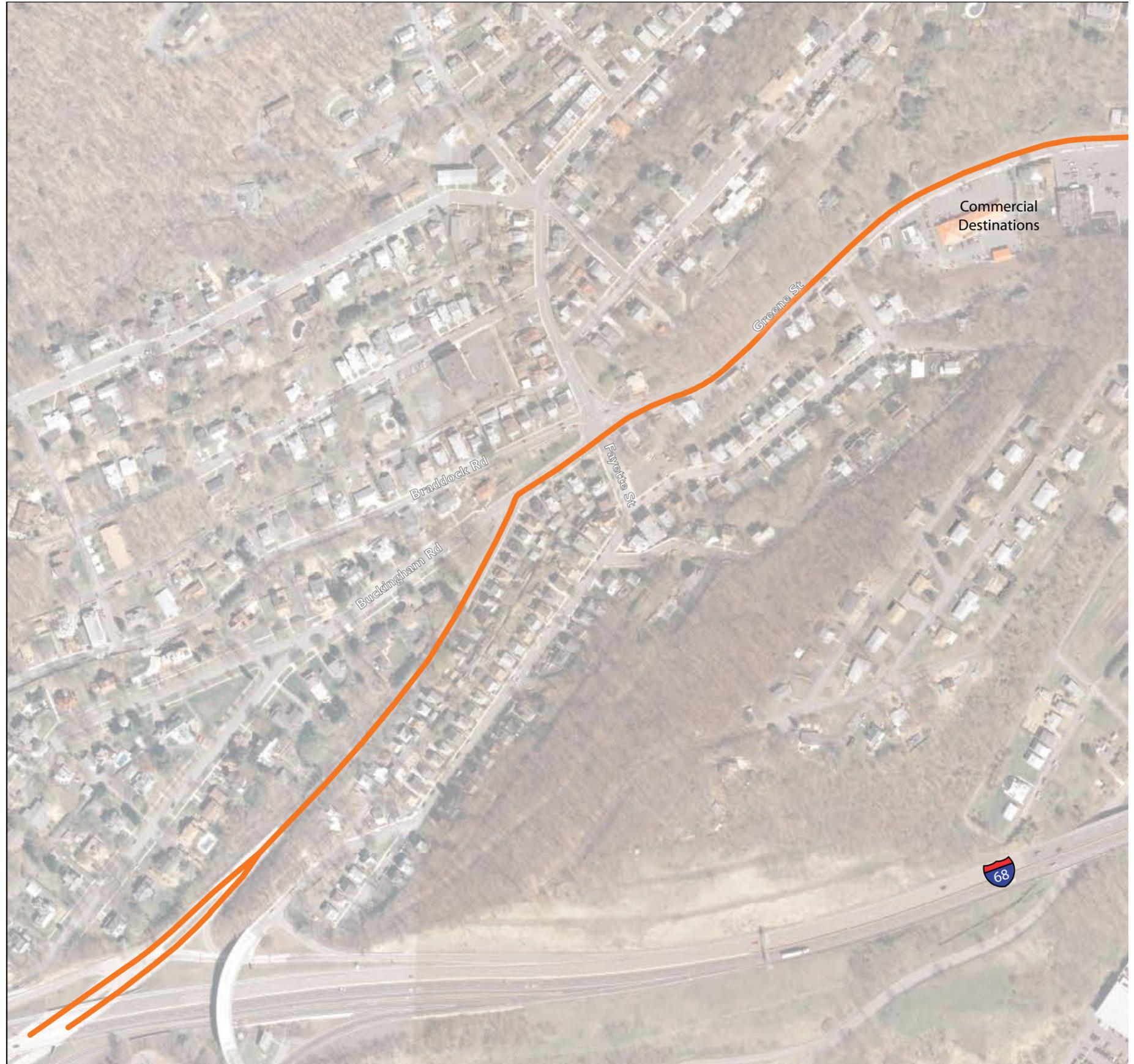
The Greene Street corridor is a transportation backbone of western Cumberland, functioning as a major urban thoroughfare, a commercial connector, and a roadway with residences. Starting at the off-ramp of I-68, Greene Street spans 1.7 miles and becomes the gateway to downtown Cumberland where it intersects Baltimore Street. The corridor passes through many distinct zones with strong histories, transportation needs, and land use priorities. The redesign of Greene Street will need to balance the distinct priorities of each zone while functioning as a comprehensive transportation system.

This study will identify multi-modal transportation, placemaking design opportunities, and programmatic strategies to improve the corridor for all modes. Special attention will be placed on transportation and streetscaping strategies that improve safety, stormwater management, access, and potential economic development along the corridor. The following existing conditions analysis illustrates opportunities and constraints for complete streets strategies that will lead to the development and evaluation of design alternatives.

## Destinations

A variety of commercial, civic, and cultural destinations are located along and adjacent to the corridor. These destinations draw youth, visitors, and residents. Some key destinations include:

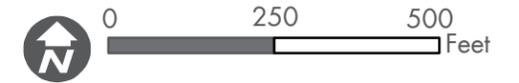
- **The Great Allegheny Passage** is located across the Baltimore Street bridge and is a popular destination for local recreation and bicycle tourism.
- **The National Road Monument** (also known as the Cumberland Road) was the first major improved highway in the United States to be built by the Federal Government.
- **The Cumberland YMCA** is a major recreation and services destination for residents. The recreation center offers youth and adult sports, aquatics, teen education programs, and many other services.
- **The Children's Medical Group** offers health care to infants, children, and adolescents throughout the western Maryland region.
- **West Side Elementary School** abuts the corridor, with the playground and recreation area being accessible from Greene Street.





### STUDY AREA AND KEY DESTINATIONS

— Greene Street Study Corridor



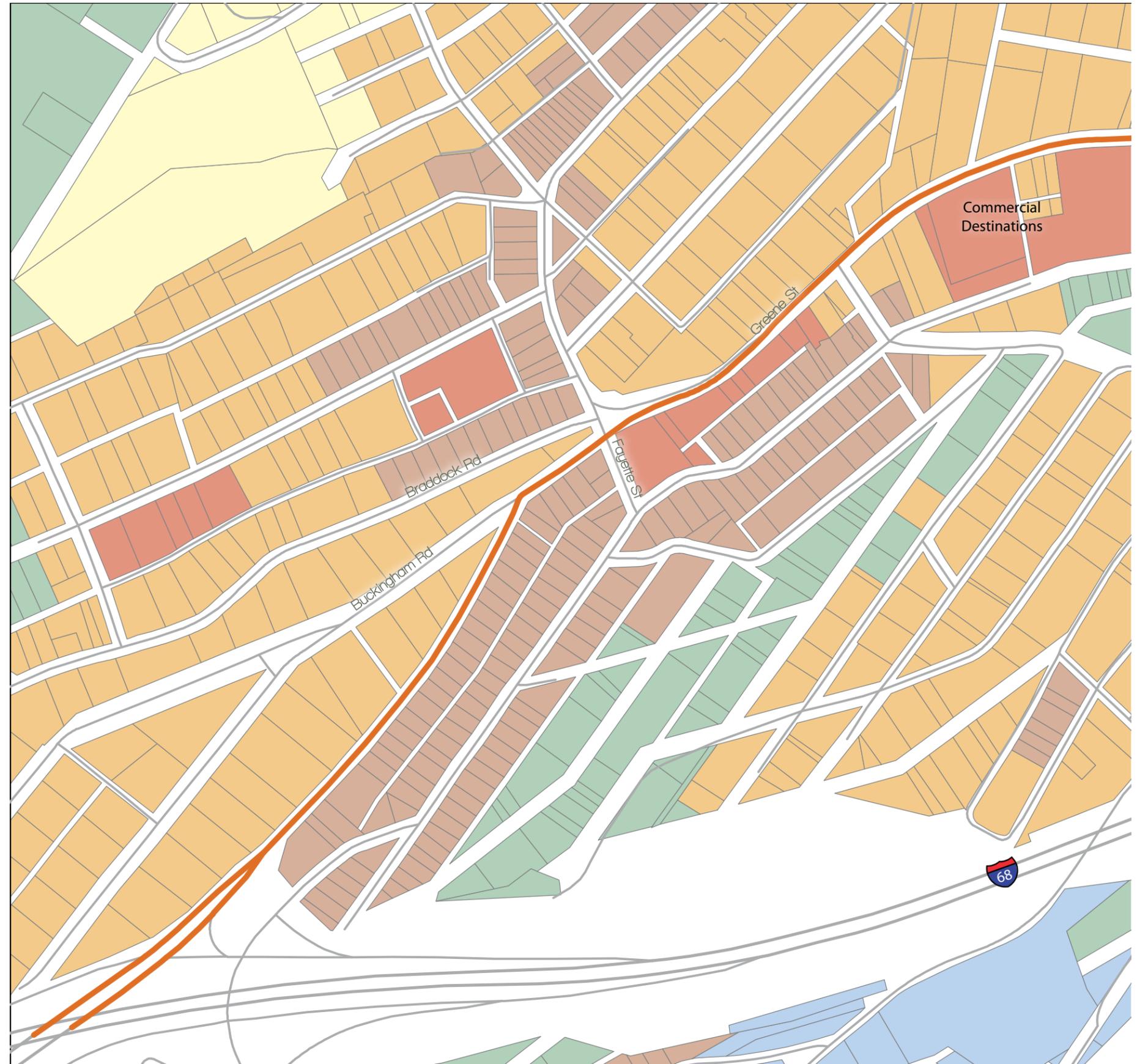
## Land Use

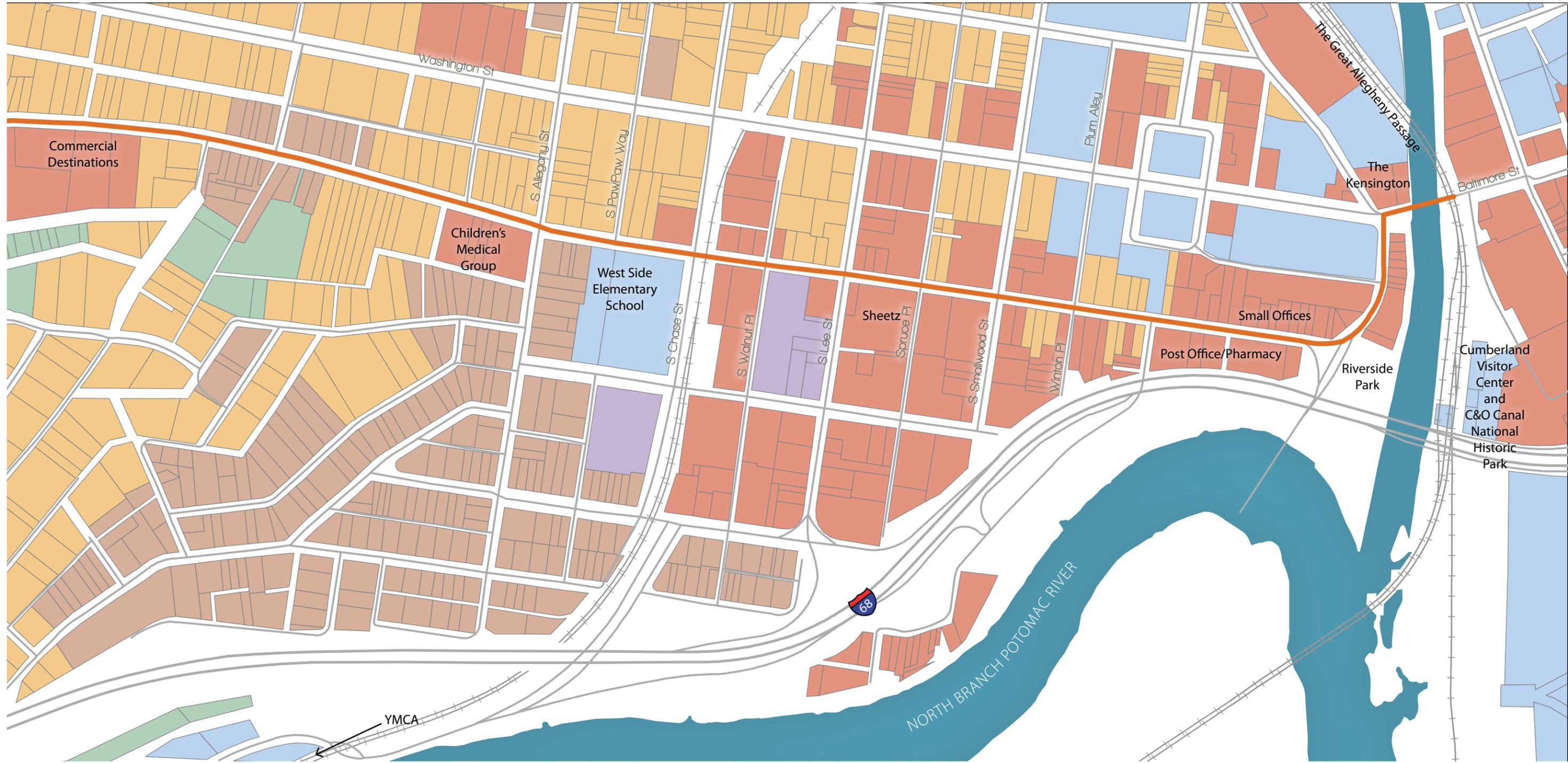
Land use and street design are complimentary street life elements. Streetscaping in residential areas will vary from design in commercial segments of the corridor. As the land use changes along Greene Street, the design of the street and sidewalk sends messages that indicate how people should move, what is available to visitors, and who is likely to be using the street. Residential land uses are commensurate with pedestrian scale lighting, protected sidewalks, and street trees. Commercial areas support employees and visitors and should be easily accessible by various modes, provide opportunities to access transit, and have comfortable sidewalk connections.

Land use transitions throughout the corridor include:

- The southwest portion of the corridor near the Fayette Street intersection is predominantly characterized by high density residential and medium density residential land uses and serves as a transition from I-68.
- Traveling toward downtown, the corridor transitions into a commercial zone with some medium density residential, high density residential, and industrial uses.
- The next zone of the corridor transitions from neighborhoods to a school zone with some commercial destinations.
- The closest area to downtown has commercial uses and is an extension of the downtown areas.

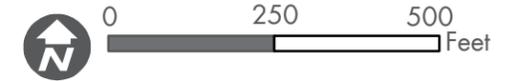
These land use transitions, as well as the street character, support the rationale for analyzing and providing recommendations for Greene Street in four distinct zones. These zones appear in the analysis and opportunities beginning on page 3-14.





### LAND USE

- Commercial
- Industrial
- Institutional
- Forest
- Low Density Residential
- Medium Density Residential
- High Density Residential



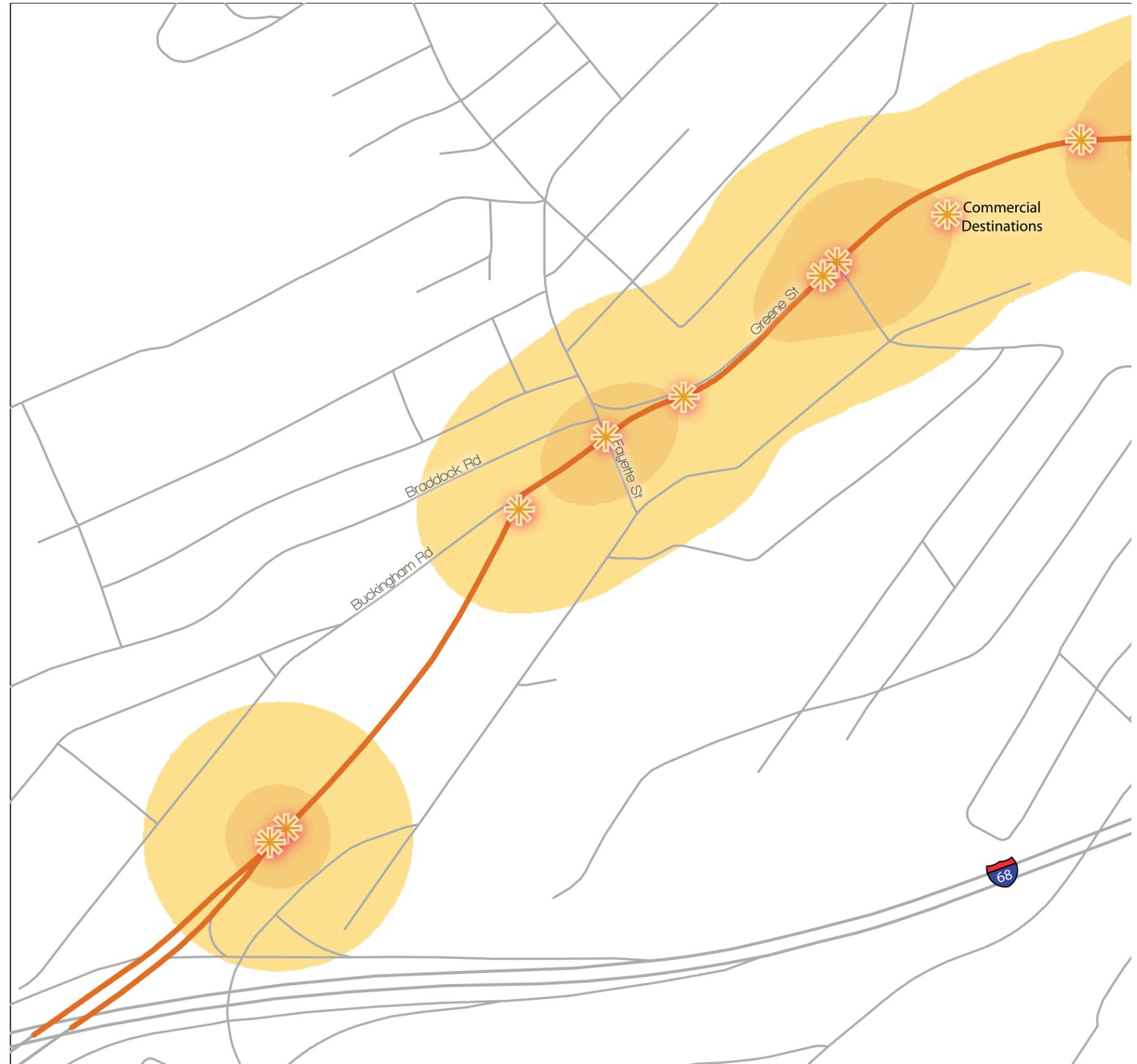
### Crash Data

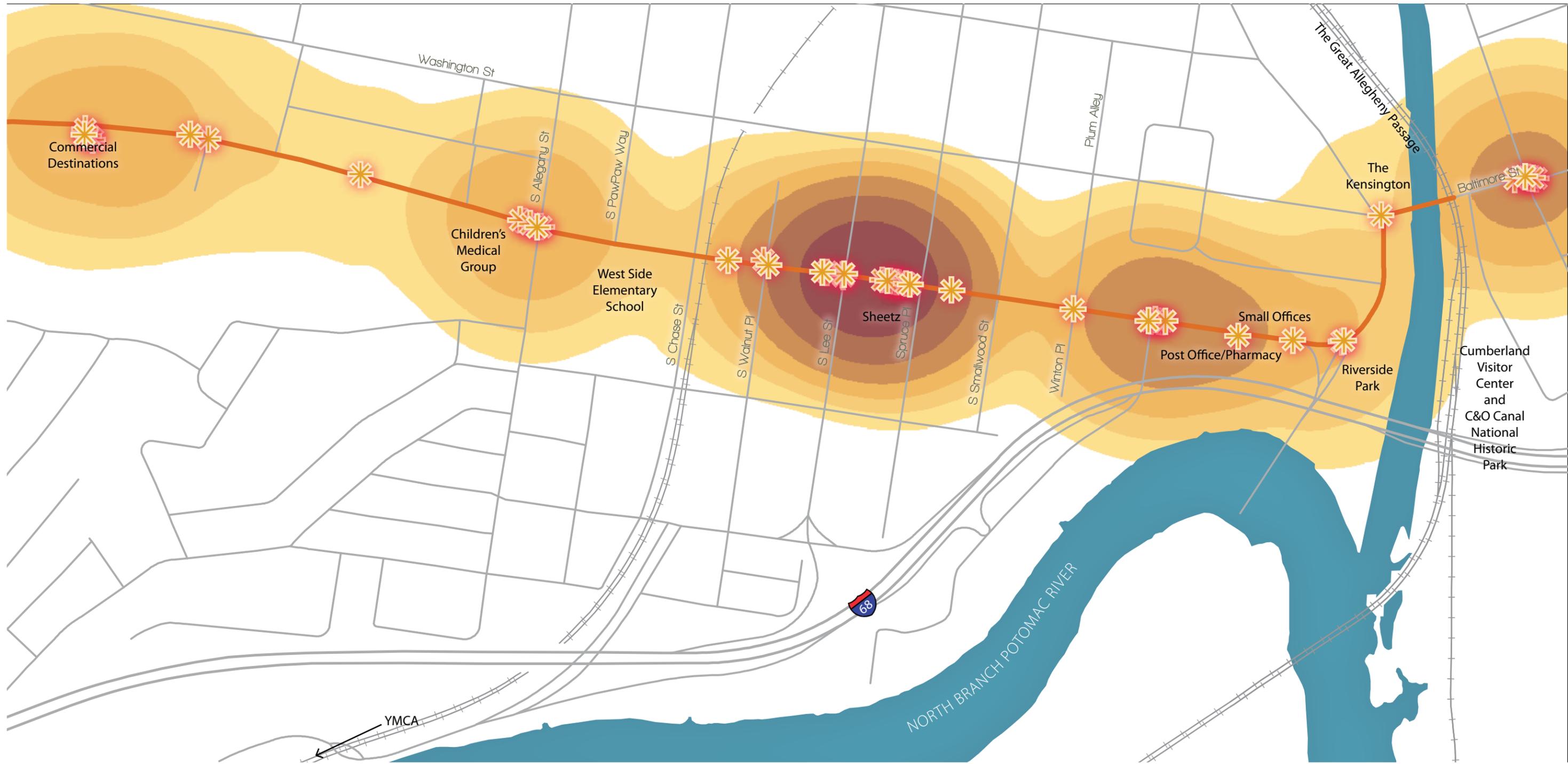
Existing crash data was analyzed for data years 2013 and 2014 for motor vehicles. Darker regions shown along the corridor indicate a higher density of crashes at a particular location. Overall, there were 57 crashes within the study area.

The highest density of crashes occurred in Greene Street between South Smallwood Street and South Walnut Place. This may be due to movements associated with the signalized intersection at South Lee Street, as well as turning movements in and out of Sheetz. The Sheetz is a significant pedestrian trip generator; during field studies, pedestrians were observed crossing at various locations along Greene Street. Providing marked crosswalks and appropriately timed countdown signals at the intersection of Greene Street and South Lee Street will help guide pedestrians to a safe crossing location.

In addition, a crest vertical curve was noted west of South Smallwood Street, which could be a contributing factor to the density of crashes in this area, as sight distance is limited.

Crash data is important to evaluate in complete streets planning. Incident locations highlight where complete streets treatments are needed to improve sightlines, organize movements, and implement elements to slow or alert drivers.





### CRASH DATA - REPORTED VEHICULAR CONFLICTS

-  Vehicular Crash Location
-  Study Corridor
- Crash Density  Low  High

## Parks, Trails, and Recreation

The Greene Street corridor has a collection of parks, green space, and trails that serve local residents and function as landmarks. The system is primarily composed of passive space that provides gateway, memorial, historical, and environmental functions.

- The Great Allegheny Passage is an important regional connection for bicyclists and hikers travelling through the Allegheny region and beyond. The trail also serves as an important recreation facility for local residents.
- The Fairmont Avenue Recreation Area is a 1.2 acre facility with open space, a basketball court, and two tennis courts.
- The Riverside Park site is a historic location featuring the log cabin occupied twice by George Washington.
- The Visitor Center and C&O Canal National Historical Park are located across Wills Creek.
- Sundial Park at the intersection of Greene and Baltimore Street.

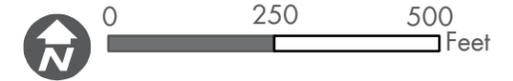
Each destination attracts residents and visitors of all ages and abilities. Through bicycle and pedestrian improvements, these destinations can become more accessible. Sidewalks, bicycle facilities, and safe crossings should be examined to improve safe and comfortable connections to each of these destinations.





### PARKS, TRAILS, AND RECREATION

- Building
- Park
- Trail
- Study Corridor

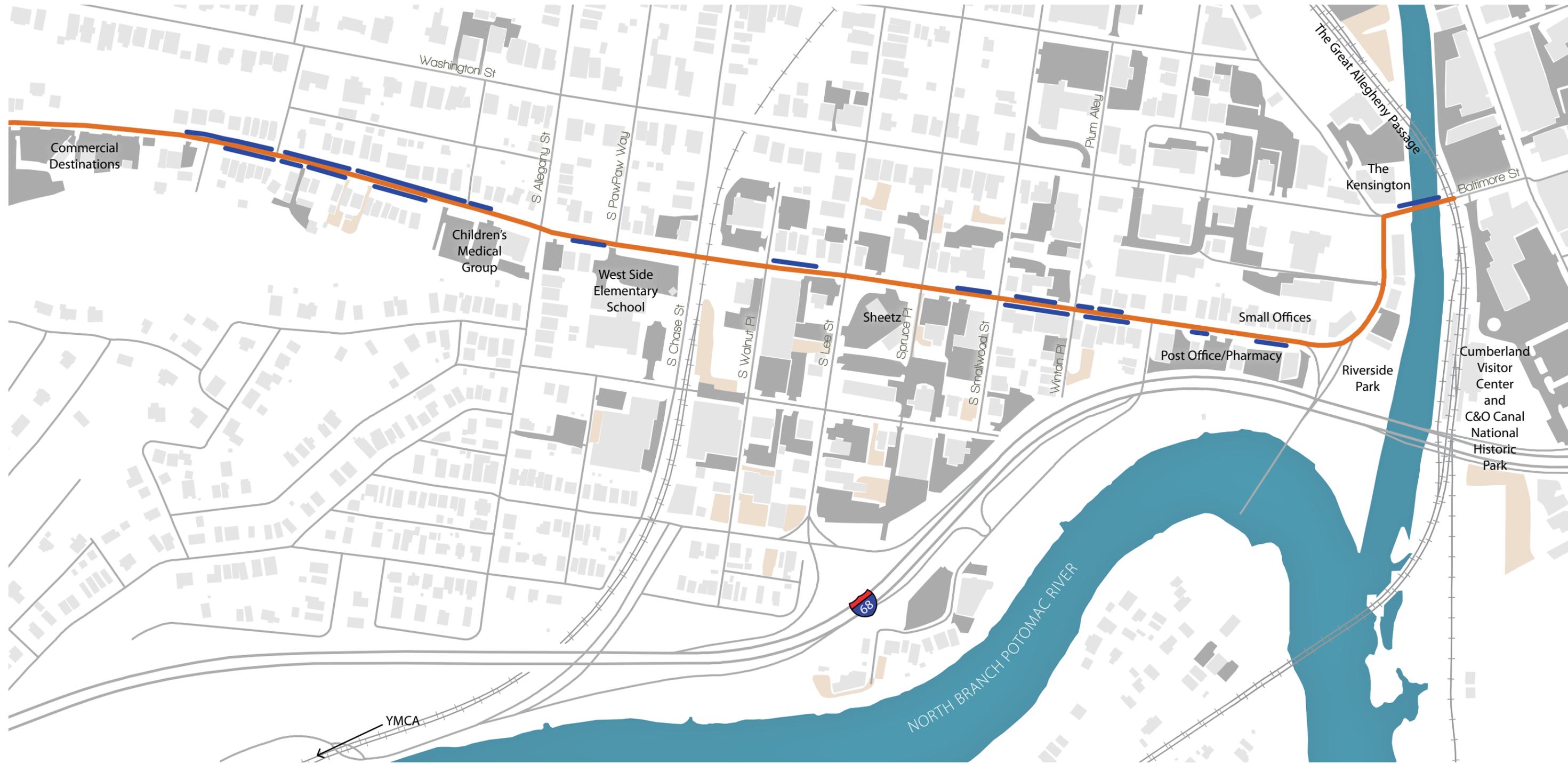


## Parking (On- and Off-Street)

On- and off-street parking are vital components of the corridor, providing needed parking for businesses and residential neighborhoods along the corridor. The Greene Street corridor has paved and unpaved off street parking and on-street parking at strategic locations. Much of the off-street parking is private or permitted for commercial or institutional use; however, there are sections of public off street parking on the south side of Greene Street near PharmaCare West. A majority of the on-street parking is categorized as parking anytime.

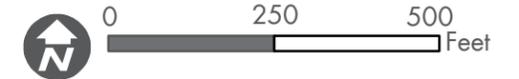
The design and location of on-street and off-street parking will be an important consideration as the corridor evolves. Parking will need to be balanced to accommodate businesses and residences while providing space to accommodate stormwater facilities and transit stops. The perception of available parking is important to economic development and considerations should be made to stripe and direct circulation through surface parking areas to maximize available spaces.





### VEHICULAR PARKING

- Building
- Unpaved Off-Street Parking
- Paved Off-Street Parking
- On-Street Parking
- Study Corridor

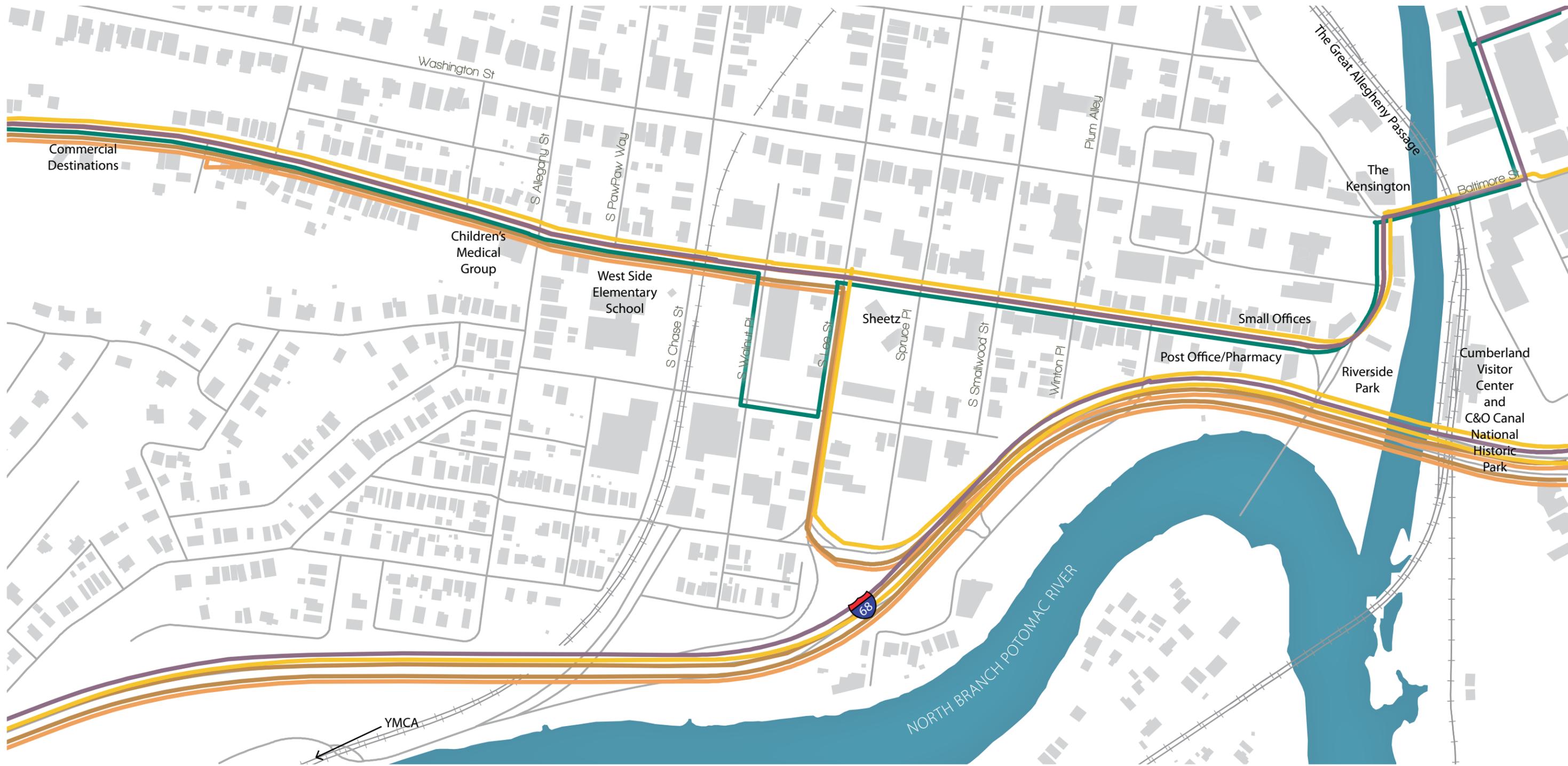


## Transit

The Greene Street corridor is an important transit hub for Cumberland and Allegany County. The corridor contains five different fixed-route Allegany County Transit services with a majority of routes operating as a flag-stop service. The Gold, Purple, Green, Morning Service, and Evening Service circulate along Greene Street, connecting people with downtown, shopping destinations, Western Maryland Regional Medical Center, Allegany College, grocery stores, Frostburg State University, and multiple residential neighborhoods.

Balancing vehicular mobility and transit circulation needs will be an important design consideration for the corridor. Also key will be transit stops, stop facilities, and access to transit via walking and bicycling.



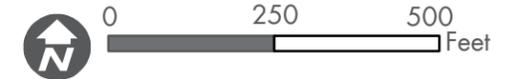


### TRANSIT CIRCULATION

- Morning Service
- Green Line Loop 1
- Purple Line

- Gold Line
- Evening Service

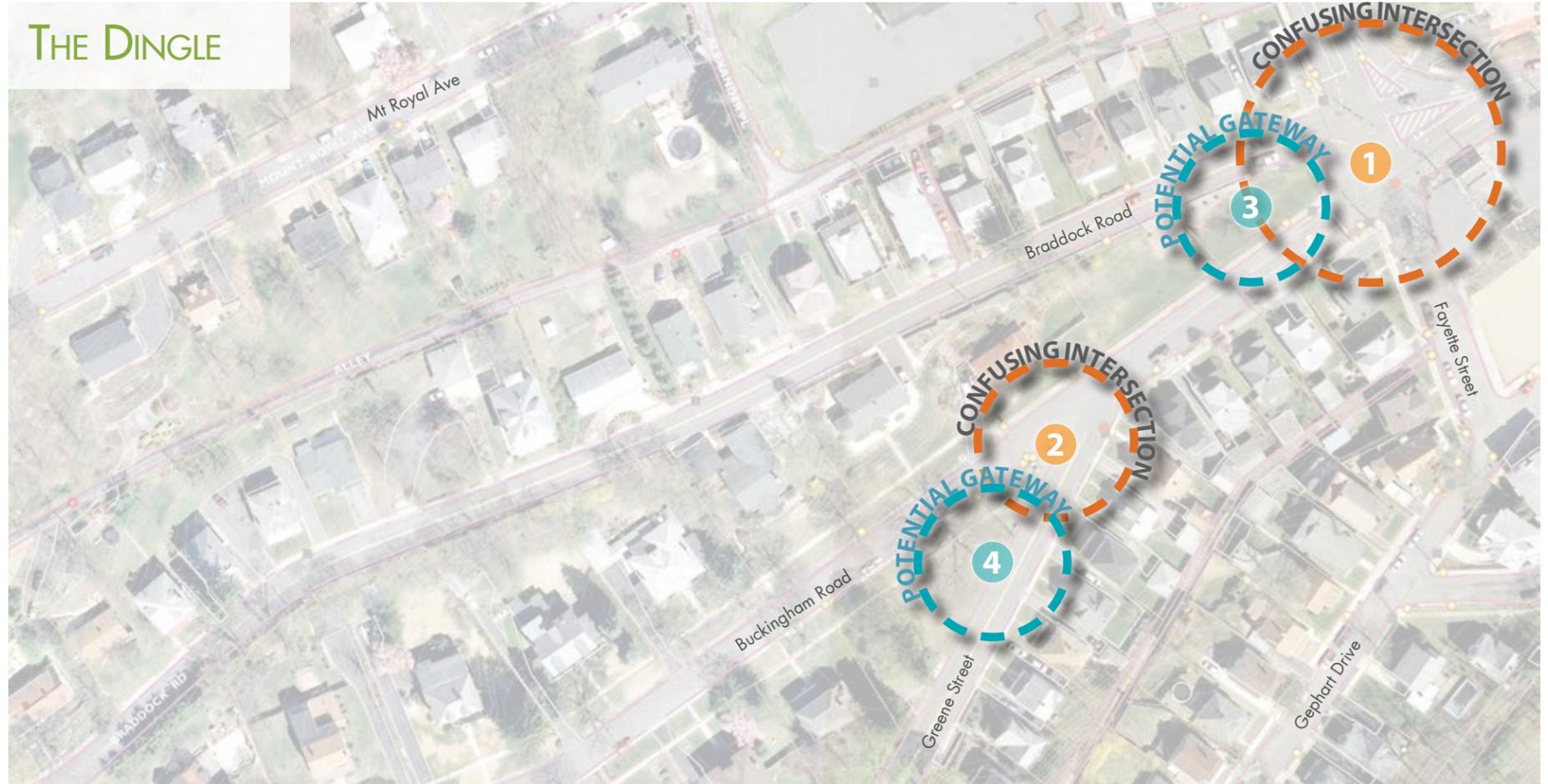
Building



## ZONE ANALYSIS

The following pages illustrate key opportunities and challenges for the four zones along Greene Street.

### THE DINGLE



**CHALLENGE** The five point intersection located at the western end of the corridor, known as the Dingle, is difficult to navigate as a pedestrian and can be confusing for motorists. Enhancements could be made to improve the circulation for all modes through the intersection.



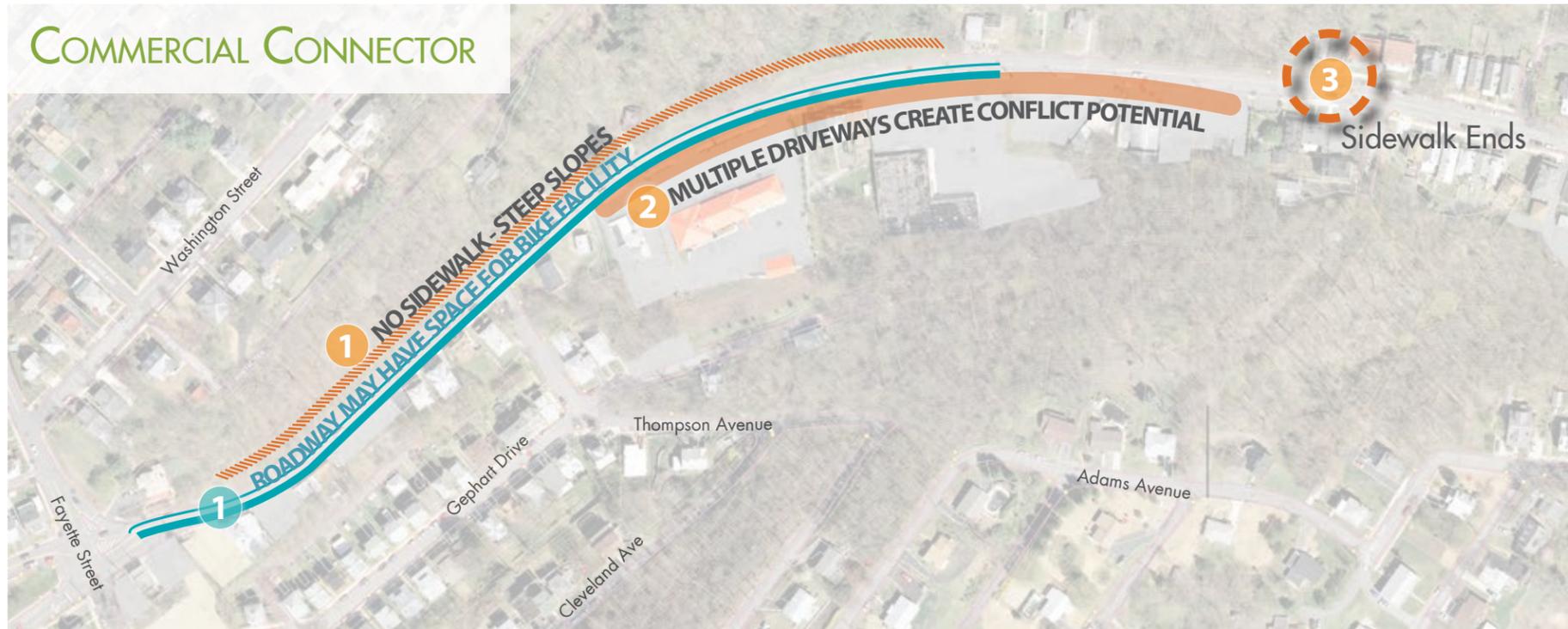
**CHALLENGE** The intersection of Buckingham Rd and Greene Street is confusing to travel through. Currently there are no pedestrian accommodations.



**OPPORTUNITY** The parcel flanked by Greene St and Braddock Road could be developed into a gateway green space that invites people coming into and out of Cumberland and provides a resting place for pedestrians.



**OPPORTUNITY** The parcel flanked by Greene St and Buckingham Road could also be developed into a gateway, becoming a welcoming feature for people travelling in and out of Cumberland.



**OPPORTUNITY** Parking is not permitted in this section of Greene Street. This may provide space for on-street bicycle facilities or widening the sidewalk to accommodate street trees.



**CHALLENGE** There is no sidewalk provided on the north side of Greene Street. This forces pedestrians to either walk along the road or cross the street without a crossing facility. The steep slope along the north side of the road poses a challenge to constructing a sidewalk along this road section.



**CHALLENGE** Sidewalks are only available on the south side of Greene Street in this area. Pedestrian circulation is complicated by the frequency of driveways and curb-cuts.



**CHALLENGE** The sidewalk on the north side of Greene Street ends abruptly. Where the sidewalk ends, there is no safe crossing to transition to the sidewalk on the south side of Greene Street.



**CHALLENGE** Vehicles, such as the one shown above, park on the grass/degraded sidewalk on the north side of the road. This creates an obstacle for pedestrians.



**CHALLENGE** Currently, there are no visual cues indicating the approach to West Side Elementary. Additional signs and pavement markings should be installed so roadway users moderate their speed and proceed with caution through the school zone.



**CHALLENGE** The narrow right of way underneath the railroad bridge causes water to funnel down the slopes on either side of the bridge and pool under it. When the water pools, it becomes a hazard and degrades the pavement quality underneath the bridge. Stormwater management treatments to abate the pooling should be implemented.



**CHALLENGE** The steep grades along the corridor pose a challenge to bicyclists and pedestrians. Improvements should focus on making travel up and down the hills safer for all modes of travel.



**OPPORTUNITY** Wide sidewalks on the south side of Greene Street provide a comfortable walking environment for pedestrians. The addition of street trees and sidewalk amenities will improve the comfort for pedestrians in this area.



**OPPORTUNITY** Sidewalk improvements and street trees will improve the comfort and decrease tripping hazards along this popular running route.



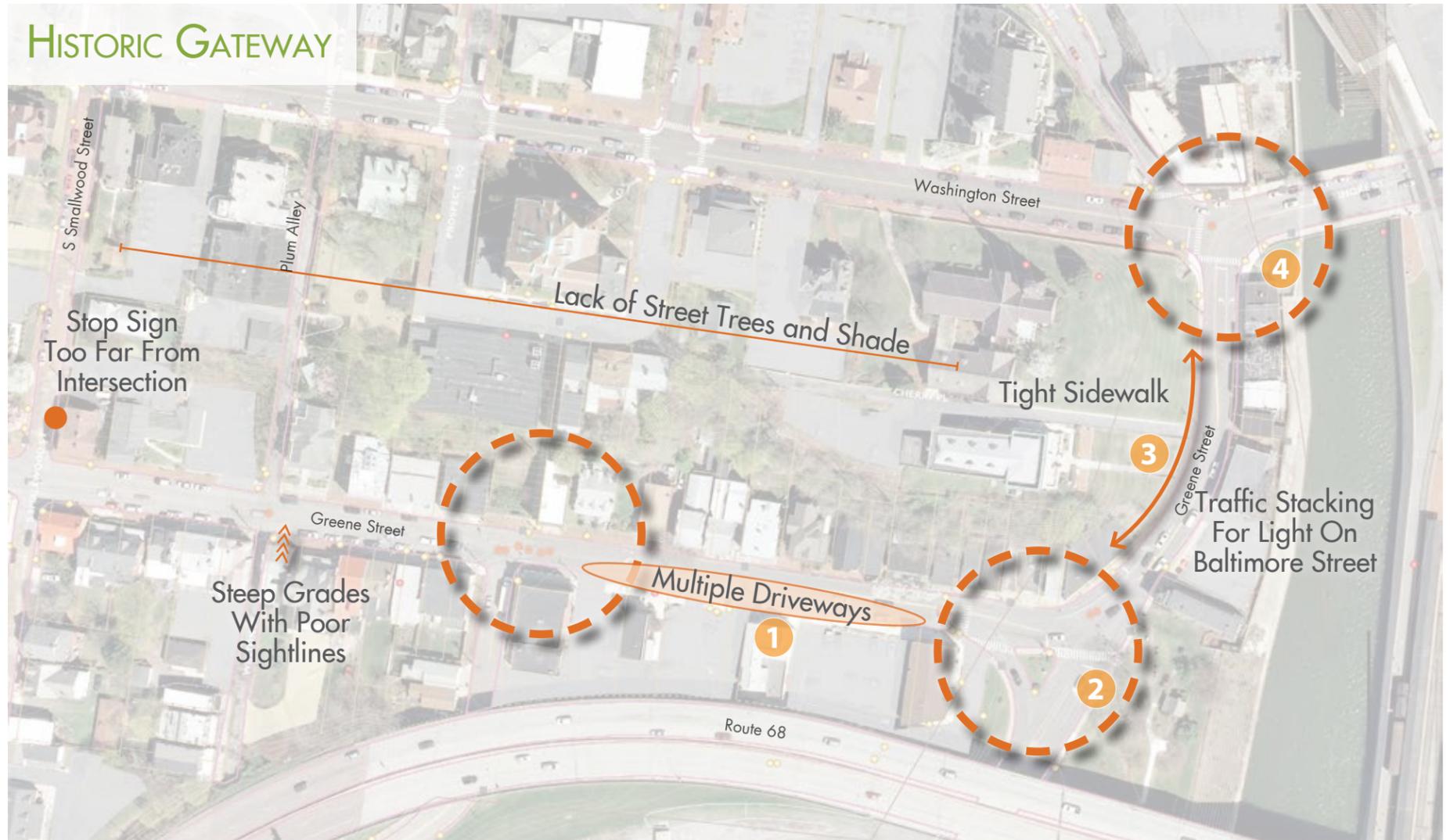
**OPPORTUNITY** The sidewalks on the approaches to West Side Elementary are in disrepair. Sidewalks are cracked and uneven, and the sidewalk material is inconsistent. There are grant programs available, such as Safe Routes to School, that provide resources to plan and implement infrastructure improvements that make walking and bicycling to school safer and more comfortable.



**OPPORTUNITY** The walls underneath the railroad bridge provide an exciting opportunity to install a mural. The mural could reflect local cultural values, such as Cumberland's railroad heritage, or be designed as welcoming gateway to West Side Elementary.



**CHALLENGE** Multiple driveways create vehicle and pedestrian conflicts as well as vehicle on vehicle conflicts.



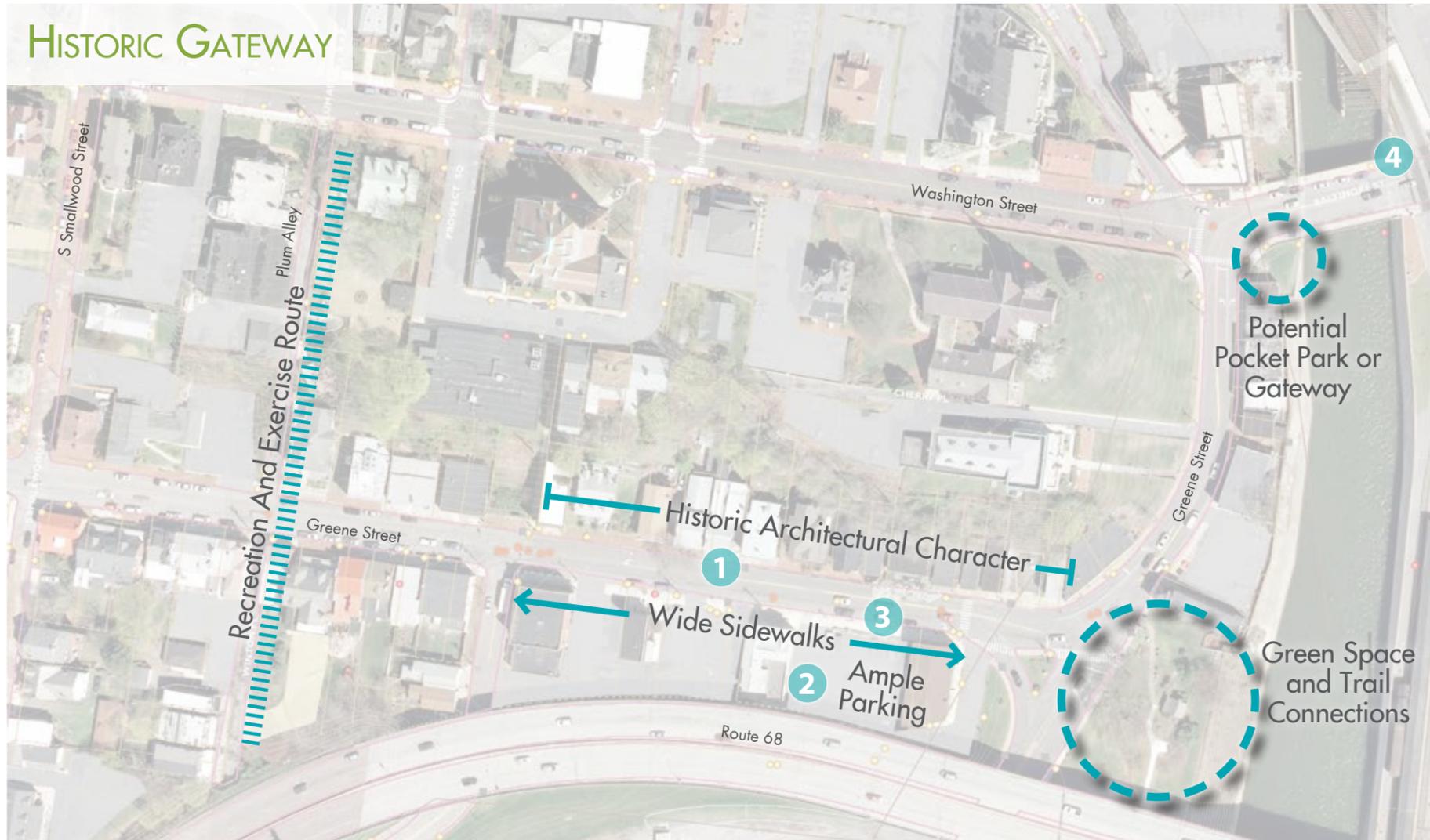
**CHALLENGE** Large turning radius coupled with a blind curve makes the placement of this crosswalk dangerous.



**CHALLENGE** Tight sidewalks are not ADA accessible and are too narrow for passing safely without walking into the roadway.



**CHALLENGE** The intersection of Greene and Baltimore/Washington is confusing for motorists traveling eastbound on Washington, as they expect all drivers to stop before turning right onto Baltimore from Greene Street. This also is a challenge for pedestrians and bicyclists.



**OPPORTUNITY** The corridor provides access to the Great Allegheny Passage Trail. Enhanced gateways, wayfinding, pocket parks, and street trees will provide stronger connections to the trail.



**OPPORTUNITY** The historic architectural style of the buildings along Greene Street is a unique and attractive asset. Improvements to the corridor should be consistent with the historic aesthetic of this section.



**OPPORTUNITY** Ample parking is available on the south side of Greene Street in the surface parking lot. Realigning parking spaces and circulation may provide additional capacity for public parking.



**OPPORTUNITY** Wide sidewalks along the south side of Greene St provide a comfortable walking environment for pedestrians and provide room to add street furnishings and street trees.

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## KICKOFF MEETING AND WALKING AUDIT

On Tuesday, October 28, 2014, the consultant team held a stakeholder kickoff meeting and walking audit for the *Greene Street Complete Streets Study*. The kickoff meeting was framed around the concept of complete streets - first reviewing the components of complete streets, then determining how those components function in the context of this study area. The discussion covered general concerns for safety and transportation efficiency, a review of past planning efforts, and a visionary discussion of what "complete streets" mean for Cumberland, Maryland.

Following the meeting, the group embarked on a walking audit of the corridor. The walking audit allowed the Steering Committee and consultant team to evaluate the corridor from a pedestrian and bicyclist perspective. Intersections were analyzed to determine how well they function for all modes of travel. Evaluation Sheets (below) were used to analyze existing facilities, evaluate maintenance, record accessibility challenges, and note other opportunities and constraints. Major observation included the lack of ADA accessibility, sidewalks in need of repair, and dangerous crossings.



The walking tour provided a pedestrian perspective for the consultant team and Steering Committee.

## WALKING AUDIT EVALUATION SHEETS

Intersection Or Road Name: \_\_\_\_\_

<p><b>Facilities:</b> presence of a suitable walking surface, such as a sidewalk or path.</p> <p>1 No sidewalk 2 Sidewalk on one side of road, or discontinuous 3 Continuous sidewalk on both sides of road</p> <p>Conflicts: potential for conflict with motor vehicles due to driveway and loading dock crossings, speed and volume of traffic, large intersections, low pedestrian visibility.</p> <p>1 High conflict potential 2 3 4 5 Low conflict potential</p> <p>Crosswalks: presence and visibility of crosswalks. Traffic signals meet pedestrian needs with separate walk lights that provide sufficient crossing time.</p> <p>1 Crosswalks not present 2 3 4 5 Crosswalks, countdown, and audible signal</p> <p>Rate the following: 1 low score - 5 high score</p> <p><b>MAINTENANCE</b> (sidewalk cracks, weeds, faded crosswalks)</p> <p>1 2 3 4 5</p> <p><b>BUFFER</b> (separation from motor vehicles)</p> <p>1 2 3 4 5</p> <p><b>ACCESSIBILITY</b> (ADA, uneven sidewalk, ramps)</p> <p>1 2 3 4 5</p> <p><b>SHADE</b> (trees, awnings)</p> <p>1 2 3 4 5</p> <p><b>AESTHETICS</b> (benches, plants, street lights, bus shelters)</p> <p>1 2 3 4 5</p> <p>What improvements would you make?</p>	<p><b>Facilities:</b> presence of bicycle specific infrastructure.</p> <p>1 No facility 2 Bike lanes on one side of road, minor discontinuities 3 Continuous bike path</p> <p>Conflicts: potential for conflict with motor vehicles due to driveway and loading dock crossings, speed and volume of traffic, large intersections, low bicyclist visibility.</p> <p>1 High conflict potential 2 3 4 5 Low conflict potential</p> <p>Intersections: Intersection markings for approach and through intersection. Traffic signals meet bicyclist needs with separate lights that provide sufficient crossing time.</p> <p>1 No markings, no signals 2 Markings or signals 3 4 5 Markings and signals</p> <p>Rate the following: 1 low score - 5 high score</p> <p><b>MAINTENANCE</b> (roadway cracks, weeds, inlets)</p> <p>1 2 3 4 5</p> <p><b>BUFFER</b> (separation from motor vehicles)</p> <p>1 2 3 4 5</p> <p><b>ACCESSIBILITY</b> (suitable for all ages and abilities)</p> <p>1 2 3 4 5</p> <p><b>STREET WIDTH</b> (narrow bike lane, no separator)</p> <p>1 2 3 4 5</p> <p><b>AESTHETICS</b> (traffic calming, medians, signage)</p> <p>1 2 3 4 5</p> <p>What improvements would you make?</p>
--	--

Efficient movement: dedicated bus lane or low traffic to allow for efficiency for all modes.

1 No dedicated lane, high traffic  
2  
3  
4  
5 Dedicated lane, or low traffic.

Is Parking adequate for land use?

1 No parking, parking needed  
2  
3  
4  
5 Sufficient on-street or off-street nearby

Intersection Or Road Name: \_\_\_\_\_

55 mph  
IDEAL: \_\_\_\_\_ mph  
DESIGN SPEED: \_\_\_\_\_ mph

The Average Daily Traffic of a roadway (all vehicles) \_\_\_\_\_

The transportation type a roadway is designed to favor \_\_\_\_\_

EXISTING: \_\_\_\_\_  
FUTURE: \_\_\_\_\_

Surrounding existing or future land-use and other characteristics \_\_\_\_\_

Features that characterize the roadway \_\_\_\_\_

The roadway with and/or number of traffic lanes \_\_\_\_\_

Connectivity to different districts, neighborhoods and/or land-uses \_\_\_\_\_

Draw the existing conditions. Use the check list below for guidance.

**LAND USE:** CIRCLE THOSE THAT APPLY (just anything not in the list)

Trees, Benches, Lights, Signs, Bricks, Awnings, Cafe Seating, Kiosk, Retaining Wall, Parking Lot/Driveway

**LAND USE:** CIRCLE THOSE THAT APPLY (just anything not in the list)

Trees, Benches, Lights, Signs, Bricks, Awnings, Cafe Seating, Kiosk, Retaining Wall, Parking Lot/Driveway

How Safe Is This Today? (The scale is from 1 to 5)

1 2 3 4 5

How would you IMPROVE this area?

Lane Width  
 Signs/Signals  
 Stop Bar  
 Cross Walk  
 Sidewalk (width)  
 Grass Strip/Trees  
 Countdown Signal  
 Curb Ramp  
 Utility Poles  
 Bike Facilities  
 Land Use  
 Driveways  
 Parking  
 Hydrants  
 Regulations

Intersection Or Road Name: \_\_\_\_\_

55 mph  
IDEAL: \_\_\_\_\_ mph  
DESIGN SPEED: \_\_\_\_\_ mph

The Average Daily Traffic of a roadway (all vehicles) \_\_\_\_\_

The transportation type a roadway is designed to favor \_\_\_\_\_

EXISTING: \_\_\_\_\_  
FUTURE: \_\_\_\_\_

Surrounding existing or future land-use and other characteristics \_\_\_\_\_

Features that characterize the roadway \_\_\_\_\_

The roadway with and/or number of traffic lanes \_\_\_\_\_

Connectivity to different districts, neighborhoods and/or land-uses \_\_\_\_\_

Draw the existing conditions. Use the check list below for guidance.

How Safe Is This Today? (The scale is from 1 to 5)

1 2 3 4 5

How would you IMPROVE this area?

Lane Width  
 Signs/Signals  
 Stop Bar  
 Cross Walk  
 Sidewalk (width)  
 Grass Strip/Trees  
 Countdown Signal  
 Curb Ramp  
 Utility Poles  
 Bike Facilities  
 Land Use  
 Driveways  
 Parking  
 Hydrants  
 Regulations



## Creating a Vision

With a healthy dialogue started, attendees were then asked to channel these thoughts into immediate and long-term vision statements for the corridor. Once each group presented their vision statements, group members were directed to the large corridor maps where they were able to draw and comment on challenges, opportunities, key destinations, places where they feel safe, and places where they do not feel safe.

Numerous ideas and concepts were documented on sticky-notes, maps, and table notes. As the feedback was assessed and synthesized, reoccurring themes emerged that were used to guide the corridor design and serve as the basis for evaluating potential alternatives. General themes and vision statements are presented in the boxes to the right.



*Multiple perspectives are key when envisioning change. Staff, residents, and business owners collaborated to formulate their goals and vision for the corridor.*

### WHAT IS YOUR IMMEDIATE VISION FOR THE CORRIDOR? (WHAT CAN WE FIX NOW?)

Blight problem – enforce city code!

Property owners (likes to live there, proud to be there) because they feel connected to the neighborhood, because the quality of life and part of the neighborhood. Improve sidewalks, street furniture, and green space; reduce blight, crosswalks, traffic.

Crosswalks, ADA, functional. Repair drainage problems. Improve traffic flow at Bridge Street (visibility of signals). No jake brakes on crosstown bridge.

Improve the safety, functionality, vibrancy, aesthetics, and relevance of the corridor.

Smoother traffic flow, signage for low train bridge, removing blighted properties, more inviting gateways at both ends of Greene Street.

Greene Street will be a safe and accessible place for everyone.

Safety issues (intersections), community engagement, clean up trash.

### WHAT IS YOUR LONG-TERM VISION FOR THE CORRIDOR? (WHAT IS YOUR ULTIMATE VISION?)

100 to 300 block - primarily pedestrian, historic, or retail. Period lighting & brick sidewalk. 400 block school – child safety zone. Safe access, crosswalks, to YMCA. 500 block – residential. Tree lined green space between road and sidewalk.

Locals & tourists, visitors; live, visit, shop, use for recreation, and enjoy life because they enjoy the residents and businesses and area.

Greene Street is a nexus for a variety of demographics who travel to work, school, and to and from downtown because it is an important central route. Would like to see a mural on the train bridge.

Where locals feel like they're visiting, and visitors feel like they've been here their whole lives.

Make Greene Street a vibrant community: diversity of businesses, façade improvements, parks and connected green space, use art to create an identity.

More balanced retail, restaurants, adaptively reuse properties. Streetscape design like in LaVale that connects Greene Street to through downtown to Baltimore Avenue corridor.

## Digging Into Details

The public workshop ended with a Street mix activity where groups were given pieces of various widths that represented sections of typical road rights-of-way, including: travel lanes, sidewalks, parking lanes, bicycle facilities, street furnishing, and vegetation. Attendees were tasked with piecing together their "ideal" street section for each of the four distinct zones along the corridor. The groups focused their efforts on creating sections that represent how they envision the corridor accommodating multiple modes of transportation while reflecting the character of Cumberland and fostering economic development.



By working within the restrictions of the existing curb-to-curb width, participants began to understand the challenges of accommodating multiple modes within a constrained environment.

## HISTORIC GATEWAY

Participants were overwhelming in support of preserving the pedestrian elements in this zone and enhancing the character of the sidewalk experience with items such as street trees, landscaping, bulb outs, benches, and bicycle racks. Travel lanes were generally set at 10 or 11 feet and street parking was either not included or only included on one side of the street. A vast majority of groups were interested in accommodating bicycles by providing bicycle lanes or buffered bicycle lanes through the area. Overall, the general theme for the Historic Gateway zone identified through the exercise was to ensure that all modes of transportation were accommodated with high quality facilities, and to reallocate street space by converting current on-street parking into bicycle facilities along the corridor.

## MAIN STREETS TO NEIGHBORHOODS

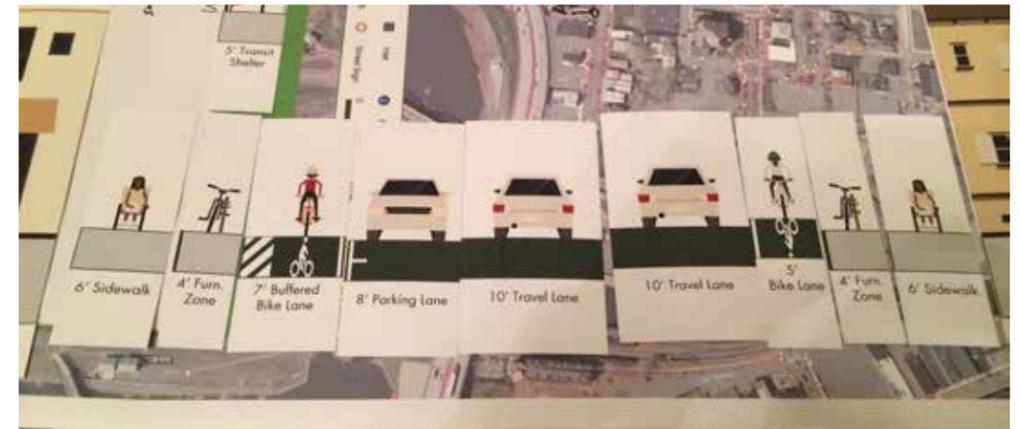
Similarly, attendees placed a priority on pedestrian accommodations in the Main Streets to Neighborhoods Zone. Since travel lanes are generally wider in this zone, additional street parking was included. Dedicated bicycle facilities were dropped in favor of a bicycle shared lane marking (sharrow). The general theme identified for the Main Streets to Neighborhoods Zone was to continue to place a priority on pedestrian accommodations, but due to the limited availability of off-street parking in this zone currently, groups chose a less-protected bicycle facility so that more on-street parking could be provided.

## COMMERCIAL CONNECTOR

In the Commercial Connector Zone, participants focused on pedestrian amenities such as a wider sidewalks with a buffer between the sidewalk and the travel lanes. A furnishing zone was also a popular choice among attendees. Shared lane markings were selected over dedicated bicycle lanes since the roadway width is narrower through this zone.



Street mix activities allow hands-on participation.



The resulting cross-section of one group after the streetmix activity.



The corridor maps were marked with thoughts and ideas by the public.

### THE DINGLE

For the Dingle Zone, participants focused on increasing the walkability of the zone by adding wide sidewalks, street furniture, and street trees. As in the Commercial Connector Zone, attendees selected shared lane markings over dedicated bicycle lanes.

### STEERING COMMITTEE CHARRETTE

Following the momentum from the public workshop, the consultant team held a charrette for the Steering Committee on Wednesday, February 11, 2015 to discuss the results of the public feedback.

The group agreed that many of the public comments revolved around the theme of stimulating economic development, improving quality of life, and a general feeling of pride and ownership for the corridor. With a long-term vision in mind, the Steering Committee collaborated to develop design solutions for each of the four distinct zones and the intersections along Greene Street.

As in any complete streets project, the Steering Committee focused on balancing the needs of all users. The group discussed the “give and take” associated with accommodating the function of the corridor with the vision of becoming a complete street. In this corridor, truck traffic is present, and not able to be relocated. While this isn’t the ideal environment to incorporate shared lane markings, the existing curb to curb dimensions are not wide enough to accommodate separated bicycle facilities. Additionally, the group determined alternate routes for bicycles are not ideal given the steep slopes of alternative paths. In addition, the vision for the corridor is to become a vibrant street with shops and restaurants where bicyclists should feel welcome. Therefore, the group determined a shared lane marking would help alert drivers of the presence of bicyclists, and help bicyclists feel welcome.

Intersection improvements were discussed with the maximum safety for pedestrians at the forefront of design

solutions. High visibility crosswalks, county down signals and audible signals will be critical to each intersection - particularly with the Blind Industries and Services located just south of Greene Street on Paca Street. Vehicle design considerations included moving signs to be more visible and adjusting lanes and medians to improve organization.

Transit along the corridor was examined to determine appropriate locations for stops. Users currently hail transit by a flagging system. By implemented stops with signs and benches along the corridor current user experience will be elevated and the presence of stops may foster new riders who may not have been aware of the transit system and were uncomfortable using the flag system.

Discussions also centered around the importance of safety near West Side Elementary. Alerting drivers that they are entering a school zone and creating safe crossings is critical. Another key destination along the corridor, Sheetz, was discussed to determine how to enhance safety for all modes accessing the site. This destination is frequented by the youth in Cumberland and should accommodate safe pedestrian access.

Character, safety, circulation, economic development and experience were highlighted throughout the Steering Committee charrette as important elements to creating a more complete Greene Street.



*Connecting Greene Street to the Great Allegheny Passage with bike facilities will enhance Cumberland’s ability to be bicycle friendly to through travelers.*



*The vision of the Steering Committee is to create an environment along Greene Street that contributes to the overall character of Cumberland.*



*ADA accessibility is important for residents and visitors. Currently, walking along Greene Street can be a challenge for those with physical challenges.*



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## CHAPTER FIVE | RECOMMENDATIONS

## OVERVIEW

When crafting design recommendations for the “movement” and “placemaking” zones of a corridor, it is imperative to understand *who* uses the street. Along this corridor, people of various ages and abilities circulate by foot, bike, transit, and car. Therefore, it is important to understand the design needs of children (West Side Elementary School, Children’s Medical Group), seniors (The Kensington), physically challenged individuals (Blind Industries and Services of Maryland), residents, employees, and visitors. It is also key to remember this route carries truck traffic, links bicyclists and pedestrians to the Great Allegheny Passage, provides access to the YMCA, and is a place where people live and work. All of these users and functions must be balanced to create an environment that is safe and efficient.

The vision developed for this plan was to: **create a safe and accessible corridor that acts as a catalyst for economic development and invokes pride and ownership for the City.**

To achieve this vision, considerations should be made for vehicular circulation, pedestrian safety, bicycle safety, greenspaces, transit stops, gateways, wayfinding, lighting, benches, bicycle parking, and other street furnishing elements.

## Vehicular and Bicycle Circulation

Truck and vehicular circulation in this corridor require standards for minimum lane widths. Currently, the lanes vary from 10.5 feet to 17 feet. Most of the corridor is constrained, especially considering the roadway is carrying turning truck movements. Since the corridor leads to Interstate 68 and serves as a gateway from Interstate 68 to downtown Cumberland, it is critical to maintain sufficient lane widths. The posted speed of 25 miles per hour is key to creating a complete streets environment.

### SHARED LANE MARKING



This posted speed, along with some traffic calming treatments like curb bulb outs, will help create a more friendly environment for pedestrians and bicyclists. While bicycle lanes do not fit in the corridor without modifying the curb to curb dimensions, shared lane markings can be used. Sometimes known as sharrows, these markings can be used to indicate a shared lane environment for bicycles and automobiles. Sharrows reinforce the legitimacy of bicycle traffic on the street and recommend proper bicyclist positioning.



Understanding WHO uses Greene Street provides parameters for design solutions.

## Pedestrian Safety

Pedestrian safety measures are an important component to the livability of any city. Cumberland possesses tremendous potential for increasing safety for their citizens, through careful planning and treatments at intersections and driveway crossings. To design streets as attractive, safe, and comfortable thoroughfares, elements can easily be added to increase visibility, provide better cues, create hierarchy between vehicle and pedestrian rights of way, and design a space intended for human scale.

### CROSSWALKS



A marked crosswalk designates a pedestrian right-of-way across a street. High-visibility crosswalks, such as continental or ladder style, are more visible than just two parallel lines.

### COUNTDOWN SIGNALS



Countdown signals provide time information in seconds. As of 2008, new federal policy requires all new pedestrian signals to be of the countdown variety and that all existing signals be replaced within ten years.

### CURB RAMP



Curb ramps are important components of a crossing facility that provide better access for wheelchair users, people pushing strollers, and pedestrians with mobility or other physical impairment.

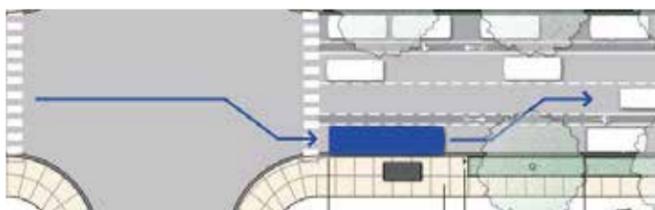
### CURB BULB OUTS



Curb bulb outs help slow traffic, increase visibility of pedestrians, and reduce crossing distances. Shorter crossings distances are helpful for seniors and young children. Bulb outs may also contain stormwater bioswales.

## Transit Stops Bus Stop

Far side bus stops are recommended for Greene Street. Where far side bus stops are not an option (near the elementary school) design guidance is provided below. The following also provides advantages and disadvantages for transit stop location options. Information and graphics from *Transit Supportive Guidelines for the Chicagoland Region*, Chapter 4 - Guidelines for Pace Infrastructure & Facilities



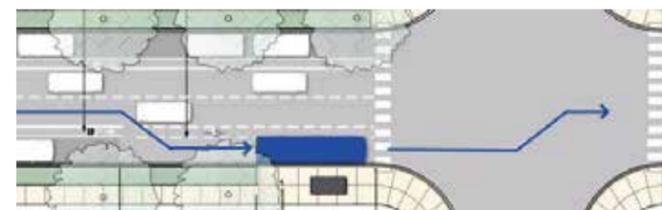
**Far-Side Bus Stops:** are located immediately after an intersection, allowing the vehicle to pass through the intersection before stopping for passenger loading and unloading.

Advantages:

- Saves running time of the route.
- Eliminates conflicts with right turning vehicles.

Disadvantages:

- Potential for intersection blockage by queued buses.
- Potential for increased rear-end collisions.



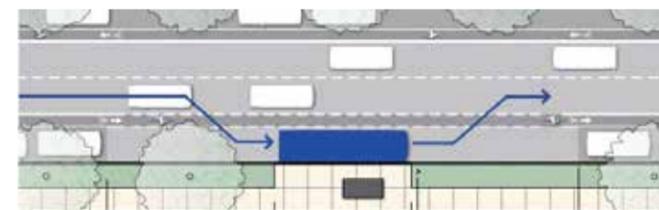
**Near-Side Bus Stops:** are located immediately before an intersection, allowing for passenger unloading and loading while the vehicle is stopped at a red light, preventing double stopping.

Advantages:

- Allows transit drivers to utilize the intersection and available sight distance when pulling away from the curb.
- Provides pedestrian access closest to the crosswalk.

Disadvantage:

- Potentially creates double stopping at intersection.



**Mid-Block Bus Stops:** are located between intersections. Pedestrian crossings are less common at mid block stops; vehicle and pedestrian sight distance concerns are typically minimized.

Advantages:

- Less overall traffic congestion.
- Minimized sight distance concerns.

Disadvantages:

- Encourages unsafe pedestrian crossings.
- Increased walking distances for users crossing the street.



**On-Street Bus Stop Configurations:** This design has little influence on construction cost, parking restrictions, and the impact of transit vehicles. Locations should be examined for traffic volumes.

Advantages:

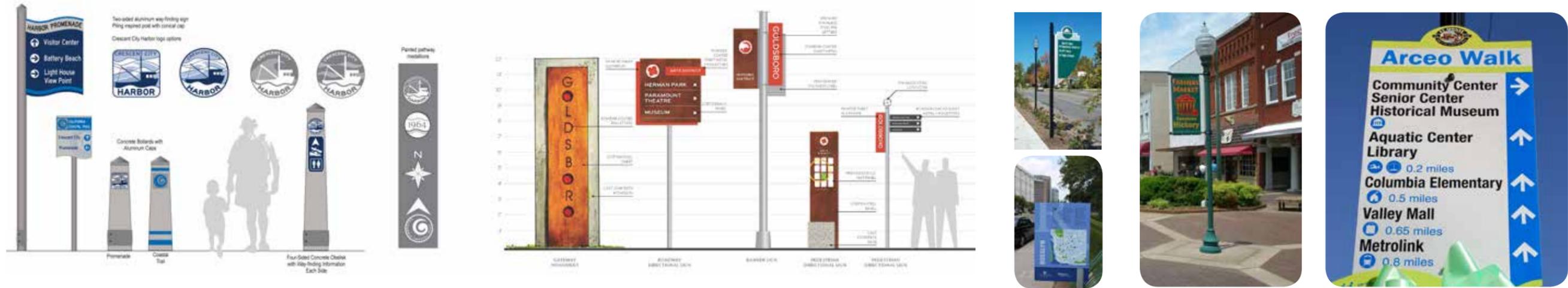
- Minimizes conflicts between right turning vehicles.
- Minimizes sight distance problems on approaches to intersection.

Disadvantage:

- May result in the intersections being blocked during peak periods by stopping buses.

## Wayfinding and Monument Signs

There are a few existing wayfinding and monument/welcome signs along the corridor including a Welcome sign on South Johnson Street. There will also be additional signs added to signify Greene Street as a segment of the Historic National Road. Other signs are present throughout the City to provide information and direct vehicular circulation. Establishing one “brand” for Cumberland and creating a clear wayfinding package for vehicles, pedestrians, and bicyclists will enhance the character of the City and contribute to economic development by directing residents and visitors to historic landmarks, key destinations, restaurants, and entertainment venues. Approaching directional signing from the perspective of motorist, pedestrian, and cyclist will complete a multimodal legibility package, thereby supporting the creation of a complete street. Materials for signage should reflect the character of the community and be selected for longevity and ease of maintenance.



## Street Furnishings and Lighting

Street furnishings and lighting are key components of designing an atmosphere that communicates the brand of Cumberland, Maryland. Benches, planters, lights, poles, awnings, fencing, bicycle parking, and sidewalk materials can all reflect historic character and provide an intimate “home town” feel. Pedestrian scale lighting creates a safe, hospitable environment that can extend retail and restaurant hours and provide safety for walking commuters in winter months. Benches provide a place for residents and visitors to rest and can help extend their trip duration along the corridor.



From New York City Department of City Planning

## Greenspace, Vegetation, and “Green Street” Stormwater Treatment

Greenspace, vegetation, and treating stormwater through bioswales are important components of urban livability and have multiple benefits. These come in several forms, shapes, and sizes. These spaces and elements introduce nature into the urban environment, provide a contrast to hard surfaces, create destinations for play or rest, foster community interaction, promote safety, attract business, raise property values, and improve water quality.

### PARK IMPROVEMENTS



Improvements (such as tree plantings, benches, lighting, interpretive signage, and art) to existing parks will create more inviting, accessible spaces that enhance the overall corridor.

### POCKET PARKS



Pocket parks are recommended for parcels that are vacated and/or not maintained. These corner parcels can create gateways into the City and Downtown.

### STREET TREES AND PLANTERS



Street trees, shrubs, planters, hanging baskets, and groundcover help delineate spaces for pedestrians as well as beautify the streetscape. Street trees have also been studied as contributors to economic development, air quality, and water quality.

### “GREEN STREETS”



Green Street treatments can add texture, color, and habitat to urban places. They also contribute to reducing stormwater volumes and slowing runoff to prevent pooling on roads while improving water quality.

## CORRIDOR RECOMMENDATIONS

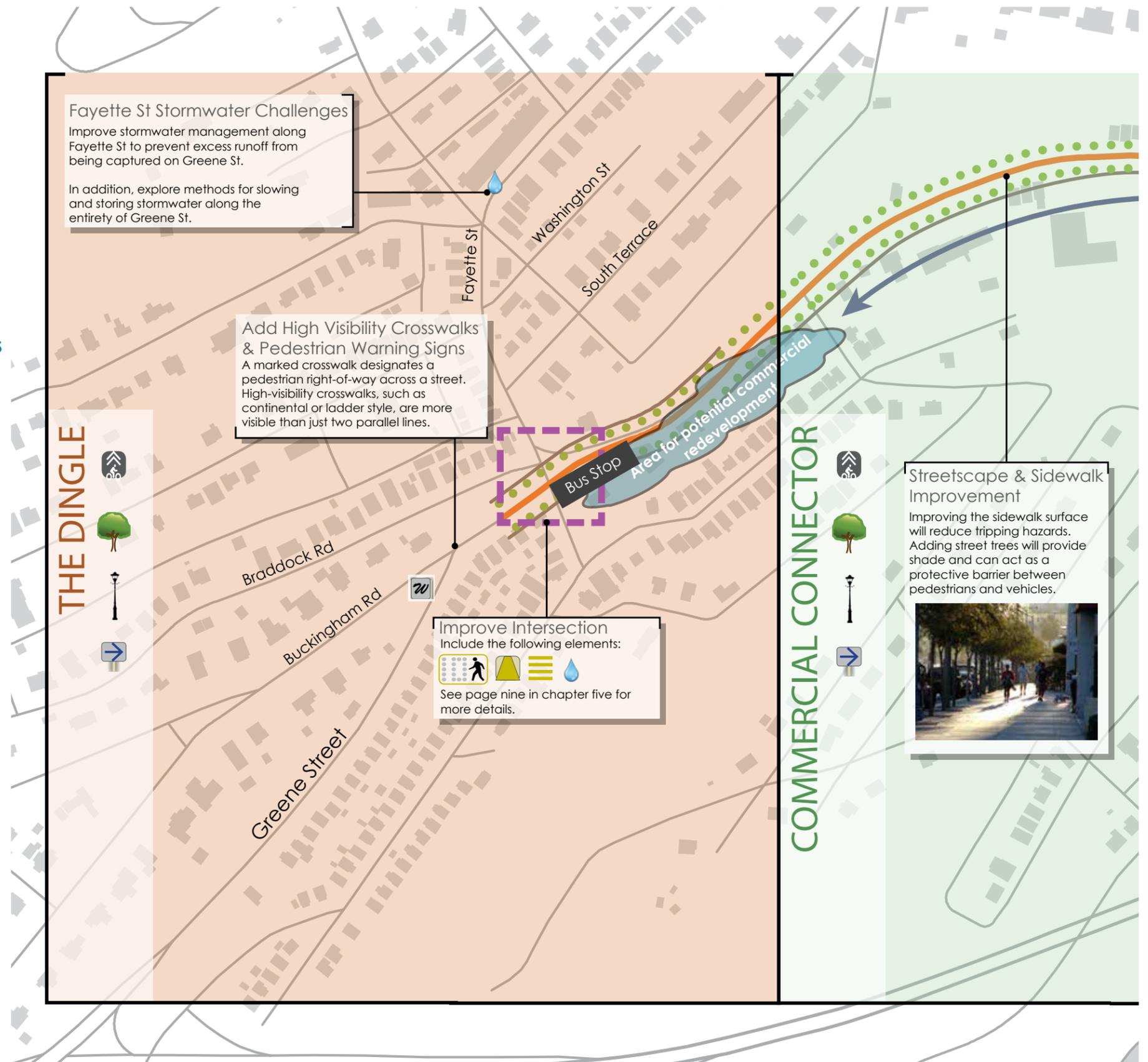
The following pages contain a series of maps and photos that detail the recommendations for Greene Street. The symbols in the narrative above are used to indicate where along the corridor treatments and facilities should be added to improve safety and user experience. The first map on pages 5-6 and 5-7 provides an overview of the corridor with notes and references to pages with additional details. The corridor is segmented into four zones: The Dingle, Commercial Connector, Main Street to Neighborhoods, and Historic Gateway. For each of the zones, additional maps are included with notes for more specific implementation recommendations and photos to clarify treatments. Three intersections - at Baltimore Street, at the Bridge, and at Fayette Street - are rendered to show more specific conceptual design solutions. Cost estimates are provided at the close of the chapter to support funding for implementation.

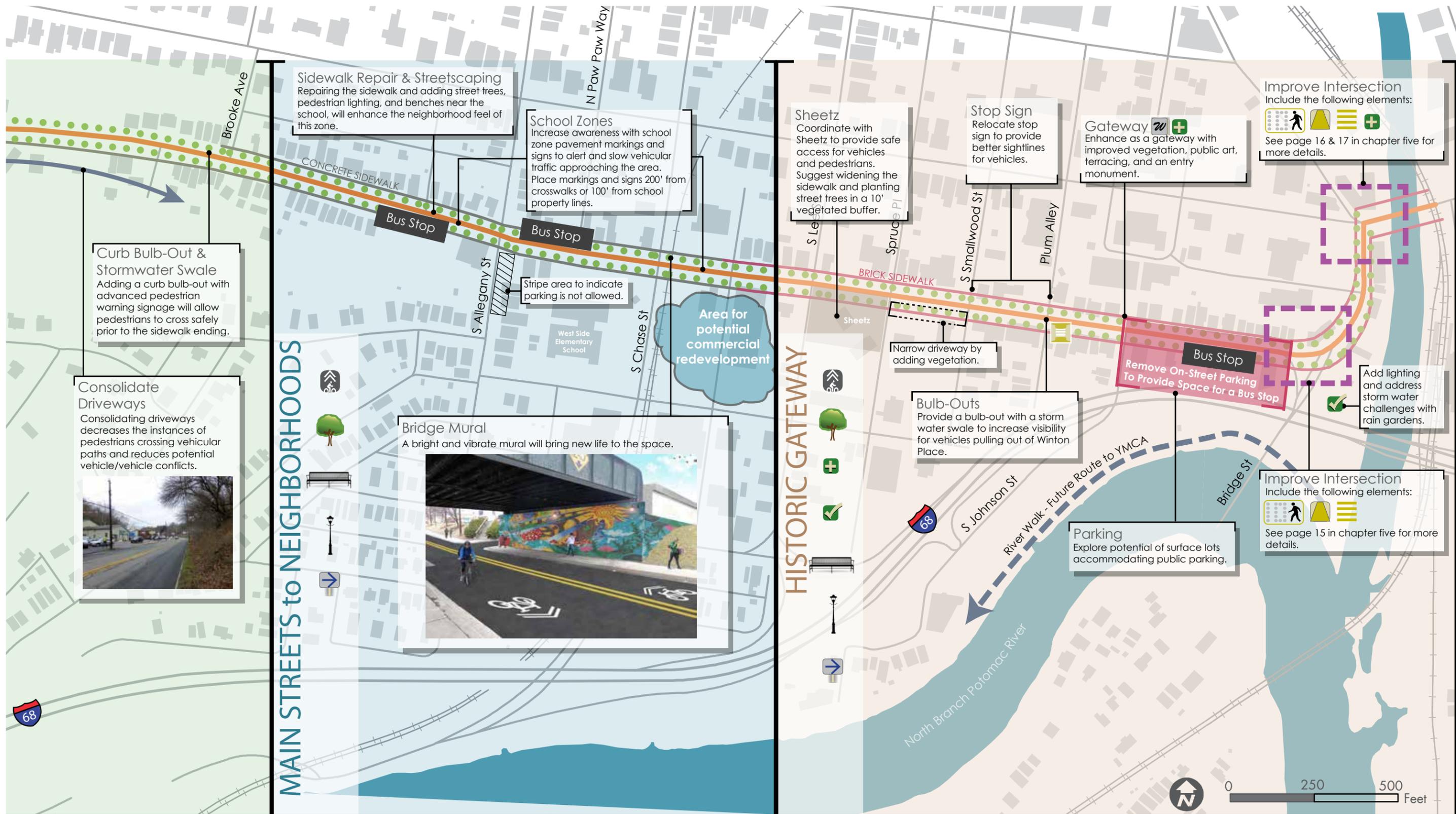
*The following recommendations are for a conceptual design for Greene Street. The right of way, intersections, and adjacent property lines were not surveyed as a component of this study. Feasibility and design development for the recommendations in this plan should begin with a survey of the corridor to understand exact dimensions and property limits.*

RECOMMENDATIONS KEY

INTERSECTION IMPROVEMENTS

- 
**Crosswalks**  
 A marked crosswalk designates a pedestrian right-of-way across a street.
- 
**Audible Countdown Signals**  
 Countdown signals provide time information in seconds.
- 
**Curb Ramps**  
 Curb ramps provide better access for wheelchair users, people pushing strollers, and pedestrians with mobility or other physical impairment.
- 
**Bulb-Outs**  
 Curb bulb outs help slow traffic, increase visibility of pedestrians, and reduce crossing distances.
- 
**Shared Lane Markings & Bike May Use Full Lane Signs**  
 Shared lane markings, sometimes referred to as sharrows, are road markings used to indicate a shared lane environment for bicycles and automobiles.
- 
**Park Improvements**  
 Improvements to existing parks will create more inviting, accessible spaces that enhance the overall corridor.
- 
**Pocket Parks**  
 Pocket parks are recommended for parcels that are vacant. These small spaces can create gateways into downtown and enhance a sense of place.
- 
**Entry Monuments**  
 Gateway monuments would provide a clear, grand message of entrance into Cumberland for visitors.
- 
**Directional Wayfinding**  
 Wayfinding signage can encourage visitation, reflect the character of Cumberland, and guide residents and visitors to key attractions.
- 
**Street Trees & Planters**  
 Large street trees provide shade for pedestrians and can act as buffers to vehicular traffic.
- 
**Street Furnishings**  
 Benches, planters, and bicycle parking can reflect the character of Cumberland and will create a more comfortable pedestrian experience.
- 
**Lighting**  
 Lighting added along streets and sidewalks increases user safety and visibility to vehicular traffic.
- 
**Stormwater Treatment**  
 The use of best practices for stormwater management will help alleviate flooding and will add texture, color, and habitat to the street environment.





**Curb Bulb-Out & Stormwater Swale**  
 Adding a curb bulb-out with advanced pedestrian warning signage will allow pedestrians to cross safely prior to the sidewalk ending.

**Consolidate Driveways**  
 Consolidating driveways decreases the instances of pedestrians crossing vehicular paths and reduces potential vehicle/vehicle conflicts.



**Sidewalk Repair & Streetscaping**  
 Repairing the sidewalk and adding street trees, pedestrian lighting, and benches near the school, will enhance the neighborhood feel of this zone.

**School Zones**  
 Increase awareness with school zone pavement markings and signs to alert and slow vehicular traffic approaching the area. Place markings and signs 200' from crosswalks or 100' from school property lines.

Stripe area to indicate parking is not allowed.

Area for potential commercial redevelopment

**Bridge Mural**  
 A bright and vibrant mural will bring new life to the space.



**Sheetz**  
 Coordinate with Sheetz to provide safe access for vehicles and pedestrians. Suggest widening the sidewalk and planting street trees in a 10' vegetated buffer.

**Stop Sign**  
 Relocate stop sign to provide better sightlines for vehicles.

**Gateway**  
 Enhance as a gateway with improved vegetation, public art, terracing, and an entry monument.

**Improve Intersection**  
 Include the following elements:  
 See page 16 & 17 in chapter five for more details.

Narrow driveway by adding vegetation.

**Bulb-Outs**  
 Provide a bulb-out with a storm water swale to increase visibility for vehicles pulling out of Winton Place.

**Remove On-Street Parking To Provide Space for a Bus Stop**

Add lighting and address storm water challenges with rain gardens.

**Improve Intersection**  
 Include the following elements:  
 See page 15 in chapter five for more details.

**Parking**  
 Explore potential of surface lots accommodating public parking.

MAIN STREETS to NEIGHBORHOODS

HISTORIC GATEWAY

## THE DINGLE CONCEPTUAL DESIGN SOLUTIONS

The Dingle is a transition in and out of Cumberland as well as a residential area. Vehicles entering and exiting Interstate 68 pass through this zone and experience a transition from interstate to a calm residential street. Function, legibility, and safety are key in this area.

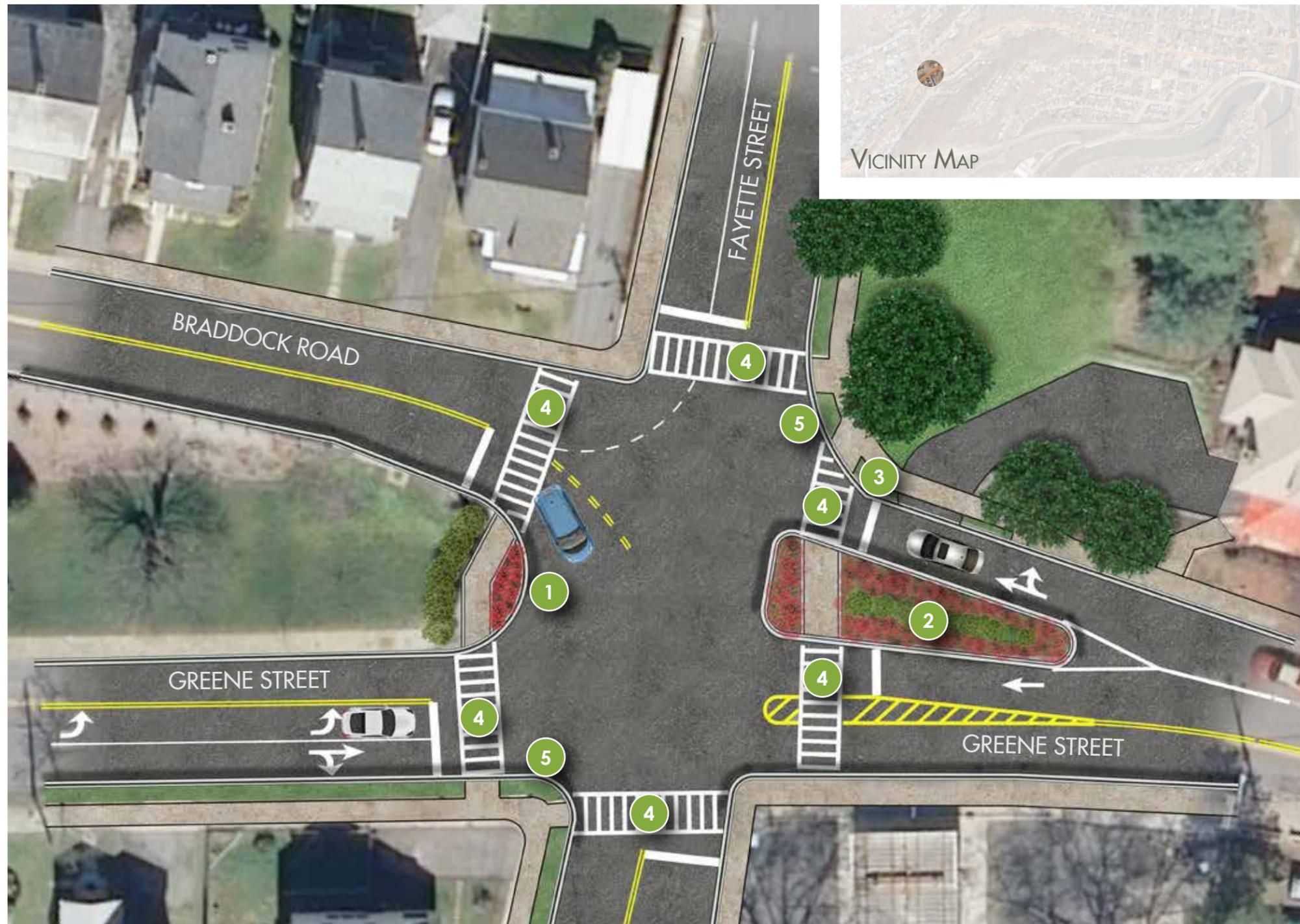
### KEY RECOMMENDATIONS

- Create an entry monument to welcome visitors to Cumberland.
- Provide high visibility crosswalks and pedestrian warning signs at all intersections.
- Reallocate space within the Dingle to provide a refuge for pedestrians.
- Explore opportunities to revitalize the corner of Fayette Street and Greene Street.
- Add a bus stop to improve access to transit for residents and potentially increase usership.
- Add shared lane markings.



Safe crossings and the addition of plantings will enhance the Dingle intersection for nearby residents.





↑ N GREENE STREET AT FAYETTE STREET/BRADDOCK ROAD

## Intersection Design Considerations

- 1 Tightening the curb radius on the west side median provides additional space for a pedestrian cut-through. A crossing would be added for this leg of the intersection, where one is not available today. One potential disadvantage is that it may be difficult or impossible for heavy vehicles to make a U-Turn at this location; however, field observations indicated that this was already the case.
- 2 Providing full height curb and gutter to split the west bound traffic on Greene Street serves both as a traffic calming mechanism as well as a safety measure for pedestrians. This raised area can also be used to plant grass and place ground mounted signs (the route shield assemblies currently ground mounted on the far side of the intersection can be relocated here).
- 3 Elimination of the free right turn for the westbound approach will slow motorists making this movement and shorten the crossing distance a pedestrian must traverse to safely cross Greene Street. It also adds a significant amount of potential green space to the corner, as less pavement is needed. One disadvantage of this, is that it requires the realignment of a private driveway as it enters Greene Street; however, at the concept level there appears to be adequate space to do so safely. It is recommended that the driveway crossing be constructed with concrete and at grade with the sidewalk to slow motorists as they enter/exit the driveway, and to provide a safe and consistent facility for pedestrians.
- 4 All four legs of the intersection will have high visibility crosswalks to improve safety, accessibility, and convenience for pedestrians.
- 5 At the northeast, and southwest corners of the intersections, pedestrian ramps are recommended with a buffer to provide added comfort for pedestrians, and space for ground mounted signs, snow storage, and other street amenities.

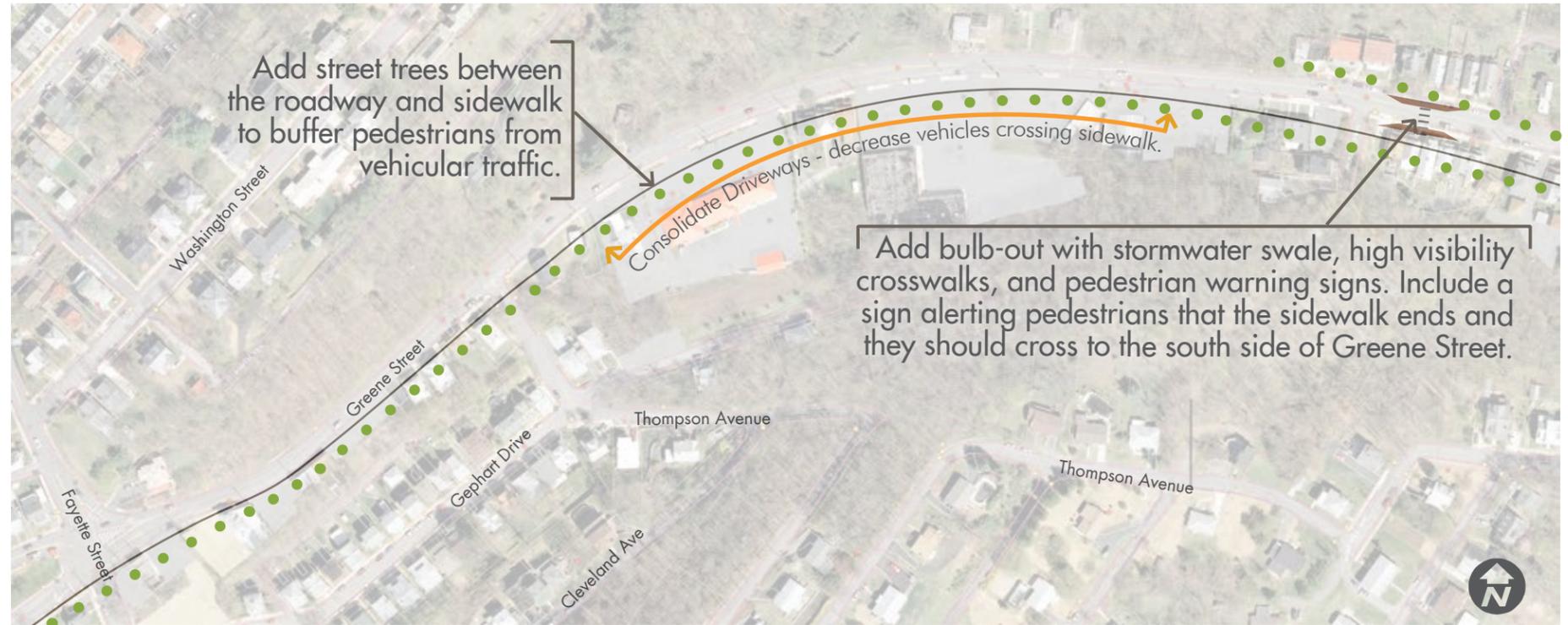
## COMMERCIAL CONNECTOR CONCEPTUAL DESIGN SOLUTIONS

The commercial connector transitions out of the residential areas of The Dingle and the homes of the Main Streets to Neighborhoods zone. Currently, this is an inhospitable environment for pedestrians with several driveway crossings, sidewalks in need of repair, and no shade.

Safety and character improvements will encourage pedestrian use and can encourage people to walk in lieu of driving to destinations in this zone and throughout Greene Street. Pedestrian scale wayfinding signage in this area should indicate distance and time to walk to downtown as a means to increase healthy transportation choices.

### KEY RECOMMENDATIONS

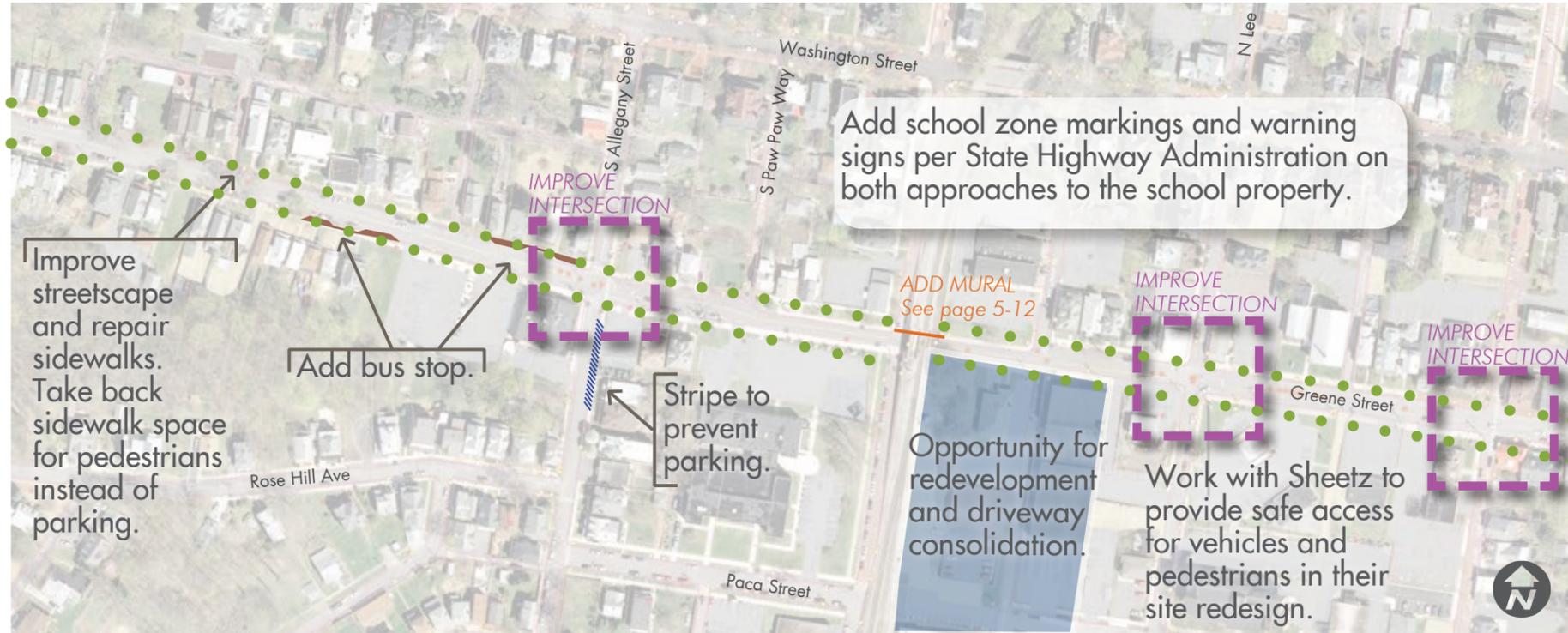
- Repair and widen sidewalks to accommodate pedestrians and people with wheelchairs or walkers.
- Add street trees in a vegetated buffer between the roadway and sidewalk to provide shade, improve the character of the corridor, and protect pedestrians for vehicles.
- Add a curb bulb out with bioswales near the termination of the sidewalk on the north side of Greene Street. Use pedestrian warning signs to alert motorists of the crossing. This will provide a safe, narrow crossing, to prevent pedestrians from crossing Greene Street where the sidewalk ends which is near a roadway curve that reduces the ability for motorists to see pedestrians.
- Add pedestrian scale lighting throughout this zone to contribute to the character and provide a perception of safety for those traveling by foot after dark. This will also increase visibility of pedestrians traversing the sidewalk.
- Add shared lane markings.



Creating and repairing sidewalks through this area will help designate and organize pedestrian movement.



Steep slopes on the north side of the road do not allow for a low-cost sidewalk addition. Significant earthwork and retaining walls would be needed to provide space for pedestrian circulation. Therefore, it is imperative to improve the sidewalk on the south side of Greene Street.



## “MAIN STREETS” TO NEIGHBORHOODS

Main Streets to Neighborhoods is one of the most critical safety areas in the corridor. West Side Elementary School, the Children’s Medical Group, and the Sheetz attract pedestrian activity from youth. These areas should be designed with the highest level of pedestrian safety accommodations.

### KEY RECOMMENDATIONS

- Add school zone elements including pavement markings, high visibility crosswalks, and school zone signage to alert motorists of children crossing the street.
- Improve all intersections with high visibility crosswalks and audible pedestrian countdown signals.
- Work with the developers of Sheetz to improve access and circulation on their property. Crash data indicated the entrance/exit on Greene Street is a location of frequent car incidents. This could be partially alleviated by not allowing left turning movements out of the Sheetz (the new design of the site may improve this potential for conflict). As one of the most frequented destinations for youth, sidewalks and bicycle parking should be improved.
- Street lights should be installed along the corridor to reflect the character of the neighborhood.
- Areas with commercial land use can be enhanced with sidewalk amenities including street trees, bicycle parking, planters, and pedestrian wayfinding.
- Sidewalks in this zone have been taken over by parking and are overgrown. By repairing and “taking back” the sidewalks, pedestrians will no longer be blocked by parked vehicles and tripping hazards will be alleviated.
- Add shared lane markings.



School zones should be marked with “SCHOOL” pavement markings 200’ from crosswalks or 100’ from property lines on both approaches. School zone warning signs, high visibility crosswalks, and audible pedestrian countdown signals should be used.



Sheetz is one of the most frequented destinations for youth along the corridor. Approaches to Sheetz should have clearly designated sidewalks, narrow and consolidated driveways, and street trees as a buffer.

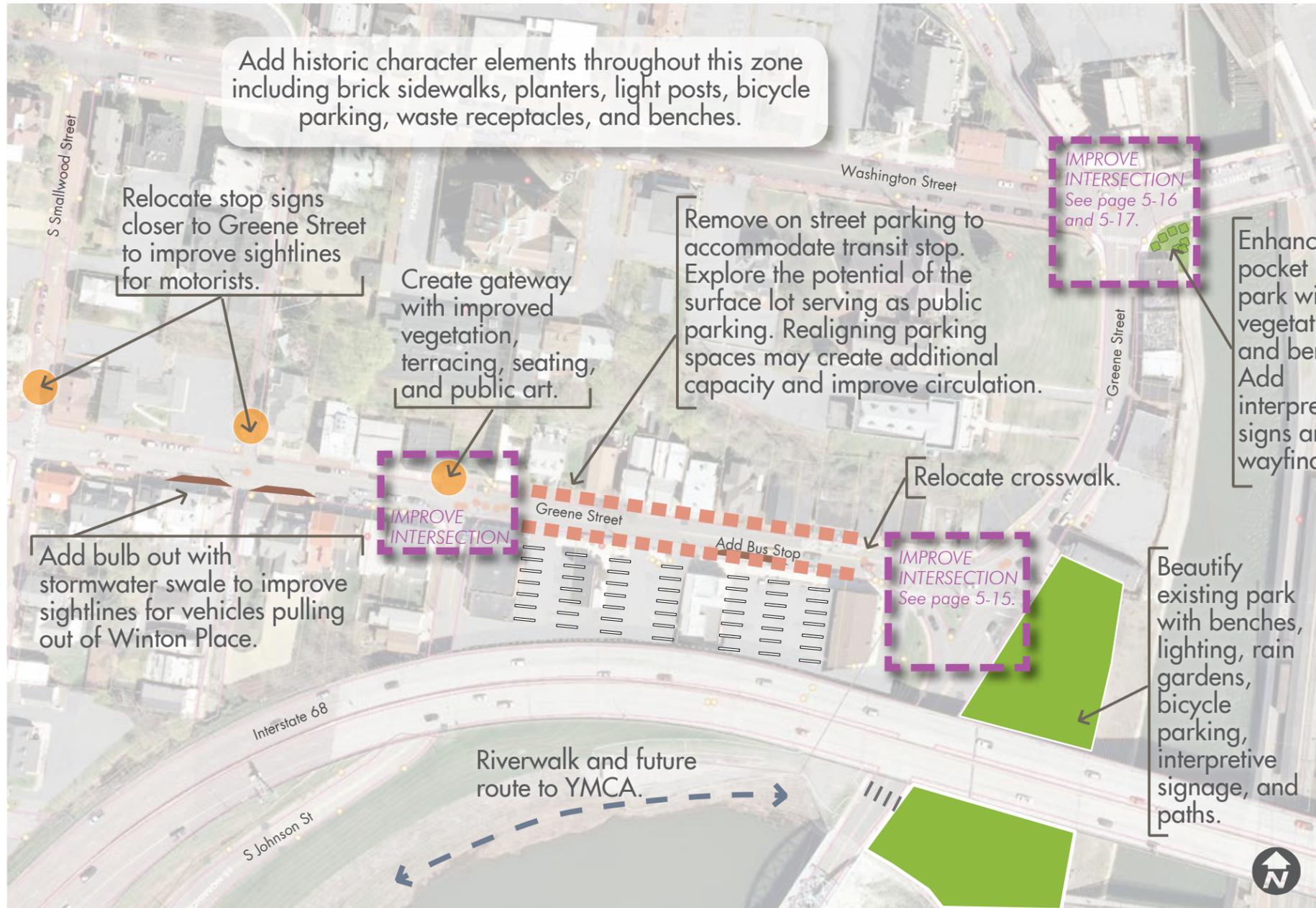
## “MAIN STREETS” TO NEIGHBORHOODS CONCEPTUAL DESIGN SOLUTIONS

The Greene Street underpass is a narrow dark space near West Side Elementary. Currently, it is not a comfortable space for pedestrians or bicyclists. However, with a creative approach, it provides a unique opportunity to add public art or murals. With the proximity to West Side Elementary, this could be educational themed or could be a rotating canvas for school children and local artists. A bright and vibrant mural, along with lighting, will bring new life to the space and become a signature character element for Greene Street.



BEFORE

AFTER



## HISTORIC GATEWAY

This zone should communicate the historic character of Cumberland through the built environment. Streetscape elements will have historic character and promote economic development.

### KEY RECOMMENDATIONS

- Provide wayfinding to direct pedestrians and bicyclists to the Great Allegheny Passage.
- Improve intersections to promote a more walkable environment, thereby fostering economic development.
- Enhance the pocket park, park under the bridge, and gateway at South Johnson Street to reflect the historic character of Greene Street. Incorporate interpretive signage and public art indicative of the historic character of the City and Greene Street's involvement as part of the Historic National Road.
- Add shared lane markings to communicate to drivers that bicycles belong on this roadway - as this route is a connection from downtown to the YMCA and from the Allegheny Trail to destinations and residences along Greene Street.



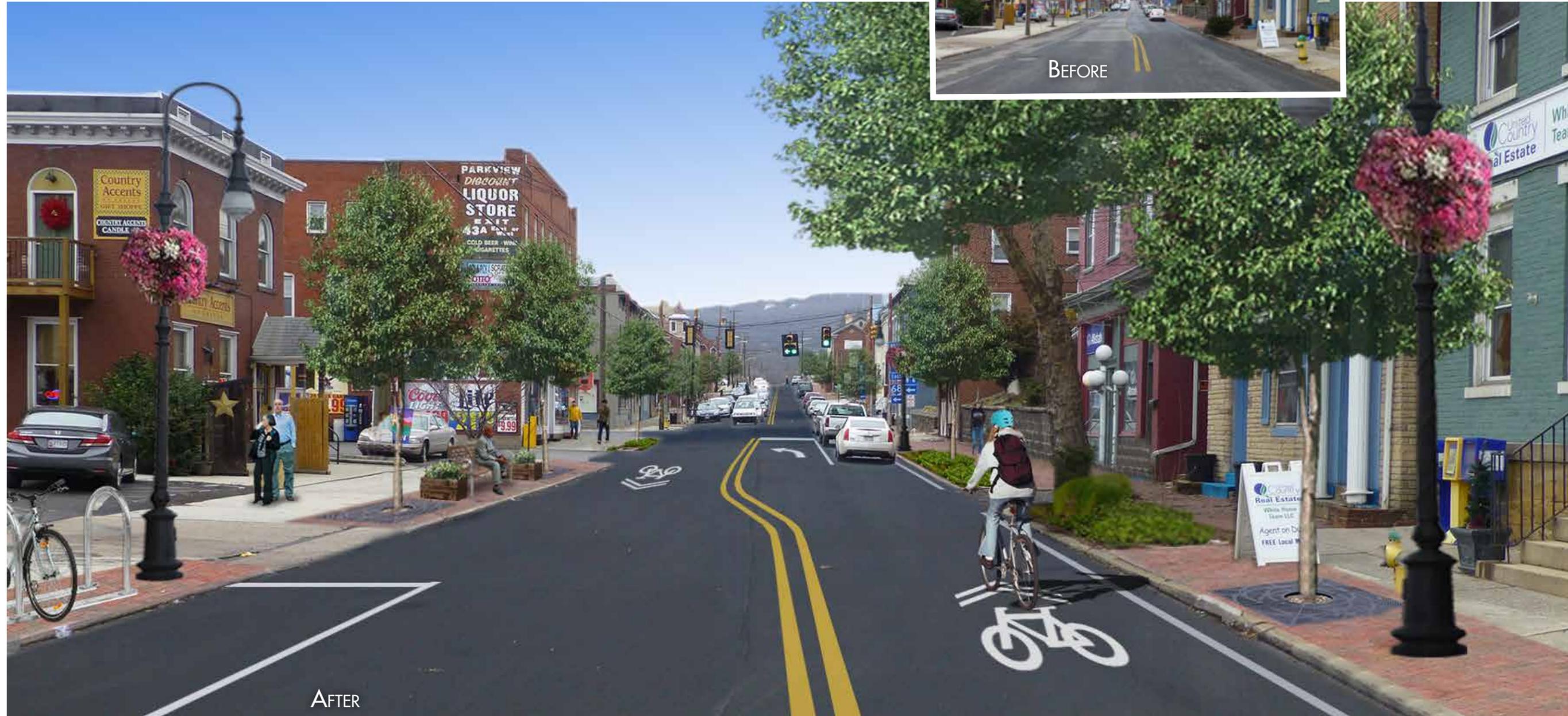
Relocate the crosswalk on the west side of the Bridge Street intersection. The current placement and road radius create the potential for fast moving vehicles to hit pedestrians.



Removing on street parking will provide space for a transit stop with improved sidewalk amenities.

## HISTORIC GATEWAY CONCEPTUAL DESIGN SOLUTIONS

Character is the main component of the design concept for the Historic Gateway. This zone is the transition from downtown into Greene Street’s commercial and residential areas and will set the tone for the corridor. By using elements including historic lighting, planters, bicycle parking, benches, seating areas, brick sidewalks, and street trees, a sense of place will be established to foster economic development and social interactions.





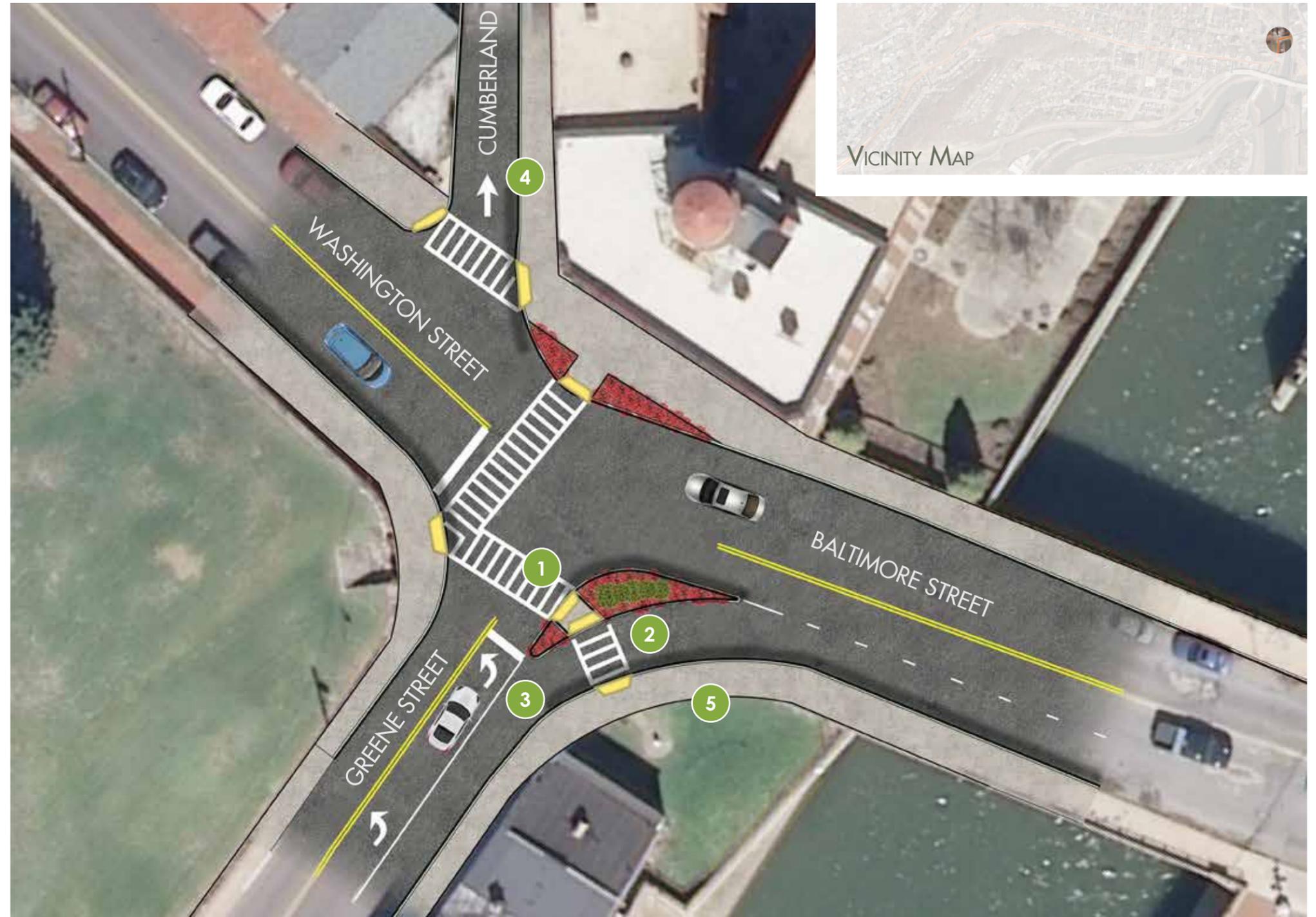
↑  
N GREENE STREET AT BRIDGE STREET

## Bridge Street Design Considerations

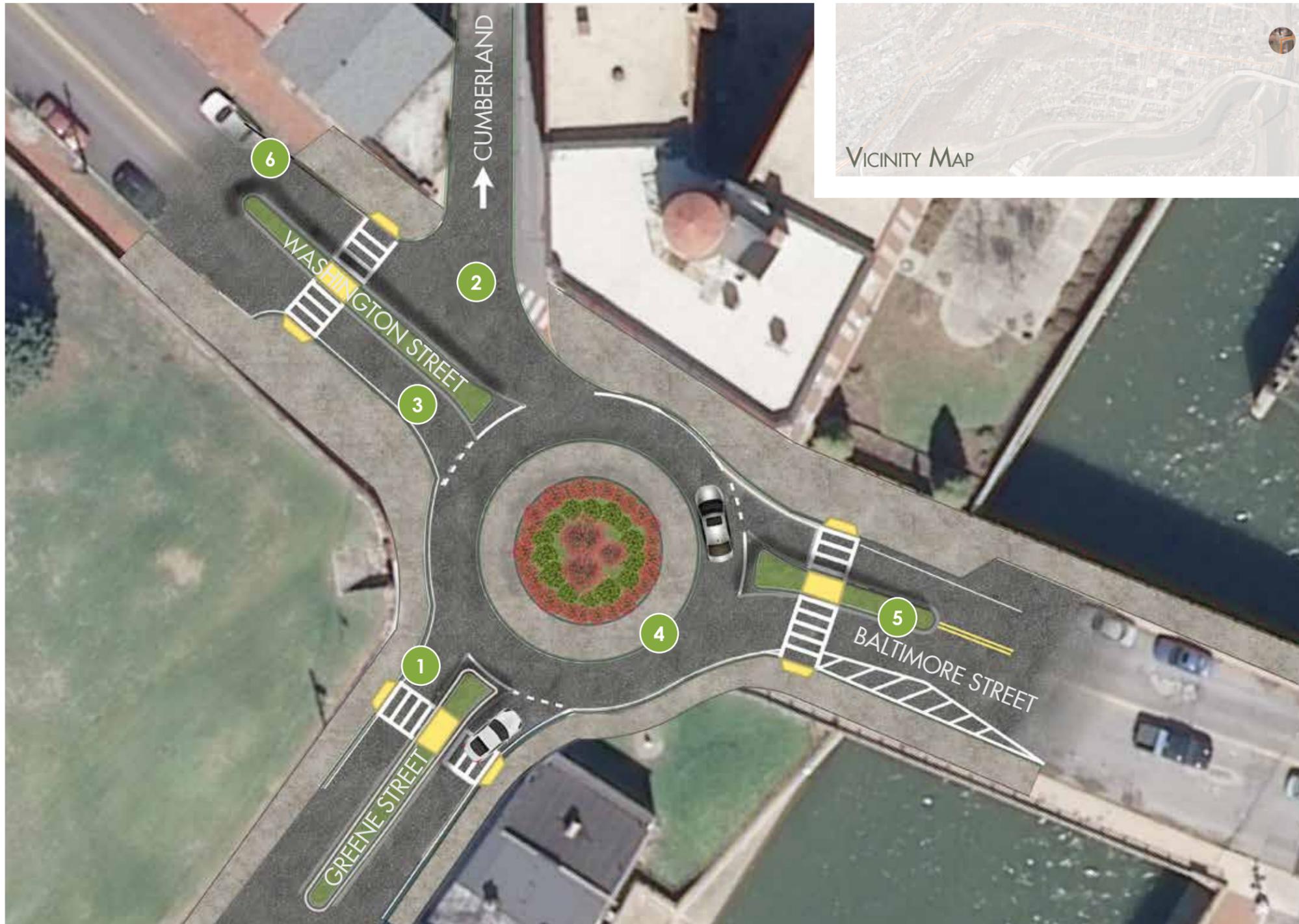
- 1 Walter Street which leads to the rear parking area at the west side of the intersection has been realigned to both shorten the crossing distance for pedestrians, and also make it more clear that the entrance is one way. This alignment also adds potential for green space and additional signing to indicate the one-way operation.
- 2 Extending the curb line in front of Cumberland Optical will slow motorists as they travel northbound on Greene Street. Those that wish to take the free right to Bridge Street will not have a turn bay; however the existing conditions are not operating as a turn bay (it conflicts with parking). Existing conditions encourage high speed right turns, resulting in dangerous crossings for pedestrians. Parking impacts are expected to be minimal at this location.
- 3 The island has been extended to better utilize the space in the center of the intersection, while also providing shortened crossing distances for pedestrians without impacting the monument. This space allows crossings of Greene Street and Bridge Street.
- 4 One potential disadvantage of the island geometry is making left turns from Bridge Street more challenging. This should be further analyzed during future design. If a red arrow is used to control turning movements south to westbound, this should provide space for heavy vehicles to make the left turn.

## Channelized Right Turn Design Considerations

- 1 This option includes restriping the crossings of both Greene and Washington Streets. It also includes a channelized right turn with curb and pedestrian cut throughs to protect pedestrians from turning vehicles. This will also redirect the visually impaired.
  - High visibility crosswalks should be used to enhance pedestrian visibility and alert motorists of where they should stop for people crossing the street.
- 2 The slip lane should not be designed to increase speed before entering the turning lane.
  - The slip lane should be designed to improve sight distances for motorists to clearly see pedestrians and still be able to stop at the crosswalk to comply with Maryland state law.
  - A storage area should be created after the crosswalk for motorists to pause for oncoming motor vehicles.
- 3 Rumble strips may be installed in the right-turn lane to help visually impaired pedestrians judge if drivers are yielding/stopping. This could possibly create noise pollution for nearby residences.
- 4 A new pull-off area should be designed on Cumberland Street for Kensington. A one-way conversion for Cumberland Street is required to accommodate the pull-off and simplify turning movements in this intersection. "One Way" and "Do Not Enter" signs will be placed where appropriate.
- 5 This concept would require the widening of the road and modifications to the green space and bridge guardrail. This could be costly depending on the impact to the bridge.



↑ N OPTION 1: GREENE STREET AT BALTIMORE STREET/ WASHINGTON STREET/ CUMBERLAND STREET



↑ N OPTION 2: GREENE STREET AT BALTIMORE STREET/WASHINGTON STREET/CUMBERLAND STREET

## Roundabout Design Consideration

- 1 Providing a roundabout at this location would greatly reduce the distance pedestrians are exposed while crossing Greene Street, Baltimore Street, or Washington Street.
- 2 The concept shown would not allow left turns out of Cumberland Street, an option that was discussed and previously considered. A One Way conversion is the solution to provide a safer circulation pattern for vehicles and pedestrians. This would need to be further analyzed in a feasibility study.
- 3 The transition of the grade from Washington Street into the roundabout would need to be studied to comply with the latest roundabout design manuals (federal and local). The visual queue of a roundabout may be better than a stop sign to slow traffic and prevent entering the intersection unlawfully.
- 4 The roundabout would have a mountable apron, or would have a fully mountable center island (to be determined upon further study/design) and is expected to handle heavy vehicles adequately.
- 5 Splitter islands associated with the roundabout can act as a traffic calming mechanism while also providing a median refuge for pedestrians and a space for necessary roadway signing.
- 6 The concept shown is not to scale nor was a survey completed for this study. This rendering is estimated to be about a 75 foot inscribed diameter. This may be too small for the design vehicle using this intersection. There may be a need for a larger diameter as well as a completely mountable curb in the center circle. Keys to pedestrian safety are correct placement of crosswalks, pedestrian cut through without ramps to accommodate wheel chairs, and appropriate approach treatments for bicyclists.

*CORRIDOR (EXCLUDES THE DINGLE, BRIDGE STREET, AND BALTIMORE/WASHINGTON/CUMBERLAND/GREENE STREET INTERSECTIONS)*

**COST ESTIMATES AND PHASING**

Planning level cost estimates help gauge the funding needed before launching into design and implementation. By exploring potential costs of the design concept, grants can be applied for and yearly budgets can be adjusted to fund the project.

For Greene Street, cost estimates are segmented by each intersection and the overall corridor. It is recommended to use these segments as implementation phases if the entire project is not able to be funded at one time.

Further exploration will be required for more refined cost estimates as this study did not include a survey or design development. Construction sequencing and rerouting vehicles, pedestrians, and bicycles should be refined prior to initiating construction.

Category 1000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
1001	130850	Mobilization	LS	1	\$205,000.00	\$205,000.00
1004	120500	Maintenance of Traffic	LS	1	\$158,440.99	\$158,440.99
1010	120820	Drums for Maintenance of Traffic	EA	50	\$75.00	\$3,750.00
1012	130840	Construction Stakeout	LS	1	\$30,000.00	\$30,000.00
<b>Category 1000 Total</b>						<b>\$397,190.99</b>

Category 2000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
2001	201032	Class 2 Excavation	CY	825	\$50.00	\$41,250.00
<b>Category 2000 Total</b>						<b>\$41,250.00</b>

Category 3000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
3001	300000	Inlet Modification	EA	25	\$2,300.00	\$57,500.00
<b>Category 3000 Total</b>						<b>\$57,500.00</b>

Category 5000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
5001	500000	8 Inch Portland Cement Concrete for Driveway Mix 9	SY	750	\$135.00	\$101,250.00
5007	585405	5 Inch White Lead Free Reflective Thermoplastic Pavement Markings	LF	215	\$5.00	\$1,075.00
5008	585407	5 Inch Yellow Lead Free Reflective Thermoplastic Pavement Markings	LF	1,400	\$5.00	\$7,000.00
5009	585410	10 Inch Yellow Lead Free Reflective Thermoplastic Pavement Markings	LF	230	\$8.00	\$1,840.00
5010	585412	12 Inch White Lead Free Reflective Thermoplastic Pavement Markings	LF	1,375	\$10.00	\$13,750.00
5011	5000000	Shared lane marking	EA	44	\$250.00	\$11,000.00
5012	500000	Pavement Marking - "SCHOOL"	EA	65	\$20.00	\$1,292.00
<b>Category 5000 Total</b>						<b>\$137,207.00</b>

Category 6000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
6001	600000	Reconstructing Existing Sidewalk Ramps	EA	60	\$1,300.00	\$78,000.00
6002	600000	Combination Curb and Gutter Any Height or Depth	LF	9625	\$75.00	\$721,875.00
6003	600000	Curb Any Height	LF	250	\$60.00	\$15,000.00
6005	600000	Brick Sidewalk (assumed about 1/2 of the corridor)	SF	38500	\$25.00	\$962,500.00
6006	655105	5 Inch Concrete Sidewalk (assumed about 1/2 of the corridor)	SF	38500	\$10.00	\$385,000.00
6007	655120	Detectable Warning Surface for Curb Ramps	SF	175	\$55.00	\$9,625.00
<b>Category 6000 Total</b>						<b>\$2,172,000.00</b>

Category 7000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
7001	704345	Placing Furnished Topsoil 4 Inch Depth	SY	500	\$7.00	\$3,500.00
7002	708220	Turfgrass Sod Establishment	SY	500	\$3.00	\$1,500.00
7003	710150	Tree, Shrub, and Perennial Installation and Establishment	LS	1	\$72,000.00	\$72,000.00
7004	710170	Constructing Planting Beds	SY	280	\$2.00	\$560.00
7005	712100	Tree Branch Pruning	LS	1	\$2,000.00	\$2,000.00
7006	700000	Deciduous Shrubs (36" Height)	EA	75	\$45.00	\$3,375.00
7007	700000	Decorative Planters	EA	45	\$1,500.00	\$67,500.00
7008	700000	Street Furniture - Benches	EA	10	\$2,000.00	\$20,000.00
7009	700000	Bike Racks	EA	12	\$1,000.00	\$12,000.00
<b>Category 7000 Total</b>						<b>\$182,435.00</b>

Category 8000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
8008	801130	Square Perforated Tubular Steel Sign Post	LF	250	\$165.00	\$41,250.00
8009	802145	Adjust Existing Handhole	EA	15	\$353.85	\$5,307.75
8013	813014	Install Ground Mounted Sign	SF	250	\$10.00	\$2,500.00
8022	800000	Decorative Light Pole And Decorative LED Luminaire	EA	75	\$3,100.00	\$232,500.00
<b>Category 8000 Total</b>						<b>\$281,557.75</b>

Sub Totals	
Net - Total	\$3,269,140.74
Contingency (20%)	\$653,828.15
<b>Total</b>	<b>\$3,922,968.89</b>

*THE DINGLE INTERSECTION UPGRADES*

Category 1000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
1001	130850	Mobilization	LS	1	\$46,000.00	\$46,000.00
1004	120500	Maintenance of Traffic	LS	1	\$36,530.52	\$36,530.52
1010	120820	Drums for Maintenance of Traffic	EA	50	\$75.00	\$3,750.00
1012	130840	Construction Stakeout	LS	1	\$6,500.00	\$6,500.00
<b>Category 1000 Total</b>						<b>\$92,780.52</b>

Category 2000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
2001	201032	Class 2 Excavation	CY	13	\$50.00	\$650.00
<b>Category 2000 Total</b>						<b>\$650.00</b>

Category 3000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
3001	300000	Inlet Modification	EA	4	\$2,300.00	\$9,200.00
<b>Category 3000 Total</b>						<b>\$9,200.00</b>

Category 5000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
5007	585405	5 Inch White Lead Free Reflective Thermoplastic Pavement Markings	LF	230	\$5.00	\$1,150.00
5008	585407	5 Inch Yellow Lead Free Reflective Thermoplastic Pavement Markings	LF	900	\$5.00	\$4,500.00
5010	585412	12 Inch White Lead Free Reflective Thermoplastic Pavement Markings	LF	2,880	\$10.00	\$28,800.00
5011	585627	Pavement marking arrows	SF	85	\$20.00	\$1,700.00
<b>Category 5000 Total</b>						<b>\$36,150.00</b>

Category 6000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
6002	600000	Combination Curb and Gutter Any Height or Depth	LF	6550	\$75.00	\$491,250.00
6003	600000	Curb Any Height	LF	100	\$60.00	\$6,000.00
6007	655120	Detectable Warning Surface for Curb Ramps	SF	250	\$55.00	\$13,750.00
<b>Category 6000 Total</b>						<b>\$564,100.00</b>

Category 7000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
7001	704345	Placing Furnished Topsoil 4 Inch Depth	SY	80	\$7.00	\$560.00
7002	708220	Turfgrass Sod Establishment	SY	80	\$3.00	\$240.00
<b>Category 7000 Total</b>						<b>\$800.00</b>

Category 8000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
8001	800000	Furnish and Install Audible/Tactile Pedestrian Pushbutton Station and Signs	EA	6	\$1,181.25	\$7,087.50
8002	800000	Furnish and Install Breakway Pedestal Pole - Any Size	EA	6	\$1,398.60	\$8,391.60
8003	800000	Furnish and Install LED 16 Inch Countdown Pedestrian Signal Heads	EA	6	\$1,098.30	\$6,589.80
8008	801130	Square Perforated Tubular Steel Sign Post	EA	125	\$165.00	\$20,625.00
8009	802145	Adjust Existing Handhole	EA	5	\$353.85	\$1,769.25
8012	811001	Furnish and Install Electrical Handhole	EA	2	\$1,332.45	\$2,664.90
8013	813014	Install Ground Mounted Sign	SF	125	\$10.00	\$1,250.00
<b>Category 8000 Total</b>						<b>\$48,378.05</b>

Sub Totals	
Net - Total	\$752,058.57
Contingency (20%)	\$150,411.71
<b>Total</b>	<b>\$902,470.29</b>

*BRIDGE STREET AT GREENE STREET INTERSECTION UPGRADES*

Category 1000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
1001	130850	Mobilization	LS	1	\$45,000.00	\$45,000.00
1004	120500	Maintenance of Traffic	LS	1	\$36,074.88	\$36,074.88
1010	120820	Drums for Maintenance of Traffic	EA	50	\$75.00	\$3,750.00
1012	130840	Construction Stakeout	LS	1	\$6,500.00	\$6,500.00
<b>Category 1000 Total</b>						<b>\$91,324.88</b>

Category 2000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
2001	201032	Class 2 Excavation	CY	15	\$50.00	\$750.00
<b>Category 2000 Total</b>						<b>\$750.00</b>

Category 3000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
3001	300000	Inlet Modification	EA	3	\$2,300.00	\$6,900.00
<b>Category 3000 Total</b>						<b>\$6,900.00</b>

Category 5000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
5007	585405	5 Inch White Lead Free Reflective Thermoplastic Pavement Markings	LF	215	\$5.00	\$1,075.00
5008	585407	5 Inch Yellow Lead Free Reflective Thermoplastic Pavement Markings	LF	1,400	\$5.00	\$7,000.00
5009	585410	10 Inch Yellow Lead Free Reflective Thermoplastic Pavement Markings	LF	230	\$8.00	\$1,840.00
5010	585412	12 Inch White Lead Free Reflective Thermoplastic Pavement Markings	LF	1,375	\$10.00	\$13,750.00
5011	585627	Pavement marking arrows	SF	56	\$20.00	\$1,120.00
<b>Category 5000 Total</b>						<b>\$22,945.00</b>

Category 6000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
6001	600000	Reconstructing Existing Sidewalk Ramps	EA	8	\$1,300.00	\$10,400.00
6002	600000	Combination Curb and Gutter Any Height or Depth	LF	6700	\$75.00	\$502,500.00
6003	600000	Curb Any Height	LF	50	\$60.00	\$3,000.00
6006	655105	5 Inch Concrete Sidewalk	SF	5500	\$10.00	\$55,000.00
6007	655120	Detectable Warning Surface for Curb Ramps	SF	125	\$55.00	\$6,875.00
<b>Category 6000 Total</b>						<b>\$577,775.00</b>

Category 7000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
7001	704345	Placing Furnished Topsoil 4 Inch Depth	SY	130	\$7.00	\$910.00
7002	708220	Turfgrass Sod Establishment	SY	130	\$3.00	\$390.00
<b>Category 7000 Total</b>						<b>\$1,300.00</b>

Category 8000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
8001	800000	Furnish and Install Audible/Tactile Pedestrian Pushbutton Station and Signs	EA	6	\$1,181.25	\$7,087.50
8002	800000	Furnish and Install Breakway Pedestal Pole - Any Size	EA	6	\$1,398.60	\$8,391.60
8003	800000	Furnish and Install LED 16 Inch Countdown Pedestrian Signal Heads	EA	6	\$1,098.30	\$6,589.80
8008	801130	Square Perforated Tubular Steel Sign Post	EA	100	\$165.00	\$16,500.00
8009	802145	Adjust Existing Handhole	EA	5	\$353.85	\$1,769.25
8013	813014	Install Ground Mounted Sign	SF	100	\$10.00	\$1,000.00
<b>Category 8000 Total</b>						<b>\$41,338.15</b>

Sub Totals	
Net - Total	\$742,333.03
Contingency (20%)	\$148,466.61
<b>Total</b>	<b>\$890,799.64</b>

*CHANNELIZED RIGHT TURN OPTION AT GREENE/BALTIMORE/CUMBERLAND/WASHINGTON*

Category 1000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
1001	130850	Mobilization	LS	1	\$12,000.00	\$12,000.00
1004	120500	Maintenance of Traffic	LS	1	\$8,849.56	\$8,849.56
1010	120820	Drums for Maintenance of Traffic	EA	20	\$75.00	\$1,500.00
1012	130840	Construction Stakeout	LS	1	\$1,500.00	\$1,500.00
<b>Category 1000 Total</b>						<b>\$23,849.56</b>

Category 2000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
2001	201032	Class 2 Excavation	CY	56	\$50.00	\$2,800.00
<b>Category 2000 Total</b>						<b>\$2,800.00</b>

Category 3000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
3001	300000	Inlet Modification	EA	1	\$2,300.00	\$2,300.00
<b>Category 3000 Total</b>						<b>\$2,300.00</b>

Category 5000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
5007	585405	5 Inch White Lead Free Reflective Thermoplastic Pavement Markings	LF	200	\$5.00	\$1,000.00
5008	585407	5 Inch Yellow Lead Free Reflective Thermoplastic Pavement Markings	LF	750	\$5.00	\$3,750.00
5009	585412	12 Inch White Lead Free Reflective Thermoplastic Pavement Markings	LF	1,125	\$10.00	\$11,250.00
<b>Category 5000 Total</b>						<b>\$16,000.00</b>

Category 6000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
6001	600000	Reconstructing Existing Sidewalk Ramps	EA	7	\$1,300.00	\$9,100.00
6002	600000	Combination Curb and Gutter Any Height or Depth	LF	900	\$75.00	\$67,500.00
6003	600000	Curb Any Height	LF	30	\$60.00	\$1,800.00
6006	655105	5 Inch Concrete Sidewalk	SF	3500	\$10.00	\$35,000.00
6007	655120	Detectable Warning Surface for Curb Ramps	SF	175	\$55.00	\$9,625.00
<b>Category 6000 Total</b>						<b>\$123,025.00</b>

Category 7000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
7001	704345	Placing Furnished Topsoil 4 Inch Depth	SY	10	\$7.00	\$70.00
7002	708220	Turfgrass Sod Establishment	SY	10	\$3.00	\$30.00
<b>Category 7000 Total</b>						<b>\$100.00</b>

Category 8000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
8008	801130	Square Perforated Tubular Steel Sign Post	EA	75	\$165.00	\$12,375.00
8009	802145	Adjust Existing Handhole	EA	5	\$353.85	\$1,769.25
8013	813014	Install Ground Mounted Sign	SF	75	\$10.00	\$750.00
<b>Category 8000 Total</b>						<b>\$14,894.25</b>

Sub Totals	
Net - Total	\$182,968.81
Contingency (20%)	\$36,593.76
<b>Total</b>	<b>\$219,562.57</b>

*ROUNDBOUT OPTION AT GREENE/BALTIMORE/WASHINGTON/CUMBERLAND*

Category 1000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
1001	130850	Mobilization	LS	1	\$44,000.00	\$44,000.00
1004	120500	Maintenance of Traffic	LS	1	\$35,345.47	\$35,345.47
1010	120820	Drums for Maintenance of Traffic	EA	20	\$75.00	\$1,500.00
1012	130840	Construction Stakeout	LS	1	\$6,500.00	\$6,500.00
<b>Category 1000 Total</b>						<b>\$87,345.47</b>

Category 2000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
2001	201032	Class 2 Excavation	CY	80	\$50.00	\$4,000.00
<b>Category 2000 Total</b>						<b>\$4,000.00</b>

Category 3000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
3001	300000	Inlet Modification	EA	1	\$2,300.00	\$2,300.00
<b>Category 3000 Total</b>						<b>\$2,300.00</b>

Category 5000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
5007	585405	5 Inch White Lead Free Reflective Thermoplastic Pavement Markings	LF	275	\$5.00	\$1,375.00
5008	585407	5 Inch Yellow Lead Free Reflective Thermoplastic Pavement Markings	LF	450	\$5.00	\$2,250.00
5009	585412	12 Inch White Lead Free Reflective Thermoplastic Pavement Markings	LF	1,600	\$8.00	\$12,800.00
<b>Category 5000 Total</b>						<b>\$16,425.00</b>

Category 6000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
6001	600000	Reconstructing Existing Sidewalk Ramps	EA	7	\$1,300.00	\$9,100.00
6002	600000	Combination Curb and Gutter Any Height or Depth	LF	6750	\$75.00	\$506,250.00
6003	600000	Curb Any Height	LF	125	\$60.00	\$7,500.00
6005	600000	Brick Sidewalk	SF	200	\$15.00	\$3,000.00
6006	655105	5 Inch Concrete Sidewalk	SF	4300	\$10.00	\$43,000.00
6007	655120	Detectable Warning Surface for Curb Ramps	SF	250	\$55.00	\$13,750.00
<b>Category 6000 Total</b>						<b>\$582,600.00</b>

Category 7000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
7001	704345	Placing Furnished Topsoil 4 Inch Depth	SY	105	\$7.00	\$735.00
7002	708220	Turfgrass Sod Establishment	SY	105	\$3.00	\$315.00
7003	710150	Tree, Shrub, and Perennial Installation and Establishment	LS	1	\$10,000.00	\$10,000.00
<b>Category 7000 Total</b>						<b>\$11,050.00</b>

Category 8000						
Item No.	Code No.	Description	Unit	Quantity	Unit Price	Total
8008	801130	Square Perforated Tubular Steel Sign Post	EA	125	\$165.00	\$20,625.00
8009	802145	Adjust Existing Handhole	EA	5	\$353.85	\$1,769.25
8013	813014	Install Ground Mounted Sign	SF	125	\$10.00	\$1,250.00
<b>Category 8000 Total</b>						<b>\$23,644.25</b>

Sub Totals	
Net - Total	\$727,364.72
Contingency (20%)	\$145,472.94
<b>Total</b>	<b>\$872,837.66</b>

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