



Sustain Bladensburg

June 2014



ACKNOWLEDGEMENTS

Contributors

The project organizers gratefully acknowledge all who are involved with this project. The following organizations and persons provided considerable information and assistance with this project:

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In addition, the project organizers would like to thank the citizens of the Town of Bladensburg for their input into the planning process, and their willingness to participate in the outreach events.

Funding

Funding for this project was provided by the Chesapeake Bay Trust. For further information on this and similar funding opportunities, visit: www.cbtrust.org

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01 EXECUTIVE SUMMARY

As an urban community with direct access to the Anacostia waterfront, the Town of Bladensburg continually strives to achieve a cleaner, greener watershed in conjunction with its community enhancement efforts. The Sustain Bladensburg Project supports creating a balanced watershed system within an urban landscape such as Bladensburg by integrating site-scale stormwater management retrofits in order to catalyze small, yet effective changes to the overall watershed health. It provides an exciting opportunity to introduce sustainable and green practices that will engage the community and attract economic investment all the while contributing to restore the ecologically viable Anacostia watershed.

The SSWP has been designed to serve as an advisory document that presents a set of guidelines to help community leaders, residents, and policy makers establish a framework for existing and future community enhancement projects. The objectives are to identify a network of trails throughout the town with recommendations for stormwater retrofits; create a conceptual site plan for a multi-functional Community Building; and provide guidelines for establishing a wayfinding signage system across the Town of Bladensburg.

This report highlights three primary goals for Bladensburg:

1. Increase multi-modal connectivity
2. Highlight historic landmarks and cultural amenities
3. Promote the use of sustainable and green practices



02 INTRODUCTION

The Town of Bladensburg is located one-mile northeast of Washington, D.C. and shares its western edge with the banks of the Anacostia River. The Anacostia River watershed is primarily confined to an urban landscape that has been substantially altered from its natural conditions. In recent years, the Anacostia River and its tributaries became one of the most polluted and ecologically stressed water bodies in the U.S. due to urbanization, population growth, and imperviousness. Impervious surfaces contribute to excessive stormwater runoff, high levels of pollutants in waterways, loss of riparian areas, and degradation of ecological habitats in the watershed.

While much has been accomplished to restore this valuable urban watershed, the river and its tributaries continue to remain ecologically stressed and highly polluted. Recognizing the importance of revitalizing and restoring the Anacostia River, four communities including Bladensburg, Colmar Manor, Edmonston, and Cottage City collaborated with Prince George's County to establish the Port Towns Revitalization Initiative. The partnership has been successful at drawing strength, insight, and resources to boost their local economies while helping to protect the watershed through integrated planning, design, and construction of green infrastructure and low impact development practices.

Today, the Town is seeking to develop a new and improved green infrastructure that promotes the health and well-being of the Anacostia River and its community members.

The three primary components of the Sustain Bladensburg Project are:

- **Conceptual Site Design** - A destination/demonstration site for the community building that strengthens the town center.
- **Trail Improvement Recommendations** - A pedestrian/bicyclist loop that connects the town center to the Bladensburg Waterfront Park.
- **Wayfinding Guidelines** - A wayfinding/signage system that enhances the Town's identity while increasing accessibility, visibility, and spatial awareness for residents and visitors.

HISTORY OF BLADENSBURG

In the 18th century, Bladensburg was established as a thriving commercial port that exported flour and tobacco. However, the Town's economic vitality began to decline when poor land use practices and flooding caused the river to silt in. In the early 19th century, the river became too shallow for large ships to navigate, and the port was closed.

In the 1950s, the Army Corps of Engineers channelized the river's entire main stem and constructed bridges, levees, and highways as part of the Anacostia River local flood protection projects. Straightening parts of the river, dredging, and constructing pumping stations helped mitigate the flooding, but the once vital connection between the Town and the river was severed.

Throughout the 20th century, the Town invested in developing residential subdivisions and became among the first ring of suburbs around Washington, D.C. Historic landmarks that date from the 18th century – such as the Market Master's House, Bostwick House, George Washington House, Magruder House, Free Hope Baptist Church, and the Spa Springs – still exist and serve as reminders of Bladensburg's vibrant past as a successful maritime community (Town of Bladensburg, 2010).



Bladensburg is best known for its role in the War of 1812, where the British defeated American troops before entering the nation's capitol and set fire to many of the government buildings in what became known as the Burning of Washington.

SUSTAINABLE INITIATIVES

A sustainable community is one that invests in healthy, safe, and walkable neighborhoods while protecting its natural resources, promoting community interactions, and encouraging economic developments. It strives to be economically, socially, and environmentally viable through integrated community effort. The success of a sustainable community relies on growing awareness, involvement, and commitment from citizens and leaders of the town.

In Bladensburg, the “Green Team”—composed of residents, business owners, and a variety of committed partners—have worked together to help guide and assist the Town with best and leading practices for sustainability. The mission of the Green Team is to “integrate sustainable concepts and solutions into every aspect of our community by focusing on creating an environment where humans and nature can mutually thrive for generations to come” (Sustain Bladensburg, 2012). The lists below highlight some of the Town’s accomplishments on promoting a healthy, sustainable community.

Recognition & Partnerships

- Port Towns Community Health Partnership
- Let’s Move City
- Transformative Neighborhood Initiative
- Healthy Eating Active Living (HEAL) Collaboratives
- Maryland Smart Energy Communities
- Sustainable Maryland Certified

Programs & Events

- Wellness Ambassador Program
- SEED to FEED Summer Youth Program
- Eat Local Farm Share
- Growing Your Food at Autumn Woods
- Community Clean-Up Day
- Walkers Wear White at Night

Projects & Policies

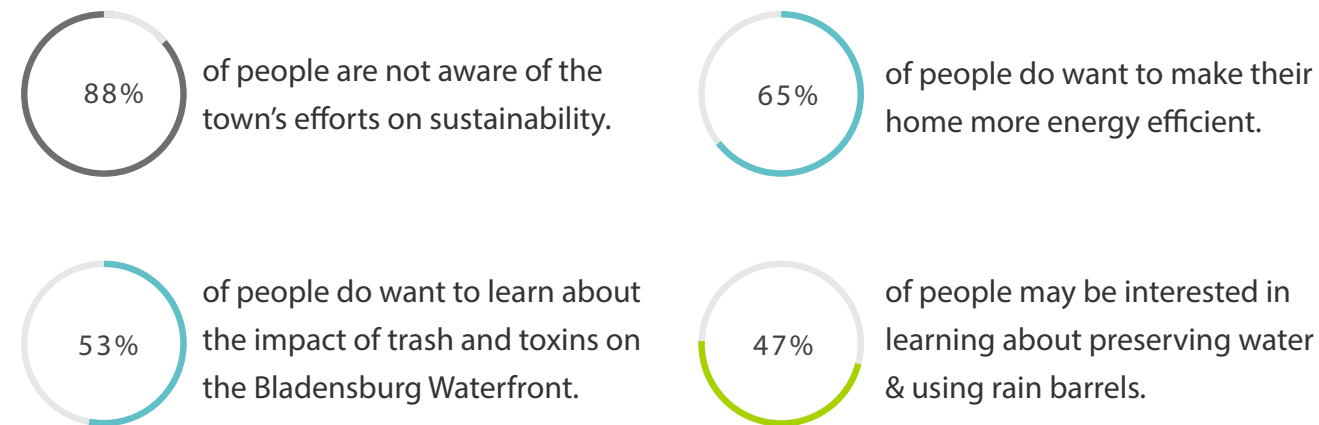
- PTYC’s Pedestrian Safety Policy
- Green Purchasing Policy
- MEA’s EmPOWER Community Program
- Route 450 Green Street Revitalization Plan
- Municipal parking lot retrofit
- Municipal paperless policy

DEFINING COMMUNITY NEEDS

Over the decades, the Port Towns Communities have focused on encouraging economic growth and revitalization through promoting historic landmarks, improving building facades, and upgrading the Bladensburg Waterfront Park. Despite the Town's effort to elicit business development, tourism, and community involvement, poor access and street presence have prevented the best use of these assets. Furthermore, the residents of Bladensburg are still unaware of the Town's growing contribution to creating a greener community.

In order to gain a better understanding of what the community needs, residents of Bladensburg were asked to participate in a survey that addresses sustainability efforts in the community. According to the survey, the majority of the respondents are unaware of the Town's efforts on sustainability. However, more than half of the participants expressed their interest in learning more about sustainability and green practices (Sustain Bladensburg, 2012).

Total number (#) of respondents: 17



GOALS AND STRATEGIES

Increase multimodal connectivity

- Integrate new and existing network of trails that is both pedestrian and bicyclist-friendly.
- Connect trails to local points of interest and green spaces to encourage outdoor recreational activities.
- Increase safety by installing or repairing sidewalks, roadway markings, and bicycle lanes.

Highlight historic landmarks and cultural amenities

- Incorporate a wayfinding system with interpretive signage throughout the trail to help guide users of all ages and abilities.
- Incorporate interpretive signage on historic properties and civic features to increase visibility of the Town's valuable resources.
- Organize tours and events to attract visitors and expand the Town's capacity to welcome tourism.

Promote the use of sustainable and green practices

- Use permeable pavement when installing new sidewalks to increase groundwater recharge.
- Install bioretention cells, bioswales, and street trees to treat runoff from impervious surfaces.
- Create awareness of the Town's efforts to "go green" by demonstrating how LID works along the Sustain Bladensburg Trail.

RELATED STUDIES AND REPORTS

Several reports, planning documents, and studies were reviewed in the preparation of this project in order to determine the priority locations for sustainable and green infrastructure retrofits.

Plan Prince George's 2035 Adopted General Plan

The Plan 2035 is a comprehensive 20-year general plan that serves as a blueprint for long-term growth and development in Prince George's County. It establishes a framework to capture a greater share of the region's forecasted job growth, meet the needs of the changing population, and preserve the County's valuable natural and historic resources. Plan 2035's objectives include:

- Targetting public investment and incentives, and guiding development in three priority investment districts.
- Reclassifying the scale and type of development appropriate for existing centers based on their primary function in the County.
- Facilitating economic growth in the County's primary employment areas.
- Locating reserve areas where near-term development is deferred until additional residential capacity is needed.
- Reinforcing areas identified for preservation.
- Identifying priority action steps over the next decade.

ULI Washington Technical Assistance Panel Report - Bladensburg Town Center

The Urban Land Institute (ULI) was commissioned on behalf of the Town of Bladensburg by the Port Towns Community Development Corporation to develop a strategy to implement the Bladensburg Town Center Sector Plan approved by Prince George's County. The panel developed actionable items that the Port Towns CDC can accomplish in the near term to raise the visibility of the community and set the foundation for developing a town center in Bladensburg.

Some of the panel's recommendations that this study addresses include:

- Link the historic assets of Bladensburg to the trail system through urban design, signage and collateral materials.
- Link pedestrians and bicyclists from the Bladensburg Town Center to the Anacostia River Trail, Waterfront Park, historic resources, and schools.
- Incorporate wayfinding improvements in the town center to better orient automobiles, bicyclists and pedestrians.
- Improve the industrial area by landscaping the periphery of the industrial zones.

Formula 2040 - Master Plan for Parks, Recreation, and Open Space

This plan is the culmination of work that commenced in 2008 with a Needs Assessment project called Parks & Recreation: 2010 and Beyond. The "formula" in Formula 2040 is Parks + Recreation = Experience. The formula is a recognition that parks, recreation and leisure programming is a major component of the Department's mission. This plan establishes a framework that will assure the department can meet future parks and recreation programmatic and facility needs. Formula 2040 contains:

- A profile of where Prince George's County and its parks, recreation, and open space system are today.
- A description of demographic, recreation, and leisure trends that will influence the future direction of parks and recreation in Prince George's County.
- A strategic framework consisting of a vision, goals, objectives, and policies to guide the County's decision-making process.
- Specific strategies and action steps that will be taken to implement the plan.

Port Towns Youth Council's Community Asset Mapping

In 2012, students from the Port Towns Youth Council (PTYC) participated in identifying assets and issues that threaten the health and wellness of the Bladensburg community through the Port Towns Summer Camp Program. The objective of this document is to analyze the environmental, geographic, and demographic make-up of the Town of Bladensburg and begin a dialogue with Town leaders to help the community achieve optimum health and wellness. The PTYC's recommendations for the Town include:

- Increase walkability and bikeability.
- Increase visibility by ensuring that all signs are clear to both pedestrians and drivers.
- Improve stormwater management by using permeable pavement and bioretention materials in parking lots.
- Improve streetscape aesthetics by installing more trees, recycling bins, and special pavement for crosswalks.
- Increase access to fresh and healthy food.

Anacostia River Watershed Restoration Plan

The Anacostia River Watershed Restoration Plan (ARP) and Report, finalized in February 2010, is a multijurisdictional, ten-year restoration plan that identifies environmental and ecological restoration opportunities within the entire Anacostia River watershed. This study is intended to advance the following restoration goals of the Anacostia Watershed Restoration Plan:

- Dramatically Reduce Pollutant Loads
- Protect and Restore Ecological Integrity
- Improve Fish Passage
- Expand Forest Cover
- Increase Public and Private Participation

The Town of Bladensburg lies partially within the Northeast Branch sub-watershed, and partially within the Tidal River watershed. In addition to the above overall goals, this study advances objectives particular to the Northeast Branch and Tidal Reach including:

- Retrofit current stormwater controls: utilize bioretention cells, filters, bioswales, wet ponds, and wetlands to add controlled acreage to the subwatershed.
- Restore fish and other aquatic habitat through improved water quality and flow management.
- Remove barriers to fish migration.
- Remove invasive species and replant the riparian corridor.
- Increase tree canopy tree planting in both urban and non-urban areas.

Total Maximum Daily Loads of Trash (TMDL) for the Anacostia River

In September 2010, the U.S. Environmental Protection Agency, the District of Columbia, and the state of Maryland finalized a Total Maximum Daily Load (TMDL) or “pollution diet” for trash in the Anacostia River. During rain events, trash gets swept into roadways and enters the storm drains, which then get deposited in nearby streams. The result is not only unappealing but endangers wildlife habitat and impairs water quality. In the Anacostia River watershed, alarming amounts of trash are delivered through stormwater runoff each year.

The TMDL highlights six high-priority trash-reduction objectives and associated strategies:

- Significantly increase funding for trash reduction programs.
- Create and enhance regional partnerships and coordination among businesses, environmental groups, individual citizens, and government at all levels and in all jurisdictions.
- Improve people’s awareness, knowledge, and behavior relating to littering and illegal dumping.
- Promote the greater introduction and use of effective trash reduction technologies and approaches.
- Improve enactment and enforcement of laws to reduce trash.
- Increase trash monitoring-related data collection, generation, and dissemination efforts.

Approved Countywide Master Plan of Transportation

The 2009 Countywide Master Plan of Transportation (MPOT) addresses transportation issues for all modes of transportation within Prince George’s County. This master plan fully supports the goals identified by the MPOT for the County’s developed tier:

- Maintain medium to high density.
- Encourage quality infill, redevelopment, and restoration.
- Preserve and enhance the environment.
- Maintain high bus and rail transit coverage.
- Provide interconnected non-motorized modes of travel.

Approved Port Towns Sector Plan and Sectional Map Amendment

In October 2009, Prince George’s County approved a plan containing recommendations on future land uses and development for a new Port Towns destination center focused on the Anacostia waterfront that links the towns of Bladensburg, Colmar Manor, Cottage City, and Edmonston. Policy guidance for this plan came from the 2002 Prince George’s County Approved General Plan. The plan contains recommendations for future development within targeted areas of the Port Towns and development standards specifically tailored to meet the goals and objectives of the Port Towns.

The plan presents a vision for the Port Towns to foster an identity that is indicative to sustainable, healthy, and pedestrian-oriented communities; as well as to celebrate and build upon the area’s cultural history, diversity, location, amenities, and environmental assets.

Approved Bladensburg Town Center Sector Plan and Sectional Map Amendment

In June 2007, Prince George’s County approved a sector plan containing a comprehensive analysis and action plan for the development of the proposed Bladensburg Town Center. In addition to the Port Towns Sector Plan, policy guidance for this plan derived from the 2002 Prince George’s County Approved General Plan. The plan focuses on the primary commercial corridor, Route 450 (Annapolis Road), and the surrounding areas. It also includes specific guidelines and recommendations for new, infill, and future development within the town center.

The purpose of this plan is:

- To implement the recommendations of the 2002 Prince George’s County Approved General Plan and assess its implications on the project area.
- To update parts of the 1994 Approved Master Plan and Sectional Map Amendment for Bladensburg–New Carrollton and Vicinity (Planning Area 69).
- To amend the zoning map, through an SMA, in order to implement the land use recommendations of this sector plan and 2002 General Plan.
- To set policies that will guide future development pertaining to urban design, historic resources, economic development, transportation network, transit, public facilities, outdoor spaces, and green infrastructure in the planning area.

The plan promotes the Town of Bladensburg as a designated wellness district that functions to benefit the overall health and wellness of its residents. The goal is to provide the community with access to healthy foods, reliable transportation, safe places to walk, and employment and housing options that will help individuals make healthier choices.

Approved Countywide Green Infrastructure Functional Master Plan

In 2005, Prince George’s County adopted a countywide green infrastructure plan that aimed to implement the recommendations of the 2002 General Plan. The purpose of this plan is to protect the integrity of environmentally sensitive features through planning, land acquisition, and land development processes. Its goal is to preserve, protect, and enhance the contiguous network of green infrastructure – which is defined by the county as waterways, wetlands, woodlands, wildlife habitats, and other natural areas of countywide significance. The plan identifies the Anacostia River as a special conservation area and it provides policies and strategies regarding the Chesapeake Bay TMDL and the county’s Phase II Watershed Implementation Plan.

The primary objectives are to improve the water quality and stream habitat in each major watershed in order to increase the Benthic Index of Biological Integrity (IBI) rating by at least one category by the year 2025. Specific policies include the following:

- Preserve, protect, enhance, or restore the GI network and its ecological functions
- Restore lost ecological functions of surface and groundwater features
- Presume existing woodland resources and replant woodland in suitable areas
- Promote environmental stewardship as an important element to the overall success of the master plan.
- Recognize the green infrastructure network as a valuable component of the county’s Livable Communities Initiative.

2001 Approved Anacostia Trails Heritage Area Management Plan: A Functional Master Plan for Heritage Tourism

In 1996, the Maryland Heritage Areas Authority (MHAA) – which administers the Maryland Heritage Preservation and Tourism Areas Program – recognized the Anacostia Trails Area as a Heritage Area. In doing so, state resources became available for preserving the historic, natural, and cultural resources that has encouraged tourism in the Anacostia Trails Heritage Area (ATHA). The ATHA encompasses 14 municipalities, including the Port Towns and several unincorporated communities in northern Prince George’s County.

The Anacostia Trails Heritage Area Management Plan (ATHAMP) is a functional planning document amended to the Prince George’s County General Plan. The vision of this plan is to create major tourist destinations within the ATHA where visitors may come and enjoy a wide variety of attractions, visit well-maintained communities, and spend tourist dollars. The ATHAMP identifies numerous historic and cultural landmarks within Bladensburg including the Bladensburg Waterfront Park, Battle of Bladensburg Visitors Center, George Washington House, Market Master’s House and Publick Playhouse.

Goals and strategies from this study include:

- Promote the importance of the ATHA to the history of the state and nation
- Conserve natural resources and open spaces
- Preserve and enhance historic sites and cultural resources
- Expand and enhance linkages among heritage attractions
- Improve streetscapes and other aesthetic features to enhance tourist attractions and experiences

03

PRINCIPLES OF GREEN INFRASTRUCTURE

WHAT IS GREEN INFRASTRUCTURE?

Prince George's County defines green infrastructure as the interconnected network of waterways, wetlands, woodlands, and green spaces that maintain ecological integrity, manage stormwater, reduce flooding, capture pollution, and improve water quality. When integrated through a holistic approach, green infrastructure has the ability to transform a community, elevate the quality of life, and increase desirability.

In an urbanized area such as Bladensburg, the definition of green infrastructure is extended to include nature and nature-like practices that enhance the overall environmental quality such as tree plantings, rain gardens, green roofs, and permeable pavements. These practices are flexible and can be integrated into the planning, design, and construction of new and infill development. It can also be applied to retrofit of diversified spaces such as public and private properties, streets, trails, and schools. Green infrastructure practices can look unique to each individual application and site – depending on its context, character, and needs.

WHAT IS LOW IMPACT DEVELOPMENT?

The application of green infrastructure to the build environment is called Low Impact Development (LID). LID – which first took root in Prince George's County in the 1990s – is increasingly used in urban areas throughout the country. The emphasis of LID is to incorporate landscape-based design controls into a site's design in order to manage stormwater by intercepting and treating runoff before it reaches the storm drain. LID practices differ from traditional stormwater treatment methods in that they are smaller in scale, easier to construct, and emphasize functionalities that resemble predevelopment hydrologic conditions.

Traditionally, the objective of stormwater management has been to move runoff away from properties quickly via a system of concrete gutters and sewers. Little attention was given to limiting the amount of pavement or other impervious cover being introduced. In urban environments, the combination of increased imperviousness and fast-moving stormwater has led to unintended consequences such as downstream flooding, erosion and sediment loading in streams, and reduction in groundwater recharge. Slowing down and retaining rainwater on site helps to address these issues. With LID, stormwater management emphasizes design controls that allow rainwater to be evapo-transpired, infiltrated, stored for later use, and be slowly released downstream over time. In many cases, the stormwater is also filtered to remove specific pollutants.

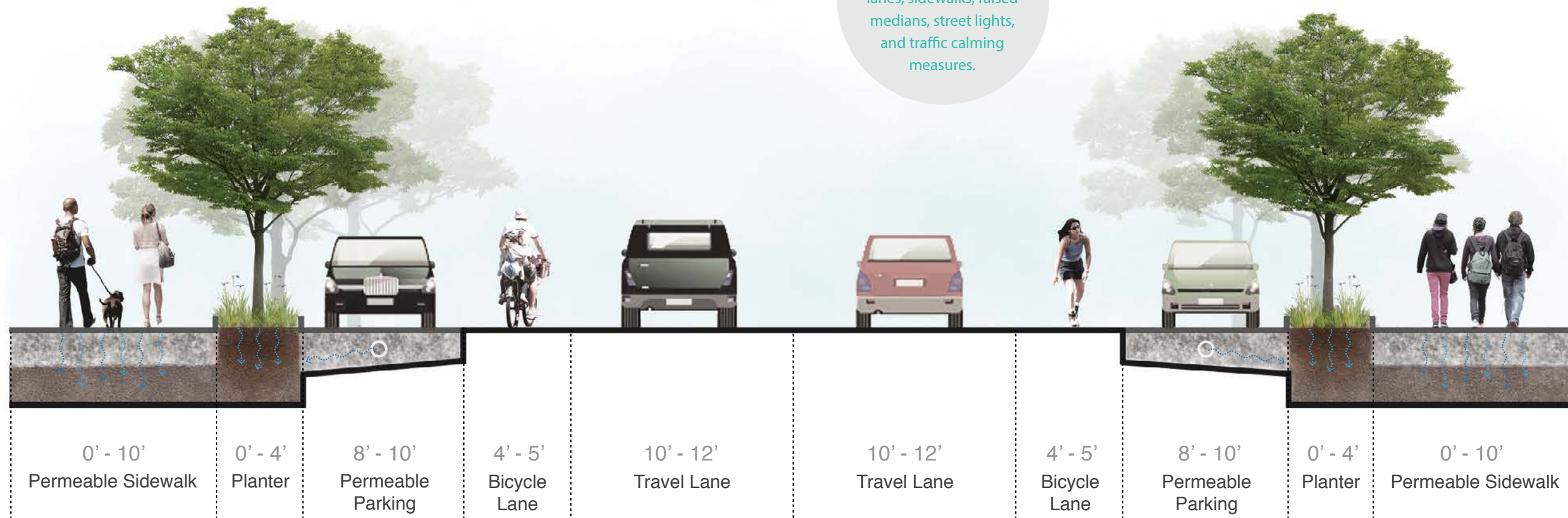
WHAT ARE COMPLETE + GREEN STREETS?

Complete streets enable safe, comfortable, and convenient access for pedestrians; cyclists; motorists; and public transportation users of all ages and abilities. They are designed to make it easy to cross the street, walk to shops, and bicycle to work. They allow buses to run on time and make it safe for people to walk to and from bus/train stations. Complete streets improve safety, provide transportation alternatives, create a sense of place, and increase adjacent property values.

By adopting a Complete Streets policy, communities like Bladensburg can direct their transportation planners and engineers to routinely design and operate the entire right of way to enable safe access for all users. In the process, they are creating better communities for people to live, play, work, and shop (Smart Growth America, 2014).

A green street is constructed to slow down stormwater in order to treat the pollutants prior to entering the storm drain or to infiltrate water into the ground. The installation of LID controls in the Right of Way (ROW) is one of the major features of “green street” designs. Given the limited width of the ROW in Bladensburg, green street practices on narrower roads often focus on planting street trees and installing street planters to capture stormwater. Porous pavements are also recommended for sidewalk and parking lot rehabilitation.










Components of a complete street include bike lanes, sidewalks, raised medians, street lights, and traffic calming measures.



BENEFITS OF GOING GREEN

Green infrastructure practices have multiple benefits besides stormwater management functions. One approach for evaluating the effect and overall value of the multiple benefits can be determined by using the Triple Bottom Line approach (Elkington, 1994). This approach aids decision makers and stakeholders by considering the social, economic, and environmental benefits of projects rather than just the construction life cycle costs.

The application of the Triple Bottom Line approach is important in the Town of Bladensburg because of the potential opportunities that exist for integration of green technologies into planned and on-going improvements to the transportation infrastructure as well as public and private redevelopment projects. These green techniques will help protect and restore the Anacostia watershed; enhance and facilitate the experience of walking, biking, and using public transportation; and help create a sustainable, attractive gateway to the town.

 Cleaner Air	 Cleaner Water	 Trash Reduction
 Better Connected Neighborhoods	 Safer Streets	 Community Reference Point
 Increased Property Values	 Cooler Communities	 Avoided Treatment Costs



Cleaner Air

Landscape features such as trees and other vegetation that are common in green street designs help to reduce power plant emissions and improve air quality by reducing the amount of electricity necessary for cooling, and their benefits can be calculated by using standard models such as the US Forest Service's Urban Forest Effects (UFORE) model. Trees placed around streets and parking lots increase shade and evapotranspiration, thereby lowering summertime air and the surface temperatures of impervious areas. In Bladensburg, tree and forest cover helps reduce air pollution by removing 6.5 metric tons of pollutant, saving costs of \$115,160 per year.



Cleaner Water

Anacostia River's water quality has been poor and suffers from urban stormwater runoff. Incorporating LID practices can help to decrease the amount of pollutants entering the river in several ways. The first inch of runoff carries a higher concentration of pollutants; by capturing the first inch or more of rainwater on site, LID facilities slow down and temporarily store runoff, reducing the impact of fine sediment erosion on water quality and aquatic habitat. Additionally, the plantings and bio-filtration processes used in LID design can help treat runoff before it infiltrates into the ground, evapo-transpirates, or is released into nearby streams.



Trash Reduction

The Anacostia River watershed is heavily affected by high levels of trash that are delivered through stormwater runoff and is subject to a Total Maximum Daily Loads (TMDL) for trash. Green street projects that incorporate trash reduction measures such as tree box filters, storm drain stenciling, storm drain inserts, and periodic street sweeping will help reduce the amount of trash entering the storm system that drains to the Anacostia River. Such efforts should be integrated with outreach and educational efforts that involve the community to increase awareness and involvement.



Better Connected Neighborhoods

In most communities, the car defines our primary mode of transportation. Connectivity refers to the evaluation of a project’s ability to promote alternative modes of transportation such as walking, biking, and the use of public transit, in order to create or link spaces. Accessible routes to public parks, schools, and neighborhood destinations are all measures that could be used to evaluate a street’s ability to improve connectivity. For the Town of Bladensburg, this includes making better connections to the Anacostia River Trail by improving physical and safety features of bus stops, sidewalks, and bicycle lanes.



Safer Streets

All too often, arterial roads are built without sidewalks, crosswalks, pedestrian refuges, and bus shelters. Features such as curb extensions, bump-outs, and vegetated refuge islands help to slow down traffic and reduce pedestrian crossing distances. The addition or enhancement of sidewalks, bike lanes, and roadway markings can further add to greater public safety. The benefit of improving street safety can be measured by the amount of money saved by reducing the number of pedestrian injuries and fatalities per year.



Community Reference Point

While often qualitative in nature, this benefit refers to the ability of a feature to positively serve as a signature or a destination for community residents and visitors. It promotes the community’s unique identity and serves as a model for development and redevelopment (DC OP, 2011). Going green can contribute to enhancing the attractiveness of a neighborhood and establish a sense of pride for the community. Potential measures for evaluating this benefit are increase in sales by nearby merchants, the number of ceremonies or presentations held, and anticipated number of visitors to the project location.



Increased Property Values

Green streets elements such as plantings and street trees are associated with more attractive neighborhoods, which help to increase nearby property values. For example, a study in Portland, OR, found that street trees added an average of \$7,020 to the price of nearby houses – equivalent to the value of a 106 square foot addition, with a total benefit-cost ratio estimated at almost 10 to 1. Additionally, access to green spaces and parks can increase the value of properties that are located within a three-block radius (Donovana and Butry, 2010).



Cooler Communities

Tree and forest canopy clean the air and makes our communities breathable. By absorbing carbon dioxide in the atmosphere, they release oxygen and help settle out particle pollutants that are harmful to the human lungs. Trees, forests, and urban green infrastructure practices help improve air quality by reducing air temperatures, removing greenhouse gases, and filtering out pollutant particulates. They provide shade and transpire water which lowers air temperature, cut energy costs, and reduces carbon dioxide production at the power plant.



Avoided Treatment Costs

Green street practices such as the installation of bioretention and permeable pavement that increase infiltration on-site reduce the amount of water being conveyed into stormwater treatment facilities and can help reduce localized flooding events. Over time, these practices can also reduce pressures to increase storm drain capacity. These benefits can be evaluated by determining the amount of stormwater that will be infiltrated versus the costs of treatment and expansion.

OVERVIEW OF STORMWATER MANAGEMENT



Bioretention cells are depressed basins designed to slow, collect, and clean stormwater runoff, giving it time to infiltrate into the ground or evapo-transpire into the air. Rain gardens are typically designed to completely drain within a 12-24 hour period. Because of their relatively small footprint, they can easily fit into an urban landscape or other areas where space is limited.



Stormwater planters are similar in function to regular bioretention practices except they are adapted to fit into “containers” within urban landscapes. Integrated into tree boxes or urban landscaping planters, stormwater planters are designed to collect runoff from pavements and filter it through a bioretention system to collect pollutants such as excess nutrients, heavy metals, oil, and grease.



Permeable pavement is specially designed to allow stormwater to infiltrate through the pavement to an underground storage basin or exfiltrate into the ground and recharge the water table. They provide the same load-bearing support that conventional pavement does and are good for walking, biking, and parking areas, and for driving on low-to moderately-trafficked streets.



Green roofs provide economic, environmental, and social benefits and work with many building types. In addition to water quality benefits, green roofs reduce the life cycle costs of roofs, save on energy costs, create wildlife habitat, provide space for food production, and creates usable green space that would otherwise go underutilized as empty space.



Green walls can be designed to help slow down and absorb stormwater, modify micro-climates, and add beauty to a garden or living space. When designed without soil, cisterns placed above the growing medium can help provide a constant supply of water.



Street trees are one of the most economical stormwater BMPs available. Trees intercept water via their canopies, improve air quality, reduce the urban heat island effect, improve neighborhood aesthetic, and reduce stormwater runoff through evapotranspiration and root uptake.



Rain barrels (or Cisterns) capture stormwater from the roofs of buildings and store it on site. These systems help reduce runoff volumes and velocity, and protect delicate watersheds and aquatic life.

04 CONCEPTUAL SITE DESIGN

BLADENSBURG COMMUNITY BUILDING

The primary objective for developing a concept for the Community Building site is to provide a multi-functional facility that meets the growing needs of the community while serving as a civic anchor to the town center. The existing library is scheduled to be relocated in 2015 as part of Prince George's County's Capital Improvements Program. This concept plan is intended to generate discussions about the site's potential to catalyze the revitalization of the town core, promote environmental education, and service the community.

Located at one of Bladensburg's main intersections at Edmonston Rd and Annapolis Rd, the Community Building would be designated as the starting destination for the Sustain Bladensburg Trail. The new building concept feature sustainable technology including renewable energy sources, energy-efficient fixtures, and gray water reuse. The site itself is to incorporate low impact development practices to capture and treat stormwater. Interpretive signage will highlight LID features, trail routes and points of interests. The concept plan advocates multiple LID practices including bioretention, permeable pavement, green walls, and green roofs. The civic core's vision is to serve as the sociocultural hub of Bladensburg; it reflects community involvement and accommodates a mix of uses including festivals, farmer's markets, block parties, town hall meetings, and much more.

GOALS AND STRATEGIES

Create a multi-functional facility and outdoor space

- Designate the Community Building as an anchoring destination of the Sustain Bladensburg Trail.
- Provide a variety of amenities such as a fitness center, café, daycare, offices, and storage areas.
- Promote special events such as music festivals, block parties, farmers markets, cooking competitions, and sports tournaments.
- Organize group tours to visit historic sites, LID demonstration areas, and civic destinations.

Integrate LID practices to mitigate stormwater runoff.

- Install bioretention and permeable pavement to capture the first inch of rainfall.
- Plant trees along roadways to intercept rainfall and reduce surface runoff.
- Install green walls and green roofs to mitigate urban heat island effect.
- Integrate guidelines from ASLA's Sustainable Sites Initiative Program.
- Design for a minimum of 10% of the site to include tree canopy or equivalent green space such as planter boxes, bioretention, green roofs, or other vegetated areas.

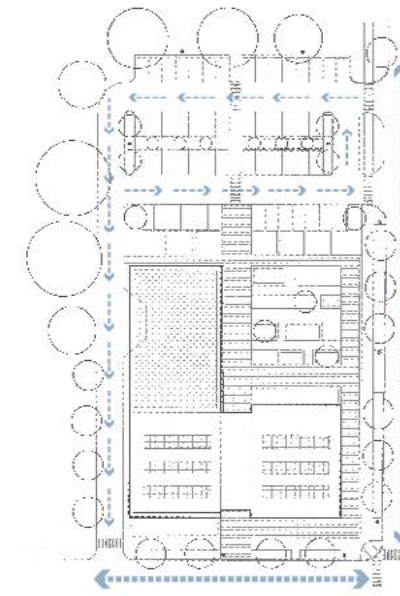
Provide opportunities for an active lifestyle

- Provide pedestrian connections to open spaces, trails, public transit, and popular destinations.
- Incorporate complete streets to ensure safety, comfort, and convenience for pedestrians, bicyclists, and public transit users.
- Organize events such as outdoor fitness training, yoga classes, cross fit competitions, and meditation sessions.
- Increase awareness of local food production and accessibility to community gardening.

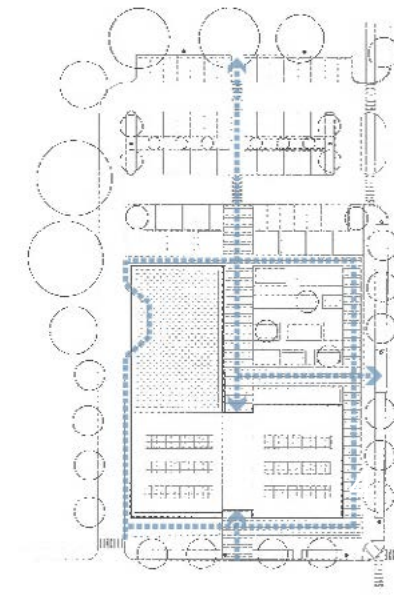
CONCEPTUAL SITE PLAN



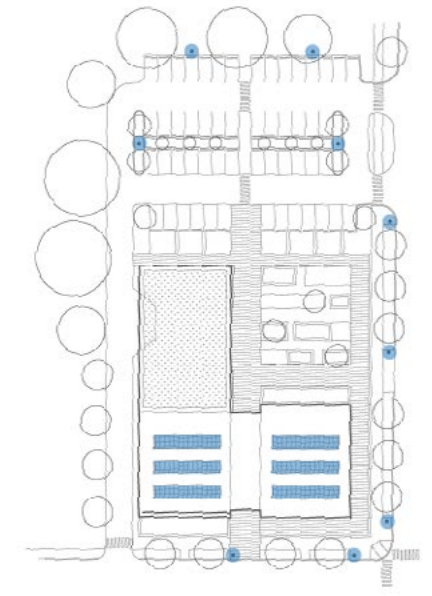
Circulation



Vehicular/bicycle

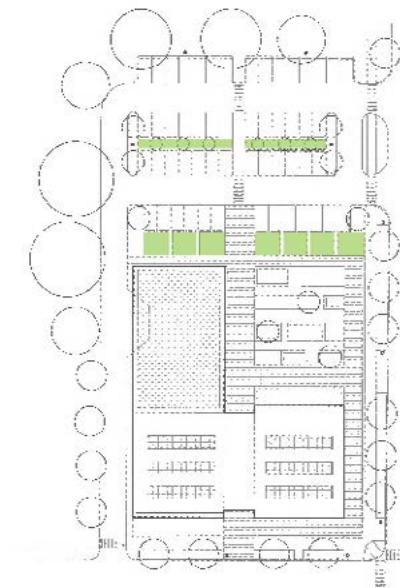


Pedestrian

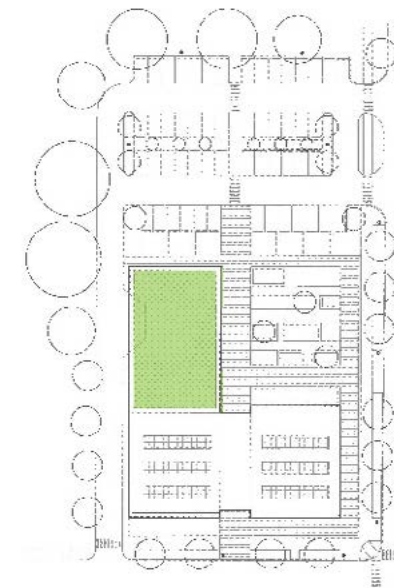


Solar panel/LED light

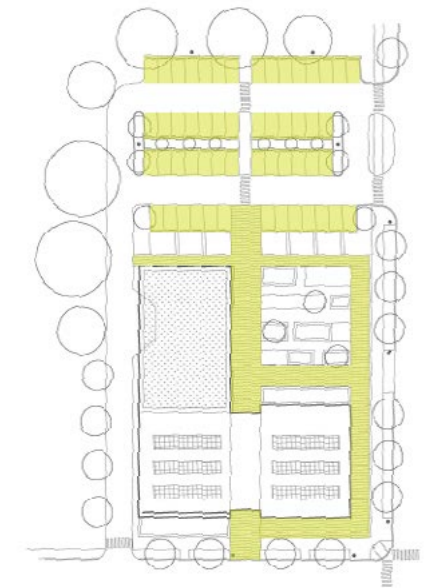
Stormwater Management



Bioretention

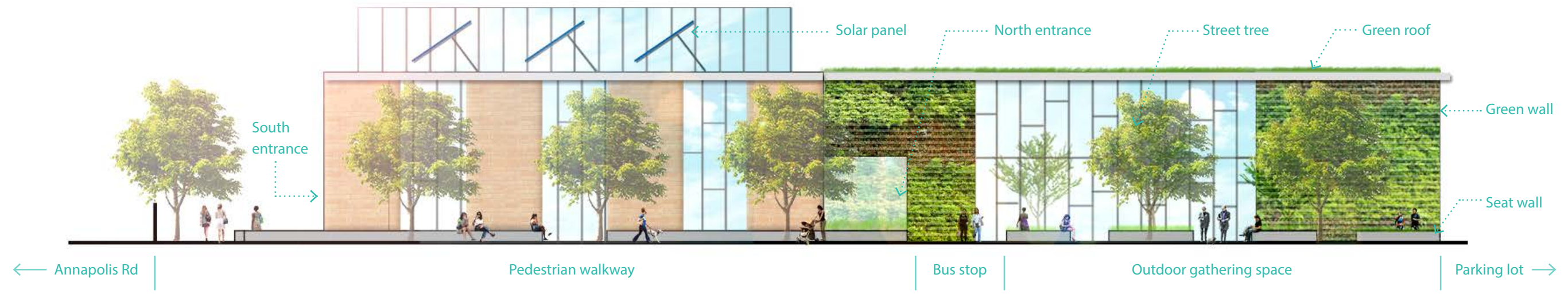


Green roof/green wall

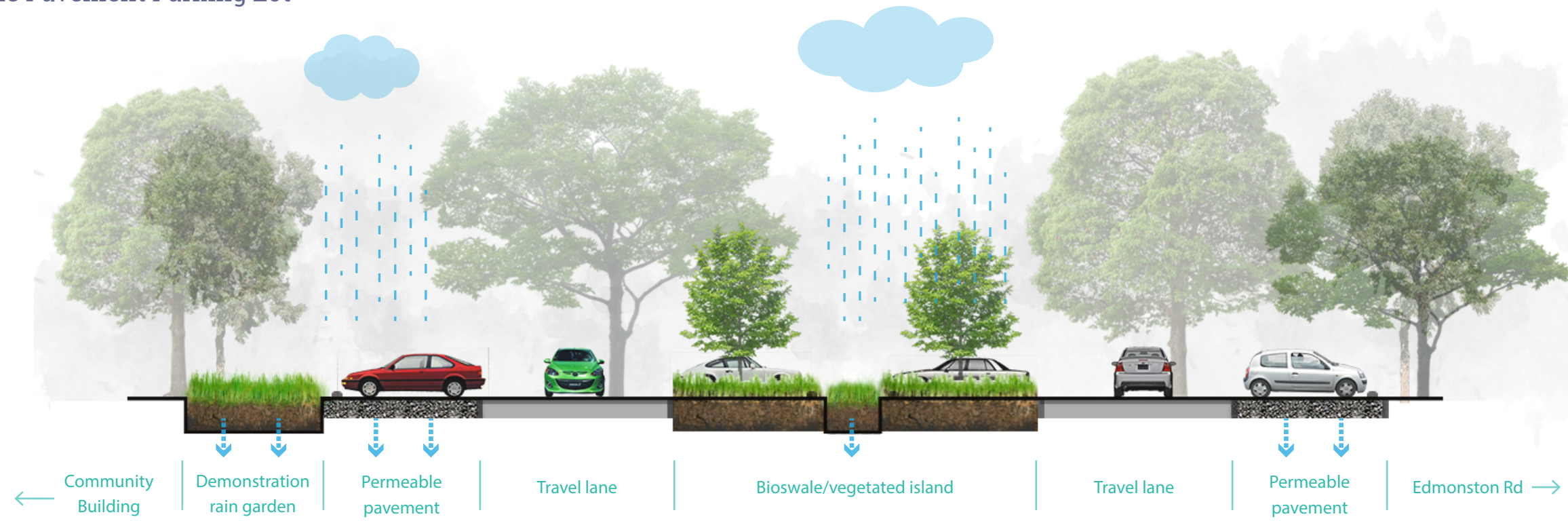


Permeable pavement

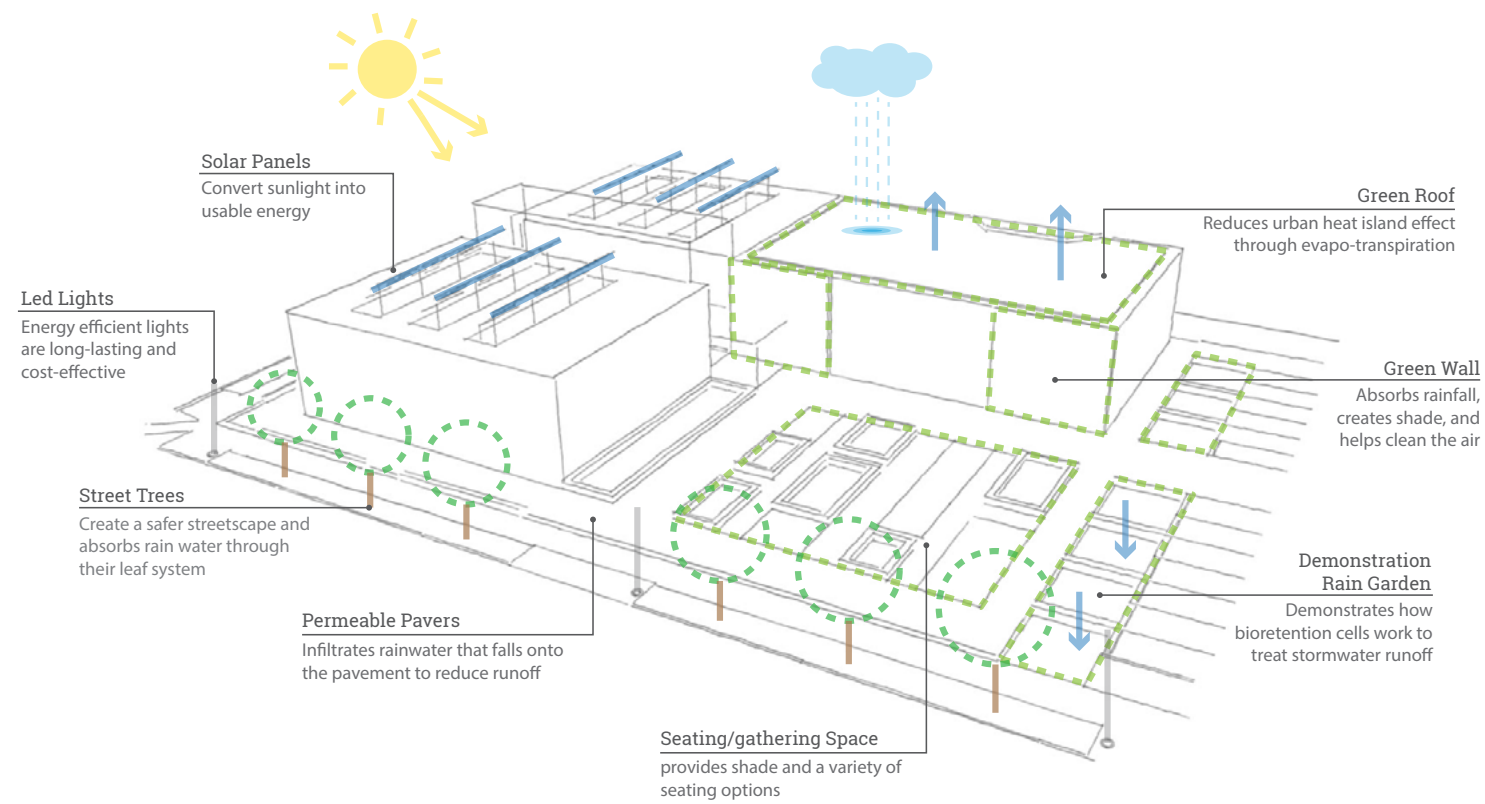
East View of the Community Building



Permeable Pavement Parking Lot



Sustainable Elements



Preliminary Cost Estimate

Description	Unit	Qty	Unit Cost	Price
Pervious pavement	SF	20,000	\$5	\$100,000
Street tree planting	EA	8	\$600	\$4,800
Bioretention	SF	2,500	\$80	\$200,000
Green roof	SF	4,000	\$14	\$56,000
Signage	EA	1	\$600	\$600

Total Amount: \$361,400

The vision for the Community Building is to serve as a sociocultural hub and civic anchor to the Town of Bladensburg.



05 SUSTAIN BLADENSBURG TRAIL NETWORK

In most communities, the car defines our mode of transportation. Connectivity refers to the evaluation of a project's ability to promote alternative modes of transportation, such as walking, biking, and the use of transit, in order to create or link spaces. Attractive sidewalks, safe bike lanes, traffic calming measures, access to bus stops and trails, safe routes to schools, and access to neighborhood destinations such as shops and restaurants, are all measures that can be used to evaluate a street's ability to improve connectivity.

Multimodal accessibility provides safe, efficient, and convenient ways for people to arrive at key destinations via walking, biking, and public transportation. Increasing connectivity for the people of Bladensburg makes walking and bicycling more appealing choices, enabling people to increase their local trips by these modes and minimizing automobile usage. Subsequently, the shift from automobile-dependent development toward pedestrian oriented development will increase the health benefits associated with greater levels of physical activity and reduce the costs and negative impacts associated with motor vehicle travel.

The Sustain Bladensburg Trail is intended to provide the community with a network of safe, educational, and sustainable trails that highlights the significant historical and cultural sites of Bladensburg. Included in the following pages is a map developed to show the walking tour and local attractions. The map delineates a walking/biking trail around the town center that includes an inner loop (approximately 1 mile in length) and an outer loop (approximately 2 miles in length) – both of which connect to the Anacostia River Park Trail. The map identifies potential locations for LID interventions that will serve as demonstration sites for educating students, residents, and visitors. Signage will be incorporated along the trail to provide guidance and information.

GOALS AND STRATEGIES

Increase multimodal connectivity

- Identify and evaluate a pedestrian/bicycle loop around the perimeter of the town center.
- Improve streetscapes and incorporate signage to encourage visitation to local attractions.
- Provide choice of walking and cycling routes through highly interconnected path network that lead to local and regional destinations.
- Improve the safety and comfort of pedestrians and bicyclists.

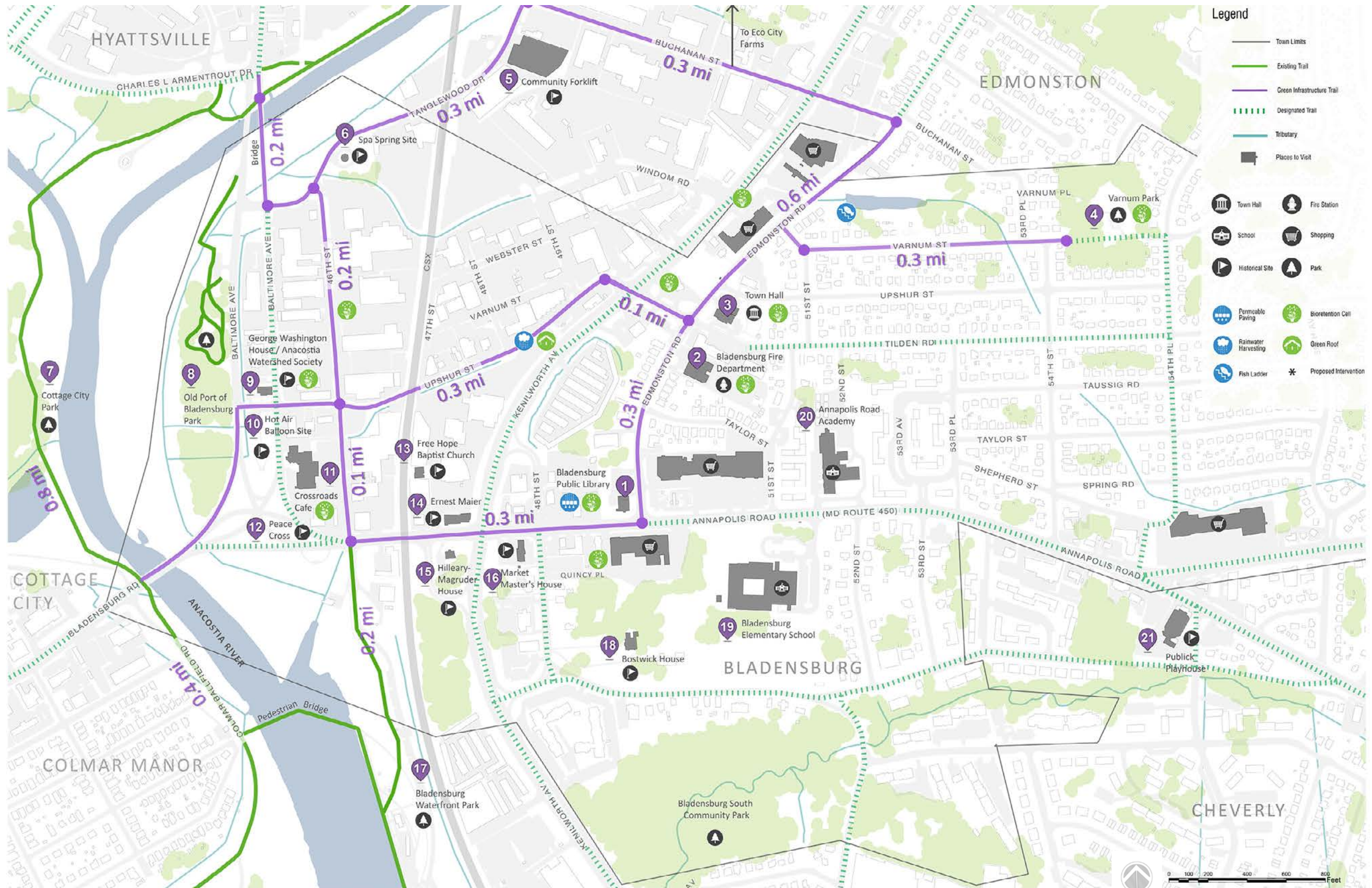
Enhance existing infrastructure network and make it pedestrian oriented

- Narrow road widths to increase pedestrian crossing opportunities and reduce vehicle speeds.
- Due to the narrow right-of-way, bicycle lanes should use SHARROWS.
- Limited road connectivity to encourage cars to use arterial roads rather than local streets and promote walking as the local trip mode.

Promote the use of green practices

- Reduce quantity and improve quality of stormwater impacting the Anacostia River.
- Identify priority LID projects within the trail route.
- Identify educational opportunities for public demonstration and observation.

SUSTAIN BLADENSBURG TRAIL MAP



TRAIL IMPROVEMENT RECOMMENDATIONS

The pedestrian/bicycle loop addresses the community's desire for an environment that fosters health and disease prevention that includes access to healthy foods, reliable transportation, and safe places to walk and exercise. Infrastructural improvement objectives of the Bladensburg Town Center Sector Plan (BTCSP) include incorporating opportunities for an active lifestyle to support the health of Bladensburg residents, maximizing passive and active recreation opportunities in parks and open spaces, and providing safe and attractive intersection crossings that encourage walking and bike riding in and around the town center. The BTCSP recommends that walking and biking be promoted by emphasizing resources for pedestrians and cyclists instead of automobiles including bicycle parking, benches, and other amenities. Pedestrian routes should be clearly defined with identifiable landmarks to ensure that they are visible and accessible. Trees should be planted along routes to mitigate noise, air pollution, sun glare, and heat.

The primary objective for the pedestrian loop study was to identify potential walking routes throughout the town that provide opportunities for activities that engage the participants through educational signage. The locations were chosen based on existing features, the potential to connect to existing trails, the potential to link to the Anacostia Waterfront, and the potential to celebrate Bladensburg's unique historic and cultural resources. Deficiencies of the proposed route that hinder pedestrian comfort and safety have been identified and improvements have been recommended.

The study represents a detailed analysis of roadway segments that could serve as a pedestrian route around Bladensburg and introduces potential areas for green infrastructure retrofits. To provide strategic recommendations for trail improvements, several factors were taken into account including topography, drainage patterns, right of ways, underground sewer network, and existing roadway conditions.



A EDMONSTON ROAD
Annapolis Rd to Tilden Rd
Length: 0.2 miles

A1: KENILWORTH AVENUE
Tilden Rd to Buchanan St
Length: 0.1 miles



B EDMONSTON ROAD
Tilden Rd to Buchanan St
Length: 0.4 miles



C BUCHANAN ST
Kenilworth Ave to
Tanglewood Dr
Length: 0.3 miles



D TANGLEWOOD DRIVE
Annapolis Rd to Tilden Rd
Length: 0.2 miles

D1: BALTIMORE AVENUE
Connect to Anacostia Trail
Length: 0.1 mile



E UPSHUR STREET
Kenilworth Ave. to 46th St.
Length: 0.4 miles

E1: Connect to GW House
& Anacostia Trail
Length: 0.1 mile



F 46TH STREET
Tanglewood Dr. to
Upshur St.
Length: 0.2 miles



G 46TH STREET
Upshur St. to Annapolis Rd.
Length: 0.1 miles



H ANNAPOLIS ROAD
46th St. to Edmonston Rd.
Length: 0.3 miles

SEGMENT A

Edmonston Road

Annapolis Rd. To Tilden Rd. (0.2 miles)



Edmonston Road is the location of the first two segments of the tour. Edmonston Road serves as the civic core with the Town Hall, Fire and Police Stations located here. Bus routes travel the stretch of road as well. Currently the roadway is not pedestrian friendly.

Though sidewalks exist, the sidewalks are narrow and not continuous. Breaks in the pavement are connected with dirt paths, indicating a heavily traveled pedestrian route. Portions of the route have sidewalks on only one side. Very few street trees provide shade and there are no shelters or benches.

Pedestrian safety and comfort can be improved by connecting continuous 6' wide sidewalks on either side of the street with a 6' planting strip between the roadway and the walkway where possible. The planting strip serves as a pedestrian buffer and a location for street trees and bioretention planters. Trees provide shade and combat excess stormwater through absorption through the leaves. Bioretention planters treat stormwater from the roadway. The addition of SHARROW pavement markings to better accommodate bicyclists and bus shelters will create a demonstration green street on a highly visible travel route.

The first segment of the trail begins at the proposed community building site – located at the intersection of Annapolis Road and Edmonston Road – and ends at the intersection with Tilden Road. The community building would serve as a demonstration and educational site, highlighting the walking trail and environmental resources through interpretive signage. Adding or increasing the planting buffer along Edmonston Road would allow space for street trees. Bioretention planters would connect to the existing stormwater system in the vicinity of the firehouse.



Provide 6-ft wide sidewalks and 6-ft wide planting strip with bioretention planters on both sides.

Provide min. 4-ft wide bike lanes, or SHARROWS

Provide SHARROW (Shared Bike & Auto Travel Lanes) and roadway markings.

Provide 6-ft wide sidewalks and 6-ft wide planting buffer strip with street trees.

1 Bioretention Curb Planter

Bladensburg Public Library /4820 Annapolis Rd

Bioretention planters and other green infrastructure provide stormwater treatment and educational opportunities at the library.

2 Bioretention Curb Planter

Checker's Drive-In Parking Lot/4850 Annapolis Rd

Refurbish and expand existing rain gardens that are located within the islands separating the Bladensburg Shopping Center/Checker's parking lot and Edmonston Road to treat stormwater from the parking area. Install a green roof on the Americana Grocery Store roof to reduce stormwater quantities.

3 Bioretention Curb Planter

4200 - 4213 Edmonston Rd

Install a series of bioretention curb planters in a planting strip adjacent to the roadway in the 4200 -4213 segment of Edmonston Road. Direct stormwater into the planters through curb cuts to treat runoff before it enters the catch basin.

Preliminary Cost Estimate

Description	Unit	Qty	Unit Cost	Price
Pervious sidewalk	SF	10,000	\$5	\$50,000
Street tree planting	EA	35	\$600	\$21,000
Bioretention	SF	3,000	\$80	\$240,000
Green roof	SF	4,000	\$14	\$56,000
Signage	EA	1	\$600	\$600

Drainage Area: 4 acres

Total Amount: \$367,600

SEGMENT A1 SPUR

Kenilworth Avenue

Tilden Rd. to Buchanan St. (0.1 mile)

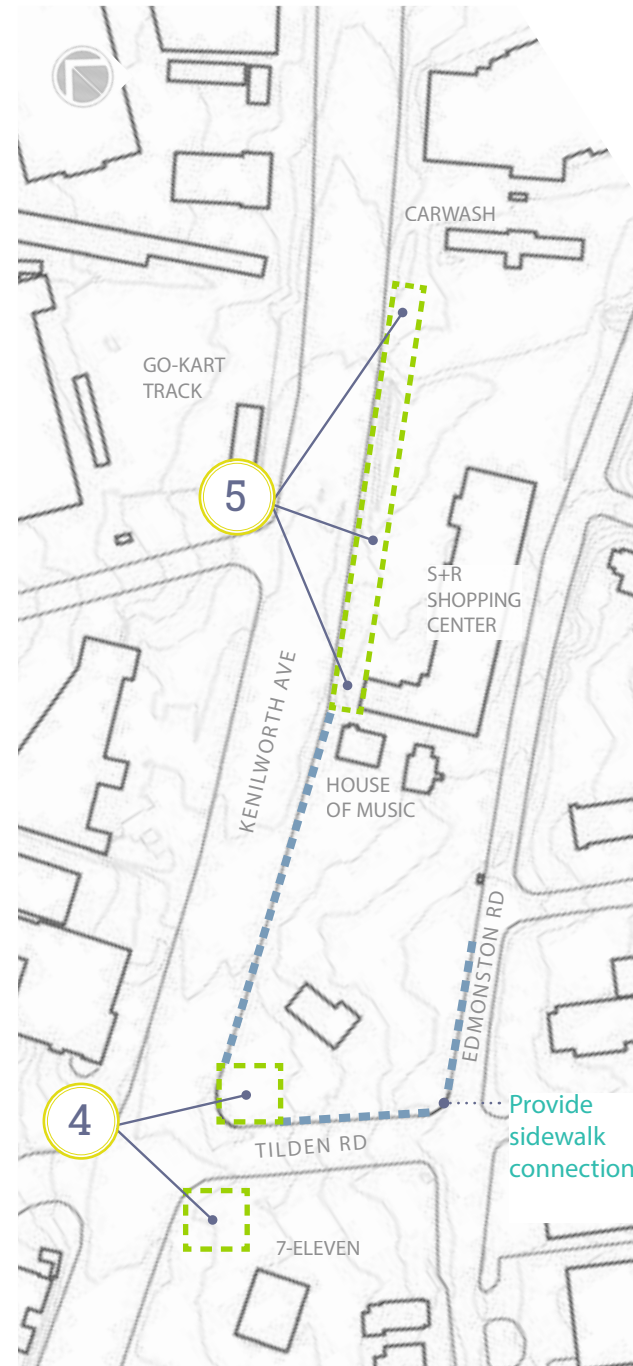


The spur from Segment A begins at the intersection of Edmonston Road and Tilden Road and connects to the shopping center via Kenilworth Avenue. Currently there are no pedestrian accommodations

though a footpath leads from the Tilden/Kenilworth intersection to the bus stop.

The grassed areas adjacent to Tilden Road (beginning at the intersection with Kenilworth Avenue) offer good opportunities for stormwater planters to collect runoff from the intersection. The area provides high visibility to demonstrate LID techniques and could serve as a gateway component for the Town.

A drainage ditch runs in front of the businesses that collect stormwater runoff from Kenilworth Avenue. The channel deepens where it connects with the underground stormwater system. This existing grassed drainage channel can be enhanced by incorporating bioswale plantings. The addition of curb cuts from the parking lot would increase stormwater filtration before it enters the storm drain system. Sidewalks and signage can be incorporated with these enhancements to create a pleasant, informative pedestrian experience along the route to the shops along Kenilworth Ave.



4 Bioretention Curb Planter

4199 & Kenilworth Ave

Install bioretention planters to capture and treat stormwater runoff from the intersection and adjacent paved areas. The area provides high visibility to demonstrate LID techniques and could serve as a gateway component for the Town.

5 Bioretention Swale Enhancement

4301 - 4511 Kenilworth Ave

Refurbish and expand existing rain gardens that are located within the islands separating the Bladensburg Shopping Center/Checker's parking lot and Edmonston Road to treat stormwater from the parking area. Install a green roof on the Americana Grocery Store roof to reduce stormwater quantities.

Preliminary Cost Estimate

Description	Unit	Qty	Unit Cost	Price
Pervious sidewalk	SF	1,700	\$5	\$8,500
Street tree planting	EA	10	\$600	\$6,000
Bioretention	SF	2,000	\$80	\$160,000
Signage	EA	1	\$600	\$600

Drainage Area: 4.5 acres

Total Amount: \$175,100

SEGMENT B

Edmonston Road

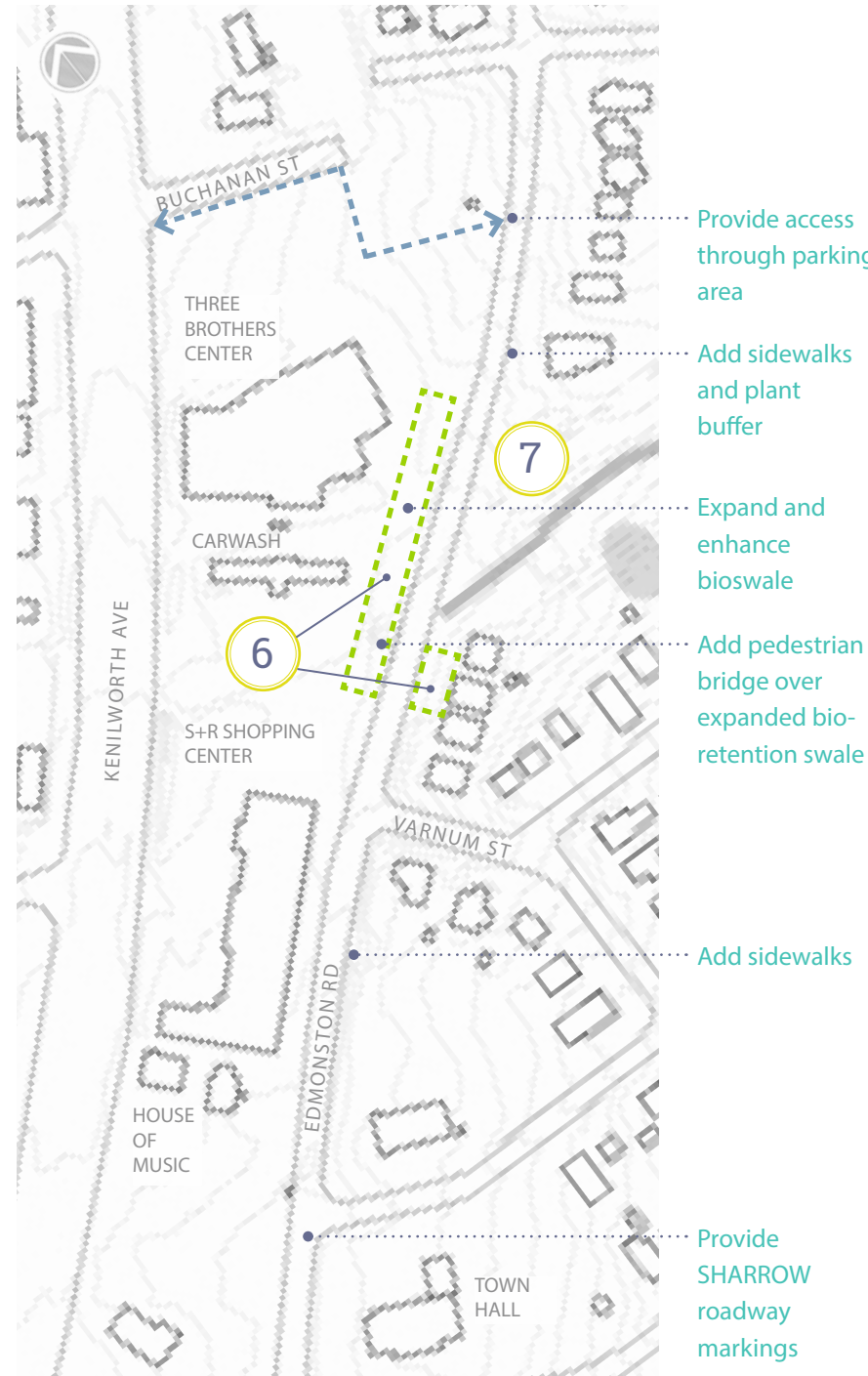
Tilden Rd. to Buchanan St. (0.4 miles)



Segment B starts at the intersection of Edmonston Road and Tilden Road and ends at the intersection of Kenilworth Avenue and Buchanan Street. This segment begins the outer, longer loop of the walking tour. Sidewalks within this segment are discontinuous; it is recommended to add sidewalks and planting buffers along Edmonston Road. The Town Hall is currently a demonstration site for energy efficiency and LID practices; include signage to highlight these features.

An expanded bioswale is proposed along Edmonston Road north of 51st Street to treat stormwater that is currently channeled directly from the roadway into the stream channel. This bioswale is an opportunity to highlight the area's hidden connection to the Anacostia River through interpretative signage. A pedestrian bridge is recommended over the area of stormwater treatment.

There is currently no connection to Kenilworth Avenue from Edmonston Road at Buchanan Street. A pedestrian link is proposed through the parking area adjacent to the Three Brothers Center. The connection would lead pedestrians to a signalized intersection that crosses Kenilworth Avenue. The outer loop of the trail runs beyond the Bladensburg town limits but offers a valuable connection to the adjacent towns, commercial areas, and the Anacostia River.



6 Bioretention Swale Enhancement & Bioretention Curb Planters

Adjacent to and across from 4321

Convert the existing mowed drainage channel into a bioswale and provide curb cuts from the parking lot. The size and location of this intervention would offer aesthetic and educational benefits.

7 Fish Blockage Removal

Northeast of Edmonston Rd/51st St Intersection

The ARP recommends fish blockage removal projects at this location to aid fish movement in the stream. The project can be highlighted through educational signage.

Preliminary Cost Estimate

Description	Unit	Qty	Unit Cost	Price
Pervious sidewalk	SF	5,000	\$5	\$25,000
Street tree planting	EA	20	\$600	\$12,000
Bioretention	SF	600	\$80	\$48,000
Signage	EA	1	\$600	\$600

Drainage Area: 2.8 acres

Total Amount: \$85,600

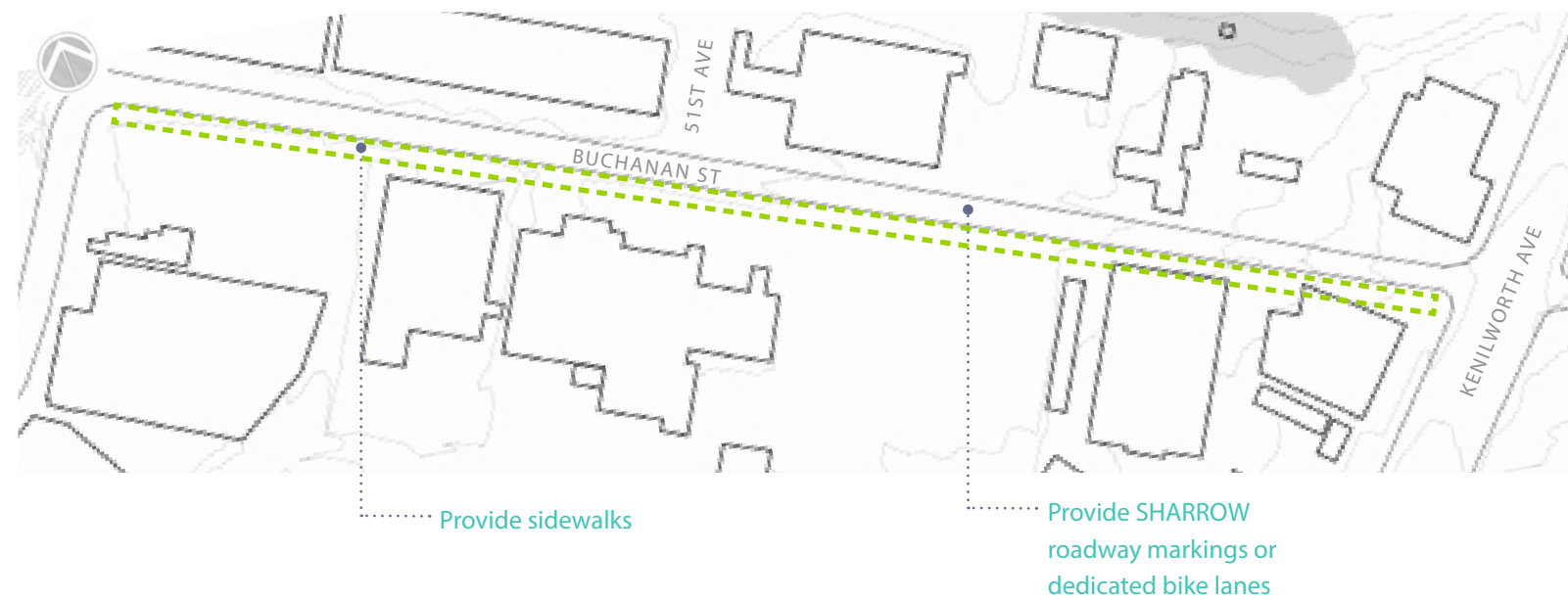
SEGMENT C

Buchanan Street

Kenilworth Ave. to Tanglewood Dr. (0.3 miles)



Segment C is part of the outer loop that begins at the signalized intersection of Kenilworth Avenue and Buchanan Street and leads along Buchanan Street to Tanglewood Drive. This portion of the trail is located in Edmonston. The Edmonston Eco-Farm, which is a model for urban agriculture is located just off the route. The roadway currently has a bicycle lane on the westbound side and sidewalks though not continuous. There is little or no vegetation along this segment. Planting strips are recommended where possible.



Preliminary Cost Estimate

Description	Unit	Qty	Unit Cost	Price
Pervious sidewalk	SF	4,200	\$5	\$21,000
Street tree planting	EA	3	\$600	\$1,800
Signage	EA	1	\$600	\$600

Total Amount: \$23,400

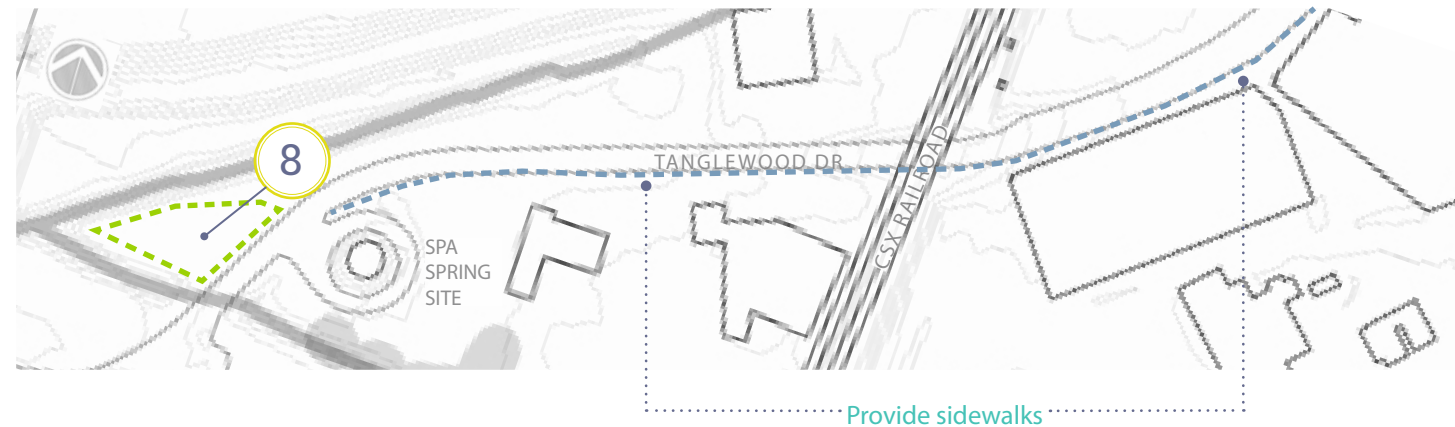
SEGMENT D

Tanglewood Drive

Buchanan St. to 46th St. (0.3 miles)



Segment D begins where Buchanan Street meets Tanglewood Drive and continues along Tanglewood to 46th Street. This segment features an at-grade signalized CSX crossing and views of the levees near the historic Spa Springs site. Currently, there are no sidewalks, roadway shoulders, or bike lane markings. Provide sidewalks and bike lanes to make this segment accessible. Planting native trees and shrubs between the roadway and the channel would contribute the health of the river and serve as an educational opportunity.



Preliminary Cost Estimate

Description	Unit	Qty	Unit Cost	Price
Pervious sidewalk	SF	7,500	\$5	\$37,500
Street tree planting	EA	30	\$600	\$18,000
Reforestation	SF	8,000	\$6	\$48,000
Signage	EA	1	\$600	\$600

Total Amount: \$104,100

8 Riparian Planting
Area north of Tanglewood Dr. adjacent to the channelized stream

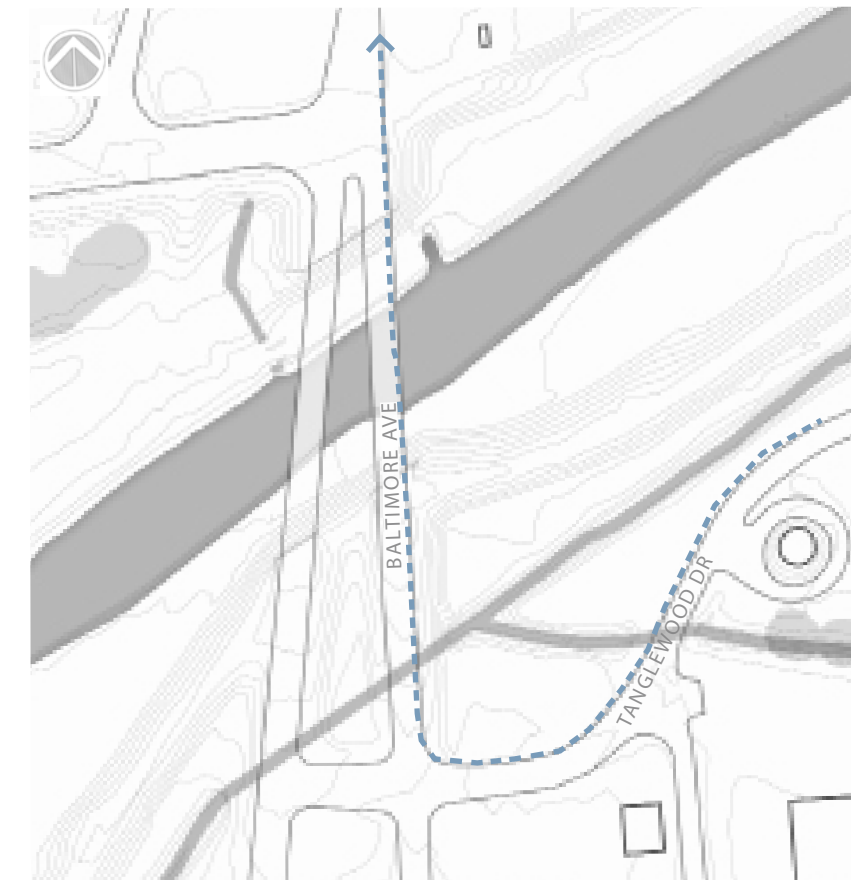
Establish planting buffer between the channel and Tanglewood Drive by planting native trees and shrubs.

SEGMENT D1 SPUR

Baltimore Avenue

Connect to Anacostia Trail (0.1 mile)

The spur from Segment D connects the tour to the Anacostia Trail via Baltimore Avenue. Tanglewood Drive meets Baltimore Avenue where a narrow sidewalk crosses the river and links directly to the trail. The Anacostia Trail links to the Bladensburg Waterfront Park as well as many local recreational areas and communities.



SEGMENT E

Upshur Street Kenilworth Ave. to 46th St. (0.3 miles)



Segment E runs along Upshur Street from Kenilworth Avenue to 46th Street. This segment runs through Bladensburg's industrial area and features a grade-separated CSX crossing. Currently, pedestrians walk

on the grass abutting the curb and gutter as there are no sidewalks. An open channel that directs stormwater towards the Anacostia River parallels Upshur Street from 48th Street to the railroad crossing. Improvements to this roadway would create a valuable connection to the waterfront area and is in alignment with County planning initiatives. Street improvements include sidewalks, lane markings, and an enhanced and widened bioswale to treat stormwater from the adjacent roadway.

9 Bioretention Swale Enhancement/ Bioretention Curb Planters

Upshur Street between 48th Ave & CSX Overpass

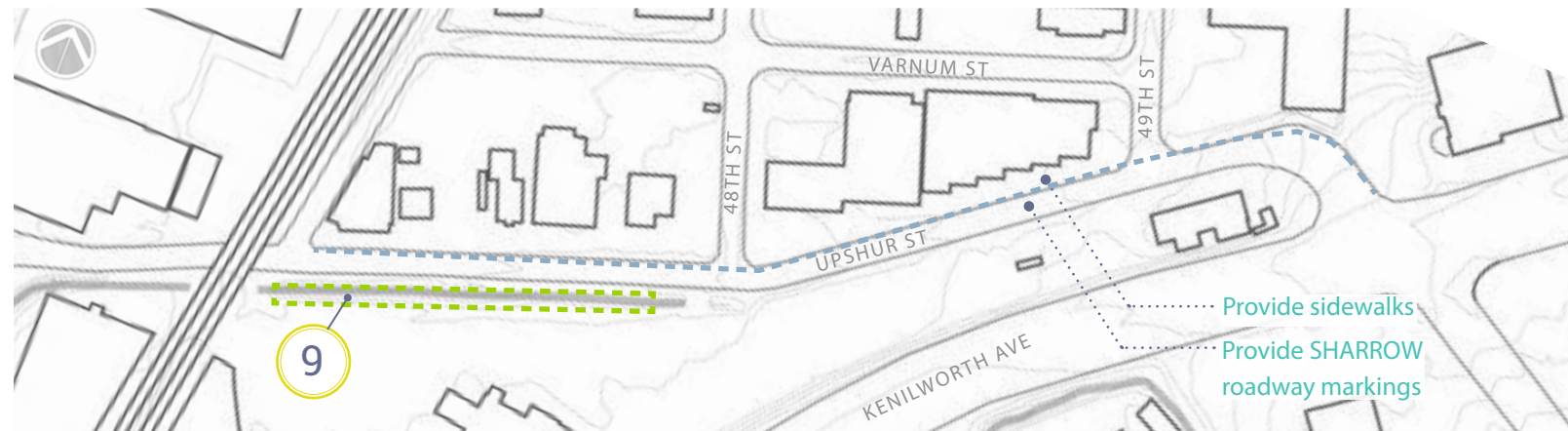
Widen the existing channel, remove invasive plants, and re-plant with native species to improve the habitat health, increase infiltration, and make the area visibly attractive. by planting native trees and shrubs.

Preliminary Cost Estimate

Description	Unit	Qty	Unit Cost	Price
Pervious sidewalk	SF	6,500	\$5	\$32,500
Bioretention	SF	2,000	\$80	\$160,000
Signage	EA	1	\$600	\$600

Drainage Area: 8 acres

Total Amount: \$193,100



SEGMENT E1 SPUR

Upshur Street Connect to GW House (0.1 mile)

Baltimore Avenue

Connect to Anacostia Trail (0.1mile)

The spur from Upshur Street offers access to some of Bladensburg's notable historic resources – the Peace Cross Monument, the Balloon Gardens, and the George Washington House located on Baltimore Avenue. The segment currently is not amenable to pedestrians due to lack of sidewalks or roadway markings. Additional study is needed to assess the impact of a pedestrian crossing at Baltimore Avenue, however, long term recommendations of the PTSP include restoring the historic street grid pattern in the vicinity of the Peace Cross monument and increasing pedestrian access to the Waterfront Park through by means of signaled intersections and crosswalks.



SEGMENT F

46th Street
Tanglewood Dr. to Upshur St. (0.2 miles)



Segment F begins at Tanglewood Drive and ends at Upshur Street. Currently there is little or no pedestrian accommodation, little or no vegetation, and the narrow roadway is dominated by on-street parking. The surrounding area is primarily pavement as well. Recommendations include installing 6' sidewalks on both sides, roadway markings with bike lanes, and planting strips. Removing portions of paving and replacing with street trees and bioretention planters will reduce stormwater runoff quantities and improve the runoff quality on existing industrial properties.

10 Bioretention Curb Planters

Capital Building Supply 4501 46th Street

Install a bioretention curb planter to treat the roadway as well as the adjacent impervious pavement.

11 Bioretention Curb Planters

4301 46th Street

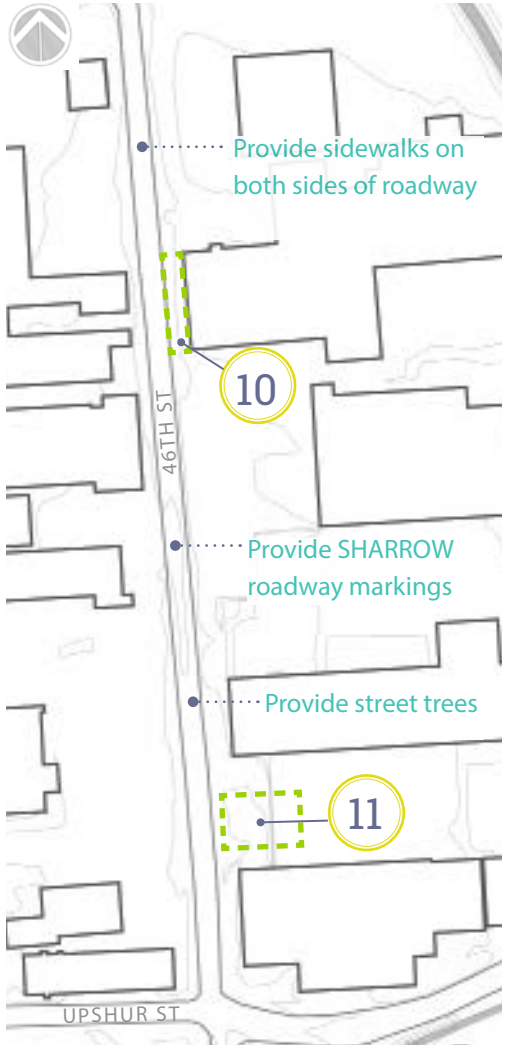
The ARP recommends the installation of a bioretention planter to treat the adjacent impervious surface.

Preliminary Cost Estimate

Description	Unit	Qty	Unit Cost	Price
Pervious sidewalk	SF	12,000	\$5	\$60,000
Street tree planting	EA	60	\$600	\$36,000
Bioretention	SF	1,000	\$80	\$80,000
Signage	EA	1	\$600	\$600

Drainage Area: 1.9 acres
(98% Impervious)

Total Amount: \$176,600



SEGMENT G

46th Street
Upshur St. to Annapolis Rd. (0.1 mile)



Segment G begins at Upshur Street and ends at Annapolis Road. The Port Towns Sector Plan (PTSP) recommends preserving, enhancing, and providing a transition to existing industrial uses. The PTSP also recommends providing a pedestrian oriented gateway entrance to the park with a signalized crosswalk. Incorporating green street elements along 46th Street advance the goals of a revitalized and integrated industrial area.

12 Bioretention Curb Planters

4519 46th Street

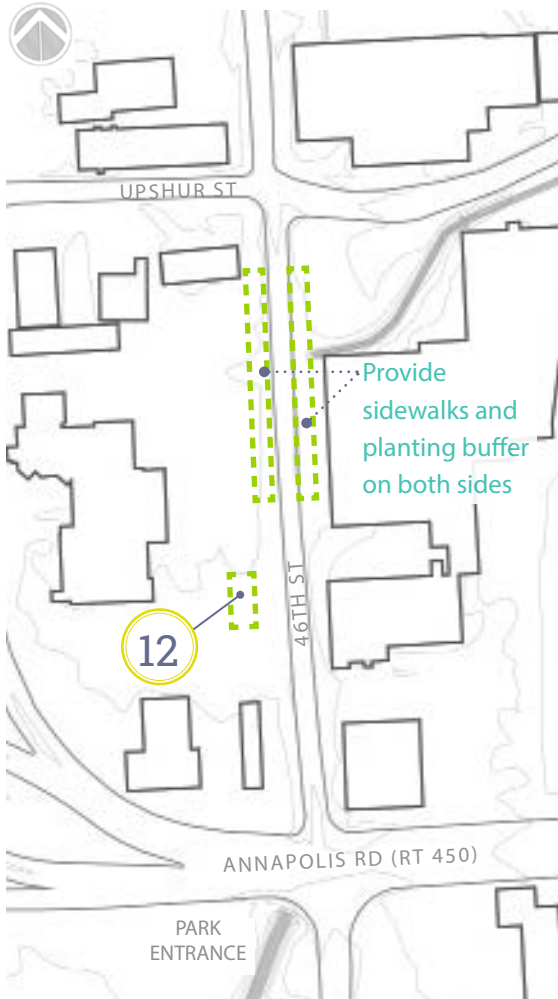
The ARP recommends the removal of pavement and the installation of a bioretention system in the parking lot.

Preliminary Cost Estimate

Description	Unit	Qty	Unit Cost	Price
Pervious sidewalk	SF	8,000	\$5	\$40,000
Street tree planting	EA	40	\$600	\$24,000
Bioretention	SF	800	\$80	\$64,000
Signage	EA	1	\$600	\$600

Drainage Area: 1.9 acres
(98% Impervious)

Total Amount: \$128,600



SEGMENT H

Annapolis Road 46th St. to Edmonston Rd. (0.3 miles)

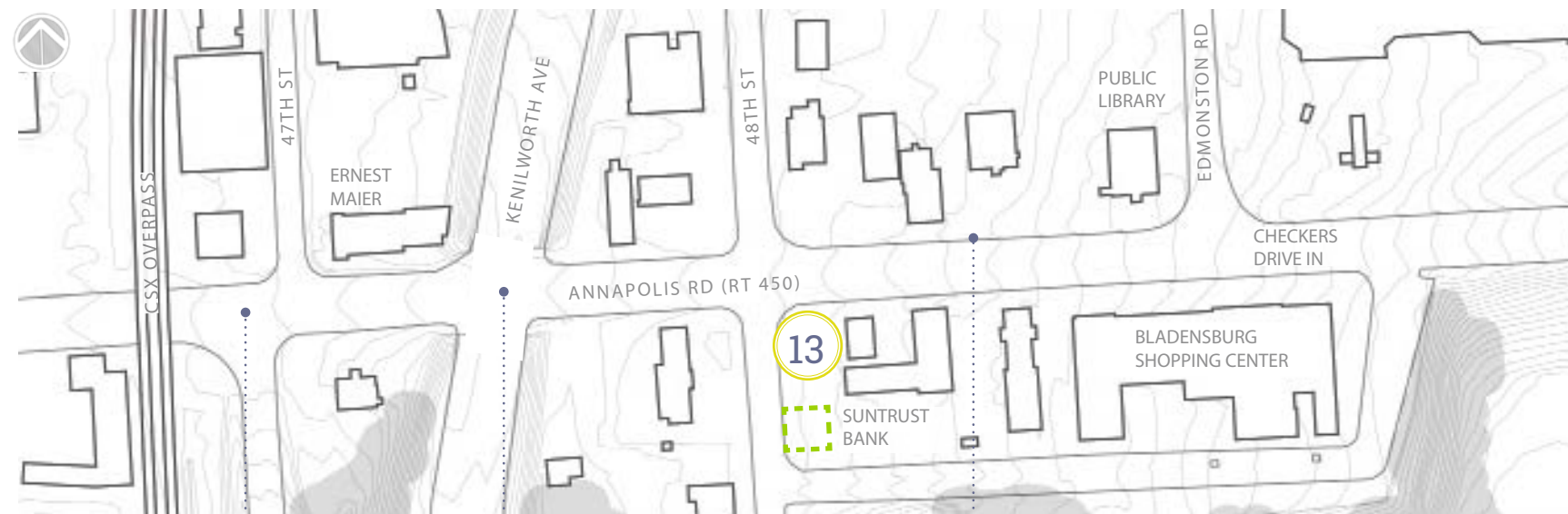


Segment H begins at the entrance to the Bladensburg Waterfront Park. From the park, visitors can access the Anacostia Trail and many cultural and recreational amenities. The final segment of the trail links the park back to its origin at the community building along Annapolis Road.

There are multiple historic resources accessible from Annapolis Road. The Hilleary-Magruder House is located along the route and the Market Master's and Bostwick Houses can be accessed from 48th Street. Wayfinding signage is recommended to highlight these resources.

Designated as an SHA Green Street, sidewalks have been upgraded along the segment though there is no buffer and the Kenilworth Avenue underpass remains problematic. Upgrades to Annapolis Road have been proposed to address these issues.

The BTCSP recommends infrastructural improvements that include upgrading Annapolis Road between 46th Street and 55th Avenue to create a pedestrian-friendly boulevard environment and removing the Kenilworth Avenue overpass to create an at-grade intersection with Annapolis Road. These improvements would substantially increase pedestrian accessibility and connection to the waterfront.



Provide bike lanes

Provide improvements to pedestrian tunnel

Provide continuous sidewalk and planting buffer with street trees

13 Bioretention

SunTrust Bank /4805 Annapolis Road

The ARP recommends the removal of pavement and the installation of a bioretention system in the parking lot.

Preliminary Cost Estimate

Description	Unit	Qty	Unit Cost	Price
Bioretention	SF	280	\$80	\$22,400
Signage	EA	1	\$600	\$600

Drainage Area: .4 acres
(98% Impervious)

Total Amount: \$23,000

06 WAYFINDING SYSTEM

WHAT IS WAYFINDING?

Wayfinding is an organization, navigation, and visual communication tool that allow users to orient themselves within a setting; determine their destination; and select a route to reach their destination. The Anacostia Heritage Trail Area Master Plan reports that wayfinding within the communities linked to the trail is challenging and there is a perception that the area is disorderly and difficult to navigate. The purpose of this component of the study is to improve navigation within the town and identify significant resources within the vicinity. Location indicators and accessible course of direction is conveyed through signage, maps, and other graphic communication.

The wayfinding signage should include a site-specific map, destination points and corresponding information for each destination. It should include the location, trail length, historical sites, and cultural amenities. In addition, it should include a brief description of the LID features and a digital scan code for access to more information.

Purpose of the Wayfinding System is to:

- Strengthen the identity of Bladensburg and the greater Port Towns communities.
- Highlight historic and cultural resources located in and around Bladensburg.
- Improve pedestrian circulation and accessibility to popular destinations.
- Utilize signage to promote a greater awareness of the Anacostia and advance the community's commitment to environmental stewardship.

DESIGN GUIDELINES

Circulation + Orientation

- Develop a focal point at the Community Building and a system of circulation paths.
- Indicate the level of difficulty for each route option (e.g., flat, gentle slope, steep slope).
- Include the “you are here” icon on the map to help users orient themselves to the general setting.
- Identify landmarks within a walkable distance (1/4 to 1/2 mile radius) from the individual signage.
- Provide directional information that guides people along a route; this includes signs with arrows and easy-to-learn pictograms.
- Place signs in transitional areas to assure users that they are on the correct path to their destinations.

Visibility + Legibility

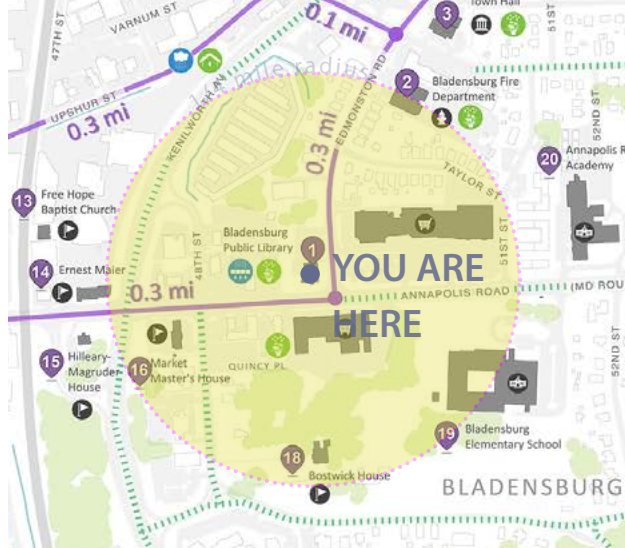
- Provide information in multiple formats (e.g., large print, Braille, voice).
- Ensure colors, text styles, and graphics are consistent, and use colors that are easily recognizable by name (blue, orange, gray)
- Place lighter text on a darker background in order to make font appear larger, and restrict the use of public safety colors (red, yellow, green)
- Ensure that signage size, shape, and accessibility comply with ADA regulations.

DESIGN EXAMPLE

Bladensburg Community Building

- ➔ Town Hall
0.2 miles
- ➔ Bostwick House
0.4 miles
- ➔ Shopping Center
0.2 miles

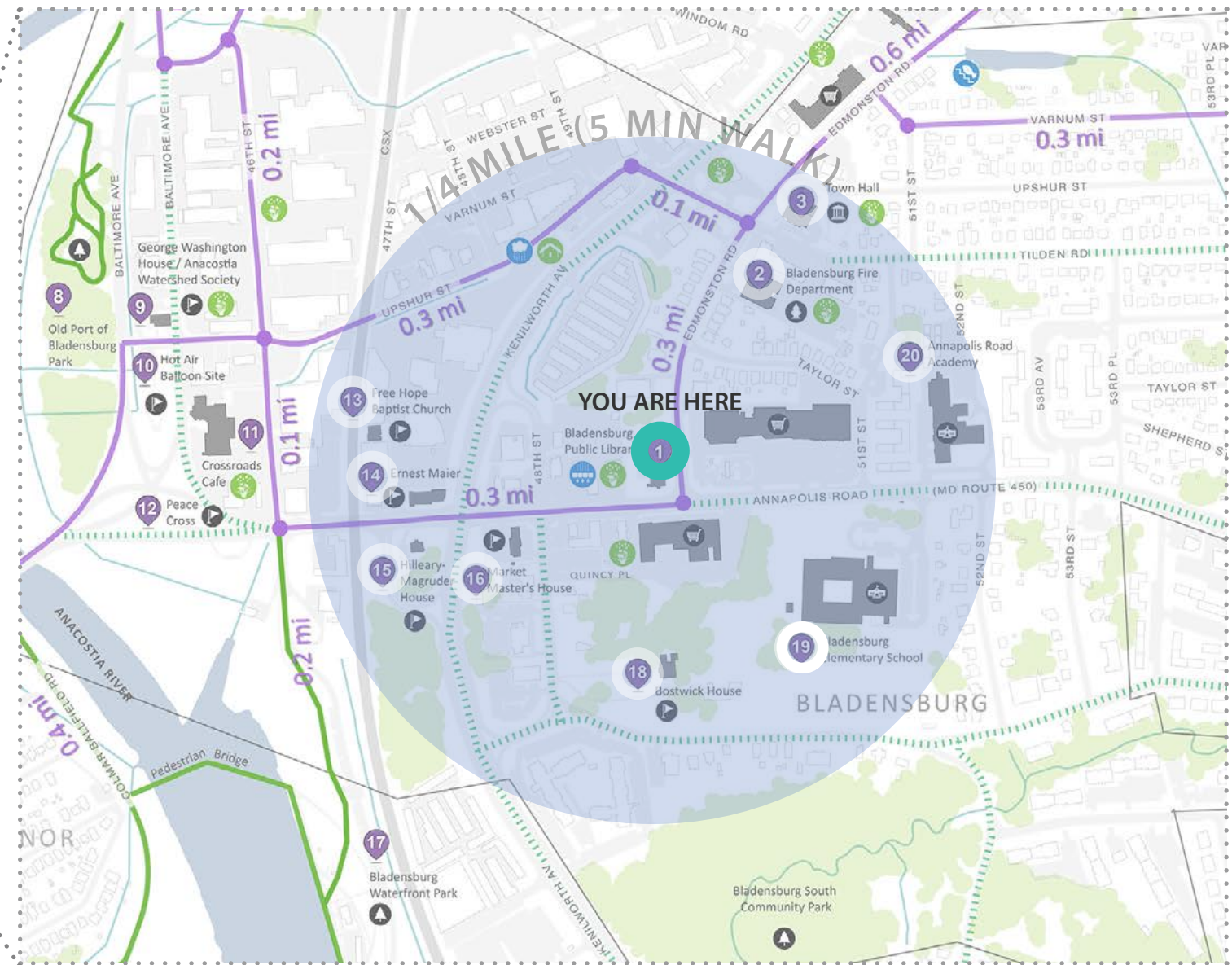
Town of Bladensburg Sustain Bladensburg Trail Map



Points of Interest:

- Town Hall
- Bostwick House, Ernest Mainer, Free Hope Baptist Church, Magruder House, Market Master's House
- Bladensburg Shopping Center
- Annapolis Road Academy, Bladensburg Elementary School

Scan to Learn More



07 STORMWATER MANAGEMENT TOOLBOX

The Stormwater Management Toolbox showcases specific green stormwater management and green infrastructure techniques available within the development and redevelopment process. Basic information is included about:

- Bioretention
- Stormwater Planter
- Permeable Pavement
- Green Roof
- Green Wall
- Street Tree
- Rain Barrel + Cistern

BIORETENTION

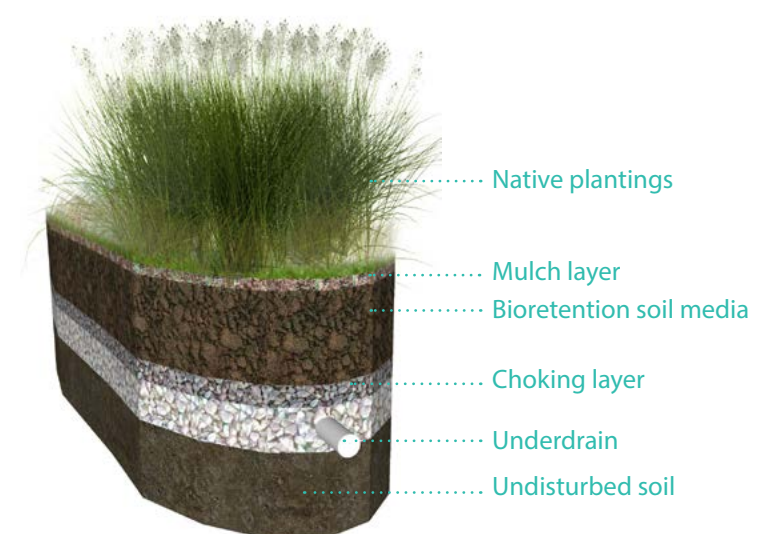
Bioretention systems are green infrastructure practices that use a combination of vegetation, such as trees, shrubs, and grasses, planted in a specialized soil bed to slow down, collect, and filter stormwater runoff. Runoff is directed into bioretention systems either as overland flow or through a stormwater drainage system. When configured as a basin, bioretention systems are most commonly referred to as rain gardens. Bioretention basins are designed to collect water and give it time to infiltrate into the ground or evapo-transpire into the air.

Because of their relatively small footprint and flexible design features, bioretention systems can easily fit into an urban landscape or other areas where space is limited. Bioretention systems can remove a wide range of pollutants from stormwater runoff, including suspended solids, nutrients, metals, hydrocarbons, and bacteria. They can also be used to slow water down to reduce peak runoff rates (NJDEP, 2009).

A range of shapes, sizes, and layouts can be used to adapt bioretention features to street configurations, grades, soil conditions, and space availability. Bioretention practices include rain gardens, stormwater curb extensions, stormwater planters, tree box filters, and bioswales.



Bioretention basins (rain gardens) allow rain and snowmelt to seep naturally into the ground while also providing beauty in the landscape.



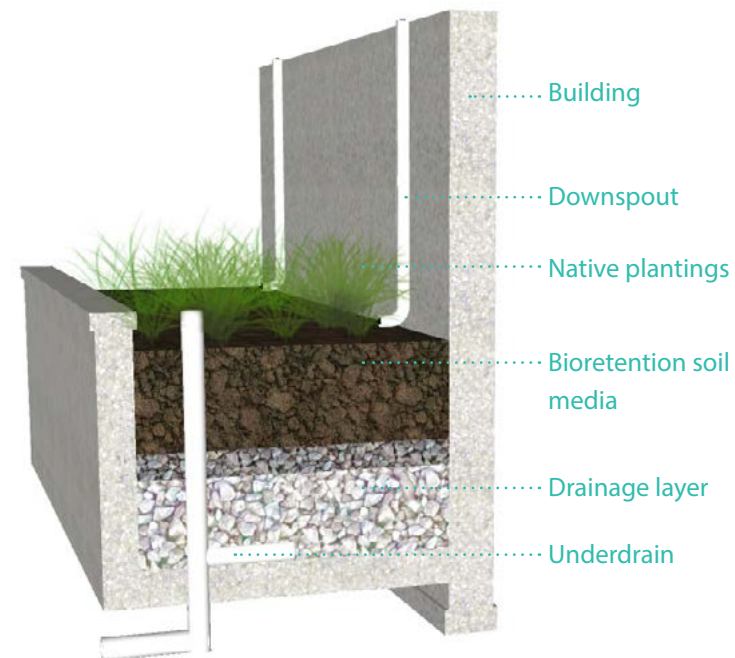
STORMWATER PLANTER

Stormwater planters –also known as infiltration or flow-through planters – are similar in function to regular bioretention practices except they are adapted to fit into “containers” within urban landscapes. Integrated into tree boxes or urban landscaping planters, stormwater planters collect runoff from pavement – mostly sidewalk and roads – and filter it through a bioretention system to treat pollutants such as excess nutrients, heavy metals, oil, and grease. Treated stormwater is then either infiltrated into the ground as groundwater or discharged into a conventional storm sewer pipe.

Stormwater planters have a small footprint, are normally rectangular, feature hard edges and concrete sides, and can easily be incorporated into street retrofits or be built to fit between driveways, utilities, trees, and other existing constraints. In addition, they also help to provide greenery, improve air quality, and reduce the urban heat island effect.



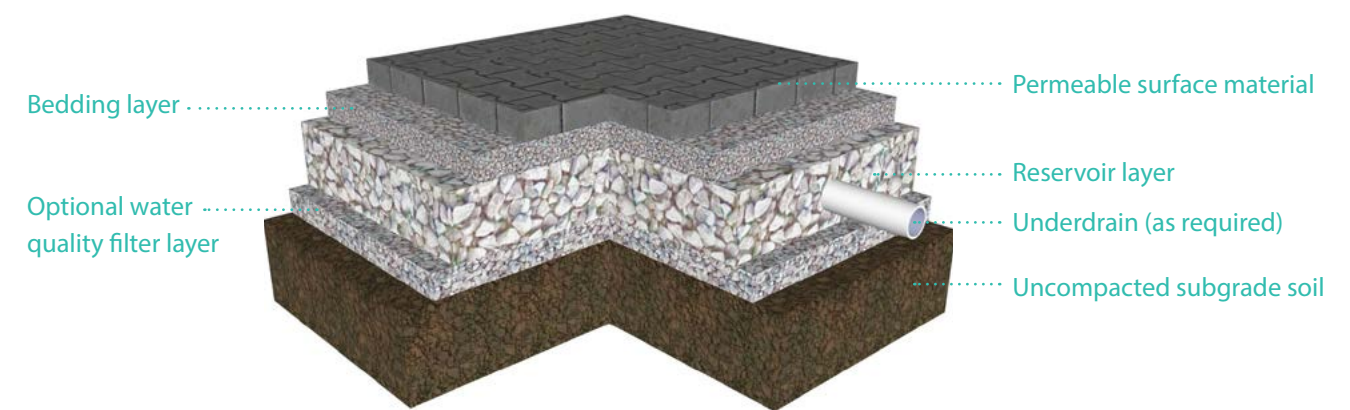
Stormwater planters are an on-site retrofit option for treating rooftop runoff in ultra-urban areas.



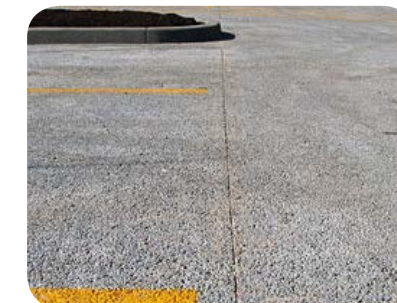
PERMEABLE PAVEMENT

Permeable pavement comes in many varieties, but the most common include interlocking permeable pavers, pervious concrete, and porous asphalt. Permeable pavement provides the same load-bearing support that conventional pavement does and is good for sidewalks, bike lanes, parking areas, and small alleys. Unlike traditional pavements, its design allows stormwater to infiltrate through the pavement to an underground storage basin or filter into the ground and recharge the water table.

Permeable pavement is ideal for planting trees in a paved environment while still permitting full use of the pavement. Their porous nature allows adjacent trees to receive ample air and water. High albedo permeable pavements reflect sunlight away from the pavement helping to reduce the urban heat-island effect, reduce cooling costs, improve the health of urban vegetation, and can improve air quality. From a health perspective, improved air quality can reduce the symptoms of respiratory disease.



Interlocking Permeable Paver



Pervious Concrete



Porous Asphalt

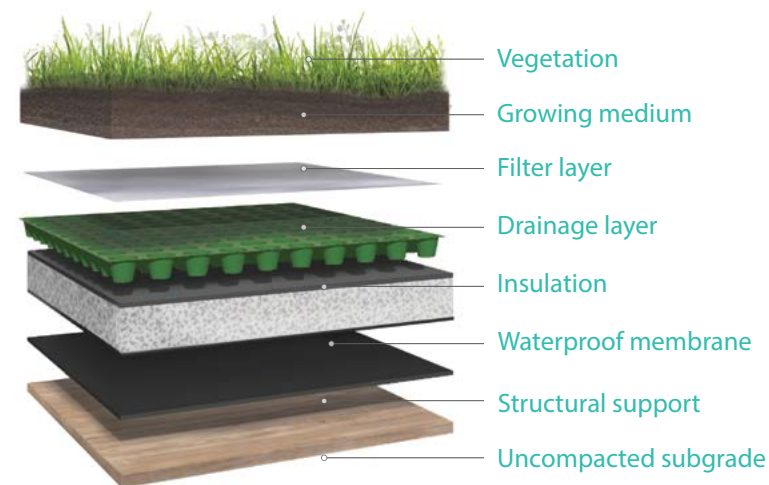
GREEN ROOF

Green Roofs provide economic, environmental, and social benefits and work with many building types. In addition to water quality benefits, green roofs reduce the life cycle costs of roofs, save on energy costs, create wildlife habitat, provide space for food production, and create usable green space that would otherwise go underutilized. Green roofs also have the capability to sequester large amounts of carbon. Replacing conventional roofing materials in an urban area of about one million people, for example, would capture more than 55,000 tons of carbon – the same effect as removing more than 10,000 mid-sized SUVs or trucks off the road a year (Getter et al. 2009).

Green roofs come in two general types: extensive and intensive. Extensive green roofs typically have a growing medium of 3-4", are usually planted with sedums, require less irrigation, and have low maintenance requirements. Intensive green roofs can have up to 12" of growing medium and can support shrubs and trees. The ability to maintain larger plant material also introduces a need for constant irrigation and a more regular maintenance schedule. Both types require additional attention to structural integrity, waterproofing and plant sustainability.



Research conducted on green roof installations in the Midwest indicates that they can retain an average of 75% of annual rainfall, with winter absorption averaging 40-50% (MacDonagh 2005).



GREEN WALL

Green infrastructure technologies are continuously evolving as engineers, designers, and landscape architects find new and creative ways to integrate 'green' concepts into urban landscapes. Green walls, also known as biowalls, living walls, and vertical gardens, are one such example. While the idea of having greenery growing up a building or retaining wall is not new, coupling it with ways to ensure improved stormwater uptake and community benefits is new.

Green walls can be designed to help slow down and absorb stormwater, clean the air, modify micro-climates, and add beauty to a garden or living space. When designed without soil, cisterns placed higher than the top of the growing medium can help provide a constant supply of water. Just as green roofs can reduce the strains on combined sewer systems by slowly releasing stormwater over time, this delay in runoff is also considered a benefit of green wall technology.

The strategic placement of green walls with street trees and other greenery can reduce air pollution (e.g., nitrogen oxide and particulate matter) by up to 30%, proving to be a more cost-efficient measure than other strategies that are currently employed (Pugh et al., 2012).



A plug system can be used in an interior setting combined with rainwater harvesting and filtering system.



A tray system is where soil is bound in burlap and plants are inserted through a hole in the fabric.

STREET TREES

Street trees are one of the most economical green infrastructure practices available. Urban trees intercept stormwater in their canopies, improve air quality, reduce the urban heat island effect, and improve neighborhood aesthetic. In a study of urban street trees in Minneapolis, MN, it was estimated that the average street tree intercepts 1,685 gallons of stormwater (McPherson et al., 2005).

One of the most important factors of planting street trees is the size and composition of the soil area. Dense, compact soil and a small soil area can dramatically reduce a tree's size potential, and as a consequence, reduce potential stormwater benefits. For urban trees to reach their full maturity, trees need 1 to 2 cubic feet of soil volume for every square foot of crown area spread. However, a typical street tree only has about 120 cubic feet of available soil, restricting its tree canopy spread to 10 ft. before it begins to decline. By expanding tree spaces to allow for 500 cubic feet of soil, the same tree canopy can grow more than 20 feet. Even larger soil volumes will yield larger trees (Casey Trees, 2008).

In more suburban settings, reforestation and afforestation can provide more benefits than street trees alone. Typically defined as reforestation or afforestation areas of contiguous woodland greater than or equal to 5,000 square feet, additional benefits include the creation of habitat, noise abatement, and stream bank stabilization.



RAIN BARREL & CISTERN

Rain barrels and cisterns are cost efficient, easy to maintain features that have applications in residential, commercial, and industrial buildings. Rain Barrels capture stormwater from the roofs of buildings and store it on site. These systems help reduce runoff volumes and velocity while protecting delicate watersheds and aquatic life.

Rain barrels and cisterns hold water that is free of most sediment and dissolved salts, making it perfect for landscape irrigation. These systems help reduce a building's overall potable water usage while capturing rain water for reuse. Covers and screens are placed at the entrance to keep out mosquitoes.

Cisterns are typically used in more commercial applications, can hold as much as 10,000 gallons of rainwater, and can be stored either above or below grade. Cisterns can help reduce pollution runoff by capturing water and storing potentially contaminated water and filtering it before further use. To be most effective, they should be completely dewatered between rain events.



A rain barrel installed at Community Forklift in Edmonston, MD.

08 APPENDIX A

BMP LOCATIONS

1. Bioretention Curb Planters - [Community Building /4820 Annapolis Road](#)

Incorporate bioretention planters when designing for the Community Building to treat stormwater runoff from Edmonston Road.

2. Bioretention Curb Planters /Green Roof - [Checker's Drive-In Parking Lot /4850 Annapolis Road](#)

Expand existing rain gardens that are located within the islands separating the Checker's parking lot and Edmonston Road. In addition, install a green roof on the Americana Grocery Store to reduce runoff quantity.

3. Bioretention Curb Planters - [4200 - 4213 Edmonston Road](#)

Install a series of bioretention curb planters in a planting strip adjacent to the roadway. Direct stormwater into the bioretention planters through curb cuts.

4. Bioretention Curb Planters - [4199 & 4201 Kenilworth Ave](#)

Install bioretention planters to capture and treat runoff from the intersection and adjacent impervious surfaces. The area provides high visibility to demonstrate LID techniques and could serve as a gateway component for the Town.

5. Bioretention Swale Enhancement - [4301 - 4511 Kenilworth Ave](#)

Convert the existing mowed drainage channel into a bioswale and provide curb cuts from the parking lot.

6. Bioretention Swale Enhancement/Bioretention Curb Planters - [Adjacent to and across from 4321](#)

Expand existing channel into a bioswale and install bioretention curb planters to treat stormwater from the roadway.

7. Fish Blockage Removal - [Intersection of Edmonston Rd NE & 51st St](#)

The ARP recommends fish blockage removal projects at this location to aid fish movement in the stream.

8. Riparian Planting - [Area north of Tanglewood Drive adjacent to the channelized stream](#)

Establish planting buffer between the channel and Tanglewood Drive by planting native trees and shrubs.

9. Bioretention Swale Enhancement/Bioretention Curb Planters - [Upshur Street between 48th Ave & CSX Overpass](#)

Widen the existing channel, remove invasive, and re-plant with natives species to improve the habitat health, increase infiltration, and make the area visibly attractive.

10. Bioretention Curb Planters - [Capital Building Supply/4501 46th Street](#)

Install a bioretention curb planter to treat runoff from the roadway and adjacent impervious surfaces.

11. Bioretention Curb Planters - [4301 46th Street](#)

The ARP recommends the installation of a bioretention planter to treat the adjacent impervious surface.

12. Bioretention Curb Planters - [4519 46th Street](#)

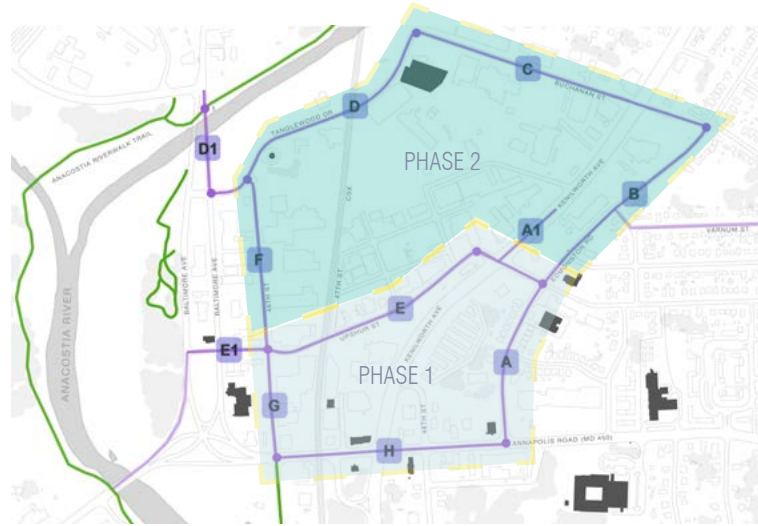
The ARP recommends the removal of pavement and the installation of a bioretention system in the parking lot.

13. Bioretention - [Suntrust Bank /4805 Annapolis Road](#)

The ARP recommends the removal of pavement and the installation of a bioretention system in the parking lot.

Appendix B

COST ESTIMATES



Community Building

Description	Unit	Qty	Unit Cost	Price
Pervious pavement	SF	20,000	\$5	\$100,000
Street tree planting	EA	8	\$600	\$4,800
Bioretention	SF	2,500	\$80	\$200,000
Green roof	SF	4,000	\$14	\$56,000
Signage	EA	1	\$600	\$600

Total Amount: \$361,400

**Community Building Estimated Total:
\$361,400**

Phase I : Segments A, E, G, H

Description	Unit	Qty	Unit Cost	Price
Pervious sidewalk	SF	10,000	\$5	\$50,000
Street tree planting	EA	35	\$600	\$21,000
Bioretention	SF	3,000	\$80	\$240,000
Green roof	SF	4,000	\$14	\$56,000
Signage	EA	1	\$600	\$600

Segment A Drainage Area: 4 acres Total Amount: \$367,600

Pervious sidewalk	SF	6,500	\$5	\$32,500
Bioretention	SF	2,000	\$80	\$160,000
Signage	EA	1	\$600	\$600

Segment E Drainage Area: 8 acres Total Amount: \$193,100

Pervious sidewalk	SF	8,000	\$5	\$40,000
Street tree planting	EA	40	\$600	\$24,000
Bioretention	SF	800	\$80	\$64,000
Signage	EA	1	\$600	\$600

Segment G Drainage Area: 1.9 acres Total Amount: \$128,600

Bioretention	SF	280	\$80	\$22,400
Signage	EA	1	\$600	\$600

Segment H Drainage Area: .4 acres Total Amount: \$23,000

**Phase I Estimated Total:
\$712,300**

Phase II : Segments A1, B, C, D, F

Description	Unit	Qty	Unit Cost	Price
Pervious sidewalk	SF	1,700	\$5	\$8,500
Street tree planting	EA	10	\$600	\$6,000
Bioretention	SF	2,000	\$80	\$160,000
Signage	EA	1	\$600	\$600

Segment A1 Drainage Area: 4.5 acres Total Amount: \$175,100

Pervious sidewalk	SF	5,000	\$5	\$25,000
Street tree planting	EA	20	\$600	\$12,000
Bioretention	SF	600	\$80	\$48,000
Signage	EA	1	\$600	\$600

Segment B Drainage Area: 2.8 acres Total Amount: \$85,600

Pervious sidewalk	SF	4,200	\$5	\$21,000
Street tree planting	EA	3	\$600	\$1,800
Signage	EA	1	\$600	\$600

Segment C Total Amount: \$23,400

Pervious sidewalk	SF	7,500	\$5	\$37,500
Street tree planting	EA	30	\$600	\$18,000
Reforestation	SF	8,000	\$6	\$48,000
Signage	EA	1	\$600	\$600

Segment D Total Amount: \$104,100

Pervious sidewalk	SF	12,000	\$5	\$60,000
Street tree planting	EA	60	\$600	\$36,000
Bioretention	SF	1,000	\$80	\$80,000
Signage	EA	1	\$600	\$600

Segment F Drainage Area: 1.9 acres Total Amount: \$176,600

**Phase II Estimated Total:
\$564,800**

Note:

- Costs not provided for: roadway marking, demolition, gray infrastructure, architecture
- Roadway marking to be scheduled in conjunction with roadway improvement projects.
- Streetscape improvements for Kenilworth Avenue to be integrated into State Highway's overall Capital Improvements Program
- Quantity of street trees were determined by spacing of 30' on center.
- Costs for solar panels and LED lighting to be determined upon completion of final design.
- Costs for extensive green roofs can range from \$14-\$25 per square foot (Gudeman, 2012).
- Unit cost for bioretention referenced from: "Cost of Stormwater Management Practices in Maryland Counties" prepared by Dennis King and Patrick Hagan.

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PHOTO SOURCES

Page #	Credit
2	Town of Bladensburg
12	Top Left: LID Center Top Center: LID Center Top Right: Linden Lampman Mead Middle Left: LPA, Inc. Middle Center: City of Mt. Rainier Middle Right: U.S. EPA Bottom Left: Ernest Maier, Inc. Bottom Center: Manuguf Bottom Right: Stanton Homes
30	LID Center
31	Left: LID Center Right: Ernest Maier, Inc.
32	Left: City of Mt. Rainier Center: Bonnie Alter Right: Manuguf
33	Stanton Homes