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GREENING
AMERICA'S
CAPITALS

THE ANACOSTIA METRO STATION AREA

Washington, D.C.

EPA United States Environmental Protection Agency

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Greening America's Capitals is a project of the Partnership for Sustainable Communities between the U.S. Environmental Protection Agency (EPA), the U.S. Department of Housing and Urban Development (HUD), and the U.S. Department of Transportation (DOT) to help state capitals develop an implementable vision of distinctive, environmentally friendly neighborhoods that incorporate innovative green building and green infrastructure strategies.

EPA is providing this design assistance to help support sustainable communities that protect the environment, economy, and public health and to inspire state leaders to expand this work elsewhere. Greening America's Capitals will help communities consider ways to incorporate sustainable design strategies into their planning and development to create and enhance interesting, distinctive neighborhoods that have multiple social, economic, and environmental benefits.

Washington, D.C., was chosen in 2011 as one of five state capital cities to receive this assistance along with Montgomery, Alabama; Phoenix, Arizona; Jackson, Mississippi; and Lincoln, Nebraska.

More information is at http://www.epa.gov/smartgrowth/greencapitals.htm.

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EXECUTIVE SUMMARY

The Anacostia Metro station attracts thousands of transit users each day for trips to work, school, and other destinations. The area lies at the intersection of major roads and is near several planned development projects, so it is likely to grow in the future. The site is surrounded by four arterial roads that have significant traffic, making it difficult for pedestrians and cyclists to get to the Metro station. The District of Columbia asked the U.S. Environmental Protection Agency's Greening America's Capitals program to help create a plan for the streets and intersections around the station. Improving the public realm by using environmentally sustainable techniques can make the area both greener and safer.

The EPA team analyzed the site and its environs and found that the surrounding streets and intersections had poorly marked and maintained crosswalks, incomplete sidewalks and bicycle lanes, and large curb radii that allow vehicles to make turns at high speed.

The team developed a menu of potential changes, including median refuges, clearly marked bicycle paths, and better crosswalks. These improvements would help people feel safer and more comfortable walking to and from the transit station.

The natural systems analysis found that a significant amount of storm water runoff channeled through the area to the nearby Anacostia River, both at the surface and in drainage pipes underground, without any kind of water quality treatment. Green infrastructure strategies, including rain gardens, porous paving, and constructed wetlands, could enhance the public realm and improve the river's water quality.

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The team presented a range of ideas for discussion with the community during a three-day workshop. With local government and resident input, the team developed design concepts that integrate solutions to keep pedestrians and bicyclists safe while improving water and air quality:

- Change Howard Road from a predominantly automobile-oriented street to one that achieves a better balance between vehicles and pedestrians.
- Improve pedestrian and bicycle safety at the station.
- Add a more formal street closure at Shannon Place to prevent illegal vehicular access from Howard Road.
- Turn the Shannon Place cul-de-sac into a pedestrian plaza and park, reduce the impervious surface by replacing it with a lawn and porous pavements, and add a broad crosswalk the width of Shannon Place to make it safer for pedestrians to cross Howard Road to get to the station.
- Use the planned removal of the entrance ramp to Interstate 295 near the intersection of Firth Sterling Avenue and Howard Road for constructed wetlands that would provide ecological and educational value.
- Realign the roads and crosswalks at the intersection of Howard Road, Martin Luther King, Jr. Avenue, and Sheridan Road to provide safer, shorter crossings. This realignment could create a small park between Sheridan Road and Martin Luther King, Jr. Avenue that could include neighborhood historical markers, art, or wayfinding information.
- Add a new bicycle path along Suitland Parkway to provide a regional connection from the Anacostia and Hillside neighborhoods to the Anacostia River.

The team offers these design concepts for the District government to consider as it plans for future improvements in the Anacostia Metro station area and seeks funding for implementation. The ideas behind these designs could also be applied to other sites in the District and elsewhere to incorporate environmentally sustainable practices into pedestrian and bicycle safety improvements.

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PROJECT GOALS

About 12,000 passengers board Metrobuses and 7,700 get on Metrorail at the Anacostia Metro station each weekday. It is surrounded by four major roads: Suitland Parkway, Martin Luther King, Jr. (MLK) Avenue, Firth Sterling Avenue, and Howard Road. Bus, car, bicycle, and pedestrian traffic on these roads converges at the station area. Several large development projects are planned or underway nearby and are anticipated to increase station use. The District of Columbia recognized the need to improve pedestrian access and safety at the Metro station and applied for assistance from EPA's Greening America's Capitals program. EPA convened a team of EPA staff and private-sector design experts from Parker Rodriguez, Inc. and ZGF Architects to help the city develop design concepts for the station area. The city's goals for this assistance include:

- Plan for improvements on the roads and intersections surrounding the station to improve pedestrian and bicycle safety and access.
- Incorporate green infrastructure for stormwater management, using vegetation and soil to manage rainwater where it falls.
- Make the area more environmentally sustainable and attractive for residents and better connect the neighborhood to the Anacostia River.

Figure 1: Anacostia Metro station site.

The design concepts that the team developed can help the community envision a public realm that is both safer and more environmentally responsible. The District could choose to incorporate some of these ideas into future plans for improvements.

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WORKSHOP

On February 13-15, 2012, the District of Columbia hosted a design workshop to present and discuss design options for the Anacostia Metro station area.

Members from a variety of stakeholder groups participated, including the DC Office of Planning, DC Department of Housing and Community Development, District Department of Transportation, District Department of the Environment, Washington Metropolitan Area Transit Authority (WMATA), Metropolitan Police Department, and local schools.

On the evening of the first day, a public meeting was held in Matthews Memorial Baptist Church on MLK Avenue at which several design options for the site were discussed. Participants from the community noted that:

- The heaviest pedestrian and vehicular traffic occurs when schools close, before the evening rush hour.
- Wayfinding for visitors and new users of the Metro station is poor and could be improved.

Figure 2: Residents, local government officials, and staff attended the workshop to help develop the design concepts.

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- Better nighttime lighting would improve public safety.
- Shannon Place should be more securely closed to vehicular traffic from Howard Road to prevent vehicles from illegally crossing the sidewalk.
- Better pedestrian access to the river from the station area is needed.
- The community wants to celebrate the history of the neighborhood and could use public spaces to do so.
- The Baptist church at the corner of MLK Avenue and Howard Road has plans for the development of a vacant parcel it owns on the other side of Howard Road, although those plans were not presented.

After the public meeting, the team met with District government staff to develop design concepts that reflected the community's input. On the third day, the team presented revised plans and sketches at an open house (see Appendix A). The public generally supported the proposed design concepts.

Figure 3: The team presented preliminary design concepts at a public open house.

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SITE ANALYSIS

REGIONAL CONTEXT

Nearby developments are expected to increase ridership at the Metro station. These include the relocation of the Department of Homeland Security to St. Elizabeth's campus, the consolidation of the Naval Support Facility Anacostia and Bolling Air Force Base as Joint Base Anacostia-Bolling, and redevelopment of Poplar Point. All of these areas are within half a mile of the station, putting them within a five- to 15-minute walk. In addition, the Barry Farm neighborhood is slated for redevelopment, and the MLK Avenue corridor is part of the District's Great Streets Initiative, a multi-year, multiple-agency effort to transform under-invested corridors into thriving and inviting neighborhood centers. The land around the site is expected to become more densely developed and populated, so the site will need to serve more people in a safer fashion with better connections to new and existing uses.

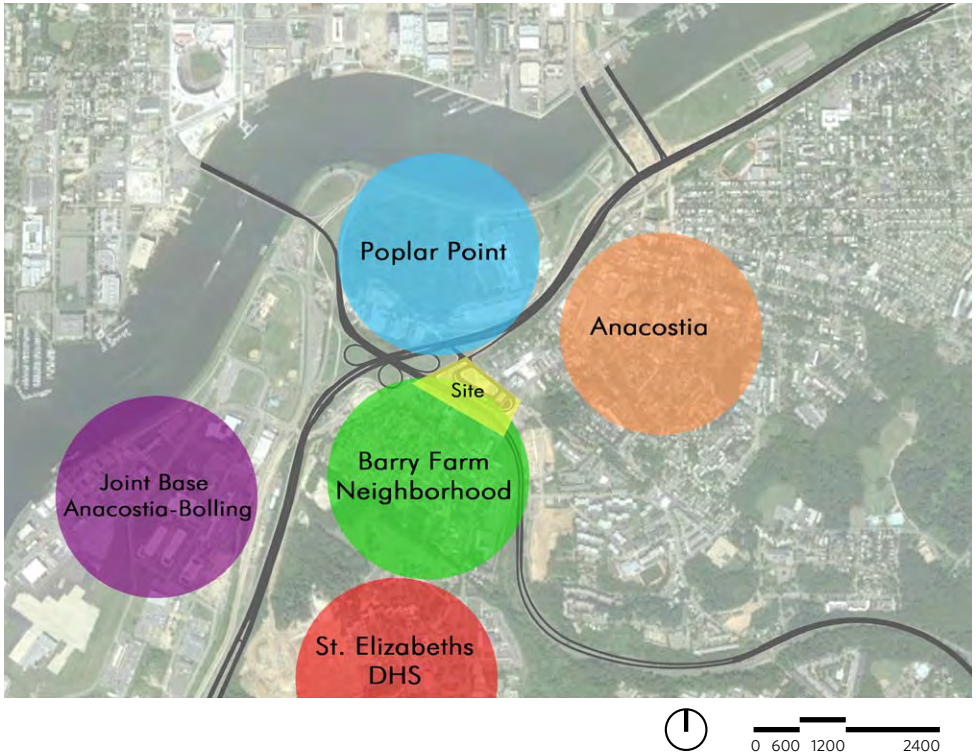

Figure 4: Regional land use nodes.

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REGIONAL HYDROLOGY

The watershed that drains to this area covers hundreds of acres and sends runoff, both overland and in storm drains, directly to and through the site. I-295 is a raised highway, and its embankments act as levees to thwart the direct overland flow of this runoff to the Anacostia River, except for two openings at Suitland Parkway and Howard Road. The existing storm drainage system appears adequate to direct this runoff safely to the Anacostia River, so flooding does not currently seem to be an issue in the area. However, the river receives all of the area's stormwater with the pollutants it has picked up along roadways, roofs, and other impervious surfaces. As the proposed developments in the area are built, safely managing stormwater moving through the site could become more challenging. Capturing stormwater and using natural systems to cleanse it before it reaches the Anacostia River would improve water quality and reduce the threat of flooding.

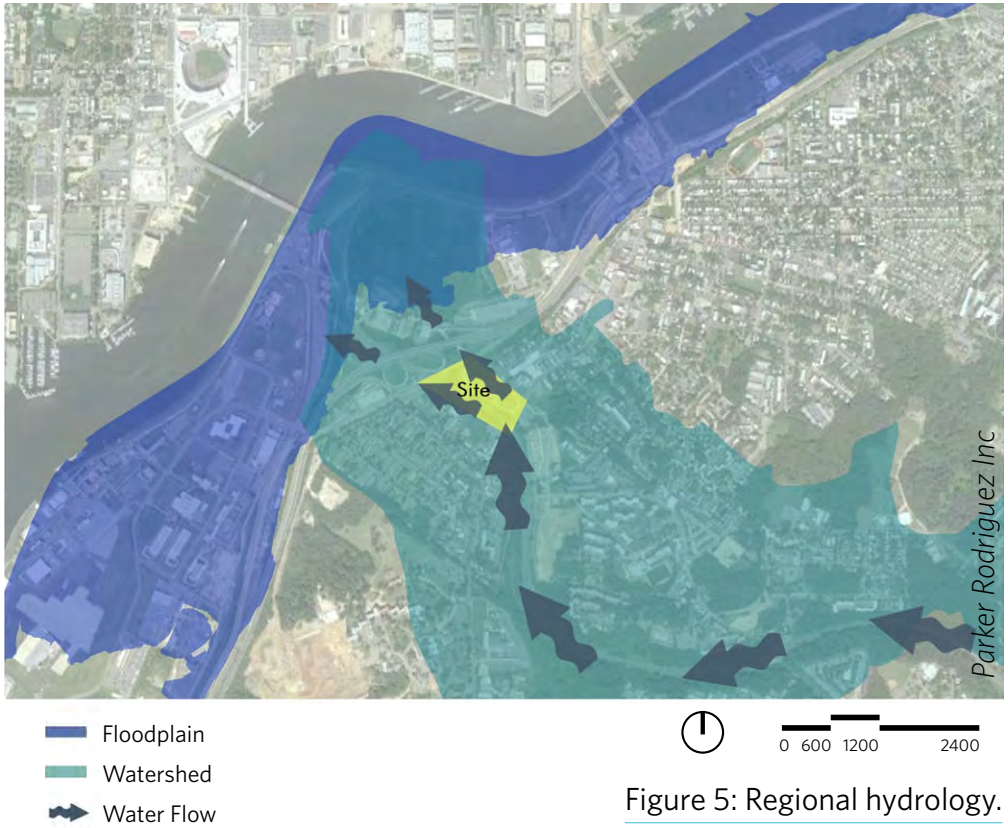

Figure 5: Regional hydrology.

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SITE HYDROLOGY

The site lies at the lower end of a tributary of the Anacostia River called Stickfoot Creek. The natural channel of the creek follows Suitland Parkway, but it is contained entirely in underground pipes at the site. The site captures significant off-site runoff from upstream communities, mostly drawn through the areas that envelope Suitland Parkway and Howard Road.

A proposed South Capitol Street project would remove ramps on the northwest side of Firth Sterling Avenue, which could make the land available for another use (see Appendix B for more information about this project). One use to consider might be stormwater management that incorporates green infrastructure solutions.

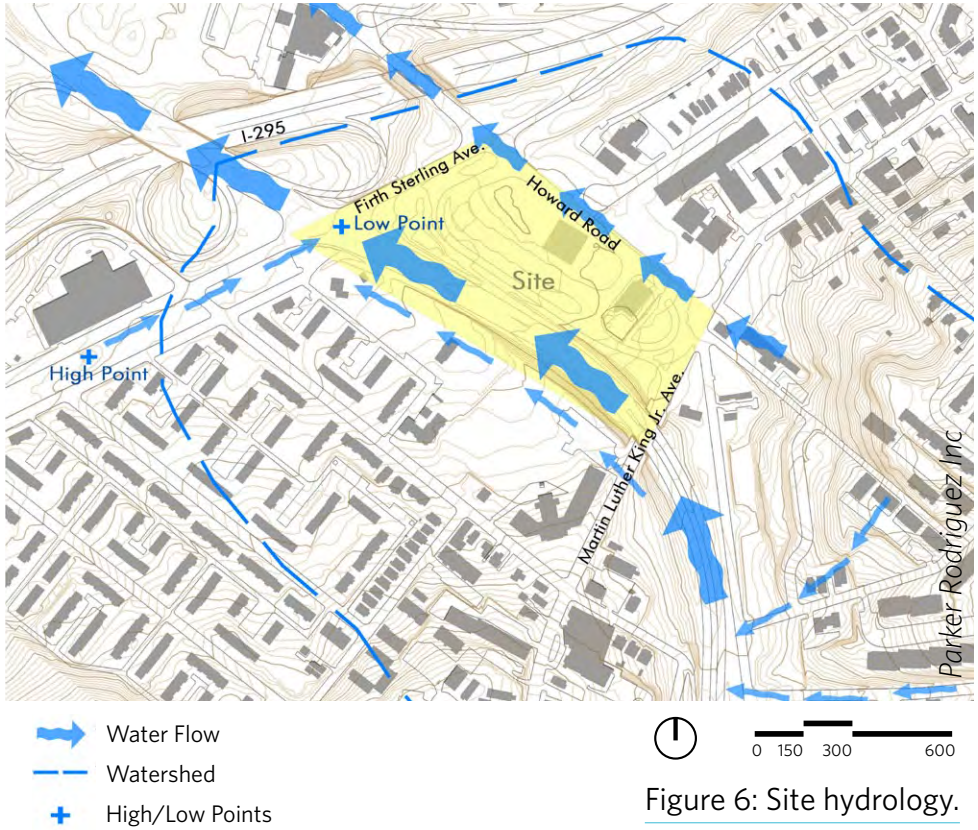

Figure 6: Site hydrology.

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IMPERVIOUS SURFACES

The area immediately around the station and adjoining roads is predominantly impervious. The landscaped spaces around Suitland Parkway and I-295 provide some pervious area. However, Suitland Parkway is slated to be widened by three lanes in the proposed South Capitol Street project (see Appendix B). Barry Farm has a relatively large amount of open space, but this area is also going to be redeveloped. These and other future developments could increase the impervious surfaces in the watershed, further affecting the Anacostia River and increasing the threat of flooding at the site. However, redevelopment of the area also provides an important opportunity to reduce the threat of flooding and reduce pollutants carried by stormwater into the Anacostia River by incorporating into projects green infrastructure that uses natural systems to manage rainwater where it falls.

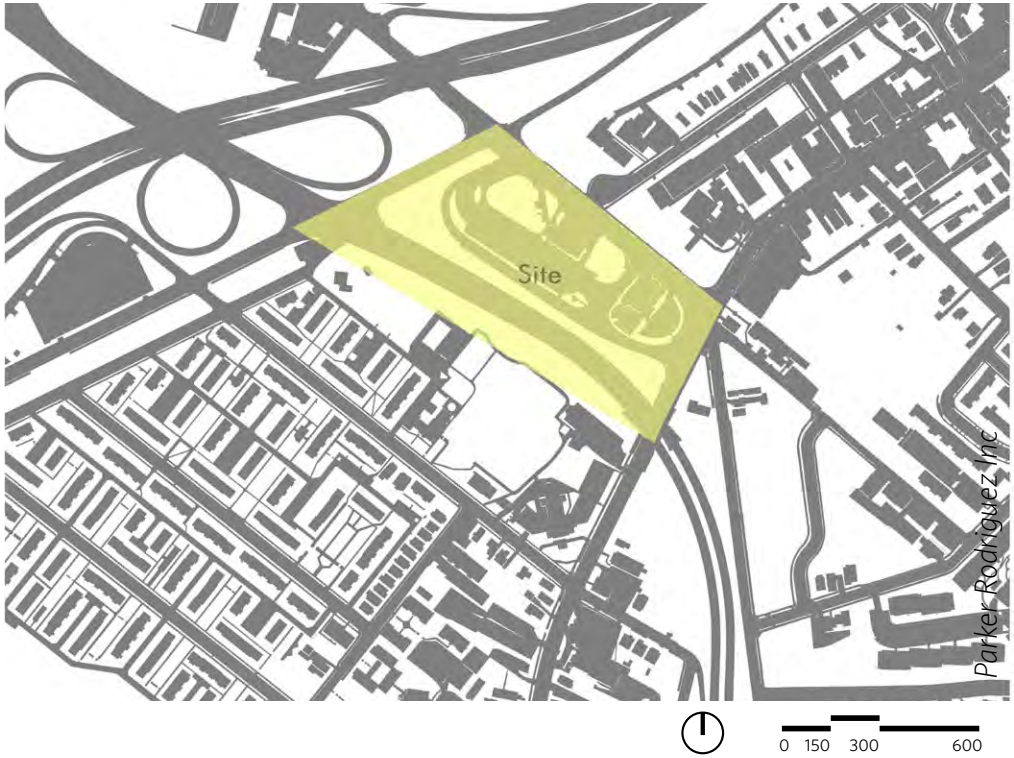

Figure 7: Impervious surfaces (illustrated in gray).

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LAND USE

The Anacostia Metro station lies between two predominantly residential communities, historic Anacostia to the northeast and Barry Farm to the southwest. To the northeast is a mix of single- and multifamily residences on a densely interconnected street grid. Barry Farm includes apartment buildings set in landscaped courtyards with alleys and parking in the rear. Both neighborhoods feature building heights of one to three stories, giving of the neighborhood moderate density and human scale. Barry Farm has a large recreation facility and ball fields along its northern boundary adjacent to Suitland Parkway.

The core of historic Anacostia is northeast of the site, and its commercial corridor follows MLK Avenue through the site area. In addition to retail uses, institutional uses and churches are sprinkled along MLK.

Four schools are within walking distance of the station. They create significant pedestrian activity in the morning and the afternoon as children make their way to school and home again. All of the main roads surrounding the station—Firth Sterling Avenue, Howard Road, and MLK Avenue—are major routes for schoolchildren.

One of the schools is on Howard Road northwest of I-295, requiring most students to walk under the highway overpass to reach it.

Figure 8: Land use.

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REGIONAL TRANSPORTATION

The site lies at the nexus of multiple modes of transportation, both existing and proposed. Vehicular access to the site is excellent. Regional roads include I-295, which is part of the interstate network; Suitland Parkway, the major connector from Washington, D.C., to Andrews Air Force Base; and MLK Avenue, the main street for all of Anacostia.

Heavy use of the Metro station is partly attributable to the fact that over 20 bus routes stop at the station, and ridership is likely to increase because of the planned developments in the area. The bus routes use Firth Sterling Avenue, Howard Road, and MLK Avenue to reach the Metro station.

In addition to the existing public transit options, the District of Columbia plans to build a streetcar system, with a line running from Joint Base Anacostia-Bolling through the Metro station site and north to the 11th Street Bridge. The streetcar will stop at the Metro station, although the precise alignment and location of the stop are not yet finalized. Thus, the station area will see more pedestrian activity as people change between the streetcar, Metrorail, and buses.

The District has also developed a plan for a regional bicycle network in the site area. A portion of the network is already in place along Suitland Parkway south of the site. The goal is to provide a continuous bicycle path along Suitland Parkway to the Anacostia River Park at Poplar Point and the new Frederick Douglass Memorial Bridge across the Anacostia River (see Appendix B). District planners envision the Anacostia station site including a link to that path along the southwest side of the station.

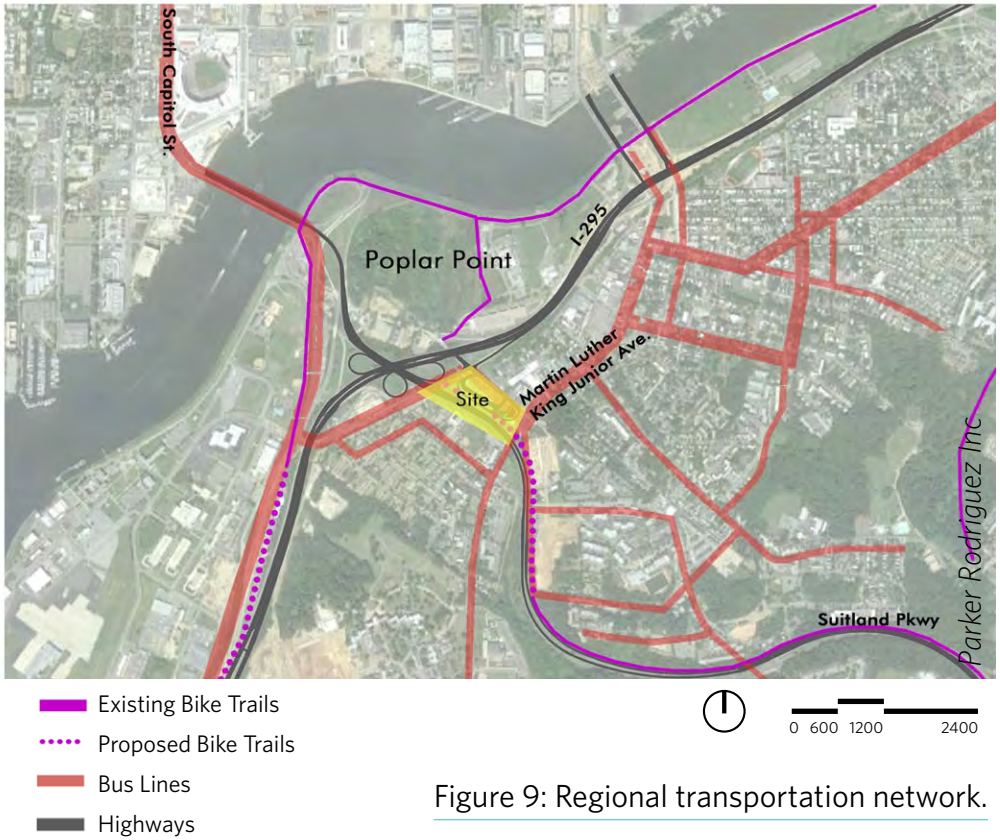

Figure 9: Regional transportation network.

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LOCAL TRANSPORTATION

Although the site has excellent vehicular access, many of the roads in the site area lack adequate pedestrian and bicycle paths. While MLK Avenue has adequate sidewalks, Howard Road and Firth Sterling Avenue have incomplete, narrow, and/or deteriorated sidewalks, which make them less appealing to pedestrians. Suitland Parkway is a limited-access highway with no sidewalks. An existing bicycle path, separated from traffic along the eastern side of Suitland Parkway, ends less than half a mile from the Metro station. Howard Road is a designated bicycle route, but it does not have a bike lane, and there is substantial automobile and bus traffic on the road.

Adjoining the Firth Sterling Avenue right of way is a CSX rail line that is not currently used by the railroad and is in disrepair. Its right of way might be available for a bike path if the District and CSX can reach agreement.

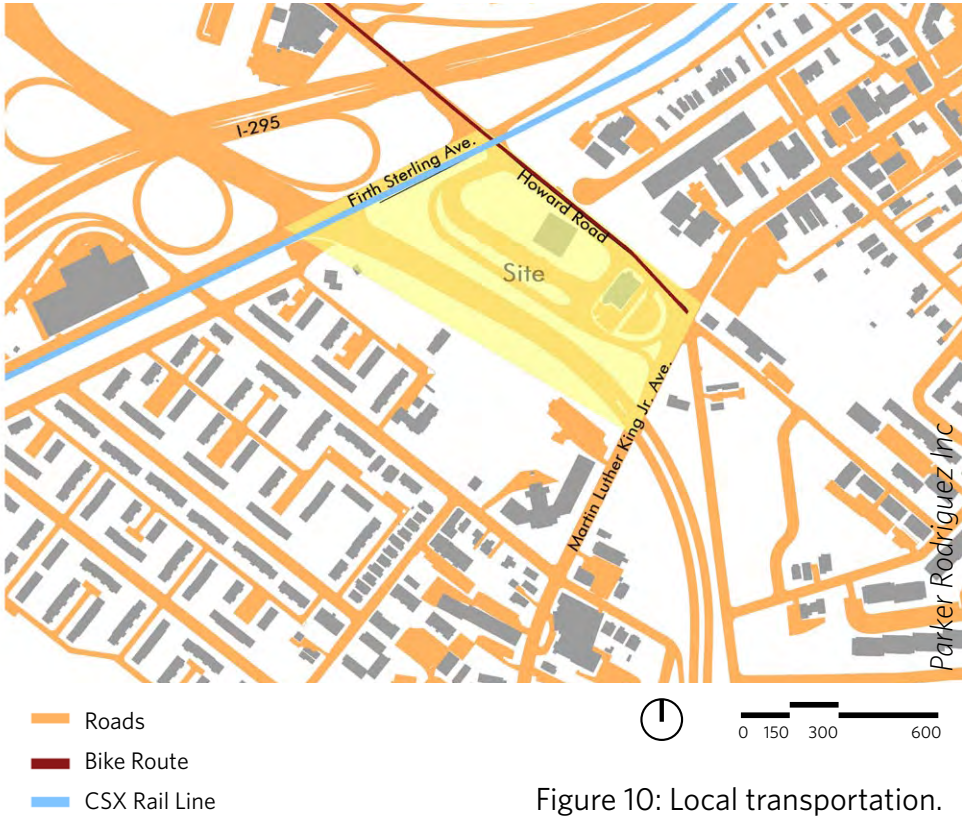

Figure 10: Local transportation.

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PEDESTRIAN NETWORK

Pedestrians face multiple challenges to safe passage through the site. Key intersections have high vehicular traffic volumes and often fast-moving traffic, especially along Firth Sterling Avenue and Suitland Parkway. The crosswalks are poorly marked or deteriorated. Many have no pedestrian refuge in the middle of the road for people who cannot cross the street in one signal cycle; where refuges do exist, they are inadequate. Sidewalks in the area are often not wide enough to accommodate the number of pedestrians who use them. Improving public safety is a high priority given the throngs of schoolchildren who walk through the site every day.

I-295 is a barrier between the site and the Anacostia River and the Poplar Point area, compelling pedestrians to use the narrow sidewalks of Howard Road under the I-295 overpass. Suitland Parkway separates the Metro station from Barry Farm, forcing pedestrians to use either Firth Sterling Avenue or MLK Avenue, lengthening the distance they must walk.

The intersection of Howard Road, MLK Avenue, and Sheridan Road is particularly challenging for pedestrians. Five roads come together in an ungainly way, creating irregular crosswalk patterns, extended crosswalk lengths, and inadequate pedestrian refuges.

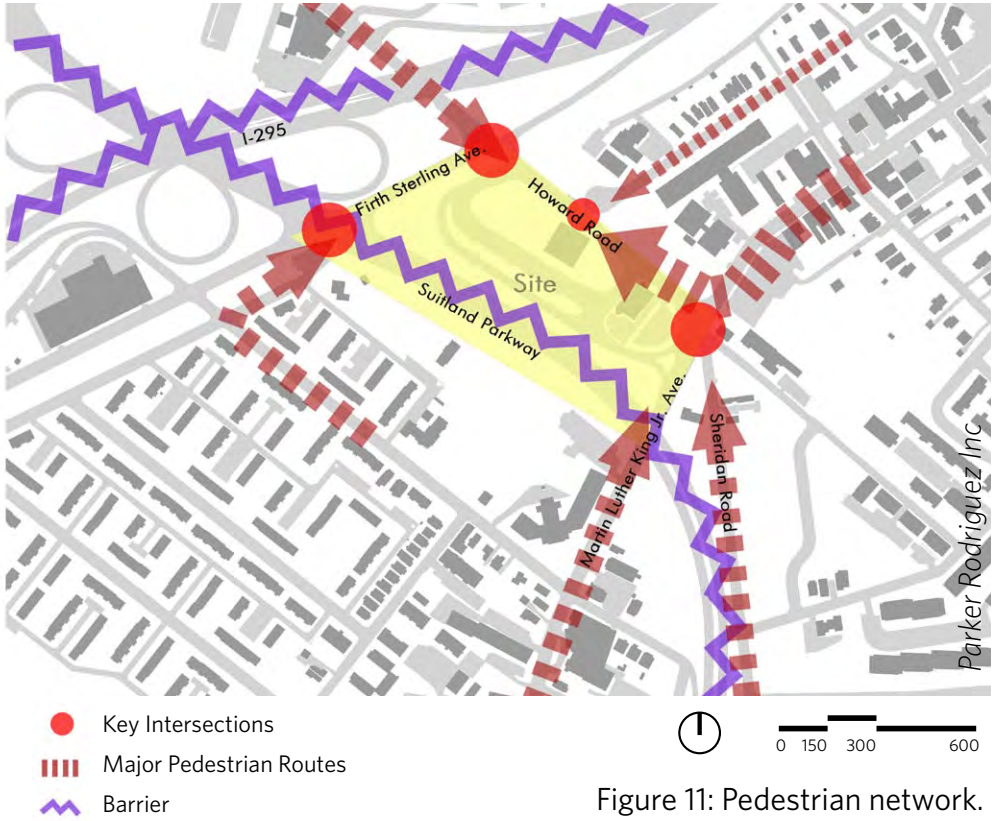

Figure 11: Pedestrian network.

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HOWARD ROAD

Howard Road is a four-lane road that forms the northeastern boundary of the site. It is one of the original streets in the historic neighborhood of Anacostia and also one of the few streets that connect the neighborhoods of Anacostia and Hillsdale to the Anacostia River and the future Poplar Point development.

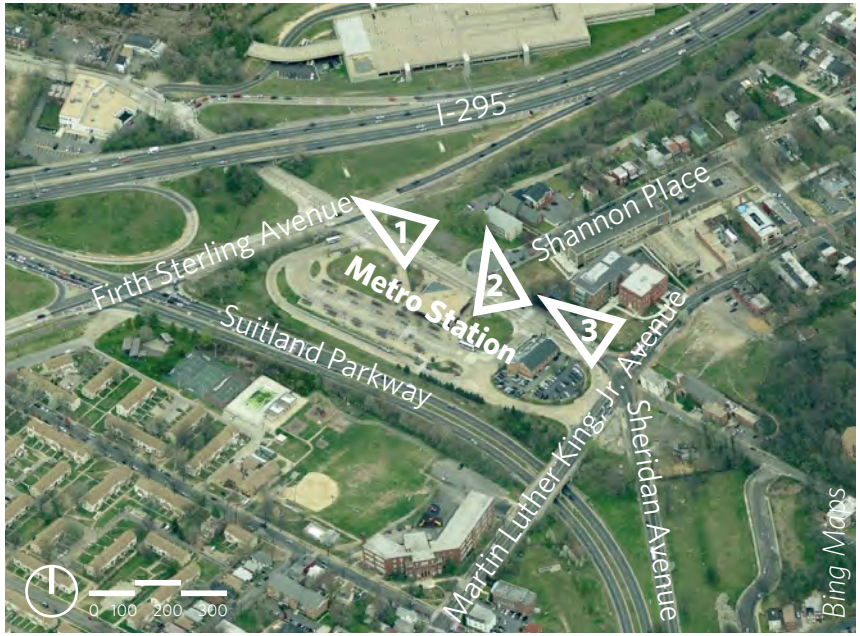

Figure 12: Orienting diagram. Arrows show the perspective taken in the following images.

Figure 13: Near the intersection of Howard Road and Firth Sterling Avenue a bus entry drive creates a 40-foot-wide crossing for pedestrians with no signal to indicate when it is safe to cross.

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SHANNON PLACE

Shannon Place terminates at Howard Road in a cul-de-sac directly across from the Metro station.

Figure 14: A rolled curb on Howard Road at Shannon Place allows emergency access, but many motorists drive over the sidewalk, endangering pedestrians.

Figure 15: The crosswalk over Howard Road to the Anacostia Metro station from Shannon Place has a flashing yellow light to warn vehicles of pedestrians crossing. However, the sensor often does not function properly, and drivers often fail to yield to pedestrians.

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FIRTH STERLING AVENUE

Firth Sterling Avenue is a four-lane road that ends with an entrance ramp to northbound I-295. A major pedestrian route from the Barry Farm neighborhood to the Metro station crosses Suitland Parkway along the southeast side of Firth Stirling Avenue.

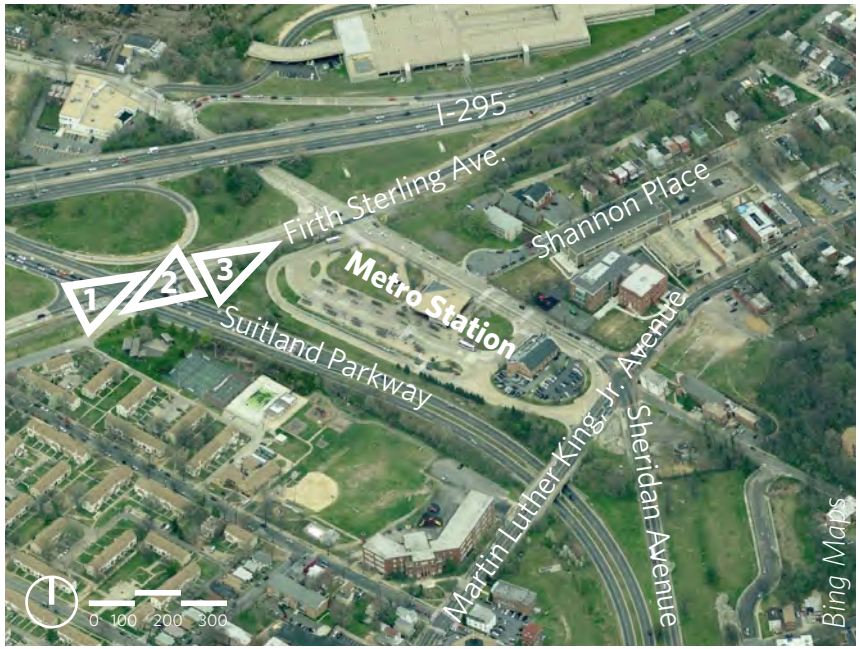

Figure 16: Orienting diagram. Arrows show the perspective taken in the following images.

Figure 17: The crosswalk across Suitland Parkway is over 70 feet wide with no pedestrian refuge in the median and two free right turn lanes that allow drivers to turn right without slowing.

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Figure 18: Though each of the free right turn lanes on Suitland Parkway has a small refuge, they are badly deteriorated and do not meet accessibility standards.

Figure 19: Firth Sterling Avenue along the Metro station showing the disused CSX rail line.

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MARTIN LUTHER KING, JR. AVENUE

Martin Luther King, Jr. Avenue is the main street of Anacostia.

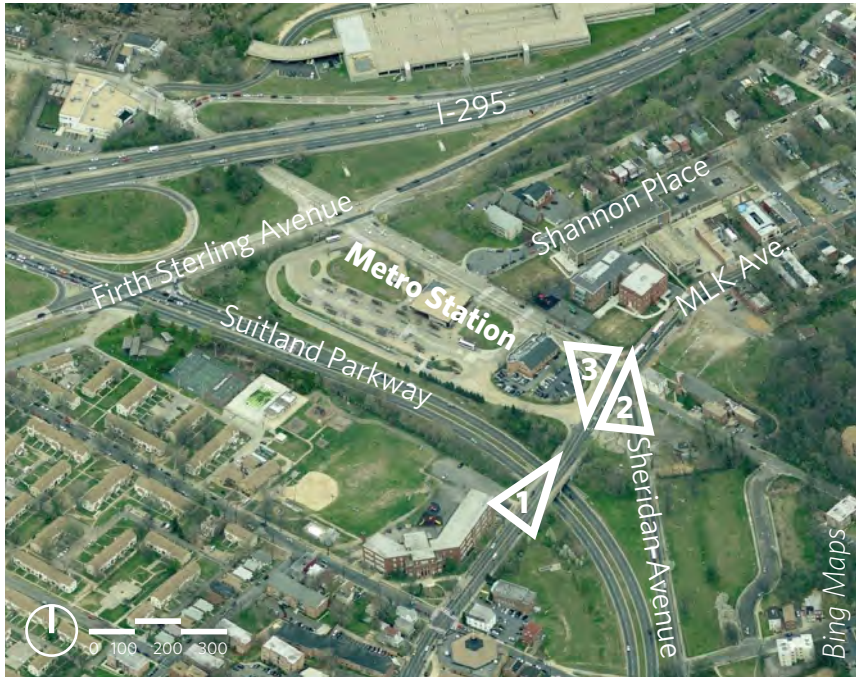

Figure 20: Orienting diagram. Arrows show the perspective taken in the following images.

Figure 21: MLK Avenue has four lanes with sidewalks on both sides of the street between eight and 10 feet wide at the station area.

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Figure 22: The five-way intersection of MLK Avenue, Howard Road, and Sheridan Road is confusing, and crossing distances are long due to angled crosswalks.

Figure 23: MLK Avenue has free right turns on its northwestern side at Howard Road and one (shown here) for buses to access the station.

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DESIGN CONCEPTS

Figure 24 illustrates the overall plan concept that the team developed with community input. It includes a variety of strategies that could improve pedestrian and bicycle safety while better protecting water quality. Figure 25 shows an overview of the entire site, indicating areas where detailed design concepts have been developed. The following pages describe these concepts for the following five locations:

- **SUITLAND PARKWAY:** The regional bicycle path along Suitland Parkway would be extended, following the alignment of the parkway under the MLK Bridge and ascending the embankment to reach the station at a new entry point. Improvements to crosswalks in the station area would be needed for safe passage of bikes and pedestrians across the bus loop.
- **FIRTH STERLING AVENUE:** In the area near the intersection of Firth Sterling and Howard Roads, the planned removal of an entrance ramp to I-295 offers the opportunity for an alternative land use. Using this land for constructed wetlands would add ecological benefits and provide educational opportunities for the hundreds of schoolchildren who pass by daily (see Appendix C).
- **SHANNON PLACE:** A more formal street closure with steel bollards would prevent illegal vehicular access from Howard Road. A new, broad crosswalk the width of Shannon Place would give pedestrians a safer way to cross Howard Road to reach the station. The Shannon Place cul-de-sac could become a pedestrian plaza and park, reducing the impervious surface by replacing it with a lawn and porous pavements (see Appendix C) and adding trees to improve air quality by removing pollutants and particulates from the air.

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- **HOWARD ROAD:** The design concepts for Howard Road would change its character from predominantly automobile-oriented to one that achieves a better balance between vehicles and pedestrians. Relocating the primary bus access roads from Howard Road to Firth Sterling Avenue would give buses a simple circulation pattern within the station, a loop with access in from Firth Sterling and out to MLK Avenue. This change would allow two bus access drives along Howard Road to be closed, significantly improving pedestrian safety by creating uninterrupted sidewalk on Howard Road along the Metro station.
- **MLK AVENUE:** Roads and crosswalks are realigned at the intersection of Howard Road, MLK Avenue, and Sheridan Road to provide safer, shorter crossings at this five-way intersection. Sheridan Road could be realigned to form a T-intersection with Howard Road about 80 feet east of MLK.

This change eliminates one point in the five-way intersection, allowing a smaller crosswalk pattern with a more rational rectangular form. The area of land between Sheridan Road and MLK that is created by the realignment could be a small park that could provide civic space for neighborhood historical markers, art, or wayfinding information. Part of this land is private property, with two separate owners, neither of which was present at the workshop. The road realignment could occur only with the full agreement and support of those property owners.

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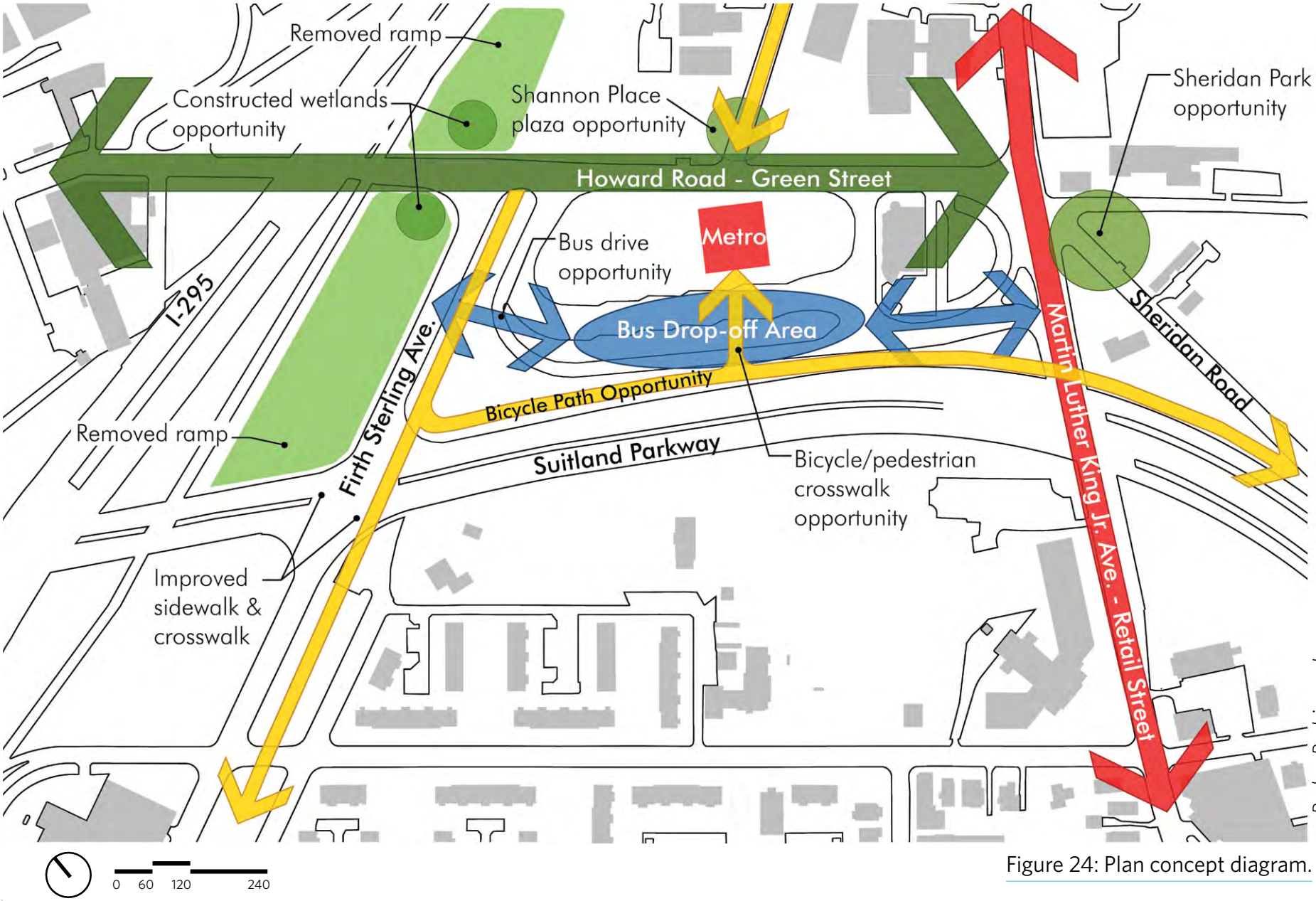

Parker Rodriguez Inc

Figure 24: Plan concept diagram.

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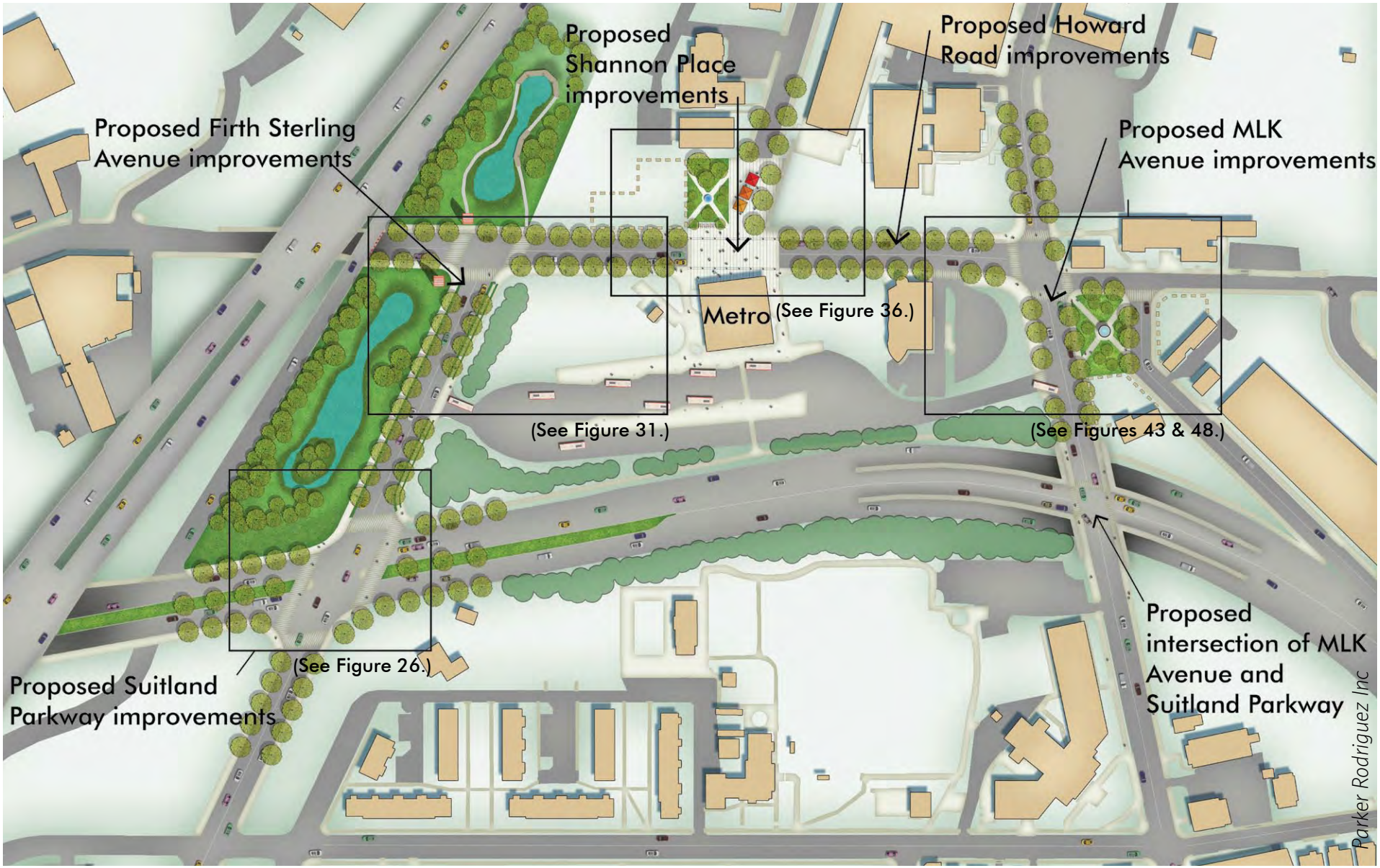

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Figure 25: Design concepts.

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DESIGN CONCEPTS: SUITLAND PARKWAY

The design concepts for Suitland Parkway include a new, 10-foot-wide bicycle path from Sheridan Road along the north side of Suitland Parkway. It would follow Suitland Parkway from Sheridan Road, passing underneath MLK Avenue and ascending the roadway embankment to the Metro station, providing a direct link to the station. The path would continue west to Firth Sterling Avenue, then north to Howard Road. A new median refuge on Suitland Parkway at Firth Sterling Avenue would allow a person to navigate halfway across a road and to wait safely in the refuge for the light to change again, if need be. Median refuges are particularly helpful to children, elderly people, disabled people, and others who might need more time to get across a road. The elimination of the free right turns at this intersection would further improve the pedestrian environment by forcing drivers to slow as they approach the crosswalk to turn. Shade, flowering, and evergreen trees would be planted along the embankment of Suitland Parkway to provide shade for cyclists and improve water and air quality in the neighborhood.

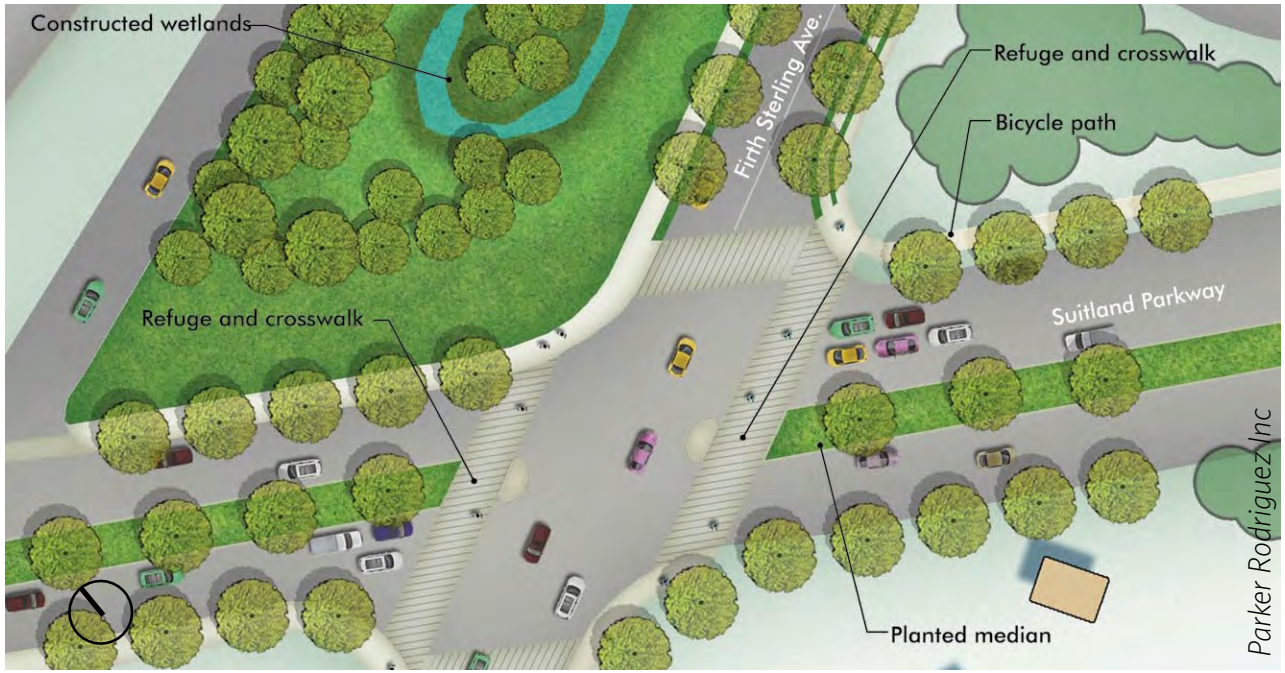

Figure 26: Design concepts for Suitland Parkway at Firth Sterling Avenue.

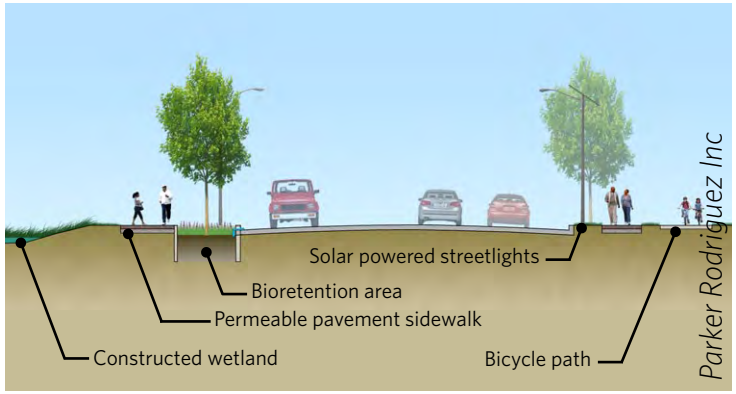

Figure 27: Section of Firth Sterling Avenue at Suitland Parkway.

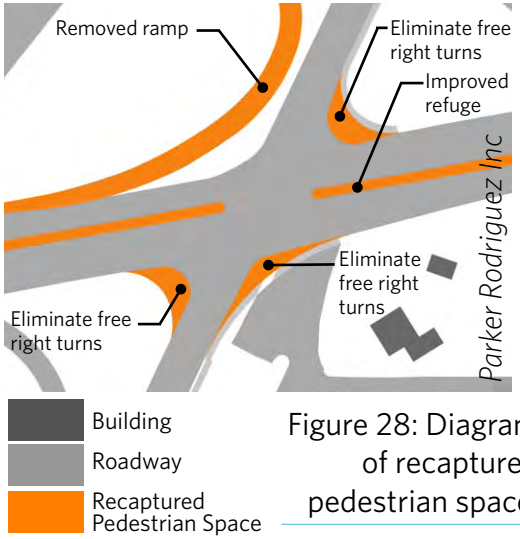

Figure 28: Diagram of recaptured pedestrian space.

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DESIGN CONCEPTS: SUITLAND PARKWAY

Figure 30: View of Firth Sterling at Suitland Parkway looking northeast. Adding a median refuge for pedestrians on Suitland Parkway at Firth Sterling Avenue would make it easier for children, elderly people, and other who cannot cross the street quickly to safely rest at the halfway point. The bicycle path appears on the southeast side of Firth Sterling Avenue, while a constructed wetland is on the northwest side of the road, occupying land that was the cloverleaf interchange, which is slated to be removed as part of the South Capitol Street project.

Figure 29: Current condition of Firth Sterling Avenue at Suitland Parkway.

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DESIGN CONCEPTS: FIRTH STERLING AVENUE

The design concepts for Firth Sterling include widened sidewalks, improved crosswalks, smaller curb radii that require drivers to turn more slowly, and a new bicycle path along the southeast side of the right of way. The design would create a new driveway off of Firth Sterling for the buses that serve the Metro station in place of the existing bus entrance off of Howard Road. Constructed wetlands on the northwest side, a continuous tree canopy, and bioretention cells in the tree boxes would help manage stormwater runoff, cool the area in the summer, and provide other environmental benefits. A pair of light towers at the intersection with Howard Road could serve as a gateway from the station to the Anacostia River. The light elements could be LED fixtures powered by solar panels within the structures, providing a bold image to the community, visible from near and far during the day and into the evening. The northwestern wetland area could include a boardwalk to allow visitors and schoolchildren to explore the new habitat that would attract birds, amphibians, and small mammals.

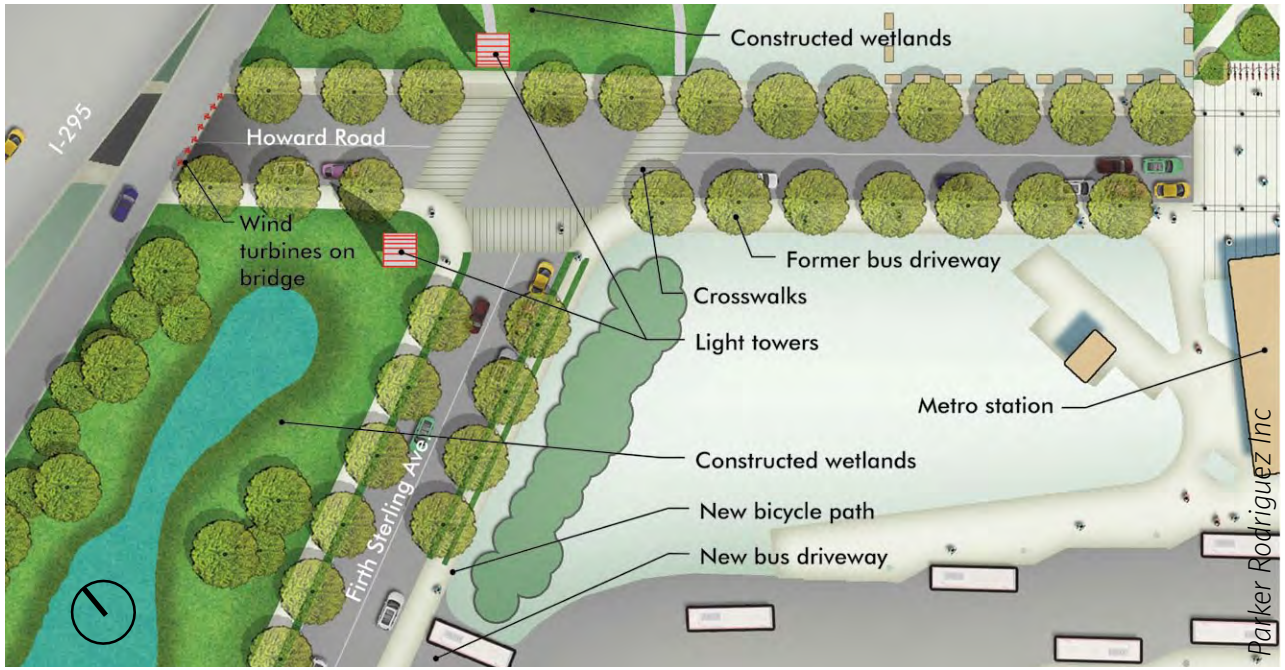

Figure 31: Design concepts for Firth Sterling Avenue at Howard Road.

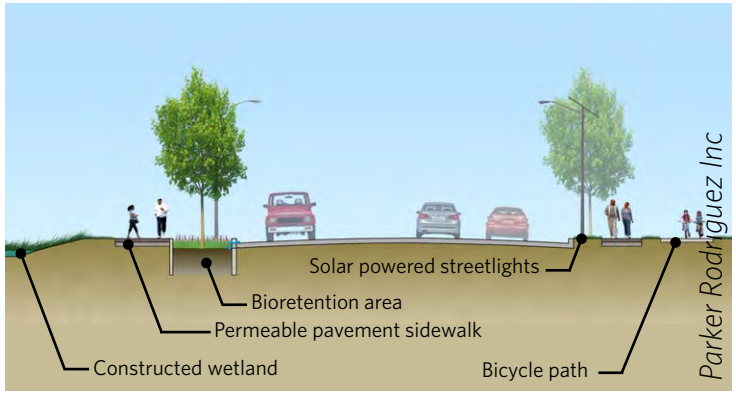

Figure 32: Section of Howard Road at Firth Sterling.

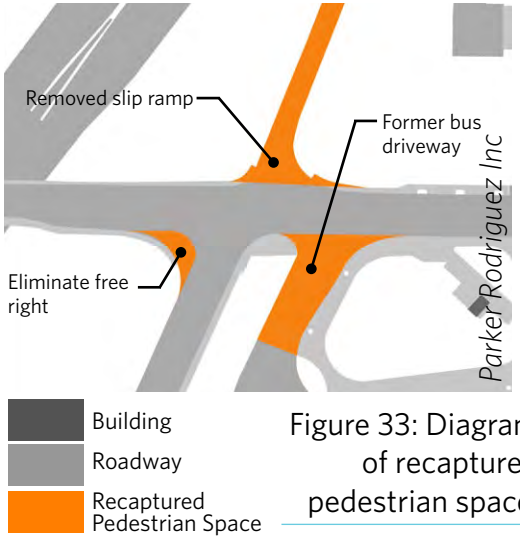

Figure 33: Diagram of recaptured pedestrian space.

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DESIGN CONCEPTS: FIRTH STERLING AVENUE

Figure 35: The illustration shows a view of Howard Road looking towards Firth Sterling and I-295. Gateway towers at the intersection of Firth Sterling and Howard Roads would provide a visual entry point into the neighborhood from the riverfront. Removing the bus driveway on Howard Road could significantly improve the pedestrian environment by creating uninterrupted sidewalk on Howard Road along the Metro station. The constructed wetlands on both sides of Howard Road beyond the towers would provide a visual connection between the neighborhood and the wetland areas of Poplar Point and the Anacostia River.

Figure 34: Current condition of Howard Road at Firth Sterling showing the crosswalk at the existing bus driveway into the Metro station.

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DESIGN CONCEPTS: SHANNON PLACE

The design concepts for Shannon Place include providing a firm street closure, replacing the existing rolled curb and "Do Not Enter" sign with a line of steel bollards to prevent illegal vehicle access. Some of the bollards could be removed by emergency-vehicle operators so that public safety would not be compromised. The asphalt in the Shannon Place cul-de-sac near Howard Road would be removed and replaced with a combination of porous pavements and park space, converting impervious surface to pervious. The porous pavement area could be converted to a pedestrian plaza as needed for markets, fairs, or festivals, and at other times drivers would be able to use the area to complete a three-point turn. The bikeshare station could be relocated along the new park area, and a new wayfinding kiosk could help station users orient themselves to the neighborhood. A broad crosswalk at Howard Road would extend the pedestrian plaza of Shannon Place. This crosswalk is proposed as a speed table, a crosswalk that remains at the sidewalk's grade rather than descending to the street grade. Vehicles passing over a speed table experience a slight bump and lower their speed, protecting pedestrians. A pedestrian-activated traffic signal would complete the menu of pedestrian safety improvements for this vital connection to the metro station.

Figure 36: Design concepts for Shannon Place.

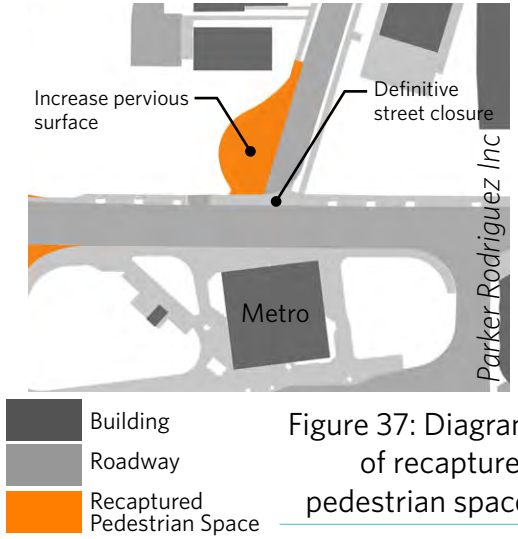

Figure 37: Diagram of recaptured pedestrian space.

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DESIGN CONCEPTS: SHANNON PLACE

Figure 39: This illustration shows the transformation of Shannon Place from an impervious asphalt cul-de-sac into a place for temporary street festivals. The portion of the existing cul-de-sac remaining as a street would be covered with porous pavement, while the rest of the cul-de-sac would be converted to a landscaped park. Part of the park could be used for a rain garden to capture and filter stormwater on the site (see Appendix C). Existing tress in the area would remain. The illustration shows the potential for new infill development that matches the scale and character of the existing building. The plaza could be used for neighborhood events such as a farmers market, which could provide locally sourced food to the community. A kiosk could provide wayfinding information and serve as a community bulletin board.

Figure 38: Current condition of Shannon Place at Howard Road.

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DESIGN CONCEPTS: HOWARD ROAD

Improvements to Howard Road could transform it into a safer and more environmentally sustainable street. The northeastern sidewalk between Howard Road and Shannon Place is adjacent to a brick wall that forms the property line of the Thurgood Marshall Academy. The sidewalk is only 10 feet wide at its widest. A new, continuous, four-foot-wide area for soil along the edge of the existing sidewalk, topped with permeable pavement and tree grates, could increase the amount of walking surface, while adding street trees. Trees provide safety and comfort by creating a barrier or edge between the street and the sidewalk. Trees and vegetation can also cool the area, create shade, improve air quality, and capture and filter rainfall.

Increasing the width of the southwestern side of the sidewalks to 25 feet along the length of the Metro station by expanding into the station area would better accommodate the number of pedestrians who use the station. The width would also allow new, seven-foot-wide tree pits that could be bioretention cells that would capture stormwater from the street and the sidewalk to naturally filter it before it reaches the ground water (see Appendix C). The sidewalk expansion into the station area would require WMATA's approval.

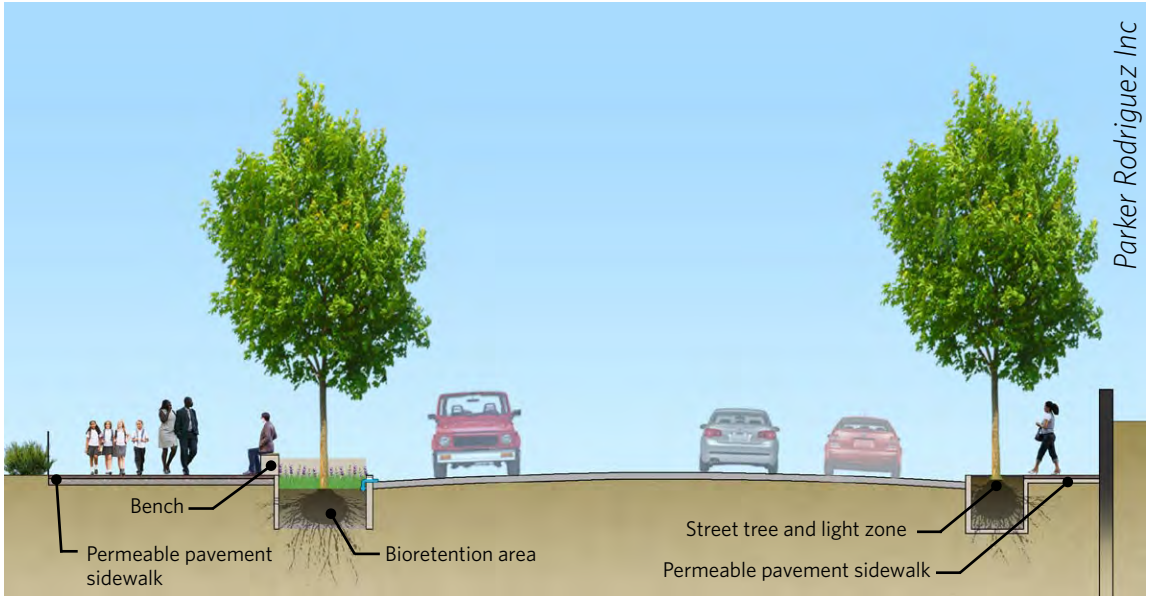

Figure 40: Section of Howard Road.

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DESIGN CONCEPTS: HOWARD ROAD

Figure 42: View of Howard Road looking towards I-295 from MLK Avenue showing widened sidewalks, a continuous tree canopy, and solar-powered streetlights. The Metro station is behind the church on the left. Thurgood Marshall Academy is on the right.

Figure 41: Current condition of Howard Road.

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DESIGN CONCEPTS: MARTIN LUTHER KING, JR. AVENUE

The design concepts for Martin Luther King, Jr. Avenue include transforming the existing, chaotic, five-way intersection into a compact, four-way intersection. This change would realign Sheridan Road away from MLK Avenue and toward a T-intersection with Howard Road, converting a short section of Howard Road to two-way travel. The tips of two currently vacant, triangular private properties would be affected by this action, and the owners would have to agree to this change. The intersection would become more compact and safer, and the realignment would also create a new, small park that could be used to recognize the neighborhood's history. The reconfiguration of public and private properties in this design concept could benefit the affected property owners by increasing the economic value of the properties given their proximity to a new park.

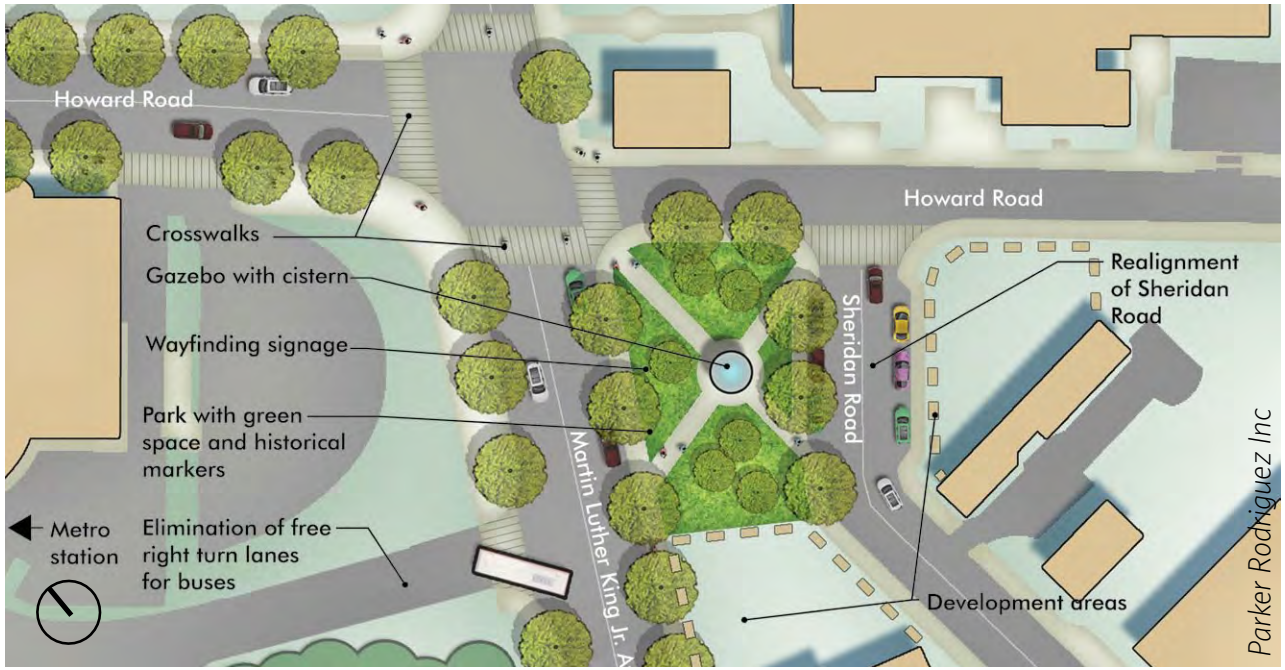

Figure 43: Design concepts for MLK Avenue at Howard Road.

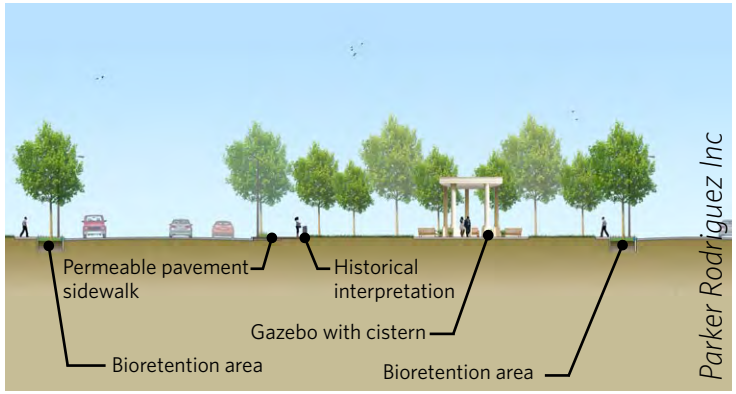

Figure 44: Section of MLK Avenue at Howard Road.

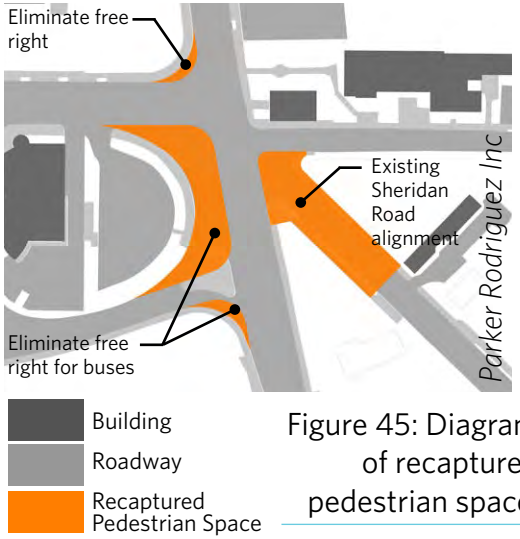

Figure 45: Diagram of recaptured pedestrian space.

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DESIGN CONCEPTS: MARTIN LUTHER KING, JR. AVENUE

Figure 47: View of MLK Avenue at Howard Road looking southeast. The sidewalks would include a continuous tree canopy, bioretention cells, and a curbside band of porous pavers, all of which would contribute to improved water and air quality in the neighborhood. The transformation of the intersection could allow the creation of a small civic park that would enhance private development that could occur on the surrounding vacant land. The park could feature seating, lawn areas, trees, and a rain garden to capture and filter stormwater on the site (see Appendix C). The gazebo in the center could be used for small performances and as a shady place for people to rest. Its roof could be inverted to capture rain water, storing it to irrigate the park. Historical markers in the park could celebrate the neighborhood's distinguished history.

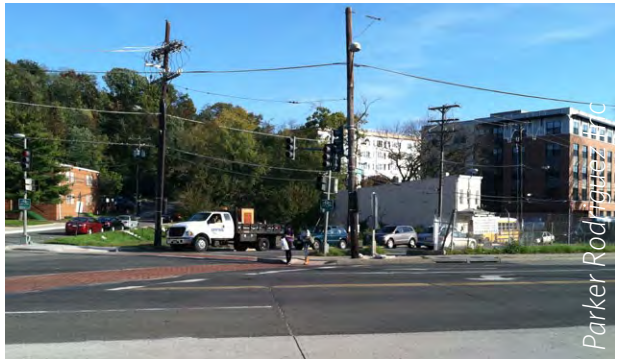

Figure 46: Current condition of MLK Avenue at Howard Road.

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DESIGN CONCEPTS: MARTIN LUTHER KING, JR. AVENUE - ALTERNATIVE DESIGN

If the former plan proves infeasible, the intersection could be left as is, but the free right turns at Howard Road and the Metro station could be removed so drivers would have to slow to make the turns as they approach the crosswalk. This action would reduce crosswalk length, still a significant improvement in pedestrian safety. The sidewalks could include a continuous tree canopy, bioretention cells, and porous pavers.

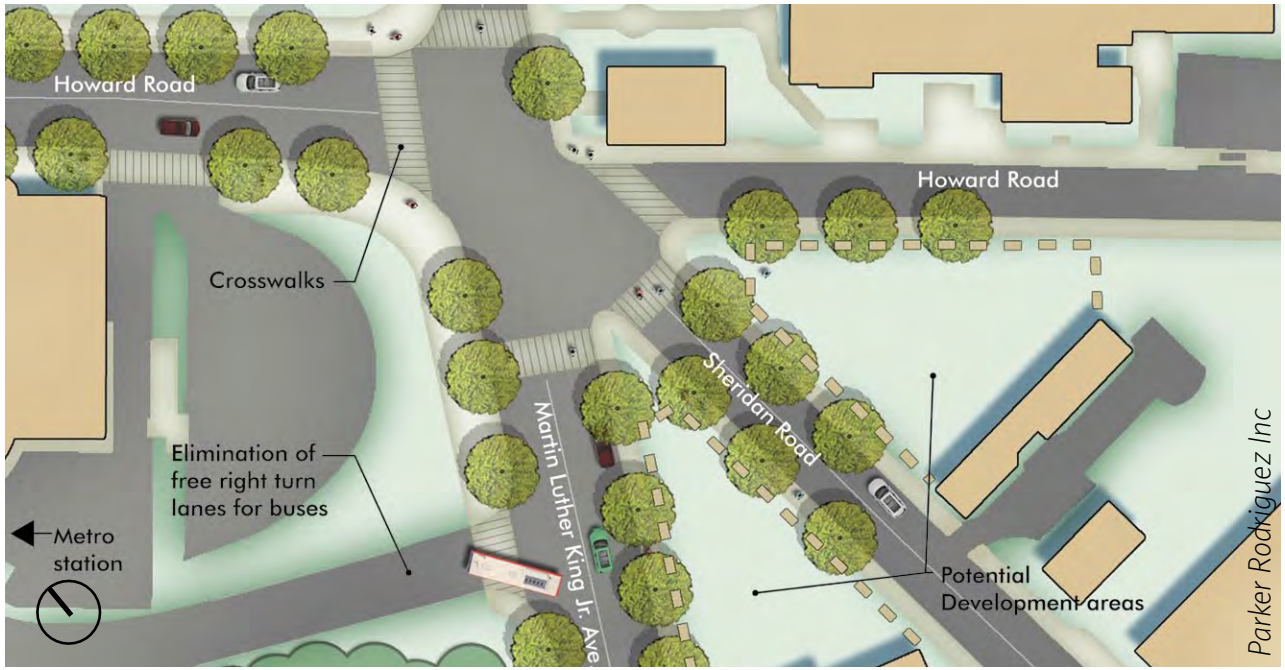

Figure 48: Design concepts for MLK Avenue at Howard Road.

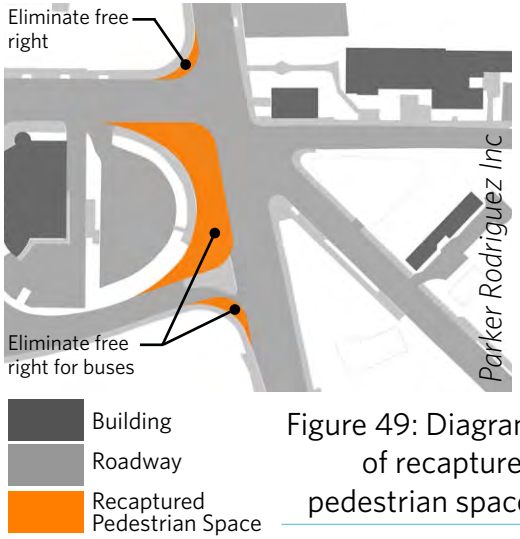

Figure 49: Diagram of recaptured pedestrian space.

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CASE STUDIES

GREEN STREET

DECATUR STREET, EDMONSTON, MARYLAND

Owner: Town of Edmonston, MD

Designer: Low Impact Development Center

Scope: Green suburban streetscape (10 blocks)

When: Completed November 9, 2010.

Cost/Funding Sources: Design report ($25,000) funded by the Chesapeake Bay Trust. Project cost ($1.2 million) funded by the American Recovery and Reinvestment Act.

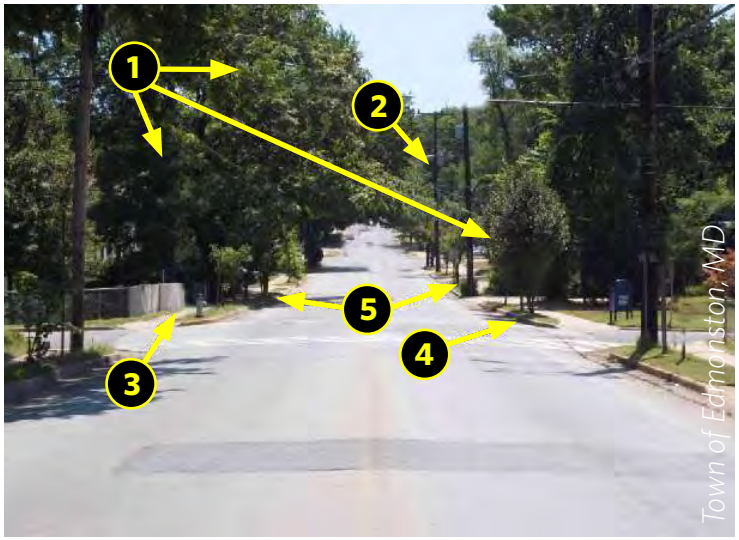
Additional Information:

Town of Edmonston, MD. The Green Street Project. http://edmonstonmd.gov/GoingGreen.html. Accessed April 20, 2012.

Town of Edmonston, MD. *Greening of Decatur Street*. July 2010. http://edmonstonmd.gov/files/Greening_DecaturSt_inclAddendum_v1.0.pdf.

To both reduce the amount and improve the quality of stormwater runoff entering the Anacostia River (one of the nation's most polluted), Edmonston implemented a green street design that includes curbside bioretention areas and new trees. Together, these elements capture 90 percent of annual total rainfall while also improving air quality. In addition to the environmental benefits, narrowing the street also helped meet the community goals of calming traffic and improving pedestrian safety.

1. Non-Native trees
2. Sodium and mercury vapor lights
3. Broken and narrow sidewalks
4. No bike lane
5. Stormwater drain



1. Native trees
2. LED lighting
3. ADA compliant sidewalks
4. Clearly marked bike lane
5. Bioretention gardens

Figure 50: Decatur Street (before and after), Edmonston, M.D.

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CONSTRUCTED WETLAND

NATIONAL MUSEUM OF THE AMERICAN INDIAN, WASHINGTON, D.C.

Owner: Smithsonian Institution, National Museum of the American Indian

Designer: AECOM

Scope: Urban constructed wetland (0.33 acres of wetland on a 4.35-acre site)

When: Design began in 1993. The wetland opened in 2004.

Cost/Funding Sources: U.S. Congress and various donors

Additional Information:

AECOM. "National Museum of the American Indian Landscape Design and EA" http://ecards.aecom.com/landscapes/NMAI.swf. Accessed April 20, 2012.

This project created a constructed wetland in an urban environment. The selected plant species are native to the mid-Atlantic Piedmont area and function as an extension of the museum by helping to educate visitors about Native Americans' use of wild plant material. The urban wetland also creates habitat for birds and insects such as mallard ducks and dragonflies.

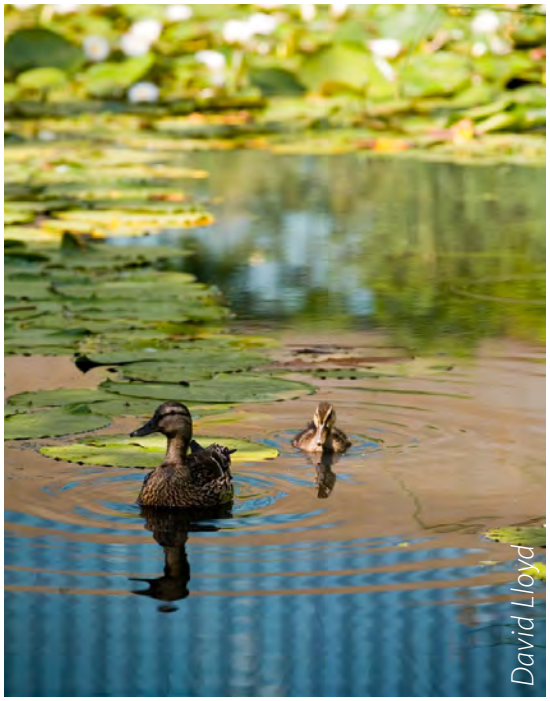

Figure 51: National Museum of the American Indian, Washington, D.C.

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FESTIVAL STREET

ELLSWORTH DRIVE, DOWNTOWN SILVER SPRING, SILVER SPRING, MARYLAND

Owner: Public-private venture between Foulger-Pratt (private developer) and Montgomery County, Maryland

Designer: Brown Craig Turner

Scope: 405,000-square-foot development and festival street (four city blocks).

When: Completed in 2004.

Cost/Funding Sources: $2.1 million for streetscape improvements.

Additional Information:

Foulger-Pratt. "Downtown Silver Spring Retail Center, Silver Spring, MD" http://www.foulgerpratt.com/dev_projects/ss_retail_center.php?list=developmentPortfolio. Accessed April 20, 2012.

The downtown Silver Spring development features Ellsworth Drive, a pedestrian-oriented street that can be closed for festivals and events. Adjacent to Ellsworth Drive is a triangular plaza with an interactive fountain and a multitude of outdoor dining options that further support an active pedestrian environment.

Figure 52: Ellsworth Drive, Silver Spring.

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RECONFIGURED INTERSECTION

COLUMBIA HEIGHTS, WASHINGTON, D.C.

Owner: District of Columbia

Designer: ZGF Architects L.L.P.

Scope: Public realm improvements, including three reconfigured intersections, six blocks of streetscape improvements, and the development of a civic plaza.

When: Planning began 2003, and construction was completed in 2010.

Cost/Funding Sources: Approximately 80% ($19.4 million) from the Federal Highway Administration and the remainder from the DC Neighborhood Investment Fund.

Additional Information:

DC Office of Planning. *Columbia Heights: Public Realm Framework*. October 2004. http://planning.dc.gov/DC/Planning/Planning%20Publication%20Files/CHPR%20Plan%20Full.pdf.

The DC Office of Planning and District Department of Transportation initiated public realm improvements for the core of the Columbia Heights neighborhood. The improvements included reconfiguring the roadways to include curb extensions to reduce the crossing distances for pedestrians. The five-way intersection of 14th Street NW, Park Road, and Kenyan Street was modified to create additional space for the civic plaza and reduce vehicular traffic westbound through the intersection by prohibiting through traffic and left turns onto 14th Street NW from Park Road.

Figure 53: Columbia Heights, Washington, D.C. Aerial photo and plan diagram illustrating recaptured pedestrian space at intersections.

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NEXT STEPS

The ideas in this report could be used at the Anacostia Metro station or at other sites where the city would like to incorporate environmentally sustainable practices into pedestrian and bicycle safety improvements. The District government could incorporate these ideas into proposed plans near the station for the South Capitol Street project, the new streetcar line in Anacostia, and/or a planned station access study by WMATA, among other opportunities.

The design concepts would require the support and cooperation of property owners and residents in the vicinity. The District government's public outreach and community engagement would need to involve these stakeholders to ensure successful implementation. Additional community input into the goals and vision for the station area would help DC decide which plans and opportunities to pursue.

Finally, many of the ideas in this report could be implemented with current operating funds, while others would require significant public investments. The improvements could be undertaken one-by-one or as part of larger projects in the area. An implementation strategy would help the city prioritize ideas and line up funding for those design concepts the city chooses to pursue.

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APPENDIX A

WORKSHOP SKETCHES

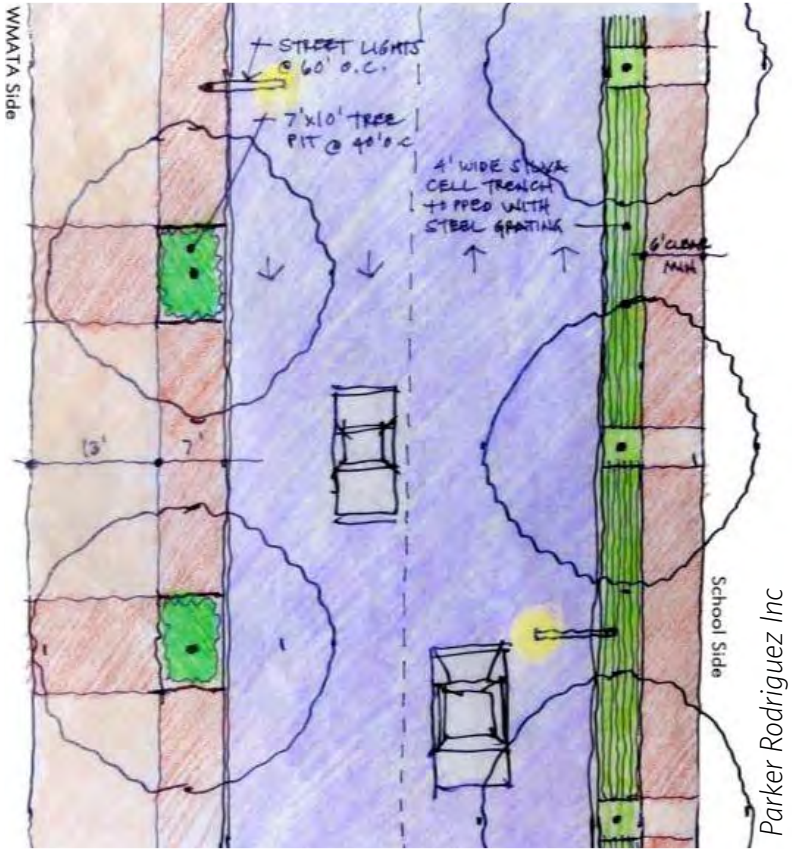

Figure 54: Detail Plan of Howard Road.

Figure 55: Section of Howard Road.

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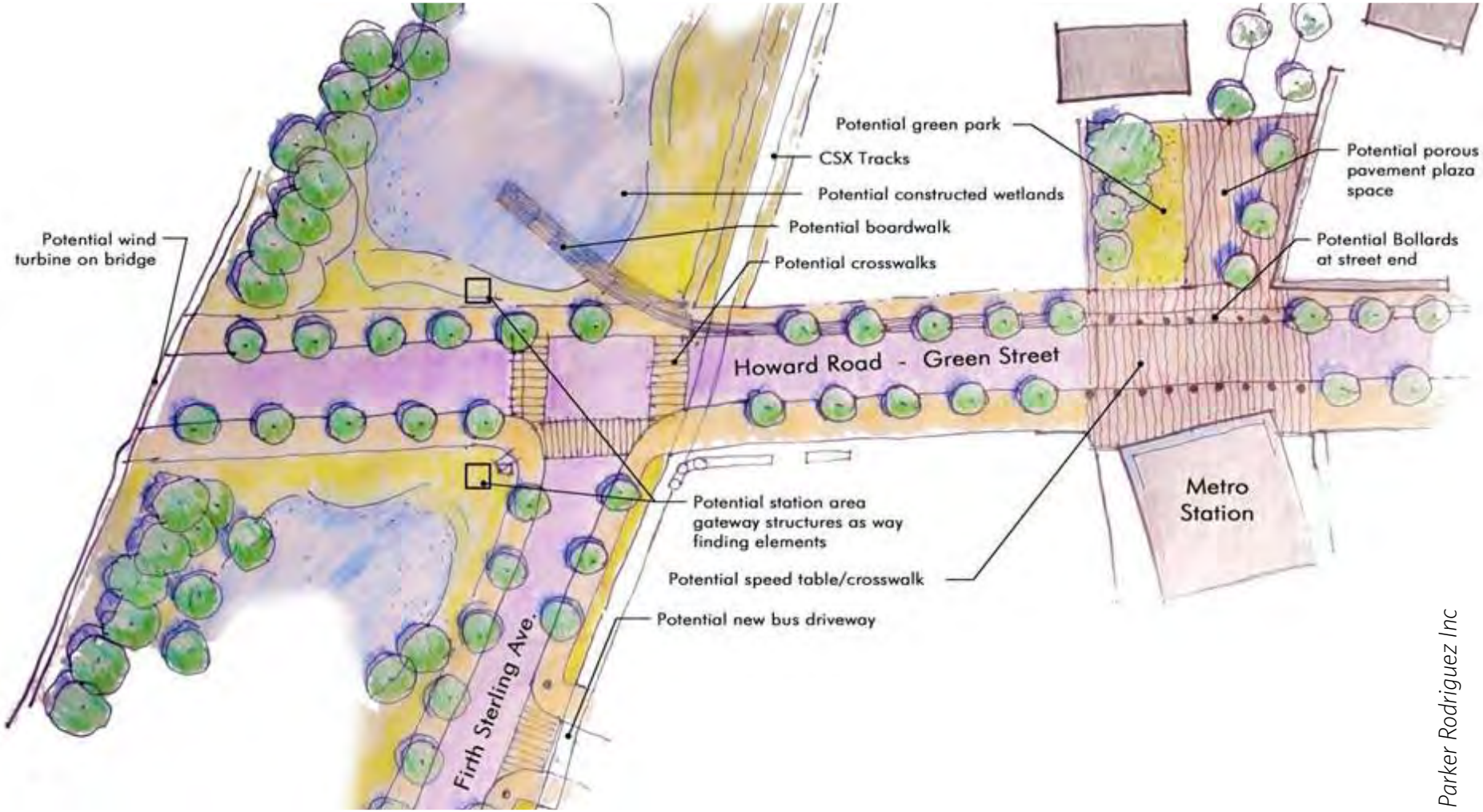

Parker Rodriguez Inc

Figure 56: Plan of the intersection at Firth Sterling Avenue and Howard Road.

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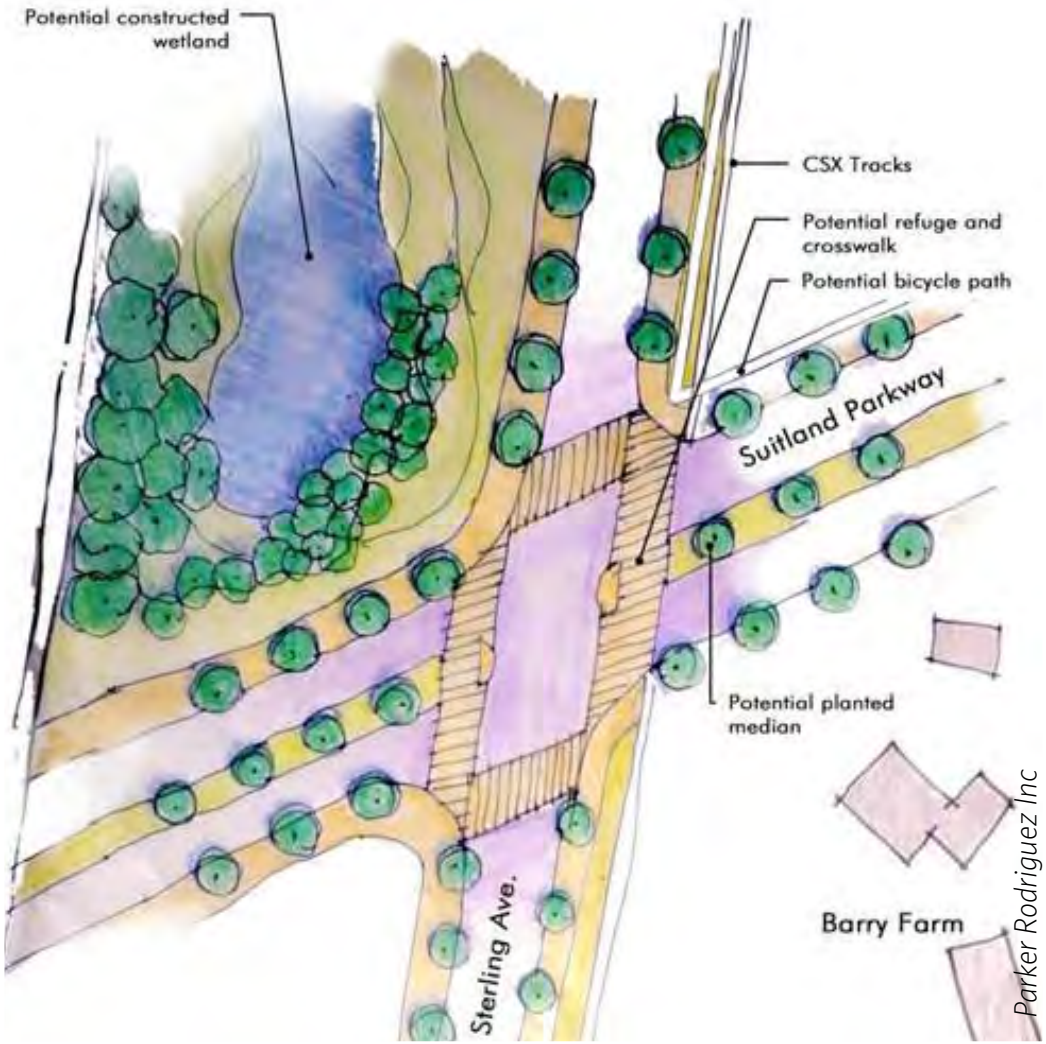

Figure 57: Plan of the intersection at Firth Sterling Avenue and Suitland Parkway.

Figure 58: Sketches of Howard Road improvements.

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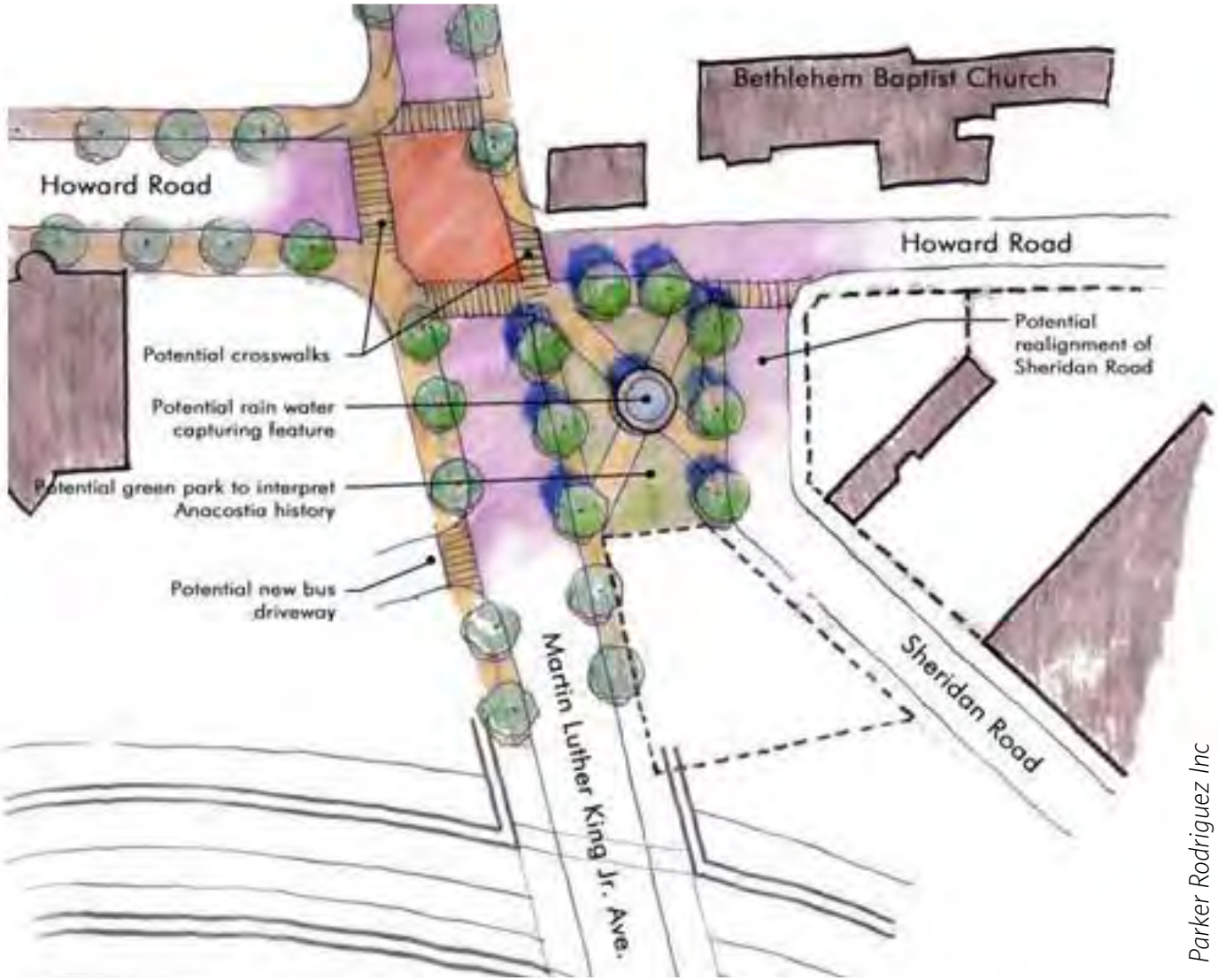

Figure 59: Plan of the intersection at MLK Avenue and Howard Road.

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APPENDIX B

SOUTH CAPITOL STREET PROJECT

The District of Columbia is planning a major infrastructure project in Southeast Washington to rebuild South Capitol Street, including replacement of the Frederick Douglass Memorial Bridge. This project will have a direct impact on the Anacostia Metro station area. As documented in the environmental impact statement for the project (Figure 60), the new bridge would land north of the Anacostia Metro station and directly connect to Suitland Parkway. The existing interchange of Suitland Parkway and I-295 would be redesigned to remove the cloverleaf ramps northwest of Firth Sterling Avenue, replacing them with on and off ramps. The existing slip ramp at the intersection of Howard Road and Firth Sterling Avenue would be removed, putting the main access to I-295 at the proposed Suitland Parkway interchange. This change would be expected to reduce traffic on Firth Sterling Avenue and Howard Road around the station area and would create new open land between Firth Sterling Avenue and I-295, both north and south of Howard Road. Potential uses for this new open land are considered in the design concepts for the site.

The South Capitol Street project proposal would also create a new four-way intersection at Suitland Parkway and MLK Avenue. The environmental impact statement, indicates that the center lanes of Suitland Parkway would rise up to meet the grade of MLK Avenue, intersecting at a stoplight on the MLK Avenue Bridge. Both Suitland Parkway and MLK Avenue would be widened, reducing the buffer area between the Anacostia Metro station and Suitland Parkway. Sidewalks would remain on both sides of MLK Avenue, and thus the team assumed there would be a safe pedestrian crossing at the new traffic signal.

Finally, an existing exit ramp from Suitland Parkway to Sheridan Road northbound would be closed under this proposed action, which would reduce traffic along Sheridan Road.

Although this project is still in the planning stages and is not fully funded, the design team assumed in its design concepts that these changes will occur as described.

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Figure 60: Image from South Capitol Street Environmental Impact Statement.

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APPENDIX C

GREEN INFRASTRUCTURE STRATEGIES

Street design can protect pedestrians and bicyclists while providing environmental benefits. Green infrastructure is a strategy to improve water and air quality through natural or biological means of treating stormwater runoff. Green infrastructure techniques use pervious surfaces to intercept runoff where it occurs, rather than piping or pumping it downstream for storage. Reducing impervious surfaces allows more water to be safely and effectively absorbed where it falls, rather than being conveyed elsewhere. Green infrastructure design uses a variety of methods including:

Figure 61: National Museum of the American Indian, Washington, D.C.

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Figure 62: Sherwood Hall Library, Fairfax County, VA.

Porous pavements – Porous pavements feature a regular pattern of pores, allowing rain water to flow directly through the pavement into the ground and, ultimately, into the ground water or an underground cistern. Either as a slab or as a paver, these pavement types can be engineered to support heavy vehicular loads. Reinforced turf panels can even appear to be grass. The appropriate pavement type will depend on the frequency and duration of use, whether by vehicles or pedestrians. Besides reducing runoff, porous pavements can also cleanse the water that flows through them, improving ground water quality.

Figure 63: Sherwood Hall Library, Fairfax County, VA.

Rain gardens – A rain garden is a shallow depression in a landscape that is designed to capture some stormwater runoff and delay its downstream journey, filtering it as it percolates into the ground water. Typically, they are planted with water-loving plants that thrive in frequent but short-lived inundations. The soils in a rain garden hold water for 12 hours or less so that it does not become a nesting area for mosquitoes. Such facilities can be informal or formal elements in the landscape but typically are small, less than 500 square feet. A drain is required for a rain garden and is typically set above the bottom of the basin, so that in a major storm, the rain garden does not overflow or remain wet for more than 12 hours. Rain gardens also beautify the landscape and make streets more pleasant for pedestrians.

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Figure 64: Constitution Square, Washington, D.C.

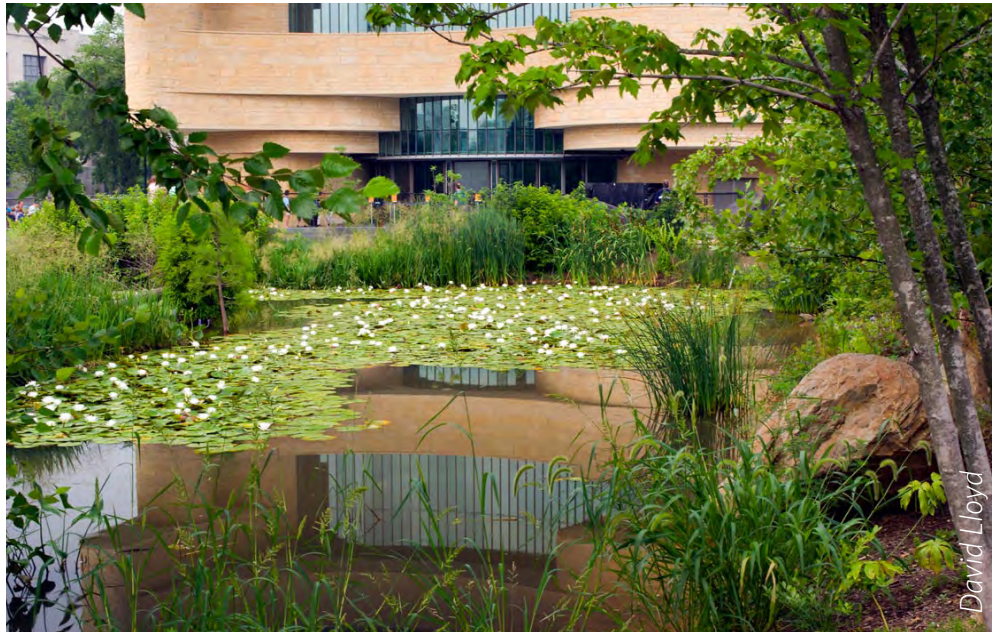

Figure 65: National Museum of the American Indian, Washington, D.C.

Bioretention cells – A bioretention cell is a linear form of rain garden, typically found in an urban streetscape where the area is constrained. It functions much like a rain garden, capturing water from streets and sidewalks where it can percolate into the ground water. However, a bioretention cell has a continuous drain along the length of its bottom to convey excess water to a storm drain so that it does not overflow. Like a rain garden, the cell cleanses the water as it reduces the quantity of water that flows downstream.

Constructed wetlands -Constructed wetlands are large landscapes created to mimic the functions of a natural wetland, providing water storage, water cleansing, and habitat. Wetlands are rich ecosystems, so introducing one into an urban environment is a challenge, but it can be accomplished with careful design. Natural wetlands have soils and hydrology to tolerate regular periods of inundation followed by dry periods. Manmade wetlands cannot achieve the full richness of a natural wetland but can help improve water quality while supporting wildlife. The design of a constructed wetland requires a detailed soil profile, shallow gradient, a meandering flow in and out of the area, and native plantings.