

1 PROJECT OVERVIEW

PROJECT SCOPE

The South Capitol Street Trail concept plan has been developed by the Transportation Planning, Policy and Sustainability Administration of the District of Columbia Department of Transportation to improve bicycle and pedestrian transportation access. Its purpose is to be used as a guide to improve the bicycle and pedestrian access network along South Capitol Street/Overlook Avenue, and to provide direction for improvements regarding a.) trail segments necessary to complete the network and b.) related access, traffic safety, and roadway improvements. This concept plan provides guidance on proposed trail alignments, as well as a phased implementation approach for all improvements.

Ideally, the trail will be integrated into the on-going roadway design and construction improvements planned within the study area. Several ongoing projects which are under development or in the planning process which are described in Chapter 2: Concept Plan of this report. The trail should be included in each of these projects to improve the non-motorized transportation network within the South Capitol Street corridor and the greater Southeast DC area .

Throughout the concept planning process several stakeholder outreach sessions were held. Outreach efforts have included the District Bicycle Advisory Council (BAC), local bicycle advocacy groups, and Ward 8 staff to present project updates and concept plans. Additionally, the planning process included meetings with various public agencies and citizen groups including, National Park Service, Department of Homeland Security, and District Department of Transportation – Infrastructure Project Management Administration.

PROJECT LOCATION

The study area for this project is located within Ward 8 of the District of Columbia as illustrated in Figure 1. The project area extends from the western limit of Oxon Cove Park and DC Village to Overlook Avenue and South Capitol Street, north to the Anacostia River, near Popular Point.

The proposed 4.25-mile South Capitol Street Trail is located predominately within the I-295 corridor, adjacent to the Blue Plains Waste Water Treatment Plan, Anacostia Naval Air Station and Bolling Air Force Base to the west, and Suitland Park (NPS Lands), St. Elizabeth’s Campus (DHS), and I-295 to the east.

PROJECT PURPOSE

The purpose of this project is to improve bicycle/pedestrian access within the South Capitol Street/Overlook Avenue corridor, and the non-motorized network connections to surrounding neighborhoods, military bases, and multimodal connections. In addition, it will extend the District’s trail network in southeast DC. The trail will be an important non-motorized transportation route providing direct access from Southeast DC neighborhoods and Maryland near the Bald Eagle Recreational Center in the Bellevue neighborhood, and Oxon Cove Park/Oxon Hill Farm, which connects to National Harbor in Maryland. The trail network will connect to the neighborhoods adjacent to the Anacostia River, and Downtown Washington DC.

FIGURE 1: SOUTH CAPITOL STREET TRAIL CONTEXT MAP



2 CONCEPT PLAN

PROJECT DESIGN CRITERIA

Based on the right-of-way/property investigation undertaken for this project, it is the design team's understanding that all of the roadways within the study area and the area where the proposed trail will be located is within DDOT right-of-way. Per research and discussions with DDOT, the following design criteria were established:

ROADWAY DESIGN CRITERIA

- **Functional Classification** – Functional classification helps to define a roadways design characteristics based on the roadway's function. Typically, assignment of functional classification is not revisited on a frequent routine basis, and at this time it is unknown when the last time the functional classification for these roads was examined.

Functional classification of the existing roadways in the study area were determined to be : (Appendix B)

- I-295 – Interstate Highway
- South Capitol Street – Expressway north of Firth Sterling, Minor Arterial south of Firth Sterling
- Overlook Avenue and Malcolm X Avenue – Minor Arterials
- Firth Sterling Avenue, and Defense Boulevard – Collectors
- MacDill Boulevard, Magazine Road, Laboratory Road, Chesapeake Street – Local

Based on the changing nature of South Capitol Street corridor north of the Anacostia River to less of an expressway feel, it is recommended that the functional classification of South Capitol Street between the Frederick Douglass Bridge and Firth Sterling Avenue be reexamined and possibly changed from expressway to minor arterial. Also, it may be appropriate to reexamine Overlook Avenue as a collector based on the close proximity of I-295, which is an arterial/interstate and Overlook Avenue's limited connectivity to the arterial network. Revising these classifications would imply less stringent design criteria and allow the design of the trail and any redesign of the roadways to be more sensitive to the surrounding community context.

- **Design Speed** – Although not a American Association of State Highway Transportation Officials (AASHTO) guideline, many jurisdictions including DDOT establish design speeds 5 to 10 mph above posted speeds. This can contribute to overly conservative designs and less ability to design roadways with sensitivity to surrounding context. Because of this many other jurisdictions are moving away from this practice and establishing design speeds that are equal to desired operating speeds. However, it is important that controlling design elements such as geometry and traffic control measures are in-line with proposed design speeds to provide a balanced design. Considering the previous discussion regarding functional class, it may be appropriate reexamine the posted and design speeds for South Capitol Street south of Firth Sterling Avenue. A posted speed and design speed of 35 mph may be more appropriate.

Existing posted speeds for the roadways in the study area include: (Appendix B)

- 50 mph on I-295
- 35 mph on South Capitol Street north of Firth Sterling
- 40 mph on South Capitol Street south of Firth Sterling
- 25 mph on Overlook Avenue
- 30 mph Malcolm X Avenue
- 25 mph on MacDill Boulevard, Magazine Road, Laboratory Road, and Chesapeake Street
- **Design Vehicle** – Since South Capitol Street and Overlook Avenue are the only streets where geometric changes are proposed for this project, this discussion is limited to these roadways. Based on the observed vehicles frequently operating along the South Capitol Street/Overlook Avenue corridor, it is suggested that the design vehicle for this corridor be an AASHTO single unit truck (SU) or city bus (BUS). It is important to resist the temptation to pick the most conservative design vehicle that may use the corridor, since this can lead to overly conservative designs and negatively impact bike/pedestrian crossing distances and vehicular speeds of turns. Several design guides including the *DDOT Design and Engineering Manual* suggests only selecting larger vehicles that will frequently use the facility.
- **Lane Widths** – As with the previous discussion regarding design vehicles, this discussion is limited to South Capitol Street and Overlook Avenue because these are the only streets where geometric changes are proposed. Existing lane widths vary between 11 feet and 22 feet. The larger lane widths associated with ramp locations and widths are governed by AASHTO ramp criteria. In non-ramp locations lane widths should be in accordance with *DDOT's Design and Engineering Manual* (10 feet to 12 feet) with 10 feet being used on collector streets and 11 feet on arterial streets with design speeds of less than 35 mph.
- **Streetscape Standards** – The northern portion of the study area falls within the Anacostia Waterfront Initiative (AWI) area. Streetscape standards within this area should follow DDOT's Anacostia Waterfront Transportation and Architecture Design Standards, and for continuity, it may be appropriate to use the AWI standards throughout project corridor.
- **General Guidance** – The ultimate design of the project should be in accordance with DDOT, *Manual on Uniform Traffic Control Devices* (MUTCD), AASHTO, and the U.S. Access Board guidelines, standards and specifications as appropriate.

TRAIL DESIGN CRITERIA

The following trail design criteria is based on research and design best practices. It is understood that the update to the *AASHTO Guide for the Development of Bicycle Facilities* will generally following these guidelines.

- **Trail Design Speed** – When establishing a potential trail design speed it is important to understand the flexibility of applying different design speeds for different situations along a trail. For relatively flat areas, design speeds between a typical bicyclist's 85th percentile speed (14 mph) and a recumbent bicyclists' 85th percentile speed (18 mph) are most appropriate. For areas with long downgrades, such as the along Overlook Avenue north of Shepherd Parkway, a design speed of 20 mph may be more appropriate. In some situations, such as approaching hazards or conflict locations, it can be appropriate to use lower design speeds (as low as 12 mph). However, reduced design speeds should be used with some other treatments such as geometric alignment shifts or traffic control measures which create slower operating speeds. In general, the design speed for the trail should be approximately 18 mph with higher or lower values in some locations based on the above considerations.
- **Trail Width and Clearances** – The minimum preferred width for a trail and buffers is a 10-foot trail, 5-foot separation between the trail and a roadway, and a 2-foot buffer on the side of the trail away from the roadway. See the Trail Segment Components section of this chapter to see how space should be allocated when there is more or less width available. The minimum preferred vertical clearance for the trail is 10 feet.
- **Trail Cross Slope** – Although ADA guidelines recommend a 2 percent maximum cross slope for accessible routes, it is recommended that a 1 percent maximum cross slope be used. This slope is easier to navigate by persons in wheelchairs. The flatter cross slope combined with using the AASHTO Lean Angle formula to establish horizontal curves also allows the direction of cross slope to be dictated by surface drainage patterns and not the direction of curvature. This allows the trail to be built with less impacts and disruption to existing drainage patterns.
- **Horizontal Curvature** – As previously mentioned, it is recommended that the minimum radius of horizontal curvature be calculated using the AASHTO Lean Angle formula and a 20-degree lean angle. For various design speeds, the minimum radii should be:
 - 27 feet at 12 mph
 - 36 feet at 14 mph
 - 47 feet at 16 mph
 - 60 feet at 18 mph
 - 74 feet at 20 mph
 - 115 feet at 25 mph
 - 166 feet at 30 mph
- **Stopping Sight Distance** – Based on the design speed, grade of the

trail and a coefficient of friction, the stopping sight distance should be calculated in accordance with the *1999 AASHTO Guide for the Development of Bicycle Facilities*.

- **Vertical Alignment** – Because this trail alignment is adjacent to roadways, grades should be in accordance with the *US Access Board Public Rights-of-Way Accessibility Guidelines* (PROWAG 2005). Vertical curves should be established based on providing the needed stopping sight distance. Trail Design Criteria is also summarized in Appendix E.

CONNECTING COMMUNITIES AND NEIGHBORHOODS

The trail will connect a number of resources and neighborhoods by connecting missing gaps within the trail/sidewalk network in Southeast DC. The improved trail connectivity in the project area is a need long identified by both the regional bicycling community and local residents in these areas. Bicycle and pedestrian travel is relatively difficult throughout the project area due to:

- lack of accommodations;
- presence of barriers which are difficult for cyclists and pedestrians to overcome such as highways, institutional sites, and natural areas; and
- lack of regional trail network.

LACK OF ACCOMMODATIONS

In many portions of the project area, accommodations such as sidewalks, trail connections, and intersection crossing treatments, simply do not exist. Where these facilities do exist the infrastructure is segmented and lack efficient connections to bus stops and intersection crossings.

The Southeast DC Trail network has long been limited by missing links, which inhibits efficient travel within the project area, specifically convenient bicycle connections between southern Prince George's County/National Harbor and various neighborhoods, parks, and trail systems in the District. Currently over 70 percent of the corridor is lacking sidewalks.

PRESENCE OF BARRIERS FOR CYCLISTS AND PEDESTRIANS

The presence of barriers is a significant factor making bicycle and pedestrian travel difficult under current conditions. Several barriers within close proximity to the project area include major highways such as S. Capitol Street, I-295, Suitland Parkway and their associated interchanges, and large, limited access institutions such as the military bases, St. Elizabeth's Hospital grounds, National Park lands, and the Blue Plains Sewage Treatment Plant.

These barriers also make the task of providing improved accommodations a challenge.

LACK OF REGIONAL TRAIL NETWORK

The proposed trail improvements will connect many neighborhoods and areas currently disconnected to Downtown DC including residents of: Historic Anacostia, Barry Farm, Congress Heights, Bellevue, Wheeler Creek, and the Washington Highlands neighborhoods, which surround the project area. The improved trails will also provide access for local and regional residents employed on the military bases, at the redeveloping St. Elizabeth's campus, as well as various locations in Downtown DC. Finally, the trails will expand the network available to a wide variety of local and regional bicyclists and pedestrians seeking access to the revitalized Anacostia River waterfront and Anacostia Riverwalk Trail.

In addition to addressing these local travel needs, it should be noted that trail improvements proposed in this project area will almost eliminate a large gap in the regional trail network and provide an extension of the Potomac Heritage National Scenic Trail.

Regional trail system goals include linking DC to Southern Prince George's County as well as Charles County, linking Potomac waterfront trails with other trail systems like the Fort Circle Route, Suitland Parkway Trail, etc., and linking the urban Maryland, DC and Virginia trail systems via the Wilson Bridge.

TRAIL ALIGNMENT

Generally describing the trail corridor from southwest to northwest, the trail begins at the existing trail connection to Oxon Cove Park/Oxon Hill Farm. At the southern limit of DC Village, the proposed trail extends along DC Village Lane and Blue Plains Drive to Shepherd Parkway. At Shepherd Parkway the trail exits the DC Village area, and extends along Laboratory Road to the intersection with Overlook Avenue. The trail extends along the walls separating Overlook Avenue/South Capitol Street and the adjacent military bases. Extending along the western side of Overlook Avenue, the roadway eventually changes to South Capitol Street, where the trail extends north to the existing trail connection of the Frederick Douglass Bridge, north of the South Capitol Street/Firth Sterling Avenue intersection. Along Overlook Avenue/South Capitol Street, the trail crosses several signalized intersections including Chesapeake St./Magazine Rd., McGuire Ave/Mac Dill Blvd., Malcolm X Ave, and the Firth Sterling Ave/ Defense Blvd. intersection.

TRAIL USERS AND TRIP TYPES

Given the population densities anticipated as a result of the redevelopment and expansions of the St. Elizabeth's campus, redevelopment of Bolling Air Force base and Anacostia Naval Air Station, DC Village, as well as the lack of trail connections in Southeast DC, it is expected that the trail will be used by a wide

range of people and for a variety of trip purposes. Users expected include:

- Bicyclists of various skill levels including children, novices, and experienced, using standard, tandems, recumbents, bicycle trailers and "trail-a-bikes."
- Pedestrians including children, the elderly, disabled persons in wheelchairs or electric scooters, people pushing strollers, dog walkers and others
- Runners and joggers
- In-line skaters, push scooters, skateboards, etc.

Common trip purposes will primarily include transportation to and from work and cyclists and runners completing a larger circuit along the Anacostia River for recreational purposes. Other trips will benefit from the increased sidewalk network in this area, and improved access to the existing bus transit network, as well as the future light-rail transit facilities. Longer trips will benefit from greater network connectivity to the National Harbor and the Woodrow Wilson Bridge providing connections to Virginia destinations to the south, Downtown DC, historic Anacostia, military sites, the St Elizabeth's site and the Anacostia Trail system along the Anacostia River to the north. The primary trail consists of a proposed segment that extends along South Capitol Street/ Overlook Avenue, which is connected by a series of sidewalks, and shared-use path connections. As an urban trail adjacent to a roadway (sidepath), design details and characteristics are critical during final design. Recommended design criteria are provided in this section and *Appendix E: Trail Design Criteria*. Each of the facility types are described below.

TRAIL SEGMENT COMPONENTS

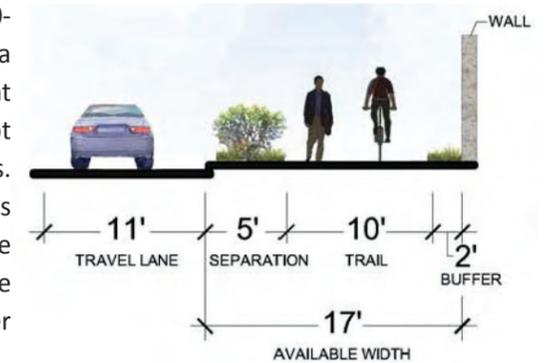
SHARED USE TRAIL

The proposed trail will consist of a 10-foot wide hard surface, composed primarily of asphalt. In locations where sufficient space for a 10-foot wide trail and buffers are not available, trail segments may be reduced to 8-foot or even 6-foot width where necessary for short distances. In general, trail widths less than 8-feet are not encouraged and only recommended as a last option due to insufficient width for bidirectional travel by bicyclists and pedestrians. Additional considerations regarding trail width are discussed further in the Trail Concept Area Chapter, which includes a discussion of each pinch point along the proposed trail alignment.

Within the trail corridor, the available width pinches due to limited space between existing edges of roadways, military base walls, and utilities.

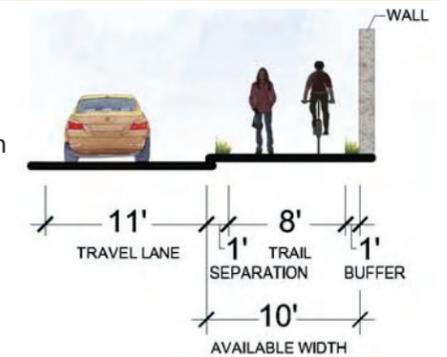
PREFERRED WIDTH TRAIL SECTION

Throughout the trail corridor, a 10-foot wide trail is preferred with a 5-foot separation from adjacent roadways, and a minimum 2-foot buffer from adjacent obstructions. If a 5-foot wide separation zone is not available, a barrier could be provided in order to maintain the preferred 10-foot trail width, per AASHTO guidance.



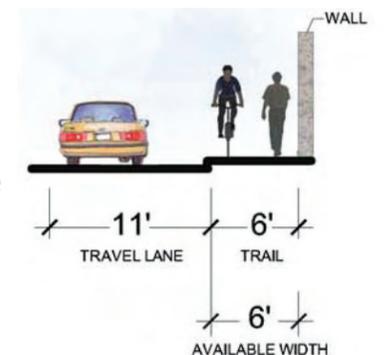
REDUCED WIDTH TRAIL SECTION

In locations where the trail corridor width is restricted and only a 10-foot is available for the trail, separation, and buffer, in general a 8-foot trail is recommended with a 1-foot separation from the travel lane and 1-foot buffer between any adjacent obstructions. A barrier to the adjacent roadway should be provided per AASHTO guidance.



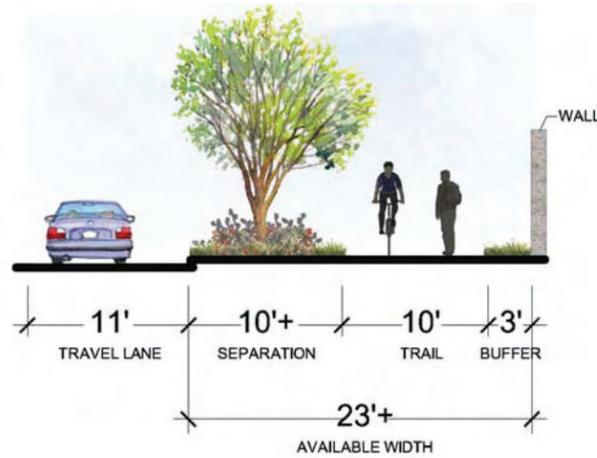
MINIMUM WIDTH TRAIL SECTION

In locations where the trail corridor width is restricted and between 6 and 10-feet, the maximum width for the shared use trail is preferred. This 6-foot wide trail section should be no longer than 50-feet in length. Shared use trail facilities should not be less than 6-feet in width.



OPTIMAL WIDTH TRAIL SECTION

Where feasible additional width to provide a wider separation and buffer between the roadway travel lanes, adjacent obstructions and the shared-use trail for landscaping is desirable.



SIDEWALKS

The sidewalk segments within the project area consist of rehabilitating or establishing new sidewalks connecting to the proposed trail. All proposed or rehabilitated sidewalks are to meet DDOT standards which require a minimum 6-foot wide sidewalk with a 4-foot tree box (6-foot preferred). All sidewalks should be in compliance with current ADA guidelines and provide curb-ramps with detectable warning strips.

TRAIL/ ROADWAY CROSSINGS

Best practice design for crossings at each of the trail/road intersections is key to ensuring trail users are able to utilize the space as safely and comfortably as possible. In general, these intersections should be improved utilizing the trail/roadway crossing detail in the *DC Bicycle Design Guide*. General improvement recommendations including curb ramps, crosswalk markings, street signage, crossing signals, and curb extensions are the types of features recommended at many of the proposed intersections to address site specific issues. Site specific concept designs are illustrated in Chapter 4: Trail Concept Areas and Pinch Points. Each intersection should be analyzed further during final design.

SIGNAGE & MARKINGS

Signs and pavement markings should be implemented through the entire trail especially the appropriate warning and regulatory signs recommended for trail/roadway intersections. Signs and markings should provide important safety

information including intersection warnings, wayfinding, trail and user restrictions and other right of way information.

In conventional roadway intersection design, right-of-way is assigned to the higher volume and/or higher speed approach. In the case of the trail crossings, trail user volumes should be taken into consideration for appropriate right-of-way designation. In addition, changes in user volumes over time should also be considered. Application of intersection controls (yield signs, stop signs or traffic signals) should follow the principle of providing the least control that is effective. Installing unwarranted or unrealistically restrictive controls on path approaches in an attempt to “protect” trail users can lead to disregard of controls and intersection operating patterns that are routinely different than indicated by the controls.

Intersection sight distance (sight triangles) is a fundamental component in selecting the appropriate control at path-roadway intersections. Yield control (for either approach) should only be used if both approaches (roadway and trail) can see enough and react to avoid a conflict. The length of the legs of the sight triangles should be calculated in accordance with the AASHTO Policy on Geometric Design of Highways and Streets, using the trail design speed and bike dimensions as appropriate.

Typical signs should consist of:

- Stop
- Yield
- Bikes Use Ped Signal
- Bikes Keep Left, Peds Right
- Bikes Yield to Peds
- Yield Here to Trail Users
- In-street Crosswalk Bollard
- Turning Traffic Yield to Bikes and Pedestrians
- Intersection Ahead
- Share the Trail
- Path Narrows
- Street/Facility Identification
- Wayfinding
- Trail Identity Signs



Source: Bernheim Arboretum & Research Forest

The shared-use trail should be supplemented by the following trail pavement markings:

Centerline Markings: Along the trail, a centerline is recommended, as it would help delineate a continuous route for trail users to traverse the length of the trail. The centerline should be dashed along stretches where sight distances allow safe passing of slower users, and solid where passing of slower users is discouraged or prohibited.

Signal Ahead / Road Xing / Stop Bars: Signal Ahead, Road Xing and Stop Bar pavement markings should correspond with the road/trail intersections as previously described.

SIGNALS

Pedestrian crossing signal, or bicycle signal heads should be implemented at all signalized trail/roadway crossings. If possible, signals should be pre-timed to provide the full bicycle/pedestrian phase in every signal cycle. If more time is needed for vehicular traffic, the bicycle/pedestrian phase can be actuated, however this should be evaluated periodically, and as trail user volumes increase the need for a pre-timed bicycle and pedestrian phase may become more critical. If the trail/roadway crossing is actuated, push buttons should be placed in a convenient location for bicyclists and pedestrians, and not cause bicyclists to dismount or wait in opposing trail traffic.

SURFACES/ PAVING MATERIALS

PAVEMENT

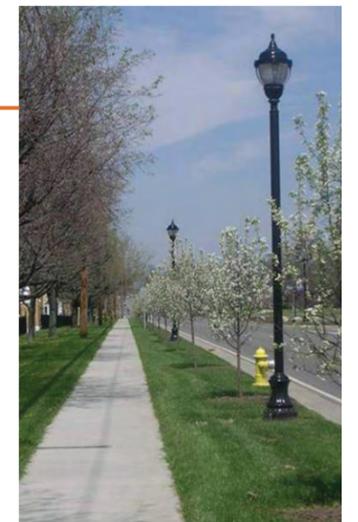


Source: TDG Library

Standard asphalt is recommended for the trail with an asphalt surface (6 inches deep) and an aggregate base (6 inches deep), depending on local geotechnical conditions.

CONCRETE

Standard concrete is recommended for sidewalk connections with a concrete surface (4 inches deep), and an aggregate base (4 inches deep).



Source: TDG Library

GRADING, DRAINAGE, LID, & LIGHTING

GRADING



Source: TDG Library

Grading to provide a seamless connection between the proposed improvements and existing landscape is important to provide a smooth transition along the trail. During final design, the limits of grading and construction will need to be delineated and should provide a context sensitive trail appropriate to the character of the streetscape.

DRAINAGE

Throughout the study area, some of the adjacent streets include curb and gutter, and drainage inlets (closed drainage system), while other sections consist of a gutter-less (open drainage system) roadway section. In general, a close drainage system is recommended where feasible to direct runoff to the storm drain network.



Source: TDG Library

Closed Drainage System – In closed drainage systems road runoff is collected along the edge of the roadway with a curb and gutter, where the drainage enters a drain inlet for subsurface containment. This condition is most common for urban roadway conditions and a majority of South Capitol Street/Overlook

Avenue includes this system type. The trail surface could be sloped toward or away from the roadway at approximately 1 percent depending on surface drainage conditions and to minimize construction impacts.

Open Drainage System – In this condition road runoff enters the adjacent pervious shoulder as sheet flow, where it soaks into the ground or is conveyed in ditches along the roadway. In open drainage areas, the trail could be sloped toward or away from the roadway at approximately 1 percent depending on surface drainage conditions and to minimize construction impacts. If sheet flow from the roadway crosses the trail it is particularly important that a grass buffer be

provided between the roadway and trail to filter roadway sediment. In appropriate areas, the buffer can be depressed to create ditches or bioswales for conveying or treating stormwater runoff. The use of ditches, bioswales, or existing drainage patterns may require the installation culverts that will cross the trail. Culvert outfalls should be designed in such a way to minimize erosion. An existing approximately 0.75 mile segment of South Capitol Street extending south from the Department of Public Works maintenance yard consists of an open drainage system with a grass strip along the shoulder with a slope down, away from the road, to areas of overgrown vegetation in the parallel railroad right-of-way.



Source: Just Smart Design

LOW IMPACT DEVELOPMENT

Low impact development (LID) is the treatment of stormwater runoff through the use of biofiltration techniques such as bioswales, and tree box filters/biocells to improve water quality and reduce stormwater runoff and pressures on existing storm water infrastructure systems.

Bioswales – Bioswales are vegetated drainage channels that convey, infiltrate, and treat stormwater runoff water through the use of vegetation and natural biological processes. These systems can be designed into areas that receive runoff from paved areas where runoff may be laden with oil and other waste washed from roadways or as overflow conveyance systems for other bioretention facilities. Where bioswales are proposed between the roadway and trail, it is recommended that every 25 to 40 feet a trench drain with a cobble apron should be installed to provide drainage under the trail and disperse drainage to the adjacent grass areas.

Tree Box Filters/ Biocells – Tree box filters/biocells consist of a container filled with an engineered soil mixture, under-drain system, and a tree or various plantings located along a roadway or impervious surface area. These systems typically replace or provide pre-treatment upstream of traditional stormwater drain inlets and treat stormwater runoff through infiltration, and natural biological processes by the plant materials present in the tree boxes. Overflow within these systems could be collected by inline drains connected to the cells' underdrains. The underdrains ultimately could tie in to a drainage structure (e.g. curb inlet) in the existing storm drain network or daylight onto pervious

surfaces if there is an elevation drop adjacent to the bioretention cell. Native vegetation in the cells could provide a degree of visual screening for trail uses from the road. In addition, the planting palette should be limited to native grasses, perennials, and shrubs if vehicle safety considerations preclude the use of trees adjacent to the roadway. Low-impact development areas are recommended along the trail and at intersections where feasible.

LIGHTING

Lighting elements of the trail serve a decorative function however are primarily intended to provide functional illumination and security of the trail during the evening and dusk hours. Through the use of appropriate lighting concepts, the trail can be a focal point that is integrated into the existing land uses and streetscapes, providing an interesting transition for users from the surrounding areas onto the trail.

Lighting levels should comply with local ordinances and should have cutoffs to shield lighting from adjacent properties. LED and solar-powered lighting is a good option that is ultimately less expensive to operate, and should be explored further during final design. As with other site amenities, lighting should be tamper resistant and made to withstand vandalism.

Existing lighting systems can be found on several of the proposed trail segments along existing roadways. In many instances these systems will remain and must be incorporated/re-utilized in the design, as well as complemented by any proposed lighting systems. In areas where the trail is proposed adjacent to existing roadways, illumination requirements for the roadways must also be kept in mind to improve safety and security for all uses. Transitions between existing streetscape lighting and proposed trail lighting will be critical in creating an inviting feel for the user.

The lighting scheme for this trail system consists of post-top fixtures or fixtures attached to existing light poles. Standalone solar fixtures are suggested in sections of the trail where existing poles do not exist and are cost feasible.



Source: TDG Library

Post-Top Luminaries - Lighting along the trail alignment is proposed with *Hadco #R54 Acorn* (Washington Globe) post-top luminaries with a wide body refractory globe and 150-watt High Pressure Sodium (HPS) lamp on a cast iron fluted 12-foot pole at 70-foot on-center spacing on one side of the trail. This light fixture is a typical District of Columbia Department of Transportation (DDOT) fixture which would enable ease of maintenance and replacement by DDOT forces.

Alternate LED, solar powered luminaries and aluminum or composite poles should be explored during final design. Each of these options could provide sufficient lighting, with a traditional street pole appearance while providing a more cost effective solution. Finally, all fixtures should consist of cut-off lenses to prevent unnecessary light pollution along the trail corridor.

The lighting scheme for the South Capitol Street trail has been divided up into five segments along the trail corridor as follows:

- 1. DC Village (DC Village Lane, Blue Plains Drive & Shepherd Parkway)** – Within DC Village, Washington Globe post top fixture luminaries with 150W High Pressure Sodium (HPS) fixtures on 14 or 16 foot poles at 75 to 90 foot spacings are proposed along the trail alignment. These fixtures are intended to replace the existing 250W HPS cobra head fixtures, provide street and trail lighting, and match the proposed lights proposed for Oxon Run Trail. In locations where cobra head luminance levels are required for the roadway, Washington Globe fixtures with DDOT “Tear Drop” luminaries are recommended.
- 2. Laboratory Road between DC Village and Overlook Avenue** – Along the Laboratory Road/I-295 overpass, the existing wall pack light fixtures mounted to the abutment walls on both sides of the underpass are in poor conditions. It is recommended that each of the six light fixtures be replaced and upgraded to 250W HPS located at approximately 100-foot spacing and 33-foot high along the abutments to provide sufficient roadway and trail lighting.
- 3. Overlook Avenue (Laboratory Road to Chesapeake Street)** – Within this segment, the existing 250W HPS cobra head light fixtures are attached to PEPCO utility poles, which are located in the sidewalk. It is recommended that where it is not feasible to relocate the trail/sidewalk around the utility poles and outside of the PEPCO utility easement, that the utility poles be relocated outside of the trail path, and the cobra head fixtures be replaced with new DDOT “Tear Drop” luminaries. If necessary, single Washington Globe post top luminaries on 16-foot pole could be installed with 250W HPS fixtures at approximately 75 to 90 foot spacing.
- 4. Overlook Avenue/ South Capitol Street (Chesapeake Street to Malcolm X Avenue)** - Within this segment the existing 250W HPS DDOT “Tear Drop” luminaries appear to have been recently installed and it is recommended that

these fixtures be retained, and supplemented for trail lighting. Supplemental light fixtures are recommended between the existing poles or with pedestrian scale fixtures attached to the existing poles.

- 5. South Capitol Street (Malcolm X Avenue to Firth Sterling Avenue)** - Along this segment existing 400W HPS cobra head non-cut off droop lenses exist which should be replaced with cut-off lenses. In addition, in order to provide sufficient trail lighting, these fixtures should be supplemented with 250W HPS Washington Globe fixtures at approximately 75 to 90 foot spacing.

ROADWAY & TRANSIT CONSIDERATIONS

Throughout much of the corridor, there is adequate width between the existing roadways (South Capitol Street and Overlook Avenue) and the adjacent military facilities to fit the proposed trail, however in some locations this area is pinched making trail construction difficult. Options were explored to determine the best approach for constructing the trail in these pinched locations. In several instances, modifications to adjacent roadway geometry, operations, and capacity are recommended. In some of these locations modifications to transit stops and considerations of transit users were taken into account. These modifications are described in more detail in Chapter 4 - Trail Concept Areas and Pinch Points, Appendix A - Pinch Point Analysis Summary Table and Appendix B – Transportation Study. The Transportation Study includes a traffic analysis of roadway and intersection modifications along South Capitol Street and Overlook Avenue. The study also assessed existing volumes and intersections conditions, future volumes and no-build conditions, as well as future volumes and improvement options.

Following is a summary of the roadway network within the project area from largest to smallest functional roadway type:

- *I-295 (Anacostia Freeway)* is an Interstate Highway which generally runs north-south within the project area. This I-295 section of the Anacostia Freeway also connects northeastward with the DC-295 section of the Anacostia Freeway/Kenilworth Avenue corridor, providing access to the Baltimore Washington Parkway. The speed limit is 50 mph within the study area.
- *South Capitol Street* is an expressway south of M Street and along the Frederick Douglass Memorial Bridge over the Anacostia River, where it continues south, parallel to I-295. The classification of this roadway changes from expressway to minor arterial south of the South Capitol Street and Firth Sterling Avenue, SE intersection. The posted speed limit is 35 MPH north of Firth Sterling Avenue and 40 mph south of Firth Sterling Avenue.
- *Malcolm X Avenue* is a two to four-lane urban minor arterial that runs east-west and extends from 8th Street on the east, across Martin

Luther King Jr. Avenue to South Capitol Street. At its west end with South Capitol Street, Malcolm X Avenue connects directly to the main entrance gate of Bolling Air Force Base. The speed limit along Malcolm X Avenue is 30 mph. Parking is allowed on both sides of Malcolm X Avenue east of the I-295 on/off ramps.

- *Firth Sterling Avenue* is a four-lane collector road that runs southwest to northeast from South Capitol Street to Howard Road. This road is a main route for motorists and pedestrians traveling between the Anacostia Naval Station, the Anacostia Metrorail station, and historic Anacostia. Firth Sterling Avenue also provides access to the Barry Farm neighborhood. The speed limit for Firth Sterling Avenue is 25 mph.
- *Defense Boulevard (South and North), MacDill Boulevard, Magazine Road, and Laboratory Road* are all local access and internal circulation roads connecting South Capitol Street/Overlook Avenue to the Anacostia Naval Base and Bolling Air Force Base facilities.

TRANSIT FACILITIES

The Washington Metropolitan Area Transit Authority (WMATA) Metrobus network is fairly extensive within the project area, as well as, the Omniride Commuter Bus from Dale City, Virginia, which stops in the area of Malcolm X Avenue, near Bolling Air Force Base.

Bus stops located adjacent to trail segments should include a landing zone with or without a shelter in addition to the adjacent trail alignment. A separate landing zone is encouraged to minimize conflicts between trail users and patrons waiting from the bus within the trail alignment. As a result, where necessary, bus stops should be relocated to provide sufficient space for the trail and bus stop. Within the trail alignment, two existing bus stops are recommended to be relocated to minimize conflicts between bus stop patrons and trail users, including the following.

- At the South Capitol Street and Malcolm X Ave/MacDill Boulevard intersection, it is recommended that the far-side bus stop be relocated to the near-side of the intersection to provide additional space for the proposed trail. At the near-side location, sufficient space for loading/unloading within the turning lane, as well spaces for a 6-foot by 8-foot bus stop adjacent to the proposed 10-foot trail.
- At the South Capitol Street and Firth Sterling Avenue intersection, it is recommended that the far-side bus stop be relocated to the near-side of the intersection to provide additional space for the proposed trail, and the proposed light-rail stop. At the near-side sufficient space for loading/unloading within the turning lane, as well as space for a 6-foot by 8-foot bus stop adjacent to the proposed 10-foot trail.

GENERAL CONSIDERATIONS

Coordination with Development near Project Corridor: Within close proximity to the project area, several projects are under development or in the planning process. In addition, several master plans and city wide initiatives are in place. The following projects influence the project area and should be closely coordinated with during final design and construction.

A. St. Elizabeth's West Campus: The redevelopment of St. Elizabeth's West Campus includes a total development of 4.5 million gross square feet (GSF) including administrative and operations space, and shared uses, such as a cafeteria, child care center and others. The redevelopment of the campus will have traffic implications for the surrounding region including South Capitol Street, Firth Sterling Avenue, and Malcolm X Avenue. The implications and conceptual designs of transportation improvement alternatives as presented in the project Environmental Impact Statement (EIS) may have implications for the proposed trail along South Capitol Street at the intersection with Malcolm X Avenue. The EIS shows reconstructing this intersection which may worsen an existing trail pinch point. Another consideration related to the St. Elizabeth's redevelopment was the potential use of a proposed roadway corridor to place a trail on the west side of I-295 (creating a sidepath along the proposed road). Recent discussions with DHS and DDOT staff indicate that this alternative may be feasible because the proposed road would be outside the security perimeter of the St. Elizabeth's site.



Source: St. Elizabeth's Master Plan

Interim Network Connections

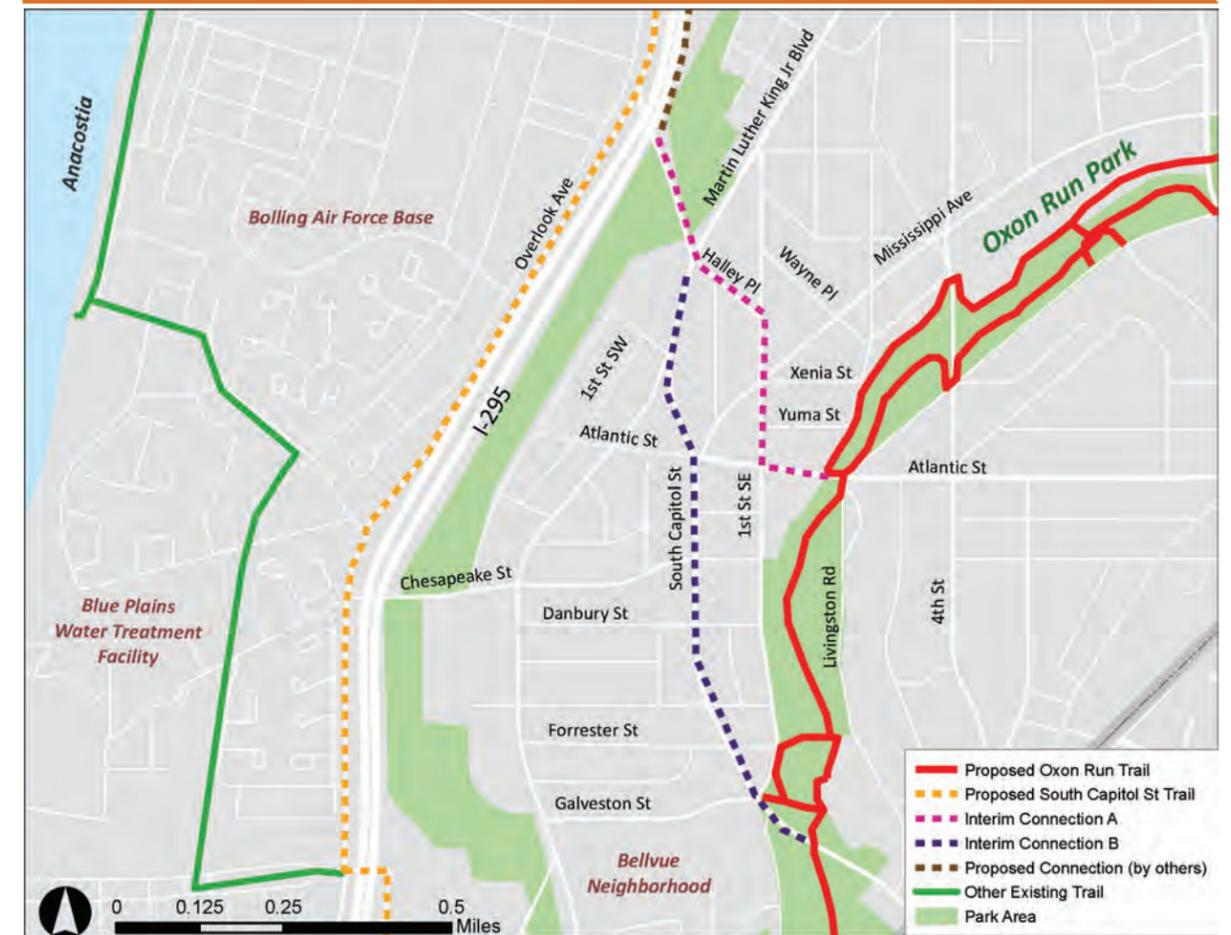
As a result of the planned redevelopment of the St. Elizabeth's West Campus into the Department of Homeland Security (DHS) headquarters, the South Capitol Street/ Anacostia Freeway intersection is scheduled to be improved by 2012 with better bicycle/ pedestrian access and facilities. Based on the preferred alternative from the St. Elizabeth's Environmental Impact Statement (EIS), a shared use path is carried through the west side of the St. Elizabeth's campus. The preferred alternative has a new interchange ramp bridge that spans Malcolm X Avenue and this poses a good opportunity for the DHS shared use path to span Malcolm X Avenue and include spurs which connect to the sidewalks along Malcolm X Avenue. However, as of Summer 2010, the plans for the interchange ramp bridge do not include a shared use path, and therefore a connection from the end of the proposed DHS shared use path, extending parallel to I-295 from Firth Sterling Avenue to Malcolm X Avenue is necessary to provide a bicycle and pedestrian connection to the west campus. Ultimately the improvements proposed as a part of the St. Elizabeth's Campus and Street Car projects impact the trail segment north of Malcolm X Avenue significantly, and thus further development and the ultimate alignment of this segment should be further reviewed once plans for both projects are further developed.

In the interim, on-street connections between Oxon Run Park and the northwest corner of South Capitol Street / Martin Luther King Blvd, where the DHS shared use path is planned to begin were evaluated to provide a north-south connection.

The following connections were evaluated, as illustrated in the interim network connections map:

Connection A: Sidepath along South Capitol Street – (per DC Bicycle Plan) – A proposed path along South Capitol Street to Oxon Run Park was illustrated, however this alignment appears to be difficult due to constrained width for a sidepath on both sides of the street. In addition, along the west side at the north end of the roadway there are significant slopes/walls within the corridor. The slopes are less severe further south, however there are numerous intersections and driveways along both sides of the corridor. Some areas appear to have sufficient width for a sidepath however others are constrained (9 feet between the curb and adjacent parking lots). Although

INTERIM NETWORK CONNECTIONS MAP



not an ideal location, the east side of S. Capitol Street appears to have better opportunities for a sidepath.

Connection B (Preferred Connection): On-Street Connections between Oxon

Run Park at Atlantic Street to 1st Street and Halley Place – A fairly direct connection was identified from Oxon Run Park along Halley Place, 1st Street SE and Atlantic Street. An on-street connection that uses Atlantic Street allows connections to proposed paths on either side of Oxon Run due to the existing bridge over the stream. Within this corridor, all of the streets are too narrow for bike lanes; however shared lane markings are feasible. There is a fairly steep hill on Halley Place and at the north end of 1st Street. Intersections appear relatively easy for cyclists to navigate, including the



Source: TDG Library

signalized intersections of S. Capitol Street /Martin Luther King Blvd, and 1st Street/Atlantic Street. The intersection of 1st Street and Mississippi Avenue is a bit awkward (5 leg and all way stop), but does not appear overly difficult for cyclists to navigate. Based on the above evaluation it appears that the most feasible and cost effective solution would be to make a connection from Oxon Run Park to the proposed St. Elizabeth's path to include on-street facilities (shared lane markings) along Atlantic Street, 1st Street and Halley Place.

B. Street Car: DDOT has initiated a project to construct a light rail line along Firth Sterling Avenue and South Capitol Street. Within the project area, the proposed street car track alignment would be on the west side of South Capitol Street from Firth Sterling Avenue to a few hundred feet south of an existing maintenance facility located on the east side of South Capitol Street. In some locations along the alignment, the proposed street car facility will occupy the total available width between the existing military wall and the west edge of South Capitol Street. This is particularly true near the proposed light rail station just south of Firth Sterling Avenue. This station also presents the potential to have a multimodal transportation connection to the trail. Recent discussions with DDOT staff indicate that construction was underway in spring 2010.

C. Anacostia Access (South Capitol Street) Transportation Study: Within the project study, several concepts to improve the connections between South Capitol Street, M Street, Suitland Parkway, I-295, Martin Luther King, Jr. Avenue, and Firth Sterling Avenue are being prepared. Originally, some of these roads and their associated intersections/ interchanges were designed to carry through traffic with little regard for neighborhood connections and aesthetic characteristics. As a result, reconfiguring these connections could improve traffic operations and safety, restore public open space, and eliminate barriers to bicycle and pedestrian transportation in the area.

D. DC Village: Proposed redevelopment of the DC Village site presents an opportunity to make a trail connection between South Capitol Street/ Overlook Avenue, and the existing Oxon Cove Trail. A conceptual site plan drawing designates a proposed sidepath trail along Shepherd Parkway, Blue Plains Drive and DC Village Lane connecting to the Oxon Cove Trail. (refer to attached graphics from DC Village Master Plan on next page)

Property Ownership: Within the trail corridor, a majority of the trail is proposed within District right-of-way or on District owned property, however land records and ownership records within the project corridor are not explicitly clear, and additional right-of-way or easements for the trail maybe necessary. Agreements with the military bases may be required for potential easements or maintenance agreements once construction is complete.

Utilities: Throughout the trail corridor the proposed trail crosses numerous subsurface utilities, and as a result, the impacts and potential modifications of these structures will have to be addressed during final design.

As mentioned within the pinch point areas, utilities, slopes, and roadway modifications are necessary. In addition to these areas, no significant areas have been determined for utility modifications, however during further design, utilities and potential retaining walls should be identified for further review.



Source: DC DOT Streetcar

Building Program		
1	MPD and FEMS Shared Parking and FEMS Reserve Apparatus Storage Structure (3 Stories)	213,200 SF
MPD		
2	MPD Special Operations Vehicle Storage and Parking	15,880 SF
3	MPD Recruiting Dormitory	12,000 SF
4	Relocated K-9 Training Facility	57,100 SF
FEMS		
5	FEMS Fleet Maintenance Operations	70,000 SF
6	FEMS Fleet Maintenance Operations Outdoor Storage	8,000 SF
7	FEMS Fleet Maintenance Operations Parking	8,400 SF
8	FEMS Training Facility	14,220 SF
9	FEMS Training Grounds	24,000 SF



LEGEND

- Existing Building
- Proposed Indoor Space
- Proposed Outdoor Space
- Proposed Parking
- Vehicle Circulation
- Landscaping
- Landscape Buffer
- Parks and Open Space
- Future Facility Site
- Existing Oxon Cove Trail
- Proposed Trail



DC Village (North) Master Plan
DC PDR PUBLIC FACILITIES PLAN

HNTB September 14, 2007

Source: HNTB Corporation

Building Program		
1	WMATA Bus Garage	
2	2-Story Structure	
	MPD Impoundment Lot	165,000 SF
3	DPW and MPD Impoundment Lot Employee Facilities	3,000 SF
4	MPD Impoundment Lot (Outdoor Storage)	330,000 SF
5	MPD Impoundment Lot Parking (Employee)	1,800 SF
	DPW Impoundment Lot	
6	DPW Impoundment Lot (Outdoor Storage)	480,000 SF

7	DPW Impoundment Lot Parking (Employee)	2,500 SF
	DPW Leaf Transfer Station	
8	DPW Leaf Equipment Storage (Surface Parking Lot)	34,500 SF
9	Parking	700 SF
	DDOT Salt Dome	
10	Salt Dome	17,000 SF
11	Outdoor Space	46,600 SF
12	Site Parking	700 SF
	Private Sector	
13	Concrete Plant	4.5 Acres
14	Asphalt Plant	2 Acres

Proposed Cell Tower

200' Buffer

10' High fence or Wall Enclosed All sides of Concrete Plant

Other Future Public Facilities, such as DCPS (10 Acres)

Note: This master plan shows future recommended uses. Although based on detailed analysis, the master plan diagram is illustrative and intended to convey a general sense of the desired future alignment of public facilities rather than a commitment to a particular design. Plan implementation by the District of Columbia is dependent on the availability of capital funds and on subsequent architectural and engineering design efforts.

Proposed Trail

Potomac Job Corps

Existing Oxon Cove Trail

LEGEND

- Existing Building
- Proposed Indoor Space
- Proposed Outdoor Space
- Proposed Parking
- Vehicle Circulation
- Landscaping
- Landscape Buffer
- Parks and Open Space
- Future Facility Site
- Existing Oxon Cove Trail
- Proposed Trail



DC Village (South) Master Plan
DC PDR PUBLIC FACILITIES PLAN

HNTB October 2, 2007

Source: HNTB Corporation

3

CONCEPT DEVELOPMENT AND IMPLEMENTATION

ANTICIPATED REVIEWS / APPROVALS

The following District agencies will review the various trail segments and provide input through the final design process.

District Department of Transportation - Transportation Policy, Planning & Sustainability Administration will provide project coordination during final design.

District Department of Transportation - Infrastructure Project Management Administration (IPMA) will provide project oversight during final design and construction, design review ensuring compliance with DDOT's *Engineering Standards and Guidelines*.

District Department of the Environment (DDOE) – Water Resources Protection will provide project review during final design to ensure all applicable laws are met for stormwater management, erosion & sediment control, and wildlife protection are maintained within the trail corridor.

District Department of Transportation - Urban Forestry Administration (UFA) will review proposed designs during final design to ensure compliance with UFA's recommended tree list.

District Office of Planning – Public Space Planning will provide design review during final design to ensure compliance with OP's public space program, which plans major public realm projects such as streetscapes, parks, and open space designs.

The following Federal agencies will review the various trail segments and provide input through the final design process:

US Army Corp of Engineers (USACE) – Baltimore District will review wetland delineations and impacts to wetlands or Waters of the U.S. in the trail corridor.

National Capital Planning Commission & Commission of Fine Arts – due to potential impacts to federal lands, review and approval by the National Capital Planning Commission and the Commission of the Fine Arts may also be required.

MANAGEMENT & MAINTENANCE OF TRAIL

Trail maintenance and management will involve a variety of activities. DDOT has already been administering some of these activities during trail development within the district. However the future workload will entail some new and additional work.

Implementation

- Managing phased trail design and construction
- Coordinating design and installation of trail wayfinding signs

Ongoing efforts include:

- Coordinating with various stakeholders to provide maintenance and surveillance support, and ensuring ongoing coordination and information exchange among city agencies, and public groups;
- Developing promotional materials;
- Managing trail operations and addressing any user conflicts that may arise;
- Regular clearing of vegetation and overgrowth;
- Repairing failed sections of the trail surface;
- Regular inspection and cleaning of catch basins, culverts and other drainage facilities;
- Maintaining and replacing signs and pavement markings; and
- Removing graffiti, if necessary.

POLICING AND PUBLIC SAFETY

Within District public right-of-way and property, the DC Metropolitan Police force will be the lead agency responsible for public safety and security. Since most of the trail will be adjacent to the various military bases, coordination with military police for trail surveillance and patrols should take place.

User security can be augmented by citizen volunteers or through cooperative arrangements with other city programs. The key to effective trail policing will be coordination; among the government police forces.

In general, motor vehicle patrols will be most effective along adjacent roadway to the trail, and supplemented with bicycle or foot patrols.

IMPLEMENTATION AND PHASING STRATEGY

The following is a brief implementation and phasing strategy. This strategy was developed through prioritizing segments of trail and those portions of the project which can be completed by complementary agencies or departments and other funding sources.

If possible, for cost and time savings, it is recommended that the project be implemented in one phase. However, a single phase typically is not possible due to funding constraints, timing of nearby capital projects (DHS Campus, Street Car) or the approval processes required for various sections of the project. As a result, if phasing is necessary, a framework of four phases of implementation is recommended. Again, if it is determined that some of these phases can be combined it would result in more cost effective implementation.

The potential phases for implementation have been organized based on anticipated approvals, potential funding amounts, and complexity of the individual trail segments. While there are many variables that must figure into the decision to undertake design and construction of a trail phase at a particular time it is critical that segments be immediately usable with seamless and convenient access.

The following is a summary of the primary segments of the project that should be implemented in each phase and a rationale for why they are recommended for the particular time frame represented by the phase. A phasing diagram is provided in Appendix C.

PHASE I - INTERIM NETWORK CONNECTIONS

As described previously, interim network connection would provide bicycle and pedestrian connections from Oxon Run Park and points south to the DHS campus and points north. Proposed improvements within this phase include:

- On-street facility markings/signage
- Trail construction (new)/sidewalk widening
- Roadway improvements

PHASE II - DC VILLAGE

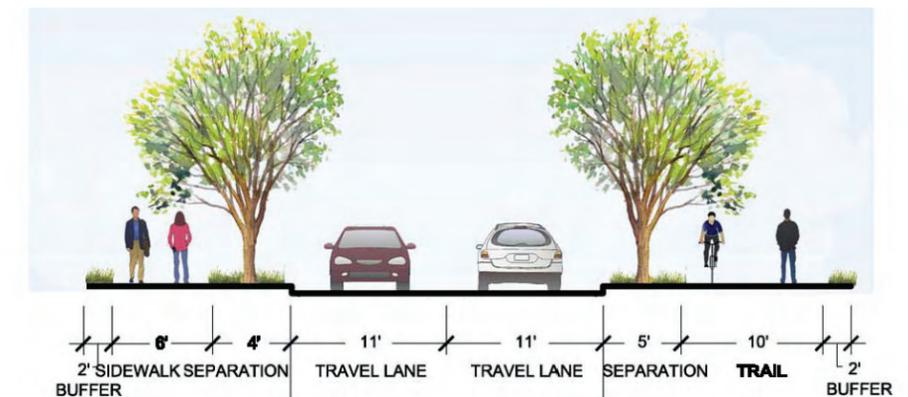
The DC Village area is located east of I-295 and is bounded on the north by the Bellevue residential neighborhood and on the south by Oxon Cove and NPS parklands. DC Village is an area slated for redevelopment and currently the existing street and sidewalk networks are in extreme disrepair and are non-contiguous. An existing asphalt trail at the eastern terminus of DC Village Lane near Bright Street leads to a bridge over Oxon Run and the NPS trail along the south side of Oxon Cove.

In general, there is very limited existing information about the DC Village area, which is owned by the District of Columbia. (An excerpt of the DC Village Master Plan is provided in Chapter 2.) The future development of DC Village as defined by the Master Plan indicates a rework of road and pedestrian pathways. Progress with the redevelopment project is still ongoing at the time of this report, and the future trail alignment within this segment will be refined once the redevelopment proceeds further.

The preliminary trail alignment within this segment consists of a 10-foot sidepath extending from the existing connection to DC Village Lane, along DC Village Lane and Blue Plains Drive and Shepherd Parkway. The trail extends along Shepherd Parkway north to the intersection of Laboratory Road, where it connects to Overlook Ave with Phase III.

This phase is connected to the ongoing redevelopment within the DC Village area. It is recommended that throughout the redevelopment process the proposed roadway improvements include trail connections and associated improvements between Oxon Cove Park in Maryland through DC Village to Shepherd Parkway and Overlook Avenue. This phase includes trail construction/sidewalk widening.

PREFERRED ROADWAY CROSS SECTION WITHIN DC VILLAGE



PHASE III - OVERLOOK AVENUE TO MALCOLM X AVENUE

Along the South Capitol Street and Overlook Avenue, I-295 runs parallel along the eastern boundary, Bolling Air Force Base, and Anacostia Naval Station are situated along the western boundary. Overlook Avenue extends north to Malcolm X Ave, where the roadway continues on to South Capitol Street, which is a major thoroughfare extending through the southeast quadrant of the District of Columbia from the U.S. Capitol to the District/ Maryland State line. This route connects the eastern shore of the Anacostia River to the rest of the city. Along the Overlook Avenue/ South Capitol Street corridor, the trail is proposed along the western side of the roadway corridor beyond the Laboratory Road intersection, and continues north to the Malcolm X Ave. intersection. Along the trail corridor, the trail is bordered by the roadway section, and several security walls along the military base property which creates a series of “pinch-points” for the trail. Additional constraints at each location may include utilities, drainage structures, traffic control devices and signage, environmental constraints and right-of-way/ property limits.

As a result, the pinch points are further defined as locations along the proposed trail alignment where South Capitol Street/Overlook Avenue travelways/traffic operations, and the military base walls extending along the west-side of the alignment result in a minimal available width for a trail between the roadway and another obstruction. As previously mentioned, the minimum desirable width for the proposed trail is 10-feet, with a 2-foot buffer and 5-foot separation from an adjacent roadway. In constrained areas throughout the trail corridor, 8-feet is recommended for the trail, with a 1-foot buffer and 1-foot separation. An absolute minimum width for limited trail segments is a 6-foot width with no buffer or separation. Where feasible, additional separation and buffer distances are highly recommended.

This phase enables a trail connection from DC Village to the proposed trail connection at the St. Elizabeth's West Campus connection. It is recommended that the improvements within this phase be coordinated with the proposed improvements to I-295/South Capitol Street, as a part of the DHS redevelopment. Improvements within this phase include:

- Trail construction/sidewalk widening
- Roadway/intersection improvements

In addition, this phase includes trail improvements and pinch points 1 through 5 along Overlook Avenue/South Capitol Street from Laboratory Road/Shepherd Parkway to Malcolm X Avenue.

PHASE IV - MALCOLM X AVENUE TO FIRTH STERLING AVE

Along the west side of South Capitol Street are military facilities including: Bolling Air Force Base and the Anacostia Naval Station. The east side is bounded by I-295 and the St. Elizabeth's campus near the northern project limits. Pinch points are generally caused by the reduction of available width for a trail between the roadway and another obstruction, such as a wall, light-rail tracks or other structures.

The South Capitol Street/ Malcolm X Avenue intersection is influenced by the ongoing redevelopments of the St. Elizabeth's West Campus for the future location of the Department of Homeland Security (DHS). As a result of the redevelopment, improvements to the surrounding roadway network are required for the project, thus resulting in a new interchange system at the Malcolm X Avenue, South Capitol Street, and I-295 intersection. The DHS roadway network plans illustrate a shared-use path along a proposed roadway between Malcolm X Avenue and Firth Sterling Avenue within the campus perimeter, but open to the general public. The preferred alternative has a new interchange ramp bridge that spans Malcolm X Avenue and this poses a good opportunity for the DHS shared use path to span Malcolm X and include spurs which connect to the sidewalks along Malcolm X Avenue.

Similar to Phase III, this phase of the proposed trail should consist of a 10-foot wide trail surface where sufficient width exists.

This phase continues the South Capitol Street trail from the St. Elizabeth's West Campus connection and Malcolm X Avenue to the northern terminus. It is also recommended that improvements within this segment should be coordinated with the proposed improvements as a part of the Firth Sterling Avenue Street Car Station.

Improvements within this phase include:

- Trail construction/sidewalk widening
- Roadway/intersection improvements

In addition, this phase includes trail improvements and pinch points 6 through 8 along South Capitol Street from Malcolm X Avenue to Firth Sterling Blvd.

ESTIMATED COSTS

Estimated costs to construct those features of the trail not yet completed or underway, which include interim bicycle access improvements from Oxon Run Park, and proposed trail improvements in Phases I - IV, are summarized in Appendix D. The estimated costs are planning level estimates that could change as design progresses and decisions are made on features for the trail.

Construction cost estimates were developed for the recommendations by identifying pay items and establishing rough quantities. Unit costs are based on 2010 dollars and were assigned based on historical cost data from DDOT, other state departments of transportation and other sources. The costs are intended to be general and used for planning purposes. Construction costs will vary based on the ultimate project scope (i.e. potential combination of projects, or use of DDOT forces) and economic conditions at the time of construction.

Costs are based on the Phased Implementation by Segment discussed earlier in this chapter and illustrated in Appendix C. Design, survey, and other pre-construction activities would add to the level of required funding

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