INTRODUCTION

The purpose of this assessment is to review the potential for and constraints associated with planning a hiking path connecting Fort Washington Park, the property known as Marshall Hall, and existing and potential launch and landing sites for human-powered boats. The assessment includes a review of opportunities and constraints that influence trail planning, potential connectivity, and costs, as well as the quality of potential outdoor recreational and educational experiences.

The route considered here is based upon a general trail corridor contained within the Prince George's County Trails Master Plan and a field inspection conducted by Lardner/Klein with PHNST volunteers knowledgeable of the project area. This assessment reviews twelve distinct project segments that reflect similar conditions and assumptions for the purpose of considering trail planning and development.

The concept plan includes the following elements:

1. Assessment Context
2. Existing Conditions
3. Analysis of Opportunities and Constraints
4. Trail Design Assumptions
5. Access/Trailhead Opportunities
6. Implementation Steps

The study area (Figure 1) is bounded by:

- Old Fort Road and Fort Washington Road to Fort Washington on the north side of Piscataway Creek
- Maryland 210 on the east side of the tidal portion of Piscataway Creek
- Farmington Road and Bryan Point Road to Colonial Farm and Marshall Hall to the south of Piscataway Creek

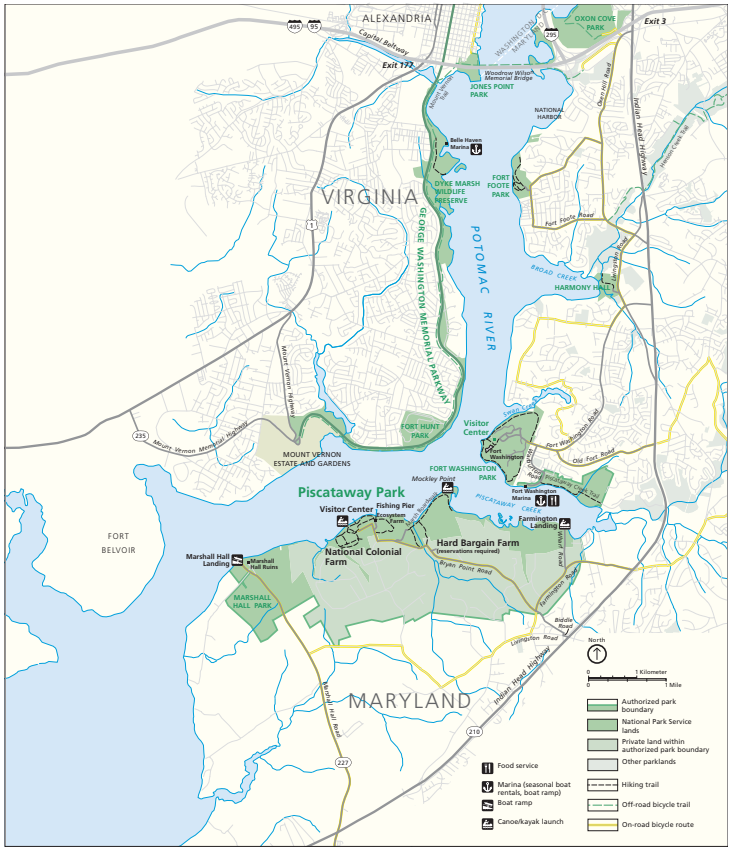


Figure 1 Location Map

ASSESSMENT CONTEXT

There are several related planning and implementation efforts providing context for the natural surface trails in the vicinity of Piscataway Park that are the subject of this report.

- Piscataway Park, Maryland: General Management Plan (1983)
- Foundation Document, Potomac Heritage National Scenic Trail: District of Columbia, Maryland, Pennsylvania, and Virginia (October 2014) available at http://www.nps.gov/pohe/parkmgmt/upload/POHE_Foundation-Doc_low-res_29SEPT2014.pdf, which serves to "integrate and coordinate all kinds and levels of planning from a single, shared understanding of what is most important about the Trail network". The foundation document establishes the

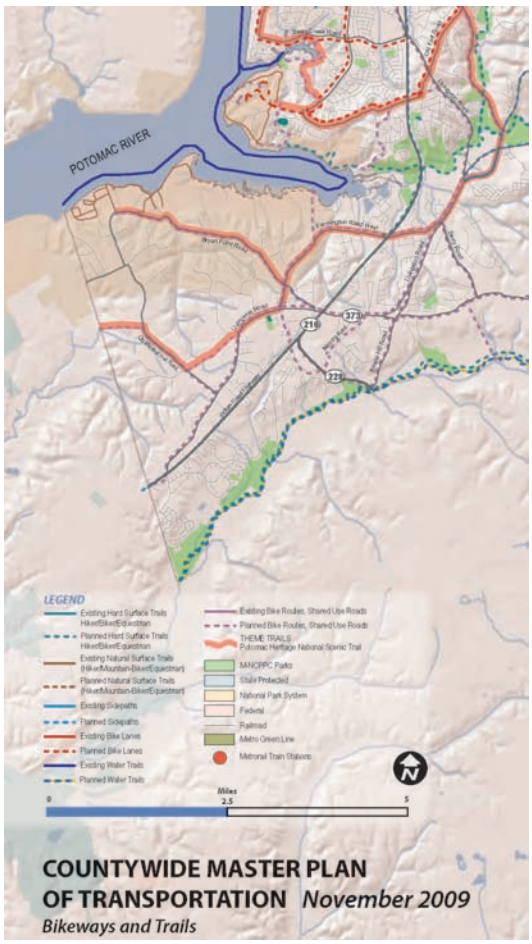


Figure 2 Prince George's County Master Plan of Transportation (2009) showing bikeways and trails (existing and planned) within the project vicinity

purpose of the Potomac Heritage NST as providing *"a means to establish an inter-connected trail network between the mouth of the Potomac River and the Allegheny Highlands and offers—through partnerships with and among agencies and citizen groups—exceptional hiking and other non-motorized recreational and educational experiences rich with geographic, ecological, historical, and social diversity."* The foundation document references additional related studies that are also part of the planning context.

- A sign plan for an associated bicycle route has been prepared and is planned for implementation in 2015 for the Prince George's section of the Southern Maryland Potomac Heritage Trail On-Road Bicycling Route (http://www.nps.gov/pohe/parkmgmt/upload/PHT-Signage-Plans_Draft_16DEC2011.pdf).
- The Prince George's County 2009 Master Plan of Transportation (MPOT) includes an illustrative map of existing and planned bikeways and trails. The 2009 MPOT provides planning level alignment for a natural surface trail that roughly parallels the shoreline of Piscataway Creek from Fort Washington to MD 210, crosses the creek along MD 210, skirts the WSSC property along Farmington Road West and Wharf Road to Farmington Landing, then returns to the creek shorelines (shown in Figure 2).
- Residents of the area have documented (using GPS) potential routes and options, which are considered as part of the assessment. The volunteer-created map is located at http://maps.google.com/maps/ms?ie=UTF&msa=0&msid=203549247925505192443.0004fcef4cbb907d46da8.

Related planning efforts include: the development of the Maryland Southern Piscataway Indian Heritage Trail; plans associated with other national trails (Captain John Smith Chesapeake NHT, and Star-Spangled Banner NHT); and completion in 2014 of a common interpretive strategy for the Potomac Heritage NST, Religious Freedom National Scenic Byway, Star-Spangled Banner NHT in Charles and Saint Mary's counties.

EXISTING CONDITIONS

Residents of Prince George's County and other PHNST advocates have been seeking to establish a natural surface footpath connecting Fort Washington Park, Piscataway Park (including the National Colonial Farm) and Marshall Hall for many years. The primary opportunities associated with this idea include:

- Linking together nationally significant historic and natural resource assets associated with Fort Washington Park, Piscataway Park and Marshall Hall to help tell the heritage- and nature-based stories associated with Piscataway Creek at the Potomac River
- Providing a high quality, nature-based recreational experience for both nearby residents and visitors
- Provide physical and visual access to the tidal section of Piscataway Creek helping to increase awareness of its natural resource values, opportunities and related vulnerabilities
- Increase economic benefits to southern Prince George's County by increasing the length of stay of visitors, increasing the likelihood that they will spend money at nearby hospitality related retail establishments

The route traverses the shorelines and tributaries of the tidal segments at the mouth of Piscataway Creek. The following key points provide a characterization of the associated lands along the shoreline:

- Piscataway and Fort Washington Parks are located in the Upper Coastal Plain Physiographic Province of Maryland
- The route is located along the floodplain and river terraces of the Potomac River and Piscataway Creek
- The Piscataway Creek floodplain is bound on the south by the base or "toe" of the Potomac River Escarpment rising from approximately 50 feet above mean high tide to 150 feet above mean high tide. The steep escarpment bluffs on the Fort Washington side descend from approximately 150' above mean high tide down to the mean water level at the shoreline. The escarpment is readily seen in the existing conditions map (Figure 3) illustrating the locations of steeper slopes (greater than 10%)
- The boundary for the 100-year floodplain roughly follows the 9' contour in the lower reaches and 10' contour in the upper reaches (see Figure 4)
- There are two major soil associations along Piscataway Creek and its adjoining lands: The Sassafras-Keyport-Elkton Association is found mainly along the terraces of the Potomac River and Piscataway Creek. The Sassafras-Croom Association is located on the slopes and gullies that cut in to the escarpment
- The terrace soils are comprised of thick beds of silty clay beneath the Keyport and Elkton soil types. They are poorly drained and generally challenging for trail building and maintenance. The Sassafras-Croom Association has high sand and gravel content making them more suitable for trails due to the better drainage
- Soil hydrologic group 'D' is a strong indicator of wetland and/or very poor drainage. These areas are shown on the existing conditions map (Figure 3) as a light blue overlay and will present a significant challenge and cost for construction of the trail. The challenges can be overcome by utilizing low boardwalks or using the alternative route around. At the same time, building a trail through this area might present some important interpretive and educational opportunities, as the plant and wildlife communities are different than those on the north side
- The adjacent land use is low density residential to the north and rural residential to the south

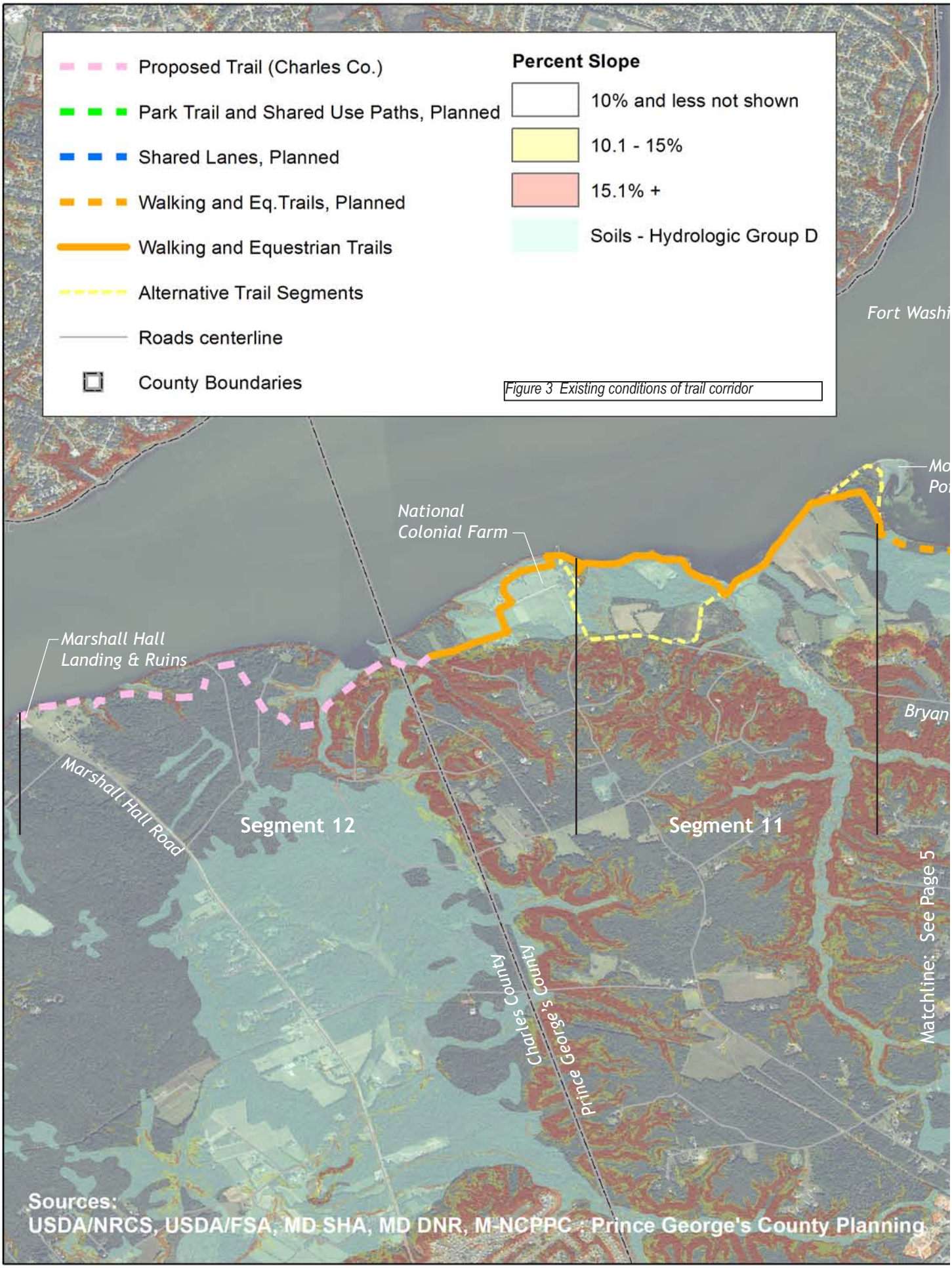
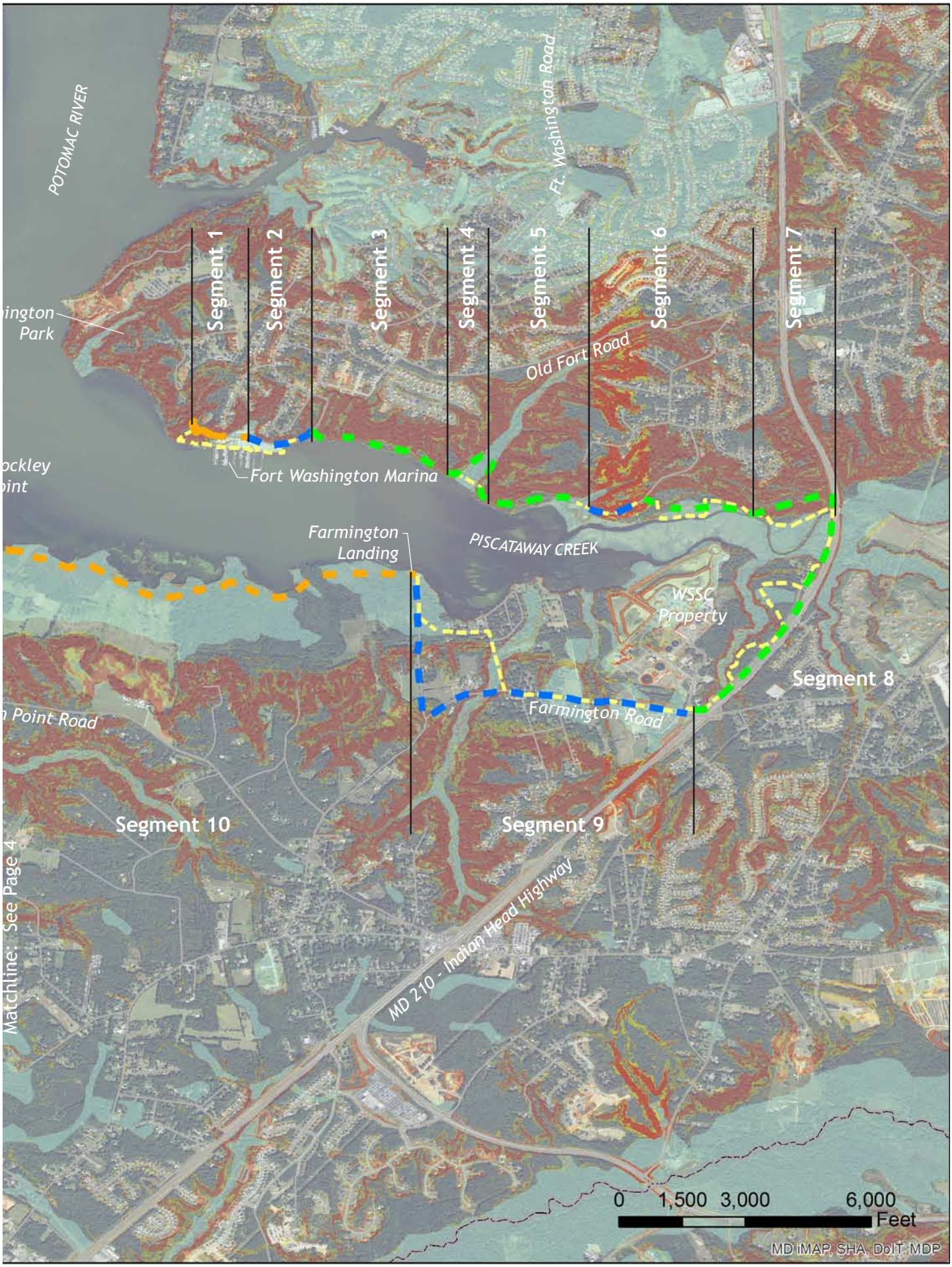


Figure 3 Existing conditions of trail corridor


POTOMAC RIVER
Ft. Washington Road
Segment 1
Segment 2
Segment 3
Segment 4
Segment 5
Segment 6
Segment 7
ington
Park
Old Fort Road
ockley
oint
Fort Washington Marina
Farmington
Landing
PISCATAWAY CREEK
WSSC
Property
Segment 8
n Point Road
Farmington Road
Segment 10
Segment 9
Matchline: See Page 4
MD 210 - Indian Head Highway
0
1,500
3,000
6,000
Feet
MD iMAP, SHA, DoIT, MDP

ANALYSIS OF OPPORTUNITIES AND CONSTRAINTS

Each distinct segment of the corridor contains important opportunities and constraints that are listed below. In some cases, options have been identified for each segment to either capture an opportunity or avoid or minimize the impact of a constraint. Segments are mapped on Figure 3.

NORTH SHORE OF PISCATAWAY CREEK

Segment 1 - Fort Washington Battery to Swim Club

The Battery at Fort Washington Park is the primary trailhead on the northern side of Piscataway Creek. The views from the Battery towards the Potomac River are outstanding and highly valued. The historic features associated with the Battery are interpreted, but that interpretation could be refreshed. The biggest challenge associated with this segment is traversing the lands owned by the adjoining swim club. The swim club will need to be consulted before any planning begins.
Two options are possible:

Figure 4 Existing Trail at Fort Washington

Option 1: Upland route above the swim club – having the advantage of providing access to the historical features of the battery above, along with traversing the escarpment through a natural cut exposing different layers of the soil and geological strata.

Option 2: Along the driveway and shoreline associated with the swim club, and then climbing up to Fort Washington along the perimeter of the escarpment.

Segment 2 - Swim Club to Piscataway Creek Trailhead

The marina's restaurant and restrooms provide both the functional facilities and the opportunity to have meal or refreshment as part of the trail experience. The biggest challenge of this section is the need to fit the trail along the roadway. An alternative route would include a trail within the Marina providing both visual and physical access to Piscataway Creek.

Figure 5 King Charles Terrace roadway section

Option 1: King Charles Terrace – the trail would follow the roadway. Further information on right-of-way widths is needed to determine if there is enough space for a footpath, or if the trail would have to be established along the shoulder of the roadway.

Option 2: Marina – the trail would be included within the Marina, avoiding the roadway issues, but likely requiring adjustments to security and fencing for the boats stored at the marina.

Segment 3 - Piscataway Creek Trail (existing)

The existing trail starts at an informal trailhead off of King Charles Terrace and follows an old roadbed and WSSC sewer line along the terrace of Piscataway Creek.

The existing trail has views out to the creek (winter). The trail surface has some areas that are ponding and would benefit from some drainage work to increase the sustainability of the trail. The Prince George's County MPOT (2009) calls for this segment to be constructed as a hard surface trail.

Figure 6 Trailhead for existing Piscataway Creek Trail

Segment 4 – Piscataway Creek Tributary Crossing

The unnamed tributary provides a break in the escarpment along the north side of Piscataway Creek. Trail access from adjoining neighborhoods is an opportunity available from the neighborhood to the northwest up through the escarpment to L'Enfant Drive, referred to as the "L'Enfant Connection." Additional trail access is available from the adjoining neighborhood to the northeast through North Piscataway Park (connecting at Pine Street) and continuing south to the east side of the tributary. The biggest challenge has been the multi-year process to initiate compliance for construction of a boardwalk on top of or adjacent to the existing sewer line crossing. Geotechnical work will be needed to insure pile construction to support the boardwalk will not affect the stability of the sewer line crossing.

Figure 7 Existing sewer line

Segment 5 –North Piscataway Park (existing trail)

The existing natural surface trail continues along the east side of the tributary on the terrace of Piscataway Creek to Piscataway Drive.

Figure 8 View of northern shoreline of Piscataway Creek

Segment 6 – Piscataway Stream Valley Park

The trail corridor crosses into an M-NCPPC Stream Valley Park. M-NCPPC is updating their Park Trails master plan and coordinating this section of the trail would be a good example of how a park trail can provide greater connectivity in conjunction with other partners. PHNST volunteers have identified two options in this corridor.

Option 1: Trail at grade within the stream valley park.
Option 2: Construction of a boardwalk along the creek edge to provide better visual access and more interpretive opportunities.

Figure 9 Level terrace adjacent to Piscataway Stream Valley Park

PISCATAWAY CREEK CROSSING

Segment 7 - MD 210 & Piscataway Creek crossing

Crossing Piscataway Creek is one of the biggest challenges to connectivity; MD 210 has no facilities for pedestrian and/or bicycle use. Crossing will eventually require a new pedestrian bridge crossing. There does not appear to be any planned or programmed modifications to MD 210 that would provide an opportunity to enhance pedestrian and bicycle access to and over the Creek. There is an old roadbed that runs parallel to MD 210 that provides a graded

Figure 10 Desirable location for pedestrian bridge over Piscataway Creek

path to reach the highway. However, the point of access to the highway has poor sight distances, vehicles travel at high and possibly excessive rates of speed, and there is little room to create a protected space for pedestrians on the existing bridge. A new pedestrian bridge appears to be the safest approach and likely the least constrained solution. There are two options for crossing:

Option 1: Upstream (east) of MD 210 – the trail would need to be developed under the bridge where it eventually would find a narrower crossing point; further upstream is a small rapids that may constrain bridge constructability.

Option 2: Downstream (west) of MD 210 – a downstream crossing could be constructed adjacent to the existing bridge on flatter water and with easier construction access on both sides utilizing an existing roadbed (could have been a former construction road, a former alignment, or something else).

Segment 8 - MD 210 & Piscataway Creek crossing to Farmington Road.

Figure 11 Google Earth view of frontage road south of Piscataway Creek and adjacent to MD 210

After crossing Piscataway Creek, opportunities are available using existing trails and roadbeds to adjacent to lands managed by WSSC (and within the non-secure wooded land to the east of WSSC) connecting with Farmington Road. Locating a trail away from MD 210 would provide for a better experience. Two options are possible

Option 1: An existing frontage road provides access to six houses and runs parallel to MD 210. The remaining distance to the bridge would be new constructed trail on wooded ground. Building closer to the base of the fill slope of MD 210 appears to be drier and less vegetation making it easier to construct a trail

Option 2 – Depending on policies and regulations, the WSSC property outside the secure fence line of the treatment plant is suitable for trail construction and would provide an opportunity to interpret the improved health of the Potomac River over the past 50 years.

SOUTH SIDE OF PISCATAWAY CREEK

Segment 9 - Farmington Road to Farmington Landing

There is little public land between WSSC and Piscataway Creek, so a route would need to follow Farmington Road. There appears to be enough space between the secure fence and Farmington Road to maintain a separated path. Property maps are needed to determine the right-of-way. WSSC should be consulted before any planning begins.

At Farmington Road there are two options for further consideration:

Option 1: Farmington Rd to Wharf Rd –staying on Farmington Road and then Wharf Road to Farmington Landing – acquiring right-of-way information is necessary to determine feasibility (and costs)

Option 2: Alternatively, a more direct route is possible by using Farmington Creek Drive and Gingrich Drive to reach what may be a paper street connection directly across to Wharf Road. The benefit of this route would be less traffic.

Segment 10- Farmington Landing to Mockley Point

This segment is constrained by the poorly drained silty-clay soils that are likely to include extensive wetlands. A mix of either boardwalk or turnpike trail construction would be needed to keep the trail functional. One link is needed between the Mockley Point Trail and the Pumpkin Ash Trail – both are located generally parallel to the shoreline on upland areas. Two privately owned parcels abut public land leaving a narrow corridor of public land along Piscataway Creek. More detailed property and topographic mapping will be needed to evaluate the feasibility and cost.

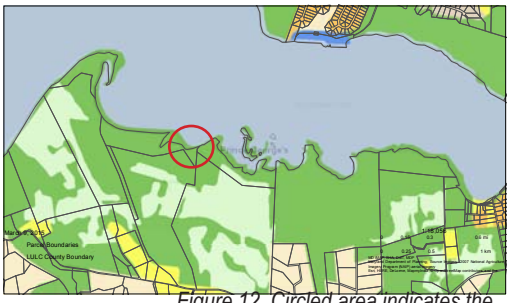


Figure 12 Circled area indicates the location of the narrow corridor of public land in Segment 10

Segment 11 - Mockley Point to Colonial Farm

Connections between the Pumpkin Ash Trail and Accokeek Creek would add considerably to the experience of this area. An extensive boardwalk section was constructed along with a "living shoreline" project between Mockley Point and and a trailhead off of Bryan Point Road. The interpreted boardwalk is a distinctive destination.

Figure 13 Boardwalk along the Living Shoreline Project

Segment 12 - Colonial Farm to Marshall Hall

Private properties owners in this corridor should be consulted before any planning begins. If at all possible, a trail would traverse wooded areas along the shoreline, connecting with the area known as Marshall Hall, which includes a parking lot, boat launch and historical markers.

Figure 14 View from jetty at Marshall Hall looking east

TRAIL DESIGN ASSUMPTIONS

As stated in the introduction, the purpose of establishing the Potomac Heritage National Scenic Trail is to provide opportunities for partnerships that create "exceptional hiking and other non-motorized recreational and educational experiences". The design and layout of trails is important to provide high quality recreational and educational experiences. A trail along Piscataway Creek should

be designed so that form, line, color and texture is compatible with its natural resource context, Trails should not be the dominant design element, but instead should "lay lightly in the land" as if it were a ribbon draped across the landscape. Trees must be preserved. Creeks must be crossed with a light touch using structures that nestle into the landscape.

This study is focused on a route for hiking with connections to historic sites, learning opportunities, exceptional natural areas and access to launch human-powered boats. In addition, the MPOT for Prince George's County notes equestrian users in some places (Figure 2) and on the northern shore, indicates a hard surface at some point.

Trail design and construction should provide a basic level of safety without removing all risk. Trails should be accessible to a wide range of abilities, but not at the expense of the need to continue to protect the environment. A natural surface trail along and in the vicinity of Piscataway Creek should be designed to withstand periodic flooding and saturated soils and to cross and provide educational opportunities associated with wetlands and tributary streams.

Some options for planning a trail should consider using the adjoining escarpment to avoid shoreline constraints and wetlands. Side hill trails should be gradual, working with the contour and shape of the hill. Trails that climb hills need to maintain a sustainable grade—somewhere between seven and ten percent—and shed water at a rate that does not erode adjoining slopes.

The following are the recommended design standards for planning based upon these assumptions:

Design Element	Footpath	Accessible Path
Min. Tread Width (Level)	36"	60"
Min. Tread Width (Slope)	24"	36"
Min. Cleared Width (level)	12" each side	24" each side
Cleared Width (slope)	12" each side	24" each side"
Cleared Height (minimum)	8'	8'
Slope (maximum sustained)	10%	5%
Slope (limited duration)	15%	8% for 30' with rail
Cross slope	3%	1% (positive drainage)
Minimum distances for passing opportunities		1200'
Resting Intervals (level)	1200'	1200'
Surface	Native, boardwalk	Asphalt, concrete, stabilized aggregate, boardwalk

A successful trail design will need to address five basic conditions that can be found in the corridor: a generally level terrain (typical condition); a hill slope terrain associated with the escarpment; a level marshy condition associated with the shoreline areas, especially along the southern shoreline; a trail crossing wetlands; and, a trail section parallel to or sharing the surface of an existing roadway.

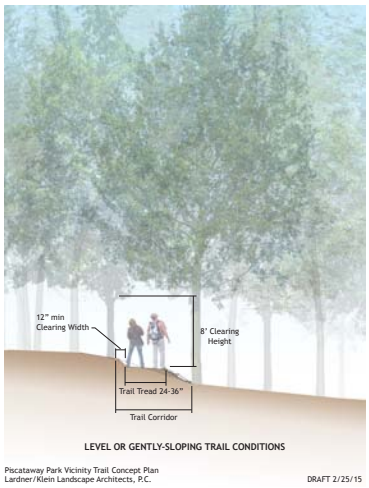


Figure 15 Typical trail section (level)

TYPICAL TRAIL CROSS SECTION)

The optimal condition for the trail is found mostly along the northern shoreline where existing trail has already been constructed or on the more gently sloped upland areas of the Colonial Farm. Figure 15 illustrates the desired tread widths and clearances. Designing a trail on level terrain requires the establishment of positive drainage to prevent ponding. Ponding results from either over use during saturated conditions, or from surface runoff from adjoining areas running across the trail.

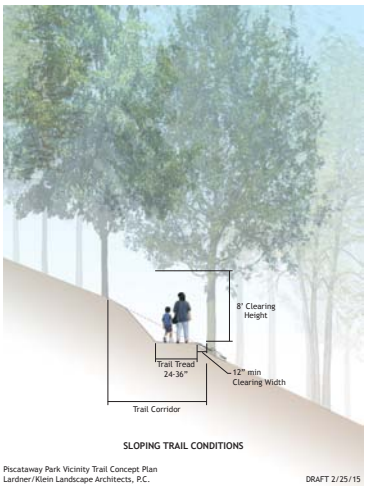
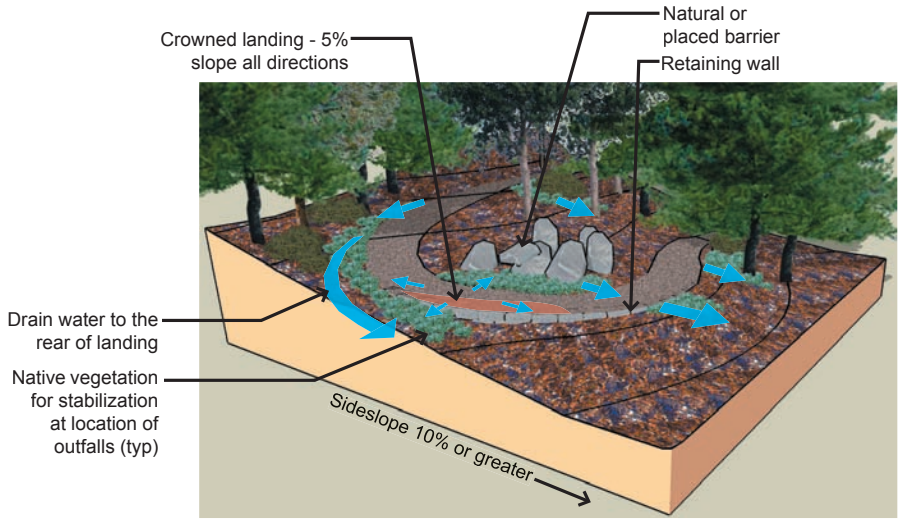


Figure 16 Typical section, hill side trail

SIDE HILL TRAIL

In the places where the trail must traverse the escarpment the desired grade[1] for the trail should be between 7 and 10%—with the trail climbing the hill at a steady rate. Figure 16 illustrates how the side hill trail should be narrowed to minimize the need for excessive grading and how best to use the cross pitch to shed water. In some situations, it may be desirable to steepen the trail to as much as

1 Trail grade refers to the change in elevation divided by distance along tl (for example a 1' rise in elevation for every 10' of trail length results in grade)



Rolling Crown Switchback

Figure 17 Rolling Crown Switchback

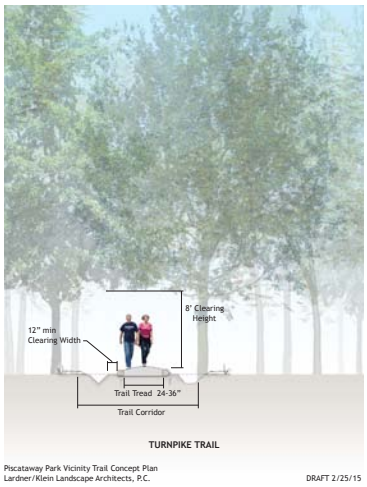


Figure 18 Turnpike

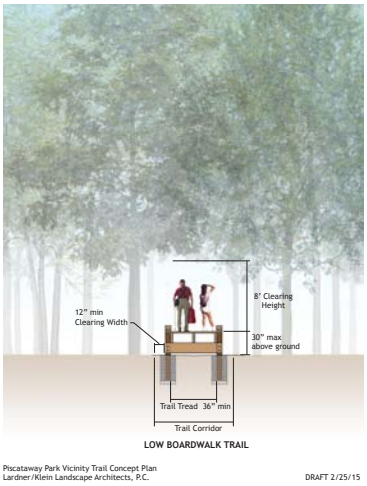


Figure 19 Low Boardwalk

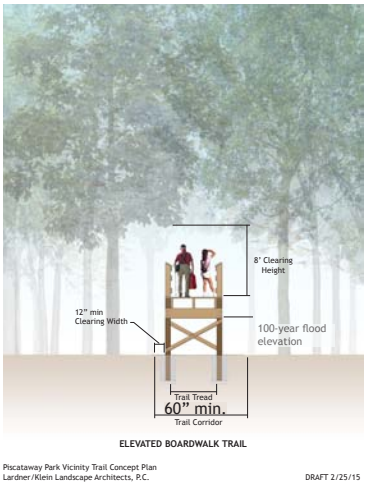


Figure 20 High Boardwalk

15% grade for short distances to minimize cutting into a slope or filling along the downslope side. Where the existing slope of the land is too steep to achieve these grades within the available trail corridor, then a switchback may be needed. Surface runoff on the switchback should be managed as shown in Figure 17.

TRAIL THROUGH POORLY DRAINED SOILS

In areas with short sections of poorly drained soils (not classified as wetlands), or where ponding is known to occur, it may be necessary to raise or re-grade a trail section to achieve positive drainage. Traditional trail designs have used a “turnpike” to simply build up the trail with a wood timber and backfill with aggregate or soil and aggregate mix (Figure 18). However, in a flood prone area, this type of trail design requires constant maintenance and repair. An alternative approach that may be more sustainable if constructed appropriately is to create a rolling grade dip, which provides a way for the water to drain off and away from the trail (Figure 21).

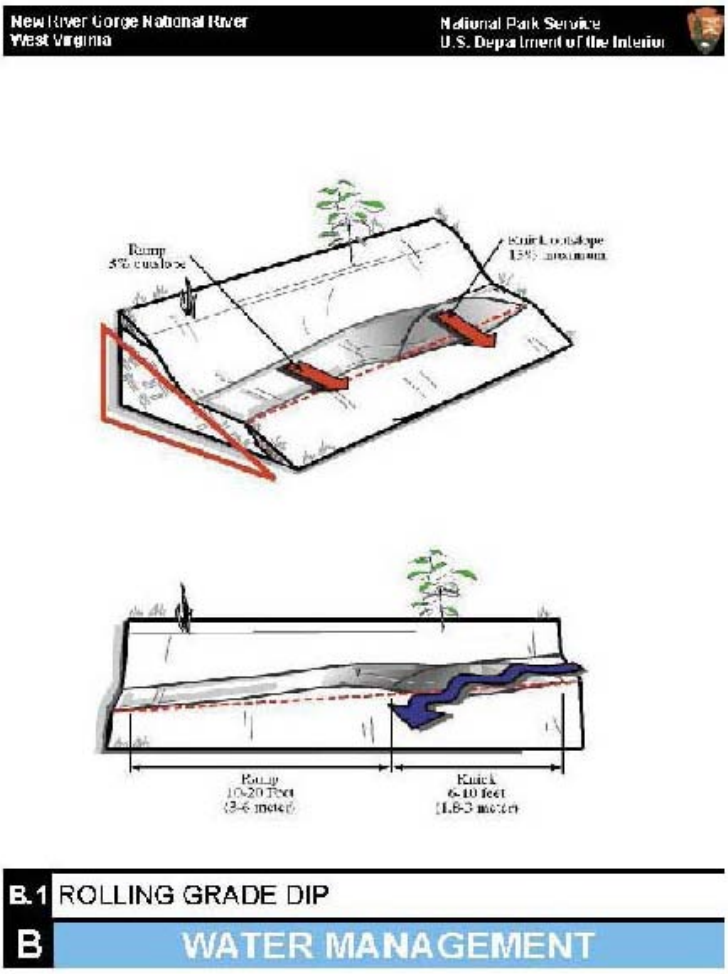


Figure 21 Rolling grade dip (source IMBA, New River Gorge single track trail design guidelines

TRAIL TRAVERSING WETLAND AREAS

In situations where the trail must cross or traverse wetlands, a boardwalk may be needed. In all cases the boardwalk superstructure and deck should be set an elevation above the 100-year floodplain to avoid multi-day periods when the boardwalk's deck stringers and related fasteners would be inundated with flood water for a multi-day period. When the elevation of the adjoining surface is less than 30" below the elevation of the deck, than a "low boardwalk" without railings can be used (Figure 19). When the difference is greater than 30" then a railing is required (Figure 20).

TRAIL ALONG A ROADWAY

Options have been identified for trail to run parallel to or utilize a portion of the roadway (shoulder use or shared travel lane). Property and right-of-way information is needed to determine the feasibility of routes along a roadway but within the right-of-way. Use of shoulders or shared lanes must be addressed through the Prince George's County Master Plan of Transportation and/or State Highway Administration depending upon responsibility for the roadway.

ACCESS TO THE TRAIL

There are two existing and four primary points of access with varying levels of parking and visitor services (located on Figure 3).

EXISTING PUBLIC ACCESS

- The existing Piscataway River Trail has a small trailhead along King Charles Terrace. Enhancements to this trailhead could include replacing the Jersey barrier with a more appropriate form of vehicle control such as a wooden guardrail (with steel reinforcement if needed for crash worthiness along the roadway).
- The Colonial Farm has a larger parking area and a visitor center that provides access to the living shorelines and boardwalk area, as well as existing trails. Thees trails provide access and interpretation for Piscataway Park's many natural and cultural features.

EXISTING SEMI-PUBLIC ACCESS

- Trail access to the existing Piscataway Trail is available from two adjoining subdivisions at L'Enfant Drive and at Pine Street.

POTENTIAL TRAILHEAD DEVELOPMENT

- Fort Washington and its visitor center could be utilized as a trailhead once a trail connection is established from Fort Washington to the King Charles Terrace trailhead (working cooperatively with the swim club and adjoining marina)
- Access from Indian Head Highway could be developed utilizing M-NCPPC

property along the parallel access road on the south side of Indian Head Highway. This would be desirable if trail access could be achieved through the WSSC property that is unsecured (Figure 24)

- Access from Farmington Landing – the existing parking area at the landing could also serve as a trailhead for access to the south side trails
- Access from the former amusement park lot adjacent to Marshall Hall

IMPLEMENTATION STEPS

The next steps for trail development in the vicinity of Piscataway Park and Fort Washington should simultaneously advance the overall design while completing the long-planned and funded boardwalk crossing of the tributary between the L'Enfant and Pine Street access trails.

1. Consult with private property owners/managers, WSSC staff and other trail stakeholders to determine support for planning, design and construction of all or partial trail segments.
2. Develop a feasibility study and preliminary design (35%) that would serve to establish a preliminary construction budget and identify the need for site specific technical studies (environmental, cultural, geotechnical, and hydrological)
3. Complete engineering and environmental documents for the tributary crossing project
4. Upon completion of the feasibility study and preliminary design, prepare all environmental documents and technical studies needed to: finalize the alignment; define the means and methods of construction; identify those segments of the trail that can be constructed by volunteers and those that will need to be contracted out; refine the construction budget and determine how the trail construction will be phased, funded and financed
5. Complete NEPA process (if necessary)
6. Develop final bidding and construction documents for those portions of the trail that will be contracted out
7. Develop a trail building handbook for use by volunteers (and those training volunteers)
8. Develop a maintenance and trail management plan and handbook