Mount Vernon Multi-Use Trail Extension
Feasibility Study

George Washington Memorial Parkway Headquarters
Turkey Run Park
Mc Lean, VA 22101

Prepared for the National Park Service by LDR International an HNTB Company

U.S. Department of the Interior
Washington, DC

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The primary purpose of this study is to consider the technical feasibility of placing a paved trail from the parking area at Theodore Roosevelt Island to I-495 at the American Legion Bridge.

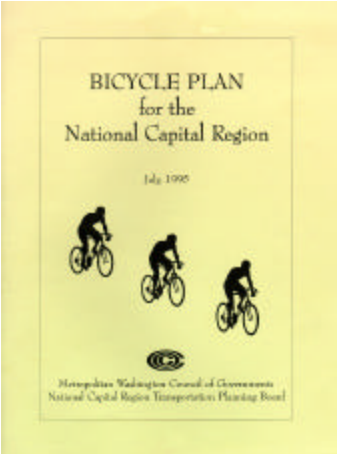
1.0 Introduction

The Mount Vernon Trail is a paved, multi-use recreational trail owned and maintained by the George Washington Memorial Parkway (GWMP), a unit of the National Park Service (NPS) in Northern Virginia. The Mount Vernon Trail begins upriver from the Mount Vernon Estate in Virginia and travels through a small portion of the District of Columbia, to its terminus at the Theodore Roosevelt Island parking area. In January 1998, the Virginia Bicycling Federation (VBF) and the Washington Area Bicyclist Association (WABA) presented to the NPS-GWMP an unsolicited proposal, *Extending the Mount Vernon Trail from Key Bridge to the American Legion Bridge (I-495) Options and Recommendations*, which asked the NPS to conduct a feasibility study examining an extension of the Mount Vernon Trail from its terminus to Interstate 495 at the American Legion Bridge.

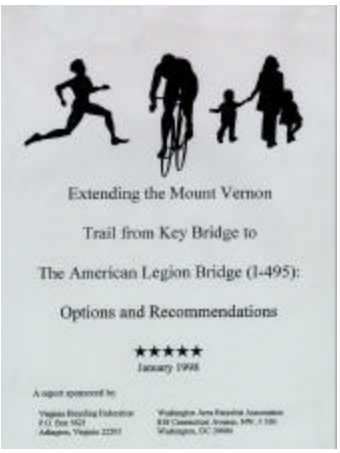
This report was developed and prepared by LDR International, an HNTB Company for the NPS. The study area includes the lands of the GWMP from the parking area at Theodore Roosevelt Island to I-495 at the American Legion Bridge, and the Arlington County and Fairfax County road and trail systems in the vicinity. The primary purpose of this study is to consider the technical feasibility of placing a paved trail in this location. Although the technical feasibility team reviewed available natural and cultural resource reports in order to become familiar with known sensitive resources within the study area, this technical feasibility study in no way serves as an assessment of environmental impacts of placing a paved trail in the proposed alternative routes described within this report. The NPS will use the alternatives developed from this study as the starting point for the planning process of the trail extension. The National Environmental Policy Act (NEPA), the National Historic Preservation Act (NHPA), and NPS Policy require this planning effort. It will include public involvement and assessments of all impacts on the environment, as well as accounting for effects on historic properties, such as the GWMP, which is listed as a National Register Property.

This study began with a work session with members of the NPS staff to outline the study process, identify available resource materials and define critical issues. Natural and cultural resource reports were reviewed to familiarize the team with known sensitive resources within the

The George Washington Memorial Parkway follows the Potomac River in Northern Virginia, traveling from Mount Vernon to the American Legion Bridge.



In July 1995, the Metropolitan Washington Council of Governments and the National Capitol Region Planning Board issued the *Bicycle Plan for the National Capital Region*. The plan proposed "a study to assess the feasibility of extending the Mount Vernon Trail from the Theodore Roosevelt Island parking area to the Beltway and the American Legion Bridge, and connecting the trail to adjacent residential areas and bicycle routes.".



In January 1998, the Virginia Bicycling Federation (VBF) and the Washington Area Bicyclist Association (WABA) presented to the NPS, George Washington Memorial Parkway unit, an unsolicited proposal, *Extending the Mount Vernon Trail from Key Bridge to the American Legion Bridge (I-495) Options and Recommendations*. This report described various alternatives for extending the trail along parkway lands, through neighboring subdivisions, and along county roads.

study area. Base files were obtained from county and NPS mapping departments. These files have been used to develop property ownership, cultural, natural, and recreation resource inventories. The study team has identified and presented trail alternatives for further evaluation. Throughout the process, the study has been reviewed by a narrow group of participants, including NPS personnel and representatives of Arlington and Fairfax counties. Other interested parties may have additional resources or alternatives to the proposed solutions.

This report contains non-specific inventories of known natural and cultural resources, property ownership and recreation resources; a summary analysis, trail location alternatives within NPS and county property, cost estimates for selected alternatives, and general recommendations for improvements and amenities throughout the study area.

After review of three preliminary drafts by the NPS and Arlington and Fairfax counties, comments have been incorporated, cost estimates have been revised, maps have been updated, and photographs and illustrations have been added to the report. This report is the final submission of this feasibility study.

1.1 Past Studies

Several past reports have proposed the extension of the Mount Vernon Trail north from its current terminus. The two most recent studies proposing this extension were the Metropolitan Washington Council of Government's 1995 study, *Bicycle Plan for the National Capitol Region* and the 1998 proposal by the VBF and WABA, *Extending the Mount Vernon Trail from Key Bridge to the American Legion Bridge (I-495) Options and Recommendations*. Both were reviewed in the preparation of this feasibility study.

1.1.1 1995 Metropolitan Washington Council of Governments Study

In July 1995, the Metropolitan Washington Council of Governments (MWCOG) and the National Capitol Region Planning Board issued the *Bicycle Plan for the National Capital Region*. The plan proposed "a study to assess the feasibility of extending the Mount Vernon Trail from the Theodore Roosevelt Island parking area to the Beltway and the American Legion Bridge, and connecting the trail to adjacent residential areas and bicycle routes." The report noted NPS objection to locating the trail along the parkway between Key Bridge and Chain Bridge, due to steep topography and the narrowness of the right-of-way. An on-street route through Arlington (Custis Trail, Lorcom Lane, Nellie Custis Drive, Military Road, Randolph Street) was suggested as a possible alternative.

The plan also proposed a multi-use bridge paralleling the American Legion Bridge. Its primary purpose would be to provide bicycle commuters access across the Potomac River, but it would also provide access to many recreational trails on the Maryland side of the Potomac River. It was proposed that the extension of the Mount Vernon Trail connect to this proposed bridge.

1.1.2 1998 Virginia Bicycling Federation and the Washington Area Bicyclist Association Study

In January 1998, the VBF and WABA presented to the NPS-GWMP unit, an unsolicited proposal, *Extending the Mount Vernon Trail from Key Bridge to the American Legion Bridge (I-495) Options and Recommendations*. This report described various alternatives for extending the trail along parkway lands, through neighboring subdivisions, and along county roads. The group identifies a preferred alternative, which has been evaluated as part of this study. The report also examined how the extension of the Mount Vernon Trail could connect to other trails and recreational resources.

The report indicated that WABA and VBF are more concerned about creating a trail that would "meet the practical needs of the Greater Washington community" than developing a potentially more scenic route along the Palisades.

Furthermore, the report stated that:

> *the current availability of established bicycle routes on streets in Arlington offers an inexpensive means of covering the distance between the Key and Chain Bridge areas. Indeed, use of the Arlington on-street system would provide bike commuters from McLean and Langley quicker access to Metro stations than would a paved*

This study will determine technically feasible alternatives for extending the Mount Vernon Trail from its current terminus at Theodore Roosevelt Island to I-495, at the American Legion Bridge. The alternatives may include any combination of GWMP lands, Arlington County lands, and Fairfax County lands.

trail in the parkway corridor all the way to Rosslyn. Moreover, the on-street Arlington route between Key Bridge and Chain Bridge passes through some beautiful wooded neighborhoods. It lies close enough to nearby local commercial areas to meet the needs of trail users. The 'break' in the natural setting on this route is far less severe than that encountered by Mount Vernon Trail users navigating through Alexandria on North Union Street.

The 1998 VBF/WABA study concluded by requesting that the NPS conduct a feasibility study examining an extension of the Mount Vernon Trail.

1.2 Purpose of Study

In response to the request by the VBF and WABA, the NPS is directing this feasibility study. This study will determine technically feasible alternatives for extending the Mount Vernon Trail from its current terminus at Theodore Roosevelt Island to I-495, at the American Legion Bridge. The alternatives may include any combination of GWMP lands, Arlington County lands, and Fairfax County lands. Proposing connections across the Potomac River into Maryland is not within the scope of this study.

Upon completion of this study, these alternatives will be analyzed for impacts to the natural and cultural resources by following the NEPA and NHPA requirements. This will also allow for public review and response to the proposed alternatives. The study will provide the basis for discussion with Arlington and Fairfax counties on the feasibility and desirability of developing alternative portions of the trail extension.

1.2.1 Feasibility Analysis and the National Environmental Policy Act

NEPA was enacted by Congress in 1969, and requires that every federal agency prepare an in-depth study of the impacts of "major federal actions having a significant effect on the environment" and alternatives to those actions. NEPA also mandates that agencies involve the interested and affected public before making decisions affecting the environment. The NPS sometimes performs a feasibility study prior to initiating the required NEPA process as a mechanism to scope issues and alternatives. This feasibility study does not preclude the need to document planning decisions by the regulations set forth by the NEPA. Nor does it preclude the need to document planning decisions by regulations set forth by the NHPA, an act that established a program for the preservation of historic properties throughout the nation. No final trail location will be determined without first fulfilling the requirements set forth by NEPA and NHPA Section 106.

1.2.2 Feasibility Criteria

Feasibility is defined by the Council of Environmental Quality as reasonable alternatives that are economically and technically feasible and show evidence of common sense. The NPS Director's Order #12 states an alternative may be eliminated as infeasible if it:

- Would be unreasonably expensive
- Could not be easily implemented for technical or logistical reasons
- Does not meet park mandates
- Is not within legal or other mandatory constraints
- Is inconsistent with carefully considered, up-to-date statements of purpose and significance or management objectives
- Would have profound adverse impact to sensitive resources
- Would not be allowed by another agency from which a permit is required

Although several of the alternatives show possible alignments through known sensitive resources, it is difficult to ascertain the severity of resource impacts of a proposed trail at this time without further study. These alignments are logistically feasible alternatives and will therefore be considered "technically feasible" for purposes of this study. Further study and impact analysis will be necessary as part of NEPA and NHPA requirements before any decisions can be made as to appropriate alignments of a possible trail in this area. At such time, if the impact analysis indicates an alternative would have a pro-

found adverse impact to sensitive resources, it would be eliminated at that time as infeasible.

In Section 6.0 of this report, several alternatives are deemed "not feasible at this time". Each alternative is accompanied by a discussion of how it is in conflict with the above listed NPS feasibility criteria. At this preliminary stage, assessing feasibility according to these criteria is necessarily based on generalized cost estimates and general assessments of potential resource impacts, as well as technical and logistical constraints.

In this study, both AASHTO guidelines and NPS standards were considered in determining alignments proposed and developing estimates of construction costs. Whenever AASHTO guidelines conflict with NPS standards, NPS standards were always used.

2.0 Methodology

The consultant team reviewed the 1995 MWCOG Study, the 1998 VBF/WABA Study, NPS documentation on sites throughout the study area, the American Association of State Highway and Transportation Officials (AASHTO) guidelines on bicycle facilities, and maps of the study area. The team hiked and bicycled along the proposed paths (where possible) and took notes on the conditions and opportunities throughout the site.

In addition, the consultant group divided the study area into five segments in order to focus evaluations of feasible proposals. These segments are described in detail in Section 5.0 - Alternatives Deemed Feasible at This Time.

2.1 AASHTO -- Types of Bicycle Facilities and Considerations for their Development

AASHTO has identified four distinct types of bicycle facilities: shared roadways, signed shared roadways, bicycle lanes and shared use paths. AASHTO has also developed general guidelines it recommends be considered when a facility type and location are being determined. The following subchapters briefly summarize these facility types and the guidelines most relevant to the Mount Vernon Trail extension.

In this study, both AASHTO guidelines and NPS standards were considered in determining alignments proposed and developing estimates of construction costs. Whenever AASHTO guidelines conflict with NPS standards, NPS standards were always used.

2.1.1 Facility Types - AASHTO Guidelines

Shared Roadway: Most bicycle travel occurs on roadways shared with motor vehicle traffic but without bicycle route designations.

Signed Shared Roadway: These are roadways designated by bike route signs that connect with other bicycle facilities and/or identify preferred routes through heavily used bicycle corridors. The signage alerts motorists that bicycles are present and informs bicyclists that the route joins to other bicycle facilities and/or is maintained in a bicycle-friendly manner.

Bicycle Lane: Bike lanes are designated by pavement markings and signage that delineate the rights-of-way in corridors of high bicycle demand. Bike lanes increase the bicycle capacity of highways that carry mixed motor vehicle and bicycle traffic.

Shared Use Path: Shared use paths do not allow motor vehicles, but serve a variety of users, including bicyclists, pedestrians, joggers, dog walkers, skateboarders, and people with wheelchairs and baby carriages. Most are built in areas that provide a recreation opportunity or serve as bicycle commuter routes. They are most common along rivers, oceanfronts, canals, campuses, between parks, or as part of planned unit developments (PUDs).

2.1.2 Design Considerations - AASHTO Guidelines

AASHTO encourages jurisdictions to consider the needs of both bicyclists and motorists when determining what bicycle facility to build and where. The design should encourage users of all types to follow the rules of the road. To this end, the association has drafted general standards and guidelines that have been summarized below. AASHTO also suggests that jurisdictions review the Federal Highway Administration's 1994 publication, Selecting Roadway Design Treatments to Accommodate Bicycles.

Paved Shoulders: Bicyclists require a minimum operating space four to five feet in width. Wider shoulders are recommended on roads that are heavily traveled or carry high-speed traffic. A shoulder must be paved for bicyclists to use it.

Delineation of Bike Lanes: A solid white line should delineate a bike lane from the motor vehicle travel lane. Rumble strips or raised pavement markers are not recommended on shoulders used by bicyclists unless pavement without markers is also provided.

One-way Facilities: Facilities should be

The American Association of State Highway and Transportation Officials (AASHTO) has identified four distinct types of bicycle facilities and has developed general guidelines it recommends be considered when a facility type and location are being determined.

one-way and route traffic in the same direction as adjacent motor vehicle traffic. AASHTO does not recommend that two-way bike lanes be located on one side of the roadway if the design causes bicycles to travel against the flow of motor vehicle traffic.

Bicycle-Motor Vehicle and Bicycle-Pedestrian Conflicts: Street crossings should be minimized to reduce the conflict between bicyclists and other roadway users. The potential for wrong-way bicycle travel and accidents increases when street crossings are numerous or a route changes character. Shared use paths can lead to conflicts of use among bicyclists, horseback riders, skaters, runners, pedestrians and others.

Barriers: Rivers, railroads, freeways or other topographical features can create physical barriers that the design of the facility must overcome.

Bridges: Bridges provide access across barriers. However, some bridge features actually may restrict access or create conditions unfavorable to bicyclists. Bridges may be narrower curb-to-curb than approach roadways. Open-grated metal decks, low railings on parapets and finger-type joints and other expansion joints can cause steering problems.

User Skill Levels: Some bicyclists can negotiate busy roads in narrow operating space. Most riders, however, prefer to use facilities that provide larger operating space. Adults and children may have excellent bicycle handling skills but not be comfortable riding on the shoulder of a shared roadway.

Safety and Security: Isolated shared use paths carry the potential for criminal acts, and remote-parking locations may become sites for theft or vandalism.

Aesthetics: Scenic resources are important elements of a bicycle facility that travels through a recreational area.

Motor Vehicle Parking: Turnover and density of on-street parking can affect bicyclist safety; diagonal and perpendicular parking are not compatible with bicycle facilities because they reduce sight distance and increase the potential for bicycle-motor vehicle conflicts.

Accessibility: Frequent and convenient access to bicycle facilities should be provided, especially in residential areas. Access for emergency, maintenance and service vehicles should be considered, as well as access to the facility from traffic generators such as schools, office buildings, shopping areas and parks.

Directness: Bicycle facilities should connect traffic generators and be located along a direct, convenient line of travel.

Stops: Bicyclists have a strong inherent desire to maintain momentum. If they are required to stop frequently, they may avoid a signed route or ignore traffic control devices.

Pavement surface quality: Bikeways should be free of bumps, holes and other surface irregularities. Utility covers and drainage grates should be at grade and outside the expected path of travel.

Maintenance: Designs that facilitate and simplify maintenance will improve bicyclists' safety and increase the use of a facility. Maintenance is a top priority because bicyclists cannot use a lane with potholes, debris or broken glass.

Truck and Bus Traffic: Trucks, buses, motor homes and trailers can cause problems for bicyclists because they are so wide. Bus stops can cause bus-bicycle conflicts and deteriorate pavement.

Traffic Volume and Speed: Traffic volume and speed should be considered when locating bicycle facilities. Experienced bicyclists often use arterial routes because they are direct and convenient. Arterial routes serve as excellent bicycle facilities if they are wide enough; if not, widening adjacent streets is better unless motor vehicle traffic diverts to it.

Intersection conditions: A high proportion of bicycle crashes occur at intersections. The needs of bicyclists should be analyzed at at-grade intersections on high-volume or high-speed roadways and mid-block crossings to determine the most appropriate design treatments.

2.1.3 Shared Use Path - AASHTO Guidelines

Long sections of the trail alignments proposed in this draft will take the form of

The guidelines developed by AASHTO are not standards; they are guidelines for various types of bicycle facilities. These guidelines may or may not be completely appropriate for a trail on land that is managed to protect natural and cultural resources as well as provide opportunities for public use.

shared use paths. AASHTO's design criteria for these facilities are similar to those for highways. However, because the operational characteristics of bicycles are very different from those of motor vehicles, bicycle design criteria for horizontal and vertical clearance, grades and paving structures are different from highway design criteria.

2.1.3.1 Width and clearance

- AASHTO recommends a paved width of 10 feet for two-way shared use paths. A width of eight feet may be adequate, but only if bicycle traffic is always low, pedestrians are not expected to use the path regularly, the alignment provides safe passing opportunities, and normal maintenance does not damage the edge of the pavement.

- A paved width of 12 or 14 feet is recommended if the path is very heavily used, has steep grades, or is maintained by very large vehicles.

- A minimum graded area of two feet with a maximum 1:6 slope should be maintained on both sides of the path, but three feet or more is better to provide clearance from trees, poles, walls, fences, guardrails and other obstructions.

- A wider separation should be considered for paths adjacent to canals, ditches, or slopes steeper than 1:3.

- A minimum separation of five feet from the edge of the pavement to the top of the slope should be maintained, and depending on the height of embankment and the conditions at the bottom, shrubbery, railings or fences should be erected adjacent to the graded area.

2.1.3.2 Grades

- Grades should be kept to a minimum, especially on long inclines

Grades greater than five percent are undesirable because the ascents are difficult to climb and the descents can cause bicyclists to exceed competent or comfortable speeds.

AASHTO provides this general guide:[xii]

Grade (%)	Maximum length of grade (feet)
5-6	800
7	400
8	300
9	200
10	100
>11	50

2.2 NPS - Minimizing Impacts to Natural and Cultural Resources

The guidelines developed by AASHTO are not standards; they are guidelines for various types of bicycle facilities. These guidelines may or may not be completely appropriate for a trail on land that is managed to protect natural and cultural resources as well as provide opportunities for public use. The NPS must balance these needs when developing all new facilities. The potential to compromise natural and cultural resources must be considered. Therefore, to minimize impacts to resources along the existing Mount Vernon Trail, the NPS has established a 9-foot paved width with one-foot clearance on each side of the paved surface. For this same reason, the NPS mandates the same dimensions are used for extension of the Mount Vernon Trail within NPS owned lands.

2.3 NPS - Accessibility for Visitors with Disabilities

NPS Director's Order #42 states:

> *Accessibility will be provided consistent with preserving park resources, visitor safety, and providing a high-quality visitor experience. Undeveloped areas, such as those outside the immediate influence of buildings and roads, will not normally be modified, nor will special facilities be provided for the sole purpose of providing access to all segments of the population. Accessibility to facilities in threshold areas will be determined on the basis of the nature of the topography, the significance of the attraction, the amount of physical modifications being made to the environment and the modifications necessary to ensure programmatic accessibility.*

Due to topographic and resource constraints, it may not be possible to construct a trail facility that meets universal accessibility requirements along all of the segments determined feasible by this study. During environmental impact evaluations, design, and construction, reasonable compromises related to the provision of universal accessibility of this trail will be determined.

The initial proposals for extending the Mount Vernon Trail- suggested that new paths could provide linkages between other trails and recreational resources in the area. To examine this proposition, the consultant team reviewed recreational, cultural, and designated natural areas located near potential new bike routes.

Historical marker at the Dawson Bailey House.

3.0 Resource and Land Use Inventory Maps

Geographic Information Systems (GIS) data was used in the production of all map exhibits for this study. The NPS GWMP Headquarters, Arlington County, and Fairfax County GIS Departments provided the data for their respective lands and/or jurisdictions.

Four large map exhibits are included with the text of this draft report and should be reviewed while reading the text. Two inventory maps at 1"=500' scale are included to illustrate the northwestern and southeastern sections of the study area.

3.1 Cultural and Natural Resource Inventory Maps

Two maps (South and North) have been prepared as an inventory of the known cultural and natural resources within the study area. The GWMP corridor owned by the NPS is illustrated in green on the map.

Topographic contours along the parkway corridor represent five-foot changes in the vertical elevation. Beyond Spout Run to the north, the parkway rises more than 100 feet above the river's edge. At certain points, the rocky slopes between the parkway and the Potomac are very steep and extend into the river.

Streams, drainage patterns, floodplains and wetlands are designated on the inventory maps in shades of blue. Roads and bridges are illustrated in gray and structures in black. Known sensitive natural and cultural resources identified by the NPS and Fairfax County are illustrated in yellow and orange-hatched patterns. Specific resources were not identified to help protect the resources. Additional studies will be required to determine what, if any, impacts to resources may occur due to the trail alignments proposed in this study. This information is necessary for an appropriate evaluation of the alternatives required by NEPA and the NHPA.

3.1.1 Cultural and Natural Resource Inventory - South Map

The initial proposals for extending the Mount Vernon Trail- suggested that new paths could provide linkages between other trails and recreational resources in the area. To examine this proposition, the consultant team reviewed recreational, cultural, and designated "natural areas" located near potential new bike routes.

The civic, cultural, and historic resources in this section are illustrated on the South Inventory map. They are also listed below by resource type, from southeast to northwest, beginning with the start of the proposed trail at Theodore Roosevelt Island.

Cultural/Historic Sites

- Fort C.F. Smith - 2411 24th Street (F)
- Glenmore - 3440 North Roberts Lane (U)
- Fort Ethan Allen - 3829 North Stafford Street (Z)

Historic Districts

- Colonial Village - Queens Lane and North Rhodes Street (D)
- Maywood Neighborhood Historic District (G)
- Walker Chapel - 4102 North Glebe Road (AA)

Schools

- H.B. Woodlawn Secondary School (Arlington County School Board) - 4100 North Vacation Lane (J)
- Taylor Elementary School (Arlington County School Board) - 2600 North Stuart Street (L)
- Marymount University - 2807 North Glebe Road (S)

Community Centers & Facilities

- Dawson Terrace Recreation Center (Arlington County) - 2133 North Taft Street (E)
- Woodmont Center (Arlington County) - 2422 North Fillmore Street (H)
- Madison Community Center

Developed as a memorial to the country's first president, the George Washington Memorial Parkway follows the Potomac River in Virginia.

The Mount Vernon Trail is popular as a recreational and commuter trail.

The Potomac Heritage Trail generally follows the Potomac River along rocky slopes and forested floodplains.

(Arlington County) - 3829 North Stafford Street (Y)

Major Drainage Ways
· Spout Run

· Windy Run

· Donaldson Run

· Gulf Branch

· Pimmit Run

3.1.2 Cultural and Natural Resource Inventory - North Map

The civic and cultural resources and historic sites in this section are illustrated on the North inventory map. Resources are listed in groups by resource type, from southeast to northwest, beginning at the Arlington County line.

Cultural/Historic Sites
· Fort Marcy (NPS) - GWMP (BB)

· Georgetown Pike (Virginia Scenic Byway)

Historic Districts
· Langley Fork Historic District - Georgetown Pike at Chain Bridge Road (MM)

Schools
· The Potomac School (Private) - 1301 Potomac School Road (II)

· Langley High School (Fairfax County School Board) - 6520 Georgetown Pike (SS)

· Churchill Road Elementary School (Fairfax County School Board) - 7100 Churchill Road (BBB)

· Cooper Middle School (Fairfax County School Board) - 977 Balls Hill Road (CCC)

Community Centers & Facilities

· Dolley Madison Community Library - 1244 Oak Ridge Avenue (WW)

· McLean Community Center - 1234 Ingleside Avenue (XX)

Major Drainage Ways

· Pimmit Run

· Turkey Run

· Dead Run

3.2 Summary Analysis Map

The initial proposals for extending the Mount Vernon Trail suggested that new paths could provide linkages between other trails and recreational resources in the area. To examine this proposition, the consultant team reviewed parks, schools, and other sites within the study area. These resources and facilities were evaluated for potential to generate pedestrian and bicycle traffic, in addition to desirability as destinations for trail users. Some sites were identified as areas to be avoided in the development of trail alternatives.

Facilities that provide existing amenities were evaluated for their potential to serve as trailhead or comfort stop locations. Proposed trailhead and comfort stop locations are presented in Section 7.0 of this report. This study defines a trailhead as a site provided where trail users may access the trail or stop along the trail to use amenities such as restrooms and drinking fountains. These facilities may provide public parking. A trailhead may be located directly along the trail, providing users direct access. A trailhead may also be located a short distance from the actual trail, and may connect to the trail via existing bike routes or a signed connector route. Signage both at the trailheads and along the trail would inform users of the locations of trailheads.

The cultural and natural resources and land uses in the study area are illustrated on the Summary Analysis Map at 1 inch = 1000 feet. The colors on the map are keyed to the following land use designations:

Green-Open space owned by the NPS, local jurisdictions, and private homeowners associations

Black Hatching-Floodplains, wetlands, and other known sensitive resources documented by the NPS, Arlington County, and Fairfax County

Purple-CIA Headquarters and the

The Custis Trail connects to the existing Mount Vernon Trail at Theodore Roosevelt Island.

The Dawson Terrace Recreation Center is the location of the Dawson-Bailey House, likely the oldest structure in Arlington County.

Fort C.F. Smith is one of the few remaining forts once part of the system of forts which surrounded the capital city of Washington DC at the end of the Civil War in 1865.

Federal Highway Administration

Blue-Schools and community centers

The Potomac Heritage Trail, existing off-street mixed-use trails, and county-designated on-street bike routes are also identified on this map.

3.2.1 Recreation Resources, Land Use & Ownership

Resources on the map are listed and analyzed from southeast to northwest, beginning with the start of the proposed trail alignment at Theodore Roosevelt Island.

George Washington Memorial Parkway (NPS)

Developed as a memorial to George Washington, the parkway follows the Potomac River in Virginia, connecting natural, historical and recreational sites from the Mount Vernon estate to the American Legion Bridge. The parkway is a four-lane divided road with grass shoulders, limited access, and high-speed travel. The GWMP is on the National Register of Historic Places (NRHP). This designation must be considered in respect to the NEPA and NHPA processes, should a proposed trail alignment along the parkway be selected for further study as part of the extension of the Mount Vernon Trail.

Mount Vernon Trail (NPS)

This 18.5-mile paved multi-use trail stretches along the Potomac River from Mount Vernon to Theodore Roosevelt Island and is popular as a recreational and commuter trail.

Potomac Heritage Trail (NPS)

This 10-mile section of hiking trail is owned by the NPS and is maintained by members of the Potomac Appalachian Trail Club. The trail stretches from Theodore Roosevelt Island to the American Legion Bridge. The trail generally follows the Potomac River along rocky slopes and forested floodplains, except in the area where the water's edge is privately owned. Because the trail is designated for hiking only and the unique experience it provides, this trail is not appropriate for multi-purpose use.

Custis Trail (B)

The Custis Trail shadows Interstate 66, connecting the Washington & Old Dominion Trail to the business centers of Rosslyn and downtown Washington D.C. The trail is 10-12 feet wide with a few hills, and connects to the existing Mount Vernon Trail at Theodore Roosevelt Island.

Arlington County Bikeways System

Arlington County has developed an extensive network of bikeways, including 36 miles of off-street multi-use trails and 50 miles of on-street bike routes. An extension of the Mount Vernon Trail should connect to this system where possible, to provide local residents access to the trail. Many locations exist for potential connections to this system. A few important prospects include connections to the following: Key Bridge, the Custis Trail, the multi-use trail through Taylor Park which provides a connection between Military Road and Old Dominion Drive, and the 41st Street connection to Chain Bridge.

Dawson Terrace Recreation Center (E)
(Arlington County)
2133 North Taft Street

The Dawson Terrace Recreation Center is the location of the Dawson-Bailey House, likely the oldest structure in Arlington County. The center features basketball courts, a meeting room, multi-purpose room, school age playground, bike racks, restrooms, and public parking. The amenities available make this a suitable trailhead location.

Fort C.F. Smith Park (F)
(Arlington County)
2411 24th Street
Size: 19 Acres

This park features a multi-use field, nature trails, a nature area, wildlife observation, and an ornamental garden. Fort C.F. Smith, also located within the park, is one of the few remaining forts once part of the system of forts which surrounded the capital city of Washington DC at the end of the Civil War in 1865. On street parking is available. The park may be a desirable destination for recreational trail users, however it is not suitable as a trailhead.

Woodmont Center (H)
(Arlington County)
2422 North Fillmore Street

Marcey Road Park is an Arlington County facility featuring a multi-use field, basketball court, tennis courts, and a picnic shelter.

The Woodmont Center serves persons with mental retardation and developmental disabilities through these program components: habilitation/day support services, sheltered employment services, the Woodmont Weavers, and supported employment group model services. Parking is available at the center. Because few other public amenities are provided, this is not a potential trailhead location.

Windy Run Nature Area (I)
(Arlington County)
2420 North Kenmore Street
Size: 14.39 Acres
This park features a softball field, multi-use field and nature trail. On-street parking is available at the end of Kenmore Street. Because parking is limited, and few other public amenities are provided, this is not a potential trailhead location.

H.B. Woodlawn Secondary School (J)
(Arlington County School Board)
4100 North Vacation Lane
The H.B. Woodlawn program is a county-wide secondary program that is open to all students in Arlington County middle and high schools. The school grounds include parking, athletic fields, and bike racks. The school is a potential generator of pedestrian and bicycle traffic, however it is not a suitable trailhead location due to its location at the periphery of the study area.

Stratford Park (K)
(Arlington County)
4321 Old Dominion Drive
Size: 5 Acres
This park features a softball field, multi-use field, soccer field, basketball court and tennis court. Because of its location at the periphery of the study area, it is not a suitable trailhead location.

Taylor Elementary School (L)
(Arlington County School Board)
2600 North Stuart Street
Enrollment: 550
The school grounds include sports fields, a playground, bike racks, and parking. The school is a potential generator of pedestrian and bicycle traffic and is a suitable location for a trailhead.

Marcey Creek Homeowners Association land (M)
This open space is under private ownership by a community association.

Donaldson Run Recreation Association land (N)
This parking area and community pool are under private ownership by a community association.

Marcey Road Park (O)
(Arlington County)
2722 Marcey Road
Size: 3 acres
This park features a multi-use field, basketball court, three tennis courts, a picnic shelter, and parking. Because it is near Potomac Overlook Park and provides fewer public amenities than that facility, this is a potential but less desirable location for a trailhead.

Potomac Overlook Park (P)
(Northern Virginia Regional Park Authority)
2845 North Marcey Road
This park features 100 acres of woodlands and nature trails. The Nature Center serves as the regional center for the Northern Virginia Park Authority's year-round programs. An unpaved hiking path along Donaldson Run connects this park to the Potomac Heritage Trail. The park features restrooms, picnic areas, and parking, making it a potential trailhead location.

Zachary Taylor Nature Area (Q)
(Arlington County)
2900 Military Road
Size: 43.5 Acres
This park features two softball fields, a multi-use field, and a paved trail. Because it lacks parking, the park is not a likely site for a trailhead.

Donaldson Run Park (R)
(Arlington County)
30th Street North and Military Road
Size: 8.28 acres
This park features unpaved footpaths, which follow Donaldson Run and connect to the Potomac Heritage Trail. On-street parking is available along 30th Street.

Washington Golf and Country Club (T)
This open space is owned by a private country club.

Gulf Branch Pumping Station (V)

The Gulf Branch Nature Center features exhibits, a classroom, children's discovery room, pond and a restored log cabin.

The Madison Community Center and Fort Ethan Allen Park site is a potential trailhead location.

Georgetown Pike has been determined Eligible for the National Register of Historic Places, and has also been declared a Virginia Scenic Byway.

(Arlington County)
Military and 36th Roads
This land is owned by the Arlington County Parks Department and is the site of a pumping station. On-street parking is available along 36th Road. Unpaved footpaths follow Gulf Branch and connect to the Potomac Heritage Trail.

Gulf Branch Nature Center (W)
(Arlington County)
3608 North Military Road
This nature center features exhibits, a classroom, children's discovery room, pond and a restored log cabin. Because it provides restrooms, bike racks, and parking, this is a potential trailhead location. It is also a desirable destination for recreational trail users.

Glebe Road Park (X)
(Arlington County)
4211 North Old Glebe Road
Size: 4 Acres
This park features a multi-use field, a school-age playground, one basketball court, three tennis courts, and a tennis practice wall. Because it is near Madison Community Center and provides fewer public amenities than that facility, this is a potential but less desirable location for a trailhead.

Madison Community Center & (Y&Z)
Fort Ethan Allen Park
(Arlington Co.)
3829 North Stafford Street
This community center features a multi-purpose room, game room, dance studio, gymnasium, weight room, accessible preschool and school age playgrounds, basketball courts and soccer field. Fort Ethan Allen is the remnants of a fort that was part of the system of forts now known as Fort Circle Parks. Interpretive features are provided at the fort. Because the site also provides bicycle racks, restrooms, and parking this center is a potential trailhead location.

Fort Marcy (BB)
(NPS)
This relatively undisturbed fort is part of the system of forts which surrounded the capital city of Washington DC at the end of the Civil War in 1865, now known as Fort Circle Parks. This site features public parking and interpretive features. It is also an access point for the Potomac Heritage Trail.

Chain Bridge Forest Association land (CC)
This open space is under private ownership by a community association.

Dogwoods at Langley Association land (DD)
This open space is under private ownership by a community association.

Pimmit Run Stream Valley Park (EE)
(Fairfax County Park Authority)
Old Dominion Drive at Leesburg Pike
Size: 67.92 acres
This park features natural areas and a hiking trail. Because of its lack of public parking and other facilities, it is not a likely site for a trailhead.

Fairleigh Woods Club land (FF)
This open space is under private ownership by a community association.

Potomac Hills Park (GG)
(Fairfax County)
6125 Kinyon Place
Size: 9.49 acres
This park features a hiking trail, natural areas, and open space. Because of its remote location along Pimmit Run, it is not a likely site for a trailhead.

Lynwood Homeowners Association land (HH)
This open space is under private ownership by a community association.

The Potomac School (II)
(Private)
1301 Potomac School Road
The Potomac School, situated on 82 acres in McLean, Virginia, is an independent, coeducational day school with 875 students in kindergarten to grade 12. It is a possible generator of pedestrian and bicycle traffic.

Georgetown Pike
(VDOT)
Georgetown Pike is approximately 17 miles long. Its present Virginia Department of Transportation-owned right-of-way varies from 40' to 130' in width. Part of the Virginia primary road system, it is a two-lane undivided rural road. The present asphalt-paved, hard surface roadbed is approximately 22' wide

Georgetown Pike Trail provides direct bicycle and pedestrian access to Langley High School and Langley Fork Park.

Langley Fork Park is owned by the NPS and maintained in cooperation with Fairfax County.

Langley High School is a destination for, and generator of pedestrian and bicycle traffic.

with open ditches and no shoulders. In 1973 Georgetown Pike was designated as the first Virginia Scenic Byway. It has also been determined Eligible for the NRHP. Both of these designations must be considered in respect to the NEPA and NHPA processes, should a proposed trail alignment along Georgetown Pike be selected for further study as part of the extension of the Mount Vernon Trail.

Central Intelligence Agency & Federal Highway Administration (JJ & QQ)
This federally owned property is located adjacent to the GWMP. The property contains the only through connection between the parkway and Georgetown Pike/Chain Bridge Road, however this connection is not for public use and cannot be considered for use as a trail. CIA policy prohibits unrestricted public access to its property.

Georgetown Pike Bike Trail (KK)
This multi-use trail follows Georgetown Pike from the CIA entrance to Dead Run Drive near I-495. Conditions vary along its length, including paved and unpaved segments varying in width from approximately 3 to 6 feet. The trail switches sides of the road near Douglas Drive. This well-used trail provides direct bicycle and pedestrian access to Langley High School and Langley Fork Park. With upgrades, this trail could potentially serve as part of the extension of the Mount Vernon Trail, or could serve as a connector trail.

Clemyjontri Park (LL)
(Fairfax County)
6319 Georgetown Pike
Size: 18.5 acres
This site was donated to the Fairfax County Parks Department for development of a barrier-free park. Proposed facilities include a playground, picnic areas, restrooms, and parking. Once proposed park facilities are developed, this park would be a suitable location for a trailhead.

Ballantre Farms Homeowners Association land (NN)
This open space is under private ownership by a community association.

Langley Fork Park (OO)
(Fairfax County/NPS)
6250 Georgetown Pike
Size: 52.85 acres
Owned by the NPS and maintained in cooperation with Fairfax County, this site contains some of the flattest topography in the area. The park features baseball fields, basketball court, fitness & hiking trails, portable restrooms and public parking. Because of the available amenities, this park could serve as a trailhead.

Claude Moore Colonial Farm (PP)
(NPS)
The farm is owned by the NPS and managed under a cooperative agreement with the Friends of Claude Moore Colonial Farm at Turkey Run, Inc. This living history site demonstrates the life of a poor farm family living on a small farm in northern Virginia just prior to the American Revolutionary War. Parking and picnic areas are available. It may be a desirable destination for recreational trail users.

Turkey Run Park (RR)
(NPS)
Public restrooms, picnic areas, and several parking areas are available, making this a desirable location for a trailhead. Visitors may also access several hiking trails from this area, including the Potomac Heritage Trail.

Langley High School (SS)
(Fairfax County School Board)
6520 Georgetown Pike
Enrollment: 1,798 students
The existing bicycle trail along Georgetown Pike passes in front of the high school property, providing access to nearby neighborhoods. Amenities available include athletic fields, bike racks, and parking. The school is a destination for, and generator of pedestrian and bicycle traffic, and would be suitable as a trailhead.

Treeline Community Association land (TT)
This open space is under private ownership by a community association.

The Cloisters Community Association land (UU)
This open space is under private ownership by a community association.

McLean Central Park (VV)
(Fairfax County)

Cooper MiddleSchool is a destination for, and generator of pedestrian and bicycle traffic.

1468 Dolley Madison Boulevard
Size: 25.57 acres
This park features a basketball court, tennis courts, tennis practice wall, Frisbee golf, a bike trail, fitness trail, hiking trail, natural area, playground, tot lot, open space, and public parking. The park is a potential destination for or generator of pedestrian and bicycle traffic, but is too far from the study area to serve as a trailhead.

Dead Run Stream Valley Park (YY)
(Fairfax County)

Churchill Road at Dead Run Drive
Size: 10.32 acres
Dead Run Stream Valley Park features a hiking trail along Dead Run. Because it is not a multi-use facility, this trail does not have potential as a connector trail.

Langley Oaks Park (ZZ)
(Fairfax County)
6504 Bright Mountain Road
Size: 101.61 acres
This large county park has several access points from the Langley Oaks neighborhood, although no formal access is available from these points. This park is a potential location for trail connections between county roads and NPS lands.

Langley Oaks Homeowners Association land (AAA)
This open space is under private ownership by a community association.

Churchill Road Elementary School (BBB)
(Fairfax County School Board)
7100 Churchill Road
Enrollment: 613 students
The school is a potential generator of bicycle and pedestrian traffic. Even though the site provides bicycle racks and parking, it is not a potential trailhead site because it is located too far on the periphery of the study area.

Cooper Middle School (CCC)
(Fairfax County School Board)
977 Balls Hill Road
The school is a potential generator of bicycle and pedestrian traffic. The site provides bicycle racks and parking, making it a potential trailhead location.

3.3 Other Area Trail Plans and Initiatives

Arlington and Fairfax Counties and local citizens groups have plans for the construction or improvement of trails near the GWMP. It is important to note the plans for these trails and their potential as connections to the extension of the Mount Vernon Trail. Because these projects have yet to be completed, they are not included on the Summary Analysis plan.

Arlington County On-Street Bike Lane Plans
Over the next five years, Arlington County plans to mark a 21-mile network of bicycle lanes on selected County streets. These bike lanes will be designed and implemented in accordance with the Guide for the Development of Bicycle Facilities (1999) published by AASHTO. One bike lane will be provided for each direction of travel on the designated streets. The bike lanes proposed along Lorcom Lane, Nellie Custis Drive, and Military Road are noteworthy to this

Arlington County - Bicycle Lanes Plan

Fairfax County - Countywide Trails Plan Map

study.

Fairfax County Proposed Countywide Trails Plan

Fairfax County has recently updated its Proposed Countywide Trails Plan. The plan illustrates many proposed trails near the GWMP, including regional trails, on road routes, major and minor paved trails, natural surface trails, and stream valley trails. Proposed trails that are noteworthy to this study are the following: regional trails along the GWMP and I-495, as well as major paved trails along Chain Bridge Road, Georgetown Pike, and Dolley Madison Boulevard. Several minor paved trails proposed through surrounding neighborhoods provide additional, but less significant opportunities for connections. For the purposes of this study, the proposed trails are being viewed as long-range proposals, because dates of anticipated completion are not available.

Potomac River Greenways Coalition - Pimmit Run Trail

This community group has begun efforts to develop a continuous public hiking trail running the length of Pimmit Run. Two sections of trail are currently open. The first section is near Kent Gardens, and the second is south of Old Dominion Drive. Many of the proposed sections would require the purchase of private land to complete.

It is expected that some alternatives would be mixed and matched with others to meet the goals and objectives of this project and mitigate negative impacts of the proposed facility.

4.0 Framework for Evaluating Alternatives

4.1 The Study Area in Five Segments

For ease of description and illustration, the study area has been divided into five segments, each of which has unique characteristics that require different solutions. The five segments are:

1. Theodore Roosevelt Island - Old Glebe Road Overpass
   1 alternative

2. Old Glebe Road Overpass - Chain Bridge Road
   1 alternative

3. Chain Bridge Road - CIA Access Road
   2 alternatives

4. CIA Access Road - Turkey Run
   3 alternatives

5. Turkey Run - I-495/American Legion Bridge
   4 alternatives

Several alternative alignments are described for some segments. It is expected that some alternatives would be mixed and matched with others to meet the goals and objectives of this project and mitigate negative impacts of the proposed facility.

Every alternative would require close coordination among the NPS and Arlington and Fairfax counties.

It is recognized that unknown sensitive areas yet to be studied and identified may exist within the study area. Where trail alternatives cross these sensitive areas, additional study would be required within the NEPA and NHPA processes to examine potential impacts to these resources in detail. It is important to note that an environmental assessment may determine that any of the technically feasible alternatives are environmentally infeasible, essentially eliminating them from further consideration.

4.2 Feasibility

As stated in 1.2.2, feasibility is defined by the Council of Environmental Quality as reasonable alternatives that are economically and technically feasible and show evidence of common sense. The NPS Director's Order #12 states an alternative may be eliminated as infeasible if it:

- Would be unreasonably expensive
- Could not be easily implemented for technical or logistical reasons
- Does not meet park mandates
- Is not within legal or other mandatory constraints
- Is inconsistent with carefully considered, up-to-date statements of purpose and significance or management objectives
- Would have profound adverse impact to sensitive resources
- Would not be allowed by another agency from which a permit is required

Although several of the alternatives show possible alignments through known sensitive resources, it is difficult to ascertain the severity of resource impacts of a proposed trail at this time without further study. These alignments are logistically feasible alternatives and will therefore be considered "technically feasible" for purposes of this study. Further study and impact analysis will be necessary as part of NEPA and NHPA requirements before any decisions can be made as to appropriate alignments of a possible trail in this area. At such time, if the impact analysis indicates an alternative would have a profound adverse impact to sensitive resources, it would be eliminated at that time as infeasible.

As part of this study, each of the possible alternatives has been reviewed with consideration to the criteria listed above, to determine if the alternative could be considered technically reasonable. Determining whether an alternative was considered feasible or infeasible at this stage, the consultant team based its assessments on technical and logistical constrains, preliminary cost estimates, and obvious severe impacts to sensitive resources. The NPS has reviewed the alternatives for consistency with manage-

Although several of the alternatives show possible alignments though known sensitive resources, it is difficult to ascertain the severity of resource impacts of a proposed trail at this time without further study. Additionalstudy and impact analysis will be required as part of the NEPA and NHPA processes before any decisions can be made as to appropriate alignments of a possible trail in this area.

ment objectives and other park mandates.

4.3 Mapping Potentially Feasible Alternatives

4.3.1 Scale

The most feasible alternatives for extending the Mount Vernon Trail as a 9-foot wide multi-use paved trail are illustrated on the enclosed map, "Trail Alignment Alternatives". In addition to the 1" = 1000' map showing every alternative discussed in this section, detailed alignment maps at 1 inch equals 200 feet are included for each segment. On the 1"=200' scale detailed alignment maps, generalized known sensitive resources are shown in a dotted pattern, and the floodplain is shown in a light gray tone.

4.3.2 Segment Descriptors

To aid identifying the numerous alternatives in this text and on the map, most alternatives have two designations:

A name referring to the general location of the alternative

A designation as "North" or "South" (indicating that the alternative is north or south of the parkway) or "Road" (indicating that the alternative follows a county road and/or existing bicycle facility) -- note that the various sections of some alternatives switch between designations as "North", "South" and "Road".

From Theodore Roosevelt Island, the most feasible route would follow the existing Custis Trail to the public streets Lorcom Lane, Nelly Custis Drive, Military Road and Old Glebe Road.

5.0 Alternatives Deemed Feasible at This Time

5.1 Segment 1- Roosevelt Island to Old Glebe Road Overpass

5.1.1 Description

Start: Theodore Roosevelt Island parking lot (end of existing Mount Vernon Trail)

Terminus: Glebe Road overpass at Old Glebe Road

Type of facility: Signed shared roadway

Number of Alternatives: 1

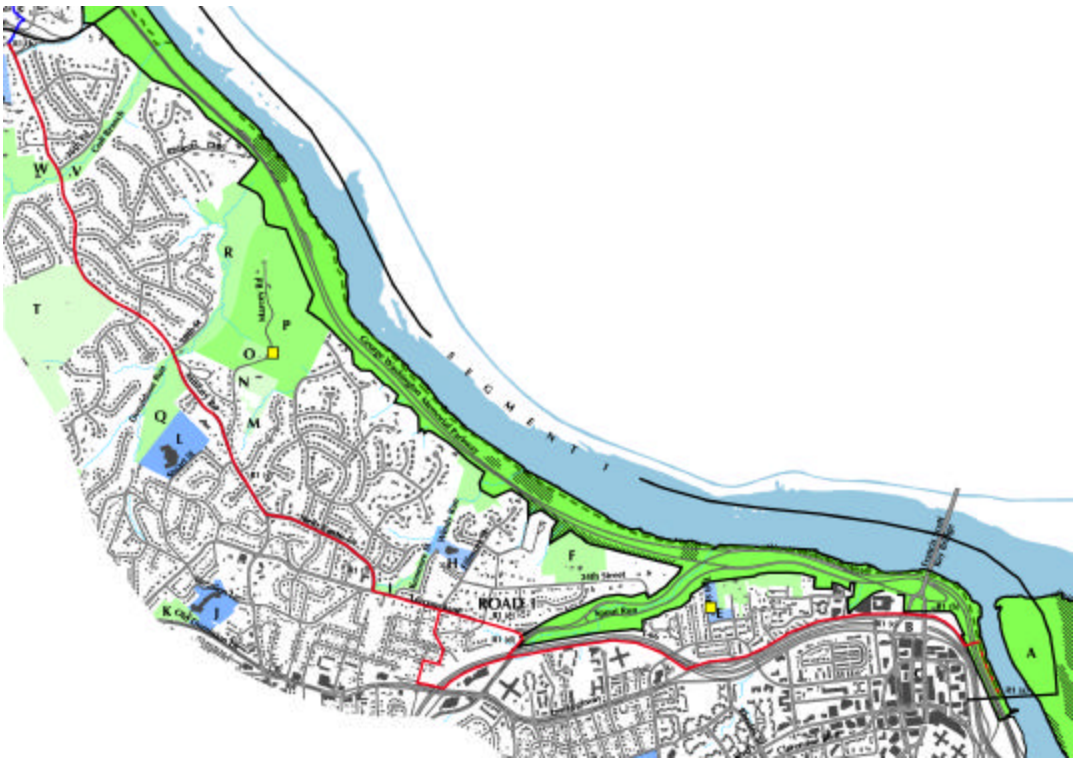
Note: Arlington County is currently implementing the designation of bike lanes along Nellie Custis Drive, Lorcom Lane, and Military Road as described in this section.

This alternative is part of the alignment identified in the VBF/WABA report as a preferred alternative.

5.1.2 I-66 / Lorcom Lane / Military Road "Road 1"

From Theodore Roosevelt Island, the most feasible route (labeled "Road 1") would follow the existing Custis Trail to the public streets Lorcom Lane, Nellie Custis Drive, Military Road and Old Glebe Road. Portions of this section are presently designated bike routes, including the four-mile Custis Trail. In addition, over the next five years Arlington plans to mark a 21-mile network of bicycle lanes on County streets. Included in the plans are Lorcom Lane (from Military Road to Edgewood Street), Nellie Custis Drive (from Lorcom Lane to Military Rd), and Military Road (from Nellie Custis Drive to Old Glebe Road). Arlington County's bike lanes will be designed and implemented in accordance with the Guide for the Development of Bicycle Facilities (1999) published by AASHTO. One bike lane will be provided for each direction of travel on the street.

This alignment follows the recommendation of members of the VBF and WABA, who indicated in their January 1998 report that they are more concerned about creating a trail that would "meet the practical needs of the Greater Washington community" than developing a potentially more scenic route along the Palisades. This alignment is also consistent with further remarks in the same report as noted in Section 1.1.2 of this study.



Segment 1 - Road 1
Not to scale

Refer to the Trail Alignment Alternatives fold-out map for more detail.

Theodore Roosevelt Island

Pedestrian bridge from the Mount Vernon Trail to Rosslyn via the Custis Trail

Begin: Theodore Roosevelt Island parking lot R1 (a)
The existing trailhead of the Mount Vernon Trail serves as the starting point for this study. The existing pedestrian/vehicular bridge across the parkway provides access to and from the Rosslyn Metro station, Key Bridge and the Custis Trail. Vehicular access is only available along the northbound side of the parkway.

Rosslyn Circle pedestrian crossing and bridge R1 (b)
An Arlington County study is analyzing bike, pedestrian, and vehicular conflicts in the Rosslyn Circle area. The study will identify physical improvements to streets, sidewalks, and trails in Rosslyn Circle. Implementation of the improvements recommended by the Arlington County study would enhance the feasibility of a trail alternative in this location. Without improvements, a trail would still be feasible but would involve greater risk to user safety.

Custis Trail R1 (c)
This shared use trail continues along Interstate 66, connecting the Washington & Old Dominion Trail to the business centers of Rosslyn and downtown Washington D.C. It is 10-12 feet wide.

Intersection of Custis Trail and Lorcom Lane R1 (d)
The VBF/WABA report suggests two potential routes for connecting to Lorcom Lane from the Custis Trail. The first is to follow an existing off-street path turn-off near the Lyon Village shopping center. The second is to continue on the Custis Trail past the shopping center and exit the trail at Irving Street. Users would then continue north on Irving Street to 22nd Street, turn east onto 22nd Street and continue to Fillmore Street, turn north onto Fillmore Street, and continue to the intersection with Lorcom Lane. Both routes are feasible alternatives for making this connection.

There exists a potential for conflict between pedestrian, bicycle, and motor vehicle traffic, should the route cross onto Lorcom Lane from the Custis Trail. This potential conflict would need to be addressed in a future study, if this segment is selected as part of the extension of the Mount Vernon Trail.

Lorcom Lane R1 (e)
This is a designated bike route. Arlington plans to mark a 21-mile network of bicycle lanes on County streets. Arlington County has plans to add designated bike lanes along Lorcom Lane within the next five years. This addition would further enhance the feasibility of this route for use as a trail. Trail users would follow Lorcom Lane to Nellie Custis Drive.

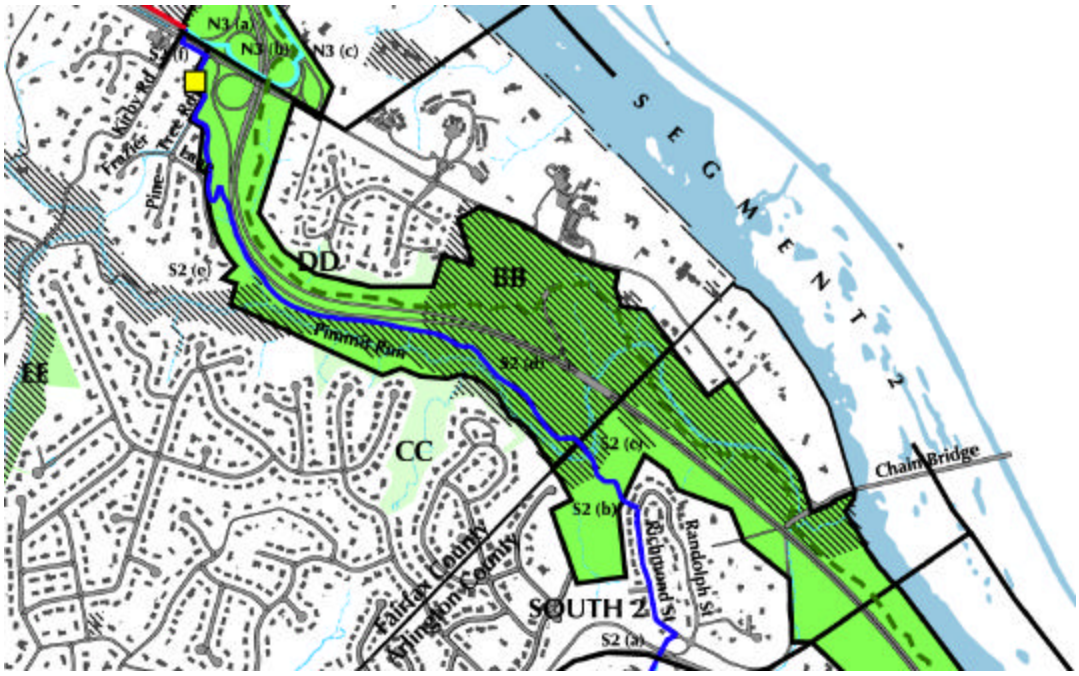
Nellie Custis Drive R1 (f)
According to the January 1998 recommendations report, "though the route on Nellie Custis Drive and Military Road contains three significant hill ascents, the roadway has wide lanes and light automobile traffic." Arlington County has plans to add designated bike lanes along Nellie Custis Drive within the next five years. This addition would further enhance the feasibility of this route for use as a trail.

Military Road R1 (g)
According to the January 1998 recommendations report, "Military Road generally parallels the George Washington Memorial Parkway a quarter to a half mile away. This proposed on-road connection between the existing and future segments of the George Washington Memorial Parkway Mount Vernon Trail also offers several recognized routes to the Metro stations between Ballston and Rosslyn." Arlington County has plans to add designated bike lanes along Military Road within the next five years. This addition would further enhance the feasibility of this route for use as a trail.

Intersection of Military Road and Old Glebe Road R1 (h)
There exists a potential for conflict between pedestrian, bicycle, and motor vehicle traffic in this area. This potential conflict would need to be addressed in a future study, if this segment is selected as part of the extension of the Mount Vernon Trail.

Because it is comprised entirely of existing facilities or those that are proposed and funded by Arlington County, there are no construction costs associated with this alternative.

This is the crucial link between the Glebe Road/Chain Bridge area and the American Legion Bridge. All other options that were considered within this segment were determined to be unfeasible.



Segment 2 - South 2
Not to scale

Refer to the Trail Alignment Alternatives fold-out map for more detail.

5.2 Segment 2 - Old Glebe Road Overpass to Chain Bridge Road

5.2.1 Description

Start: Old Glebe Road overpass at Glebe Road

Terminus: Chain Bridge Road (Route 123) at Pine Tree Road

Type of facility: Signed shared roadway and multi-use trail.

Number of Alternatives: 1

Note: This alternative is part of the alignment identified in the VBF/WABA report as a preferred alternative. It is also proposed on the Fairfax County Proposed Countywide Trails Plan.

5.2.2 Proposed Trail: Along Pimmit Run "South 2"

This is the crucial link between the Glebe Road/Chain Bridge area and the American Legion Bridge. All other options that were considered within this segment were determined to be unfeasible. These unfeasible alternatives are described in Section 6.3.1.

Although this alternative would pose many challenges, an initial assessment indicates that the route is feasible. User safety would be an issue because the trail travels through the Pimmit Run Valley, away from the parkway and other public roads. In addition, the bridge crossing and the proposed trail would be located within the Pimmit Run floodplain and its construction could have some effect on the natural environment. Therefore, additional study may be required as part of the NEPA and NHPA processes to determine the possible impacts of this alternative.

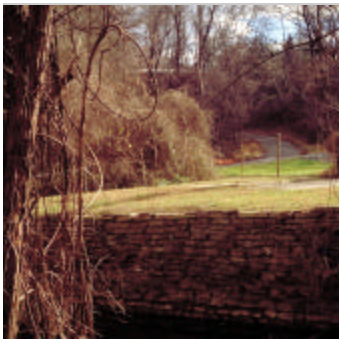
The NPS or Arlington County owns a curbed and paved access road that descends the hill between two homes on Richmond Street. It is proposed that the trail follow this access road toward Pimmit Run.

Begin: Glebe Road to Richmond Street S2 (a)

Like the "Road 1" segment, this route would begin on public streets and connect to a proposed new multi-use trail alignment near Pimmit Run. After crossing the Glebe Road overpass, the route would turn onto Richmond Street and continue through a residential neighborhood to a park access point on the left. From this point, the route would follow a new mixed-use trail alignment we have labeled as "South 2" connecting the Glebe Road/Chain Bridge Road area to the proposed routes west of Pimmit Run.

Richmond Street to Pimmit Run S2 (b)

Segment 1 ended at the intersection of Military Road at the Old Glebe Road Overpass, which intersects with Richmond Street. The NPS or Arlington County owns a curbed and paved access road that descends the hill between two homes on Richmond Street. It is proposed that the trail follow this access road



The initial thought is that the best location for a bridge crossing Pimmit Run is directly below the access from Richmond Street.

Another bridge crosses Pimmit Run near Kirby Road. This existing bridge is a precedent demonstrating that a bridge and trail could technically and logistically be constructed and maintained within the floodplain of Pimmit Run under similar conditions.

It is proposed that the trail follow Pimmit Run near the floodplain, where the topography is relatively level. This would allow for a long stretch of trail with a slope of less than 5 percent.

toward Pimmit Run. However, the road is steep, with a 12 percent grade for 400 feet, which is steeper than AASHTO recommends for bicycle facilities. For grades steeper than 11 percent, AASHTO suggests a maximum grade length of 50 feet. To mitigate excessive grades, AASHTO recommends providing signage to alert users of steep conditions, and widening the trail an additional four to six feet along steep grades, providing space for users to dismount and walk their bikes. It is noted that local residents may oppose the construction of a multi-use trail in this location.

Bridge Across Pimmit Run S2 (c)

The initial thought is that the best location for a bridge crossing Pimmit Run is directly below the access from Richmond Street. Grades in this location are relatively level compared to locations further downstream, where the grades become increasingly steep near the parkway bridge over Pimmit Run. Construction of a bridge in this location would not disturb the existing sewer line on the north side of Pimmit Run. Locating the bridge father upstream would position the structure closer to neighboring homes. This alignment provides approximately 500 feet between the bridge and the nearest residence.

The bridge proposed in this location would be approximately 200 feet long and 10-15 feet above the average water level of Pimmit Run. The bridge should be designed so as not to affect the flood level of Pimmit Run. Another bridge crosses Pimmit Run near Kirby Road, and driveways to homes in this area are in the floodplain. The conditions in that location are similar to those in this proposed bridge location. The existing bridge is a precedent demonstrating that a bridge and trail could technically and logistically be constructed and maintained within the floodplain of Pimmit Run under similar conditions.

Along The Trail-On the Edge of the Floodplain S2 (d)

It is proposed that the alignment follow the north side of Pimmit Run within or slightly above the floodplain. The construction of a trail in this location could potentially impact known sensitive cultural resources and views along the cultural landscape of the parkway. A more detailed impact analysis would be required as part of the NEPA and NHPA processes to examine these potential impacts. Because its proximity to the floodplain, the topography is relatively flat in this area. This would allow for a long stretch of trail with a slope of less than 5 percent.

Approximately 900 feet from the proposed bridge location, the stream valley narrows where a steep slope comes close to the edge of Pimmit Run. An approximately 500 foot long stretch of boardwalk is proposed here in order to traverse this area without the need for retaining walls or extensive grading. At least two culverts or short stretches of boardwalk would be necessary in other areas along this section for the trail to cross small drainage ways that flow into Pimmit Run. It is recommended that all boardwalks proposed in this study incorporate a sustainable non-slip finish, to provide a safe surface for travel when wet. A more detailed impact analysis would be required as part of the NEPA and NHPA processes to determine the potential impacts on natural and cultural resources.

Turning North Along Pimmit Run and Pine Tree Road S2 (e)

At the point where the parkway turns north and away from Pimmit Run, the alignment may have to be close to the parkway behind a stone guard wall or cross a minor tributary to Pimmit Run. The steep grades will pose a challenge here. A multi-use trail in this area would require grades of seven to nine percent over a quarter mile. Connecting the trail to Frazier Lane or continuing along parkway land to Pine Tree Road is recommended. Several locations are feasible to achieve a connection in this area, and a more detailed study of possible alignments may be undertaken in the future. Both Frazier Lane and Pine Tree Road are lightly traveled public residential streets. Users would travel on these roadways to the intersection of Pine Tree Road and Chain Bridge Road. A more detailed impact analysis may be required as part of the NEPA and NHPA processes to determine potential impacts on natural and cultural resources, and views along the cultural landscape of the parkway.

Joining Chain Bridge Road S2 (f)
Beyond the intersection of Pine Tree and Chain Bridge roads, the alternative safest to bicyclists and pedestrians may be for the trail to cross Chain Bridge Road at the existing traffic signal at Kirby Road. There are no other signals or signs where Chain Bridge Road traffic must stop in this area. Crosswalk striping and a pedestrian-operated pushbutton may be added to this signal to increase users ease of crossing at this intersection.

A 200 foot long stretch of trail would be necessary along the south side of Chain Bridge Road between Pine Tree Road and Kirby Road to connect to this signal. The Virginia Department of Transportation (VDOT) owns and maintains this section of right-of-way. Grading and a 2 to 3 foot high retaining wall would be necessary to construct a trail in this location. There is approximately 25 feet between the edge of the pavement and the edge of the right-of-way, which is adequate space for this construction.

The estimated construction cost for this alternative is $556,650. Detailed estimated unit costs for this alternative may be found in Appendix C - Detailed Cost Estimates by Segment. This alternative is part of the alignment identified in the VBF/WABA report as a preferred alternative. It is also proposed on the Fairfax County Proposed Countywide Trails Plan.

5.3 Segment 3 - Chain Bridge Road to Colonial Farm Road or the CIA Interchange

5.3.1 Description

Start: Chain Bridge Road (Route 123) at Pine Tree Road

Terminus: Colonial Farm Road or the CIA Interchange

Type of facility: Multi-use trail and signed shared roadway

Number of Alternatives: 2

5.3.2 Segment 3 - Two Alternative Routes

5.3.2.1 First Alternative: Along Chain Bridge Road "Road 3"

This alternative proposes continuing the multi-use trail alignment along the north side of Chain Bridge Road to the CIA headquarters entrance. The trail would then follow Georgetown Pike to the west. Both are VDOT right-of-ways. This route is proposed on the Fairfax County Proposed Countywide Trails Plan.

Chain Bridge Road from Kirby Road to Saville Lane R3 (a)

No trail exists along Chain Bridge Road between Kirby Road and Saville Lane. The existing distance between the edge of the road and the limits of the right-of-way varies from 20 to 75 feet along this stretch, with an average width of approximately 40 feet. This is more than adequate space to grade and construct a 9-foot wide paved trail. The trail would cross Basil Road and Saville Lane along this stretch. Crosswalk striping and signage are recommended in these locations to mitigate potential conflicts between vehicles and trail users near these intersections.

Chain Bridge Road West of Saville Lane R3 (b)

An existing paved trail is located along Chain Bridge Road from Saville Lane to the intersection at Georgetown Pike, and continues west along Georgetown Pike. The existing width between the edge of the road and the edge of the right-of-way varies from 20 to over 300 feet through the majority of this area, which is more than adequate to improve the existing facility in order to provide a 9-foot wide paved trail.

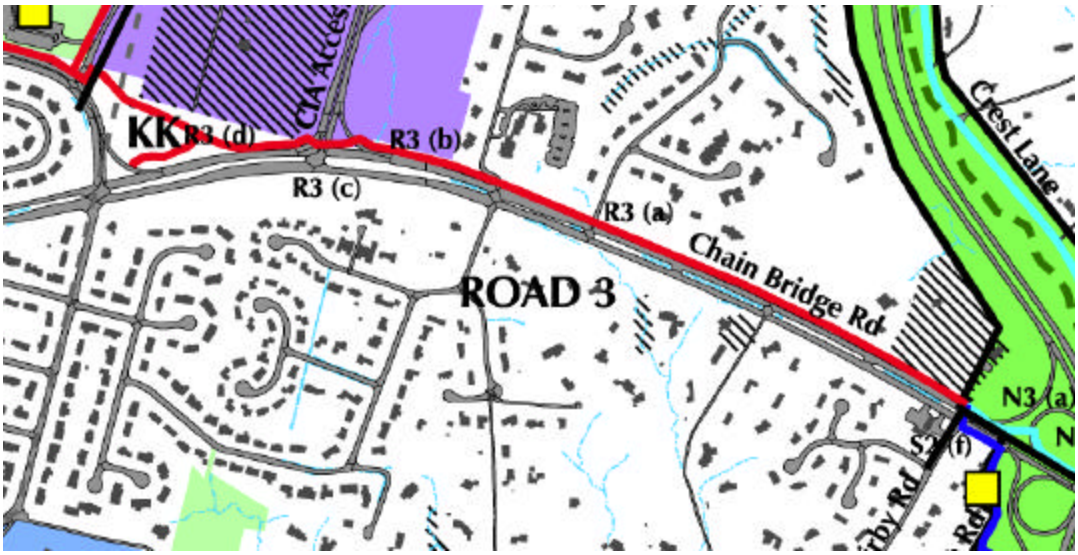
Crossing the CIA Entrance Drive R3 (c)

It is to be noted that the existing trail crosses onto CIA property for approximately 400 feet at the CIA entrance drive. Potential bicycle, pedestrian, and vehicular conflicts at the CIA entrance should be examined further in a future study, should this alternative be selected as the location for the trail. Crosswalk striping and signage are recommended to mitigate potential conflicts between vehicles and trail users at this intersection.

CIA Entrance Drive to Colonial Farm Drive R3 (d)

From the CIA entrance drive, the alternative continues to follow the alignment of the existing trail to the intersection of Georgetown Pike and Colonial Farm

An existing paved trail is located along Chain Bridge Road from Saville Lane to the intersection at Georgetown Pike. The existing width between the edge of the road and the edge of the right-of-way is more than adequate to improve the existing facility in order to provide a 9 foot wide paved trail.



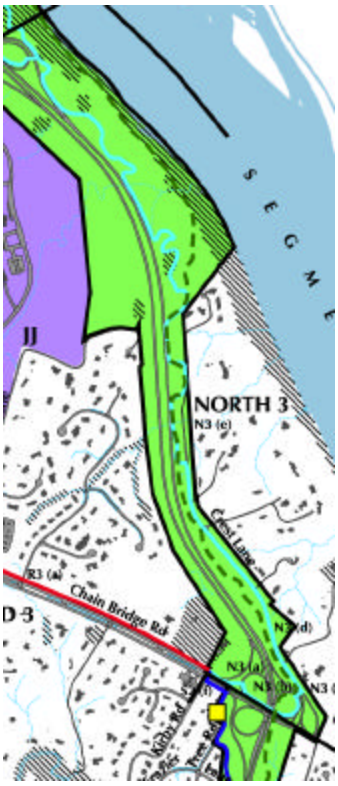
Segment 3 - Road 3
Not to scale

Refer to the Trail Alignment Alternatives fold-out map for more detail.

Drive. It is recommended that the trail cross Colonial Farm Drive at the existing stop sign. Crosswalk striping and signage are also recommended to mitigate potential conflicts between vehicles and trail users at this intersection.

A detailed study of this alternative with input from citizens and Fairfax County, would be required should this alternative be selected as part of the extension of the Mount Vernon Trail. Consideration should be given to the fact that the existing 3 to 8 foot wide bicycle facility is not as wide as the 9-foot wide multi-use trail envisioned here.

The estimated construction cost for this alternative is $235,440. Detailed estimated unit costs for this alternative may be found in Appendix C - Detailed Cost Estimates by Segment.



Segment 3 - North 3
Not to scale

Refer to the Trail Alignment Alternatives fold-out map for more detail.

The proposed location for crossing the first parkway ramp would be at the existing stop sign at the top of the ramp.

5.3.2.2 Second Alternative: Crest Lane "North 3"

A second ("North 3") alternative would follow Chain Bridge Road over the parkway to Crest Lane. There is no simple or extremely safe way to get to Crest Lane from Pine Tree Road; however, as in the previous alternative, it seems that the safest way to cross Chain Bridge Road may be to travel west to the traffic signal at Kirby Road.

Getting to Crest Lane along the north side of Chain Bridge Road would require users to cross two parkway access ramps, travel over the parkway on the overpass sidewalk, and cross a second pair of parkway access ramps. Similar conditions exist at points along the existing Mount Vernon Trail.

Crossing the Southbound Parkway Ramps N3 (a)

The proposed location for crossing the first parkway ramp would be at the existing stop sign at the top of the ramp. Vehicles are currently required to stop here, making it a safe crossing location. The proposed location for the second crossing is approximately 100 feet north of the top of the entrance ramp from Chain Bridge Road to the southbound parkway lanes. Vehicles would not be required to stop in this location, however it would provide good visibility for both drivers and trail users crossing the ramp. It is recommended that additional signage and crosswalk striping be provided in these locations. The construction of a trail in this location may affect views along the cultural landscape of the parkway. These potential impacts will require detailed analysis as part of the NEPA and NHPA processes.

Crossing the Parkway on the Overpass Bridge N3 (b)

The trail would continue along the north side of Chain Bridge Road to the existing overpass bridge. The existing sidewalk on the overpass is approximately 6 feet wide and 180 feet long. This width is not adequate for two-way bicycle traffic. Therefore, it is recommended that signage be provided at both ends of the sidewalk notifying users to cross in single file, and to dismount bicycles and walk them across. It is not necessary that the sidewalk be widened to construct this alternative, however if the overpass were reconstructed in the future, it would be advantageous to do so in order to accommodate two-way bicycle traffic.

Crossing the Northbound Parkway Ramps and Connecting to Crest Lane N3 (c)

After crossing the parkway on the overpass, the trail would follow along the third ramp, approximately 10 to 20 feet from the edge of the existing pavement. The trail would cross both ramps and connect to Crest Lane at a point about halfway between the parkway and the tops of the ramps. It is recommended that additional signage and crosswalk striping be provided here, as well as along Crest Lane. At this location, the ramps and the Crest Lane roadway are close in elevation, which would allow for a smooth, relatively level crossing. Vehicles would not be required to stop in this location; however it provides good visibility for both drivers and trail users crossing the ramps. The construction of a trail in this location may affect views along the

The existing sidewalk on the overpass is approximately 6 feet wide and 180 feet long. It is recommended that signage be provided at both ends of the sidewalk notifying users to cross in single file, and to dismount bicycles and walk them across.

Beyond Crest Lane, the most feasible alignment would follow the natural contours along the hillsides.

cultural landscape of the parkway. These potential impacts will require detailed analysis as part of the NEPA and NHPA processes.

Another alternative to reach Crest Lane from Kirby Road is for eastbound trail traffic to cross the overpass along the south side of Chain Bridge Road. Here again, trail users would again have to cross several parkway access ramps, then cross the parkway on the overpass, but in addition would have to cross Chain Bridge Road without the assistance of a traffic signal.

Along Crest Lane N3 (d)

If an alignment north of the parkway were built, Crest Lane could be considered a feasible alternative. Traffic is light and the width is adequate, although grades of 12 to 14 percent exceed AASHTO standards at several points. AASHTO recommends grade lengths no greater than 50 feet for slopes exceeding 11 percent. To mitigate excessive grades, AASHTO recommends providing signage to alert users of steep conditions and providing space for users to dismount and walk their bikes. The trail would continue on the Crest Lane roadway for approximately 2700 feet. A possible alternative to Crest Lane would be to place the trail along the mowed shoulder by the edge of the woods nearer to the parkway, with the trail running behind the parkway's stone walls.

If an alignment north of the parkway were built, Crest Lane could be considered a feasible alternative. The trail would follow the Crest Lane roadway for approximately 2700 feet.

Crest Lane to the CIA Interchange

N3 (e)

Beyond Crest Lane, the most feasible alignment would follow the natural contours along the hillsides. The hillsides are steep in some areas, however, and a trail would generate environmental impacts and would affect views along the cultural landscape of the parkway. It is also important to note that this alternative overlaps the existing Potomac Heritage Trail for approximately 2000 feet. This overlap begins at the point where this proposed alternative leaves Crest Lane and concludes where the Potomac Heritage Trail continues away from the parkway and down into the Potomac River valley. In addition, the construction of a trail in this location could potentially impact known sensitive cultural resources. These potential impacts will require detailed analysis as part of the NEPA and NHPA processes.

In areas where the land falls away from the parkway, an alignment within 10 to 12 feet of the parkway is proposed, with the trail protected behind the parkway's stone walls. The trail behind the walls would require retaining walls on the low side to hold the fill or other measures such as a boardwalk and railing. It is estimated that approximately 2900 linear feet of boardwalk and 800 linear feet of 2 to 5 foot high retaining wall may be necessary to construct this alternative. This will require more detailed impact analysis as part of the NEPA and NHPA processes to determine potential impacts on natural and cultural resources.

The estimated construction cost for this alternative is $1,023,055. Detailed estimated unit costs for this alternative may be found in Appendix C - Detailed Cost Estimates by Segment. This alternative is part of the alignment identified in the VBF/WABA report as a preferred alternative. It is also proposed on the Fairfax County Proposed Countywide Trails Plan.

In areas where the land falls away from the parkway, an alignment within 10 to 12 feet of the parkway is proposed, with the trail hidden behind the parkway's stone walls. For segments without walls, the trail could be constructed two to four feet below the parkway to reduce its visual impact.

There are two locations within this segment where the right-of-way is approximately 4 feet from the existing road edge, and the existing trail appears to cross onto private property for approximately 400 to 500 feet.

An existing paved trail is located along the north side of Georgetown Pike, and the existing right-of-way is adequate to upgrade the existing facility to provide a 9-foot trail through most of this segment.

At Langley High School, the existing trail stops at the top of the driveways, and users must continue along the driveways in front of the school.

5.4 Segment 4 - Colonial Farm Road/CIA Interchange to Turkey Run/Langley High School

5.4.1 Description

Start: Colonial Farm Road or the CIA Interchange

Terminus: Turkey Run or Langley High School

Type of facility: Multi-use trail and signed shared roadway.

Number of Alternatives: 3

5.4.2 Segment 4 - Three Alternative Routes

5.4.2.1 First Alternative: Georgetown Pike "Road 4"

This alternative continues from the end of the "Road 3" alternative proposed previously in section 5.3.2.1 of this report. The alternative begins west of Colonial Farm Road and continues along the north side of Georgetown Pike to Ridge Drive, west of Langley High School. This public right-of-way is managed by VDOT.

Colonial Farm Road to Langley High School
R4 (a)

An existing paved trail is located along the north side of Georgetown Pike within this segment. Although the existing right-of-way is adequate to provide a 9-foot trail through most of this segment, there are locations where the right-of-way is less than 4 feet from the existing road edge. It is to be noted that the existing trail appears to cross onto private property for approximately 400 to 500 feet in two separate locations. It may be necessary to obtain easements or approval from property owners in order to construct a new 9-foot wide trail in these locations.

As it follows the alignment of the existing trail, this alternative would cross Douge Hill Lane, Turkey Run Road, Jarvis Court, and the driveways at Langley High School. Crosswalk striping and signage are recommended if they are not currently provided, in order to mitigate potential conflicts between vehicles and trail users at these intersections. The trail would also cross a few residential driveways along this segment.

Langley High School to Ridge Drive
R4 (b)

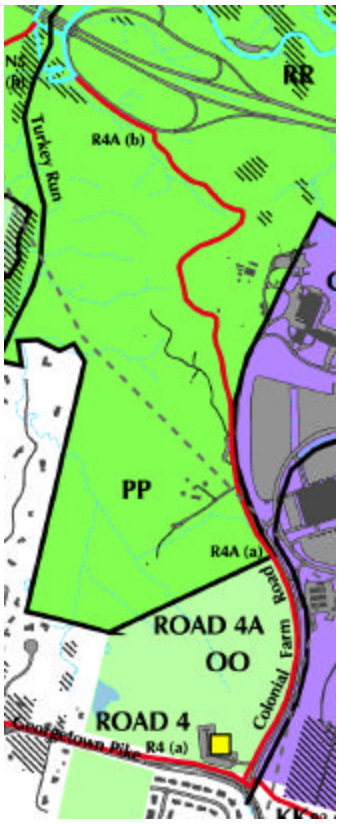
At Langley High School, the existing trail stops at the top of the driveways, and users must continue along the driveways in front of the school. This alternative proposes that a new 400 foot long stretch of paved trail be constructed along Georgetown Pike in front of Langley High School, connecting the existing trail locations.

A detailed study of this alternative with input from citizens and Fairfax County would be required should this alternative be selected as part of the extension of the Mount Vernon Trail. This alternative would also require approval from the Fairfax County Park Authority. Consideration should be given to the fact that the existing 3 to 6 foot wide bicycle facility is not as wide as the 9-foot paved multi-use trail envisioned here.

The estimated construction cost for this alternative is $251,340. Detailed estimated unit costs for this alternative may be found in Appendix C - Detailed Cost Estimates by Segment. This route is proposed on the Fairfax County Proposed Countywide Trails Plan.

Segment 4 - Road 4
Not to scale

Refer to the Trail Alignment Alternatives fold-out map for more detail.



Segment 4 - Road 4A
Not to scale

Refer to the Trail Alignment Alternatives fold-out map for more detail.

5.4.2.2 Second Alternative: Claude Moore Colonial Farm to Turkey Run "Road 4A"

Colonial Farm Road to Turkey Run Park R4A (a)

Instead of traveling exclusively on Georgetown Pike, the route could turn and follow along the west side of the Colonial Farm Road within NPS property as a separate shared use path (an alternate route labeled "Road 4A"). This location would require very little clearing or grading by following the existing road corridor. The alignment would continue to the entrance of the Federal Highway Administration. From that point, a multi-use trail could divert from the access road and travel through parkway land to the Turkey Run Park access road.

Entrance to Turkey Run R4A (b)

The outside shoulders of the ramps into Turkey Run Park are narrow and drop away from the road with steep slopes. Heavy wooden guardrails parallel the ramps. One way to provide trail access into Turkey Run Park from the south would be to construct a boardwalk, cantilevered over the steep slopes, behind the guardrails. Approximately 800 linear feet of boardwalk or retaining wall enhanced trail would be needed to approach the ramps, and approximately 900 linear feet of boardwalk would be required to follow the edge of the ramp to the end of this alternative. Here, it could connect to the alternative proposed for "North 4" in section 5.4.2.3 below, or the alternative proposed for Segment 5 in section 5.5.2.5 of this report.

This alternative would also require cooperation with the Fairfax County Park Authority, which manages Langley Fork Park in cooperation with the NPS. A more detailed analysis as part of the NEPA and NHPA processes may be required to determine potential impacts on natural and cultural resources.

The estimated construction cost for this alternative is $714,040. Detailed estimated unit costs for this alternative may be found in Appendix C - Detailed Cost Estimates by Segment. This route is proposed on the Fairfax County Proposed Countywide Trails Plan.

The trail alignment could follow the west side of Colonial Farm Road as a separate shared use path.

One way to provide trail access into Turkey Run Park from the south would be to construct a boardwalk, cantilevered over the steep slopes, behind the parkway ramp guardrails. This boardwalk could connect to the park access road or a bridge crossing over Turkey Run.

Segment 4 - North 4
Not to scale

Refer to the Trail Alignment Alternatives fold-out map for more detail.

5.4.2.3 Third Alternative: North of Parkway "North 4"

Near the CIA Interchange N4 (a)
The "North 4" alignment continues from the alternative described in Chapter 5.3.2.2 "North 3". There are two feasible alternatives for traveling past the interchange. One route would be to travel around the interchange to the east. Just beyond the CIA/FHWA access ramps, the topography drops away from the parkway dramatically. To maintain a safe gradient of descent from the CIA overpass to the parkway elevation, the trail would travel along the hilltop north of the overpass, and then drop along the hillside and back to the parkway, behind a stone wall. The construction of a trail in this location could potentially impact known sensitive cultural resources. The second route would be to cross the interchange ramps at a point about halfway along their length where visibility is good and then continue downhill towards the interchange overpass. The trail would parallel the outbound parkway lanes under the overpass and then cut behind a parkway wall immediately past the interchange. These routes present varying degrees of environmental impacts and effect on views along the cultural landscape of the parkway, which may require further study as part of the NEPA and NHPA processes.

To travel around a drainage way, the trail would most effectively be located behind the existing stone wall in the same manner as described along Segment 3. Approximately 500 linear feet of boardwalk or retaining wall would be required to construct a trail behind the existing stone wall.

Near NPS Turkey Run Headquarters N4 (b)
The trail could connect to the parking area at Turkey Run headquarters. This would allow multiple uses of the parking and roadways within the park.

Following the Access Road within Turkey Run Park N4 (c)
From the Turkey Run headquarters parking lot, the route would travel through the park along the existing access road. The road is lightly traveled with a speed limit of 15 miles per hour. If the trail should follow this road, it is recommended that signage be installed to alert drivers that it is a shared roadway.

Leaving the Roadway near Turkey Run N4 (d)
Before the access road intersects with the Turkey Run parkway interchange, the route will leave the access road and continue downhill toward the valley of Turkey Run. This segment would terminate at one of three crossing points presented for "North 5" in section 5.5.2.5 of this report. Depending on which crossing location is chosen, as much as 1400 linear feet of boardwalk or low retaining walls may be required to construct a trail in this location.

It may also be possible for the route to continue along the access drive to the interchange ramp, and then follow the

ramp before descending into the woods to a crossing at Turkey Run. However, it is recommended that traffic volumes along the ramp be studied to determine if this ramp would be safe for use as a shared roadway. Any of these solutions will require a more detailed analysis as part of the NEPA and NHPA processes to determine potential impacts on natural and cultural resources.

The estimated construction costs for this alternative range from $467,965 to $678,265, depending upon the location of the proposed crossing at Turkey Run. Detailed estimated unit costs for this alternative may be found in Appendix C - Detailed Cost Estimates by Segment. This alternative is part of the alignment identified in the VBF/WABA report as a preferred alternative. It is also proposed on the Fairfax County Proposed Countywide Trails Plan.

Views along the existing Georgetown Pike trail within Segment 5.

5.5 Segment 5 - Turkey Run - I-495/American Legion Bridge

5.5.1 Description

Start: Turkey Run/Langley High School

Terminus: American Legion Bridge (Interstate 495)

Type of facility: Multi-use trail and signed shared roadway

Number of Alternatives: 4

5.5.2 Segment 5 - Four Alternative Routes

5.5.2.1 First Alternative: Continue on Georgetown Pike "Road 5"

The "Road 5" alternative would continue the trail along the public right-of-way of Georgetown Pike from the "Road 4" segment proposed previously in section 5.4.2.1 of this report, to the American Legion Bridge and eventually across the bridge to a future mixed-use trail in Maryland. This public right-of-way is managed by VDOT.

An existing paved trail is located along Georgetown Pike within this segment. Although the existing right-of-way is adequate to provide a 9-foot trail through most of this segment, there is a 500-foot long stretch just west of MacKall Avenue where the right-of-way is approximately 8 to 10 feet from the existing road edge. It may be necessary to obtain easements or approval from property owners in order to construct a new 9-foot wide trail in this location.

Ridge Drive to Saint Luke's Catholic Church R5 (a)

As it follows the alignment of the existing trail along the north side of Georgetown Pike, this alternative would cross Ridge Drive and MacKall Avenue. Just before Douglas Drive, the trail crosses Georgetown Pike and continues along the south side of the right-of-way, crossing Douglas Drive, the driveway of Saint Luke Serbian Eastern Orthodox Church, Cloisters Drive, and the driveways of Saint Luke's Catholic Church. Crosswalk striping and signage are recommended at these crossing points, if they are not currently provided, in order to mitigate potential conflicts between vehicles and trail users at these intersections. The trail would also cross a few residential driveways along this segment.

Dead Run Drive to the Beltway R5 (b)

The existing trail ends just east of Dead Run Drive. It is proposed that the route continue with a new stretch of trail terminating at I-495. This new stretch of trail would continue along the south side of Georgetown Pike, crossing Dead Run Drive, and continuing to the intersection at Balls Hill Road. Here, the route would cross to the north side of Georgetown Pike and then continue west, crossing Balls Hill Road. Crosswalk striping and signage are recommended at the crossing points, if they are not currently provided, in order to mitigate potential conflicts between vehicles and trail users at these intersections. The route would terminate just before the northbound entrance ramp to I-495.

Several possibilities exist for connections from the end of the trail to recreational resources beyond the Beltway. The trail may connect to proposed trails along the Beltway and crossing the American Legion Bridge to Maryland where it could connect to the C&O Canal Trail and other

Segment 5 - Road 5
Not to scale

Refer to the Trail Alignment Alternatives fold-out map for more detail.

recreational trail facilities, as proposed by the MWCOG, and the VBF/WABA. The VBF/WABA study also proposes that trail users could travel to Great Falls Park from this part of Georgetown Pike. This could be accomplished by taking Balls Hill Road to Old Dominion Drive, which could be used to reach the park.

A detailed study of this alternative with input from citizens and Fairfax County would be required should this alternative be selected as part of the extension of the Mount Vernon Trail. Consideration should be given to the fact that the existing 3 to 6 foot wide bicycle facility is not as wide as the 9-foot paved multi-use trail envisioned here.

The estimated construction cost for this alternative is $362.520. Detailed estimated unit costs for this alternative may be found in Appendix C - Detailed Cost Estimates by Segment. This route is proposed on the Fairfax County Proposed Countywide Trails Plan.

Segment 5 - Road 5A
Not to scale

Refer to the Trail Alignment Alternatives fold-out map for more detail.

From Georgetown Pike, the route could travel north on Ridge Drive, which is a wide residential street with manageable grades and good visibility.

5.5.2.2 Second Alternative: Access Via Langley Oaks Park "Road 5A"

The "Road 5A" alternative would continue along public streets into the Langley Oaks neighborhood from the "Road 4" segment proposed previously in section 5.4.2.1 of this report. The route would then enter Langley Oaks Park, and cross onto NPS property near Turkey Run, connecting to alternative "North 5" which is discussed in section 5.5.2.4 of this report.

Along Ridge Drive and Sunny Hill Court R5A (a)

From Georgetown Pike, the route would travel north on Ridge Drive. The route would turn onto Sunny Hill Court and continue for approximately 700 feet. Both Ridge Drive and Sunny Hill Court are Fairfax County public streets, with wide lanes, manageable grades, and good visibility.

Through Langley Oaks Park to Turkey Run R5A (b)

Langley Oaks Park is a Fairfax County park adjacent to the southern side of the parkway. There are three access points into Langley Oaks Park from the existing Langley Oaks residential neighborhood. One access point along Sunny Hill Court is wide enough to accommodate a 9-foot wide paved trail, although no trail currently exists. A trail could be constructed from this point and continue through Langley Oaks Park, winding along hills and crossing a few small streams. Approximately 400 linear feet of boardwalk would be required to make these crossings. The route would cross onto NPS property near Turkey Run.

Approximately 400-800 linear feet of low retaining wall may be required to accommodate a trail along the steep grades approaching Turkey Run. The other two access points into Langley Oaks Park from Ridge Drive are only approximately 10 feet wide, and neighbors may object to their use as part of this trail. Although they could be alternatives to the first access point at Sunny Hill Court, it is recommended that the first access point serve as the primary trail, with these access points serving as potential connector trails.

This route could connect with the Fourth Alternative/"North 5" segment, near Turkey Run, and then continue to the American Legion Bridge when access across that bridge is constructed. Park users could also access the Turkey Run Recreation Area from Langley Oaks Park if a bridge were installed across Turkey Run.

If selected, this alternative will require a more detailed analysis as part of the NEPA and NHPA processes to determine potential impacts on natural and cultural resources. The alternative would also require partnership with the Fairfax County Park Authority. The estimated construction cost for this alternative is $438,600. Additional estimated construction costs of $1,658,000 would be required to reach the American Legion Bridge following the "North 5"alternative from the end of this alternative. Detailed estimated unit costs for this alternative may be found in Appendix C - Detailed Cost Estimates by Segment.

This access point from Ridge Drive into Langley Oaks Park may be used as an alternative to the proposed access point at Sunny Hill Court, or serve as additional an connector trail.

A trail could be constructed from this access point along Sunny Hill Court and continue through Langley Oaks Park to Turkey Run Park.

Segment 5 - Road 5B
Not to scale

Refer to the Trail Alignment Alternatives fold-out map for more detail.

At a curve near the end of MacKall Avenue, an unimproved right-of-way exists, connecting to the cul-de-sac of Heather Brook Court. Construction of a boardwalk and trail could provide a connection to Heather Brook Court.

5.5.2.3 Third Alternative: Connect Georgetown Pike to Proposed Dead Run Trail "Road 5B"

MacKall Avenue to Heather Brook Court R5B (a)

Another alternate in this segment is MacKall Avenue ("Road 5B"). The route could turn north from Georgetown Pike and follow MacKall Avenue. An alternative along MacKall Avenue would be more difficult to traverse than the alternative along Ridge Drive (Road 5A) due to steeper grades along the roadway and narrower paved lanes. Despite these conditions, an alternative along MacKall Avenue would be technically feasible. At a curve near the end of MacKall Avenue, an unimproved right-of-way exists, connecting to the cul-de-sac of Heather Brook Court. Approximately 100 linear feet of boardwalk and 200 linear feet of new trail would be required to cross a stream in this location and connect to Heather Brook Court. Both MacKall Avenue and Heather Brook Court are Fairfax County public streets.

Heather Brook Court to Dead Run R5B (b)

The route would continue on Heather Brook Court to a Fairfax County Board of Supervisors property approximately 500 feet from the end of the cul-de-sac. A gated access road on the property leads to a pump station on Dead Run. A multi-use trail could be constructed on the access road, then along a floodplain under the parkway at the Dead Run Bridge. Approximately 100 linear feet of boardwalk would be required to cross a stream along this route. An additional 400 to 600 linear feet of boardwalk or low retaining wall may be required to connect to approach the parkway near Dead Run. The construction of a trail or boardwalk in this location could potentially impact known sensitive cultural resources, and may affect views along the cultural landscape of the parkway. A more detailed impact analysis would be required as part of the NEPA and NHPA processes to examine these potential impacts.

This alternate route could connect with the Fourth Alternative/"North 5" segment near Dead Run, and then continue to the American Legion Bridge when access across that bridge is constructed. This would provide the River Oaks, Parkview Hills, Langley Forest, and Langley Oaks communities access to the Dead Run trail segment.

This alternative would require approval from the Fairfax County Park Authority and the Fairfax County Board of Supervisors. This solution will also require a more detailed analysis as part of the NEPA and NHPA processes to determine potential impacts on natural and cultural resources.

This route is proposed on the Fairfax County Proposed Countywide Trails Plan. The estimated construction cost for this alternative is $253,783. Additional estimated construction costs of $510,000 would be required to reach the American Legion Bridge following the "North 5"alternative from the end of this alternative. Detailed estimated unit costs for this alternative may be found in Appendix C - Detailed Cost Estimates by Segment.

A Fairfax County Board of Supervisors property is located approximately 500 feet from the end of the Heather Brook Court cul-de-sac. A gated access road on the property leads to a pump station on Dead Run. A multi-use trail could be provided on the access road.

Several bridge alternatives for crossing Turkey Run may be feasible in the vicinity of the existing parkway bridge.

From the crossing at Turkey Run, the trail would wind around the hillsides to avoid excessive grade changes. Between Turkey Run and Dead Run it is proposed that the trail follow behind three existing stone walls near the parkway,

5.5.2.4 Fourth Alternative: A Trail through the Woods from Turkey Run to American Legion Bridge "North 5"

The "North 5" path would connect the Turkey Run Recreation Area to the American Legion Bridge by following the rolling topography inside NPS lands on the north side of the parkway. Bridges would be required to cross Turkey and Dead Runs within this segment.

Crossing Turkey Run by High Bridge N5 (a)

Several "high" bridge solutions crossing Turkey Run may be feasible. These bridge alternatives would be located approximately 30-60 feet above the creek valley. These would range from approximately 300 feet in length if located slightly south of the existing parkway bridge to about 450 feet in length for crossings further north. If a bridge location south of the parkway is selected, approximately 300 linear feet of boardwalk or retaining wall enhanced trail would be required to follow along the steep slopes under the parkway bridge and continue along the proposed route. These bridge alternatives will require a more detailed analysis as part of the NEPA and NHPA processes to determine potential impacts on natural and cultural resources, as well as impacts to views along the cultural landscape of the parkway.

Crossing Turkey Run by Low Bridge N5 (b)

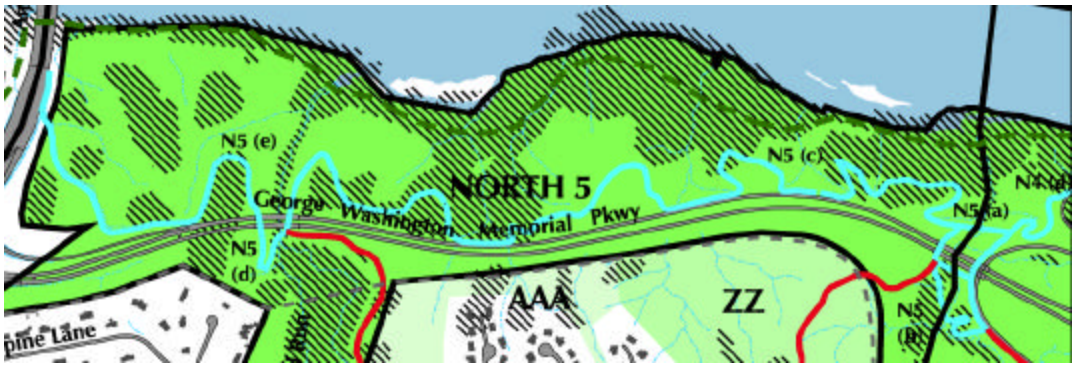
A "low" bridge, 100 to 150 feet in length, allowing the trail to cross Turkey Run Creek south of the existing GWMP bridge, may be feasible. This bridge alternative would be located approximately 10 feet above the creek valley. An average grade of 10 percent could be achieved, but the length of the trail at the maximum grade would likely exceed AASHTO standards. Approximately 600 to 1200 linear feet of retaining wall may be required to accommodate a trail along the steep slopes of the Turkey Run valley. The impacts, constructability and cost of removing large trees along the proposed route to maintain a constant grade would require further evaluation. This solution will also require a more detailed analysis as part of the NEPA and NHPA processes to determine potential impacts on natural and cultural resources.

Traveling Between Turkey Run and Dead Run N5 (c)

From the crossing at Turkey Run, the trail would wind around the hillsides to avoid excessive grade changes. Between Turkey Run and Dead Run it is proposed that the trail follow behind three existing stone walls near the parkway, as proposed in the "North 3" and North 4 alternatives. Approximately 1300 linear feet of board - walk or retaining wall would be required to construct a trail behind these walls. An additional 1800 to 2200 linear feet of boardwalk or retaining wall may be required to accommodate a trail in other steep areas along this alignment. The construction of a trail or boardwalk along this portion of the alternative could potentially impact known sensitive natural and cultural resources, as well as views along the cultural landscape of the parkway. A more detailed impact analysis would be required as part of the NEPA and NHPA processes to examine these potential impacts.

Crossing Dead Run N5 (d)

A 150-foot long bridge crossing is proposed just south of the parkway bridge over Dead Run. This bridge would be approximately 10 to 20 feet above the creek valley and would not be located within the floodplain. Approximately 600 linear feet of boardwalk or retaining wall would be required to reach the bridge



Segment 5 - North 5
Not to scale

Refer to the Trail Alignment Alternatives fold-out map for more detail.

location along the east slope of the valley. Approximately 800 linear feet of board - walk or retaining wall would be required to access the bridge along the west slope of the valley.

West of Dead Run N5 (e)
West of the crossing at Dead Run, the trail would continue to wind along the hillsides at a grade of five to ten percent slope. The construction of a trail along this route could potentially impact known sensitive cultural resources. A more detailed impact analysis would be required as part of the NEPA and NHPA processes to examine these potential impacts. The final 1,200 linear feet of the alignment would be downhill along existing drainage areas. Some parts of this area appear to have been graded for an old roadway many years ago, making it a favorable location for a trail alignment. The terminus of the trail could eventually connect to proposed trails along I-495 crossing the Potomac River, as mentioned previously.

This alternative would require a detailed evaluation of the impacts on cultural resources, viewsheds, and the environment as part of the NEPA and NHPA processes.

The section of this alternative from Dead Run to the Beltway is part of the alignment identified in the VBF/WABA report as a preferred alternative. It is also proposed on the Fairfax County Proposed Countywide Trails Plan.

Estimated construction costs for this alternative vary depending on which location is selected for the bridge crossing at Turkey Run. Use of the high bridge crossing results in an estimated construction cost of $2,280,280 for the alternative, while the middle and low alternatives are estimated at $2,188,000 and $2,218,440 respectively. Detailed estimated unit costs for this alternative may be found in Appendix C - Detailed Cost Estimates by Segment.

The George Washington Memorial Parkway was not designed for the high volumes of traffic or the high rates of speed it currently sustains. Adding cyclists would expose riders and drivers to unacceptable levels of risk.

6.0 Alternatives Deemed Not Feasible At This Time

As indicated in Section 1.2.2, the following criteria were used to judge whether an alternative is feasible:

- Would be unreasonably expensive
- Could not be easily implemented for technical or logistical reasons
- Does not meet park mandates
- Is not within legal or other mandatory constraints
- Is inconsistent with carefully considered, up-to-date statements of purpose and significance or management objectives
- Would have profound adverse impact to sensitive resources
- Would not be allowed by another agency from which a permit is required

If a project falls into any one of these categories, it may be considered to be "not feasible at this time".

6.1 "Shared Parkway"

Reasons for "Unfeasibility":

- Could not be easily implemented for technical or logistical reasons
- Would have profound adverse impact to sensitive resources
- Would be unreasonably expensive

Plus: safety concerns

According to AASHTO,

All highways, except those where cyclists are legally prohibited, should be designed and constructed under the assumption that they will be used by cyclists. Therefore, bicycles should be considered in all phases of transportation planning, new roadway design, roadway reconstruction, and capacity improvement and transit projects .

Unfortunately, the GWMP was not designed for the high volumes of traffic or the high rates of speed it currently sustains. The parkway lanes could be widened to provide dedicated bike lanes in both directions, but only the most experienced users could be expected to use the trail.

Adding cyclists would expose riders and drivers to unacceptable levels of risk, and technical issues outlined below:

6.1.1 Barriers between Automobiles and Bicycles

A curb, or any other barrier between the automobile traffic lanes and the bicycle lane, is not recommended for safety reasons. A bicycle tire slipping over the curb could cause the bicyclist to be thrown into the traffic lanes. Larger barriers would cause unsafe conditions for automobiles needing to pull off to the side of the road. Although dedicated bicycle lanes could be separated from motor

The George Washington Memorial Parkway currently sustains high volumes of traffic at high rates of speed.

vehicle traffic by a solid white line, even these lanes could conflict with any vehicular emergency stopping or pull-offs.

6.1.2 Road Widening

If widening were pursued, we would propose widening the lanes in both directions by a minimum of five feet to allow for bike lanes on each side of the road. Two-way bike traffic would not be safe for any users of any level.

Existing low curb and drainage inlets along the road edges would need to be relocated.

Where the land beyond the parkway rises, cutting into the hillside would require installation of large-scale retaining walls or dramatic re-grading to regain a comfortable grass transition into the woods. Where the land falls away from the roadbed, widening would affect the original stone walls. In some areas, re-grading would destroy some of the flowering trees that were planted during parkway construction that contribute to the cultural landscape. These changes would drastically change the design and character of the parkway, which is a historic resource.

6.1.3 Safety Concerns

Even with the implementation of the measures described above, a shared parkway would be a facility useable only by experienced bicyclists. Less experienced cyclists, walkers, joggers, and other recreational users could not be expected to use such a facility comfortably. This type of facility does not meet the multi-use, recreational character desired for the extension of the Mount Vernon Trail.

6.2 Paved Multi-Use Trail Parallel to the Parkway - Segment 1

Reasons for "Unfeasibility":

- Could not be easily implemented for technical or logistical reasons
- Would have profound adverse impact to sensitive resources
- Would be unreasonably expensive

Along much of the parkway in Segment 1, the parkway shoulders abut existing retaining walls or steep slopes. For a separate paved trail to be constructed parallel to the northbound lanes, excessive quantities of boardwalk or fill and retaining walls would be required to construct a trail beyond the existing grass shoulders. This would incur significant expense, as well as negative impacts on the surrounding ecology. For a trail to be constructed parallel to the southbound lanes, existing retaining walls and stone guard walls would need to be removed. Extensive grading would be necessary to cut into the steep hillsides along the south side of the parkway, and new retaining walls would need to be constructed in order to provide space for a trail outside of the parkway shoulder. The grading and walls would incur significant expense, as well as impacts on the surrounding ecology and views within the cultural landscape of the parkway.

Additional bridges would also be necessary for trail users to cross streams and valleys separate from vehicular travel lanes. A minimum of five crossings in excess of 400 feet in length would be required, incurring significant expense, and impacting views within the cultural landscape of the parkway.

6.3 Hugging the Water's Edge

Reasons for "Unfeasibility":

- Is not within legal or other mandatory constraints
- Could not be easily implemented for technical or logistical reasons
- Would have profound adverse impact to sensitive resources
- Would be unreasonably expensive

Extending the Mount Vernon Trail to follow the Potomac Heritage National Scenic Trail along the southern bank of the Potomac River from Roosevelt Island to Interstate 495 is feasible for only a small portion of the 10-mile study area. The NPS does not own much of the shoreline in Segments 2 and 3. In addition, the topography and history of flooding along the river do not lend to adding a multi-use trail along the water.

The existing hiking trail climbs over rockslides, traverses steep slopes and rises to higher elevations to follow the terrain.

The existing trail along the water's edge climbs over rockslides, traverses steep slopes and rises to higher elevations to follow the terrain. As a result, the alignment would not accommodate a 9-foot wide, paved, multi-use trail at gradients acceptable to bicycle users.

Some of the rockslides require climbing 20 to 30 feet between large rocks at grades ranging from 50 to 100 percent slopes. As a result, the Potomac Heritage Trail alignment would not accommodate a 9-foot wide, paved, multi-use trail at gradients acceptable to bicycle users. A series of boardwalks could be constructed to get around some of the obstacles and allow viewers to appreciate the area's natural beauty. However, this would incur significant expense, as well as negative impacts on the Potomac Heritage hiking trail, the surrounding ecology, and viewsheds to and from the Potomac River.

6.4 Adding More Shared-Use Trails on County Roads

Reasons for "Unfeasibility":

- Could not be easily implemented for technical or logistical reasons

Plus, safety concerns

Due to several limiting factors along Arlington and Fairfax County roads, it is difficult to identify safe, logical connections suitable for multi-use trail users. These factors include a lack of road connectivity, steep grades, narrow rights-of-way, and winding road alignments.

6.5 Other Routes Considered During the Study - Segment 1

Several routes were considered along Arlington County streets, many of which were determined to be unfeasible. The alternative that has been deemed feasible is presented in Section 5.0. The road segments that have been deemed unfeasible for use as an on-street bike route include the following:

6.5.1 Neighborhood Streets North and South of Military Road

The use of lightly traveled neighborhood streets was examined as an alternative to the exclusive use of Military Road in Segment 1. However, the roads within these subdivisions lack connectivity. Contributing factors include lack of road crossings over Windy Run, Donaldson Run, and Gulf Branch, and topographic constraints associated with these drainage ways. Use of these streets for short stretches would lengthen the route considerably without providing significant advantage over the use of Military Road, which is currently designated as an on-street bicycle route.

6.5.2 Old Dominion Drive to North Glebe Road

Old Dominion Drive and North Glebe Road south of Chesterbrook Road were not considered as alternatives because they are approximately one and a half miles from the GWMP, and do not provide efficient connections between Roosevelt Island and the American Legion Bridge.

6.6 Other Routes Considered during the Study - Segment 2

Several routes were considered along Arlington and Fairfax County streets, most of which were determined to be unfeasible. The alternatives that have been deemed feasible are presented in Section 5.0. The road segments that have been deemed unfeasible for use as an on-street bike route include the following:

A hiker on the Potomac Heritage Trail stands atop a rock slide overlooking the river. Some of the rockslides along the trail require climbing 20 to 30 feet between large rocks at grades ranging from 50 to 100 percent slopes.

Due to limiting factors along Arlington and Fairfax County roads, it is difficult to identify safe, logical connections suitable for multi-use trail users.

For security reasons, the CIA prohibits unrestricted public access onto its property.

6.6.1 Chain Bridge Road between Glebe Road and the GWMP Interchange

This section of road includes steep grades along a narrow right-of-way.

6.6.2 Glebe Road between Chain Bridge Road and the Military Road/Old Glebe Road Interchange

This section of road contains steep grades and a winding road alignment.

6.6.3 Streets within the Chesterbrook Farm, Chesterbrook Estates, Chesterbrook Woods, The Glebe, and Chain Bridge Forest Subdivisions

Roads within these subdivisions lack connectivity. Contributing factors include private ownership of open space, lack of road crossings over Pimmit Run and Little Pimmit Run, and topographic constraints associated with these drainage ways.

6.6.4 Kirby Road between Chesterbrook Road and Chain Bridge Road

This section of road contains areas of steep grades, narrow sections of right-of-way, and segments of winding road alignments.

6.6.5 Roads south of Chesterbrook Road

Roads south of Chesterbrook Road, such as Old Dominion Drive, were not considered as alternatives because they are approximately one to one and a half miles from the GWMP, and therefore do not provide efficient connections between Roosevelt Island and the American Legion Bridge.

6.7 A Multi-Use Trail North of the Parkway - Segment 2

Reasons for "Unfeasibility":

- Could not be easily implemented for technical or logistical reasons
- Would have profound adverse impact to sensitive resources

An alternative was considered within GWMP lands on the north side of the parkway within Segment 2. However, there is a significant difference in elevation between the Pimmit Run stream valley and the top of the hill on which Fort Marcy is sited. This change in elevation prohibits the construction of a multi-use trail at grades acceptable for public use.

The terrain remains hilly throughout this section of the GWMP lands, and the width of the corridor in this section is not sufficient to accommodate a trail alignment at grades acceptable for a multi-use trail. In addition, any alternative in this segment would create considerable conflict with the existing Potomac Heritage Trail. Trail construction would also impact archeological resources associated with Fort Marcy. For these reasons, no feasible alternative was found along the north side of the parkway in Segment 2.

6.8 Alternatives South of the Parkway - Segments 3 & 4

Reasons for "Unfeasibility":

- Would not be allowed by another agency from which a permit is required
- Could not be easily implemented for technical or logistical reasons

An alternative was considered within GWMP lands on the south side of the parkway. This alternative trail would begin at the traffic signal south of the Chain Bridge Road interchange, and would continue along the south side of the parkway, close to the backs of some residences and the fence line of the CIA. The route would cross the entrance drive to the CIA and continue west to Turkey Run, where a bridge would be required. After crossing Turkey Run, the route would continue along the south side of the parkway to Dead Run. At this point, the route would cross under the parkway and connect with alternatives along the north side of the parkway.

6.8.1 CIA Security Restrictions

For security reasons, the CIA prohibits unrestricted public access onto its property. Because of these access limitations, it is infeasible to construct a trail adjacent to CIA property or crossing CIA property near the interchange.

6.8.2 George Washington Memorial Parkway Property Width

Another limiting factor is the width of the parkway land in several locations along this route. At several points, there is

insufficient width to accommodate the safe grade changes while still providing adequate distance between the trail and vehicular travel lanes.

6.9 Conclusions

After studying these alternatives, the consultant team developed several conclusions:

- A "shared parkway" is feasible for only the most experienced riders and would not match the multi-use character of the existing Mount Vernon Trail.
- A multi-use trail is not feasible parallel to the parkway within Segment 1.
- A multi-use trail is not feasible along the water's edge.
- Due to safety concerns, narrow, steep right-of-ways, and other technical issues the possibility of extending the Mount Vernon Trail along county roads is somewhat limited, especially in Fairfax County.
- Because of CIA policy, topographic constraints, and narrow parkway width, no feasible alternatives exist along the south side of the parkway between Chain Bridge Road and Interstate I-495.

Therefore, the most feasible alternatives for extending the Mount Vernon Trail include the use of existing roadways in Arlington and Fairfax counties and the construction of off-road and off-parkway shared-use facilities in Fairfax County.

7.0 General Improvements

This area is well served by public facilities. Five existing facilities and one proposed facility are recommended as locations for comfort stops along the extension of the Mount Vernon Trail.

Should any of the proposed alternatives be selected, other improvements and facilities would be desirable to meet the needs of trail users. We suggest one trailhead or comfort stop be provided at least every two to three miles along the length of the trail corridor.

This area is well served by public facilities. Five existing facilities are recommended as locations for trailheads along the extension of the Mount Vernon Trail. More in-depth descriptions of these facilities can be found in Section 3.2.1 of this document.

- **Dawson Terrace Recreation Center**
  (Arlington County)
  2133 North Taft Street

- **Potomac Overlook Park**
  (Northern Virginia Regional Park Authority)
  2845 North Marcey Road

- **Madison Community Center & Fort Ethan Allen Park**
  (Arlington County)
  3829 North Stafford Street

- **Langley Fork Park**
  (Fairfax County/NPS)
  6250 Georgetown Pike

- **Turkey Run Recreation Area**
  (NPS)

These sites have been recommended because they fit many of the following criteria that are proposed for locating trailheads:

- Located along one or more of the proposed alternatives
- Accessible to maintenance and emergency vehicles
- Open to the public between dawn and dusk
- Provide opportunity for public parking, which could potentially serve users wishing to access the trail
- Provide necessary amenities, including a public bulletin board, a drinking fountain, a trash receptacle, a bike rack, and benches
- Connect to other public recreation facilities and trails
- Provide restrooms if possible

In addition to these five sites, a comfort stop is recommended near the intersection of Chain Bridge Road and Pine Tree Road at the end of the Segment 2 alternative. This site will not provide a public parking area from which users may access the trail, which differentiates it from the trailheads described above. We recommend that this comfort stop include a drinking fountain, trash receptacle, bike rack, public bulletin board, and benches. Public restrooms would be desirable, but are available about one mile away at the Madison Community Center, or two miles away at Turkey Run Park.

8.0 Cost Estimates

Preliminary costs have been developed for each of the alternative trail alignments by segment.Costs are based on assumed site conditions that include slopes, drainage, necessity of bridging, and forest cover.

Preliminary costs have been developed for each of the alternative trail alignments by segment. These estimates are based on per squared foot cost assumptions that the consultant has used on similar types of construction and quantity estimates measured from the 200 scale drawings. Costs are based on assumed site conditions that include slopes, drainage, necessity of bridging, and forest cover.

8.1 Typical Site Conditions Categories & Unit Costs (Appendix A)

The cost estimates have been modified subsequent to the previous draft based on the actual cost experiences provided by the NPS and based on additional field observations. The site conditions vary substantially along the various segments and alternative trail alignments. It is assumed that in the more level areas, alternatives could be aligned to minimized grading and clearing. However, in the areas of very steep slopes and large trees, retaining walls or elevated structures may be necessary to accommodate the trail width and minimize the impacts. The actual costs for construction may vary significantly depending upon the actual design solutions, a more detailed assessment of site conditions, and the level of environmental impacts deemed acceptable in future studies.
Construction methods and work areas acceptable within NPS lands may require unique equipment and long working distances between staging and construction areas. Unknown subsurface geo-technical conditions such as springs, small perennial drainage channels, and shallow bedrock may also affect construction costs.

The following Typical Site Conditions categories were identified.

Trail - Level Terrain
Paved trail construction on slopes of 5% or less-requiring little to moderate clearing and grading

Trail - Hilly Terrain
Paved trail construction on slopes of 5 to 10% or trail construction along cross-slopes-requiring moderate clearing and grading

Trail - Steep Terrain
Paved trail construction on slopes greater than 10% or the construction of switch-backs-requiring major clearing and grading

Boardwalks, Elevated Structures, or Retaining Wall Edges
11-foot wide boardwalk or elevated structure with non-skid surface, constructed along steep slopes or across low or wet areas--requiring moderate clearing and little to no grading
and/or:
low retaining walls along some portions of paved trail to avoid trees or compensate for grade changes or side slopes

Low/Short Span Bridge (40-80 foot span, under 20 foot height)

Mid Span Bridge (80-120 foot span, 20-30 foot height)

High/Long Span Bridge (120-200 foot span, over 30 foot height)

Minor Improvements along County Road/Bike Route
Bike lane striping and signage

Major Facility Improvements along County Road
Minor clearing and grading, demolition of existing trail, construction of 9' wide paved multi-use trail

Intersection Improvements
Crosswalk striping and/or addition of pedestrian pushbutton to an existing signal

8.2 Average Estimated Cost per Segment and Trailhead (Appendix B)

8.2.1 Average Estimated Cost per Segment

The estimated average cost per linear foot of trail varies substantially between different segments. Trail alternatives that follow existing trails or roadways are estimated to average $40 to $50 per linear foot for widening and improvements. Alternatives within the steeply sloping and wooded parkland may cost up to $200 per linear foot, depending upon site conditions.

The total cost of constructing the alternatives crossing Turkey Run and Dead Run will also vary depending upon the type of bridge crossing selected. The higher and longer bridge options are estimated to incur more expense than lower bridge options. However, lower bridge crossings may require additional trail length and a larger area of disturbance in order to construct a trail into the stream valleys.

8.2.2 Average Estimated Cost per Trailhead

Alternative trailheads have been identified where parking and facilities are available or could be constructed to serve the various alternatives. Additional trailheads of connecting trails may be identified in future design efforts.

8.3 Detailed Cost Estimates by Segment (Appendix C)

The 11"x17"- 200' scale plans were used in conjunction with general on-site evaluation to determine site conditions along the various alternative alignments. Linear measurements were estimated from these plans and multiplied by the unit costs to estimate the total construction costs for each segment. Final costs may vary and are dependent upon detailed study of site conditions and final design solutions.

8.4 Summary Cost Estimates by Option (Appendix D)

Three alternative trail alignments were identified, to demonstrate possible combinations of feasible alternatives, and provide a range of end-to-end estimated costs. The total unit costs of these solutions were calculated by totaling the estimates from the individual alternative segments included.

Estimated costs also include common General Contractor items covering basic General Conditions, overhead, profit, bonding, and insurance. Construction costs are in today's dollars and have not been increased to accommodate escalation to the time of construction. A design contingency of 10% is also included in the final tabulation for each segment of each alternative.

9.0 Conclusion

Some alternatives could be implemented by the counties and would require no action on the part of the NPS. However, some portion of many of the proposed alternatives would require NPS action or cooperation between the NPS and the counties if they would be selected for implementation.

Due to the nature of a feasibility study as explained in Chapter 1, no preferred alternative has been identified in this study. This step would be undertaken as part of the NEPA and NHPA processes, should the project move forward. No final trail location will be determined without first fulfilling the requirements set forth by NEPA and NHPA Section 106.

This feasibility study is intended to assist the NPS in determining the next course of action regarding the extension of the Mount Vernon Trail. Should it be decided that the project move forward, the NPS intends to seek funding to perform archeological and environmental investigations.

The purpose of this study was to determine technically feasible alternatives for extending the Mount Vernon Trail from its current terminus at Theodore Roosevelt Island to I-495, at the American Legion Bridge. Many of the feasible alternatives identified are currently included in Fairfax County or Arlington County trail master plans. Feasible alternatives identified in segments 1, 3, 4, and 5 could be implemented by the counties and would require no action on the part of the NPS.

However, some portion of many of the proposed alternatives would require NPS action or cooperation between the NPS and the counties if they would be selected for implementation. In particular, the only feasible alternative identified in Segment 2 would require the cooperation of Arlington County, Fairfax County, and the NPS. It is important to note that without the implementation of this proposed alternative, creating a multi-use trail connection from Theodore Roosevelt Island to the American Legion Bridge is not feasible.

10.0 Appendices

10.1 Appendix A - Typical Site Conditions and Unit Costs

Condition/Item	Unit	Unit Price
Trail-Level Terrain	L.F.	$43.60
Site Clearing (12' Wide Corridor)	L.F.	$3.60
Cut & chip light, trees to 6" dia.		
Grub stumps and remove		
Trail Construction (9' Width, Includes Grading)	L.F.	$40.00
Bituminous trail-2 1/2" thick paving, 4" gravel base		
Includes excavation, borrow spread,		
compaction, fine grading, backfill		
Trail-Hilly Terrain	L.F.	$47.40
Site Clearing (18' Wide Corridor)	L.F.	$5.40
Cut & chip medium, trees to 12" dia.		
Grub stumps and remove		
Grading (Gentle Slopes-18' Corridor)	L.F.	$2.00
Trail Construction (9' Width)	L.F.	$40.00
Bituminous trail-2 1/2" thick paving, 4" gravel base	L.F.	
Includes excavation, borrow spread,		
compaction, fine grading, backfill		
Trail-Steep Terrain	L.F.	$50.00
Site Clearing (20' Wide Corridor)	L.F.	$6.00
Cut & chip heavy, trees to 24" dia.		
Grub stumps and remove		
Grading (Steep Slopes-20' Corridor)	L.F.	$4.00
Trail Construction (9' Width)	L.F.	$40.00
Bituminous trail-2 1/2" thick paving, 4" gravel base		
Includes excavation, borrow spread,		
compaction, fine grading, backfill		
Boardwalk	L.F.	$280.40
Site Clearing (18' Wide Corridor)	L.F.	$5.40
Cut & chip medium, trees to 12" dia.		
Grub stumps and remove		
Boardwalk Construction (11' Width)	L.F.	$275.00
Wood boardwalk-redwood lumber, 2" x 10" joists		
@ 16" O.C.,non-skid decking, 2" x 10" beams, 4" x 4"		
posts, 2" x 4" railings, concrete footer incl. excavation		
Trail with Retaining Wall Edges	L.F.	$280.40
Site Clearing (18' Wide Corridor)	L.F.	$5.40
Cut & chip medium, trees to 12" dia.		
Grub stumps and remove		
Grading (Steep Slopes-20' Corridor)	L.F.	$4.00
Trail Construction (9' Width)	L.F.	$40.00
Bituminous trail-2 1/2" thick paving, 4" gravel base		
Includes excavation, borrow spread,		
compaction, fine grading, backfill		
Retaining Wall (2' Height Average)	L.F.	$231.00
Short Span Bridge 40 - 80 feet	L.F.	$666.00
Site Clearing (24' Wide Corridor)	L.F.	$6.00
Cut & chip medium, trees to 12" dia.		
Grub stumps and remove		
Bridge Construction (11' Width)	L.F.	$660.00
Steel, trussed or arch spans, complete in place		
Includes foundations		

Mid Span Bridge 80 - 120 feet	L.F.	$966.00
Site Clearing (24' Wide Corridor) Cut & chip medium, trees to 12" dia. Grub stumps and remove	L.F.	$6.00
Bridge Construction (11' Width) Steel, trussed or arch spans, complete in place Includes foundations	L.F.	$960.00
Long Span Bridge 120-200 feet	L.F.	$1,176.00
Site Clearing (24' Wide Corridor) Cut & chip medium, trees to 12" dia. Grub stumps and remove	L.F.	$6.00
Bridge Construction (11' Width) Steel, trussed or arch spans, complete in place Includes foundations	L.F.	$1,170.00
Minor Improvements along County Bike Route	L.F.	$0.95
Striping Bicycle lane striping - white, 4" wide	L.F.	$0.80
Signage Bike route signage (approx. 2 signs every 1/4 mile)	L.F.	$0.15
Major Facility Improvements along County Road	L.F.	$43.60
Clearing (as needed) Cut & chip light, trees to 6" dia. Grub stumps and remove	L.F.	$3.60
Demolition (as needed) Bituminous sidewalk removal - 2 1/2" thick	L.F.	$9.00
Trail Construction (9' Width, Includes Grading) Bituminous trail-2 1/2" thick paving, 4" gravel base Includes excavation, borrow spread, compaction, fine grading, backfill	L.F.	$40.00
Intersection improvements		
Traffic Signals Pedestrian pushbutton (adding to existing signal)	EA.	$4,775.00
Trailheads/Rest Areas/Other Improvements		
Site Clearing Cut & chip light, trees to 6" dia. Grub stumps and remove	S.Y.	$2.70
Grading	S.Y.	$0.75
Wood Bench - 4' Long	EA.	$850.00
Trash Receptacle	EA.	$275.00
Bicyle Rack	EA.	$400.00
Signage	EA.	$95.00
Drinking Fountain Stainless Steel, Pedestal style-including frreze-proof valve system, rough-in, suppy and waste	EA.	$2,200.00
Shelter with Community Bulletin Board and Signage Includes 8'x8' shelter, message board, directional signage, concrete pad, and installation	EA.	$6,000.00

10.2 Appendix B - Average Estimated Cost per Segment and Trailhead

Average Estimated Cost per Segment

Alternative	Distance (LF)	Total Cost	Average Cost (per LF)
Segment 1-Road 1	23700	N/A	N/A
Segment 2-South 2	5900	$556,650	$94
Segment 3-Road 3	5400	$235,440	$44
Segment 3-North 3	10300	$1,023,055	$99
Segment 4-Road 4	4950	$251,340	$51
Segment 4-Road 4A	7600	$714,040	$94
Segment 4-North 4	8750	$467,965	$53
Segment 5-Road 5	7500	$362,520	$48
Segment 5-Road 5A	8200	$438,600	$53
Segment 5-Road 5B	6000	$253,783	$42
Segment 5-North 5			
High Bridge Option	11300	$2,280,280	$202
Middle Bridge Crossi	11450	$2,188,000	$191
Low Bridge Crossing	12150	$2,218,440	$183

Estimated Cost per Trailhead

Trailhead	Location	Cost
1 Dawson Terrace Recreation Center	Segment 1	$9,325
2 Potomac Overlook Park	Segment 1	$9,725
3 Madison Community Center	Segment 1	$9,325
4 Pine Tree Road	Segment 2	$9,766
5 Langley Forks Park	Segment 4	$9,725
6 Turkey Run Park	Segment 4	$9,725

Detailed Cost per Trailhead

Trailhead 1 - Dawson Terrace Recreation Center

Item	Quantity	Unit	Unit Price	Total
Wood Bench - 4' Long	1	EA.	$850.00	$850.00
Trash Receptacle	1	EA.	$275.00	$275.00
Drinking Fountain	1	EA.	$2,200.00	$2,200.00
Shelter with Community Bulletin Board and Sig	1	EA.	$6,000.00	$6,000.00
Total				$9,325.00

Trailhead 2 - Potomac Overlook Park

Item	Quantity	Unit	Unit Price	Total
Wood Bench - 4' Long	1	EA.	$850.00	$850.00
Trash Receptacle	1	EA.	$275.00	$275.00
Bicyle Rack	1	EA.	$400.00	$400.00
Drinking Fountain	1	EA.	$2,200.00	$2,200.00
Shelter with Community Bulletin Board and Sig	1	EA.	$6,000.00	$6,000.00
Total				$9,725.00

Trailhead 3 - Madison Community Center

Item	Quantity	Unit	Unit Price	Total
Wood Bench - 4' Long	1	EA.	$850.00	$850.00
Trash Receptacle	1	EA.	$275.00	$275.00
Drinking Fountain	1	EA.	$2,200.00	$2,200.00
Shelter with Community Bulletin Board and Sig	1	EA.	$6,000.00	$6,000.00
Total				$9,325.00

Trailhead 4 - Pine Tree Road

Item	Quantity	Unit	Unit Price	Total
Site Clearing	12	S.Y.	$2.70	$32.40
Grading	12	S.Y.	$0.75	$9.00
Wood Bench - 4' Long	1	EA.	$850.00	$850.00
Trash Receptacle	1	EA.	$275.00	$275.00
Bicyle Rack	1	EA.	$400.00	$400.00
Drinking Fountain	1	EA.	$2,200.00	$2,200.00
Shelter with Community Bulletin Board and Sig	1	EA.	$6,000.00	$6,000.00
Total				$9,766.40

Trailhead 5 - Langley Forks Park

Item	Quantity	Unit	Unit Price	Total
Wood Bench - 4' Long	1	EA.	$850.00	$850.00
Trash Receptacle	1	EA.	$275.00	$275.00
Bicyle Rack	1	EA.	$400.00	$400.00
Drinking Fountain	1	EA.	$2,200.00	$2,200.00
Shelter with Community Bulletin Board and Sig	1	EA.	$6,000.00	$6,000.00
Total				$9,725.00

Trailhead 6 - Turkey Run Park

Item	Quantity	Unit	Unit Price	Total
Wood Bench - 4' Long	1	EA.	$850.00	$850.00
Trash Receptacle	1	EA.	$275.00	$275.00
Bicyle Rack	1	EA.	$400.00	$400.00
Drinking Fountain	1	EA.	$2,200.00	$2,200.00
Shelter with Community Bulletin Board and Sig	1	EA.	$6,000.00	$6,000.00
Total				$9,725.00

10.3 Appendix C - Detailed Cost Estimates by Segment

Segment 2--Preliminary Cost Estimate

Old Glebe Road Overpass to Chain Bridge Road

Condition	Distance (L.F.)	Unit Price	Total
Trail-Level Terrain	2400	$43.60	$104,640
Trail-Hilly Terrain	1500	$47.40	$71,100
Trail-Steep Terrain	900	$50.00	$45,000
Boardwalk/Retaining Wall Edges	650	$280.40	$182,260
Short Span Bridge 40 - 80 feet	200	$666.00	$133,200
Major Facility Improvements along County Road	250	$43.60	$10,900
Pedestrian pushbutton (adding to existing signal)	n/a	$4,775.00	$9,550
Total	5900		$556,650

Segment 3--Preliminary Cost Estimate

Chain Bridge Road to Colonial Farm Road - "Road 3"

Condition	Distance (L.F.)	Unit Price	Total
Major Facility Improvements along County Road	5400	$43.60	$235,440
Total	5400		$235,440

Chain Bridge Road to CIA Interchange - "North 3"

Condition	Distance (L.F.)	Unit Price	Total
Trail-Level Terrain	2100	$43.60	$91,560
Trail-Hilly Terrain	1700	$47.40	$80,580
Trail-Steep Terrain	700	$50.00	$35,000
Boardwalk/Retaining Wall Edges	2900	$280.40	$813,160
Minor Improvements along County Bike Route	2900	$0.95	$2,755
Total	10300		$1,023,055

Segment Road 4--Preliminary Cost Estimate

Colonial Farm Road to Langley High School - "Road 4"

Condition	Distance (L.F.)	Unit Price	Total
Boardwalk	150	$280.40	$42,060
Major Facility Improvements along County Road	4800	$43.60	$209,280
Total	4950		$251,340

Colonial Farm Road to Turkey Run - "Road 4A"

Condition	Distance (L.F.)	Unit Price	Total
Trail-Level Terrain	5000	$43.60	$218,000
Trail-Hilly Terrain	1000	$47.40	$47,400
Boardwalk/Retaining Wall Edges	1600	$280.40	$448,640
Total	7600		$714,040

CIA Interchange to Turkey Run - "North 4"

Option 1 - High Bridge Crossing

Condition	Distance (L.F.)	Unit Price	Total
Trail-Level Terrain	200	$43.60	$8,720
Trail-Hilly Terrain	2200	$47.40	$104,280
Boardwalk/Retaining Wall Edges	1250	$280.40	$350,500
Minor Improvements along Park Access Road	4700	$0.95	$4,465
Total	8350		$ 467,965

Option 2 - Middle Bridge Crossing

Condition	Distance (L.F.)	Unit Price	Total
Trail-Level Terrain	200	$43.60	$8,720
Trail-Hilly Terrain	2200	$47.40	$104,280
Boardwalk/Retaining Wall Edges	1650	$280.40	$462,660
Minor Improvements along Park Access Road	4700	$0.95	$4,465
Total	8750		$580,125

Option 3 - Low Bridge Crossing

Condition	Distance (L.F.)	Unit Price	Total
Trail-Level Terrain	200	$43.60	$8,720
Trail-Hilly Terrain	2200	$47.40	$104,280
Boardwalk/Retaining Wall Edges	2000	$280.40	$560,800
Minor Improvements along Park Access Road	4700	$0.95	$4,465
Total	9100		$678,265

Segment Road 5--Preliminary Cost Estimate

Langley High School to I-495 - "Road 5"

Condition	Distance (L.F.)	Unit Price	Total
Boardwalk	150	$280.40	$42,060
Major Facility Improvements along County Road	7350	$43.60	$320,460
Total	7500		$362,520

Langley High School to I-495 - "Road 5A"

Condition	Distance (L.F.)	Unit Price	Total
Trail-Level Terrain	3200	$43.60	$139,520
Trail-Hilly Terrain	1650	$47.40	$78,210
Trail-Steep Terrain	450	$50.00	$22,500
Boardwalk/Retaining Wall Edges	700	$280.40	$196,280
Minor Improvements along County Bike Route	2200	$0.95	$2,090
Total	8200		$438,600

Langley High School to I-495 - "Road 5B"

Condition	Distance (L.F.)	Unit Price	Total
Trail-Level Terrain	900	$43.60	$39,240
Trail-Hilly Terrain	1100	$47.40	$52,140
Trail-Steep Terrain	100	$50.00	$5,000
Boardwalk/Retaining Wall Edges	550	$280.40	$154,220
Minor Improvements along County Bike Route	3350	$0.95	$3,183
Total	6000		$253,783

Segment North 5--Preliminary Cost Estimate

Turkey Run to I-495 - "North 5"

Subtotal - Bridge Option 1 - From High Bridge Crossing at Turkey Run to Dead Run			
Condition	Distance (L.F.)	Unit Price	Total
Trail-Level Terrain	1200	$43.60	$52,320
Trail-Hilly Terrain	2600	$47.40	$123,240
Boardwalk/Retaining Wall Edges	3800	$280.40	$1,065,520
Long Span Bridge 120-200 feet	450	$1,176.00	$529,200
Total	8050		$1,770,280

Subtotal - Bridge Option 2 - From Middle Bridge Crossing at Turkey Run to Dead Run			
Condition	Distance (L.F.)	Unit Price	Total
Trail-Level Terrain	1200	$43.60	$52,320
Trail-Hilly Terrain	2600	$47.40	$123,240
Boardwalk/Retaining Wall Edges	4100	$280.40	$1,149,640
Long Span Bridge 120-200 feet	300	$1,176.00	$352,800
Subtotal	8200		$1,678,000

Subtotal - Bridge Option 3 - From Low Bridge Crossing at Turkey Run to Dead Run			
Condition	Distance (L.F.)	Unit Price	Total
Trail-Level Terrain	1200	$43.60	$52,320
Trail-Hilly Terrain	2600	$47.40	$123,240
Boardwalk/Retaining Wall Edges	4950	$280.40	$1,387,980
Mid Span Bridge 80 - 120 feet	150	$966.00	$144,900
Total	8900		$ 1,708,440

Subtotal - From Dead Run to I-495			
Condition	Distance (L.F.)	Unit Price	Total
Trail-Hilly Terrain	2200	$47.40	$104,280
Trail-Steep Terrain	100	$50.00	$5,000
Boardwalk/Retaining Wall Edges	800	$280.40	$224,320
Long Span Bridge 120-200 feet	150	$1,176.00	$176,400
Subtotal	3250		$510,000

Total - Turkey Run to I-495 - High Bridge Crossing			
Condition	Distance (L.F.)	Unit Price	Total
Trail-Level Terrain	1200	$43.60	$52,320
Trail-Hilly Terrain	4800	$47.40	$227,520
Trail-Steep Terrain	100	$50.00	$5,000
Boardwalk/Retaining Wall Edges	4600	$280.40	$1,289,840
Long Span Bridge 120-200 feet	600	$1,176.00	$705,600
Total	11300		$2,280,280

Total - Turkey Run to I-495 - Middle Bridge Crossing			
Condition	Distance (L.F.)	Unit Price	Total
Trail-Level Terrain	1200	$43.60	$52,320
Trail-Hilly Terrain	4800	$47.40	$227,520
Trail-Steep Terrain	100	$50.00	$5,000
Boardwalk/Retaining Wall Edges	4900	$280.40	$1,373,960
Long Span Bridge 120-200 feet	450	$1,176.00	$529,200
Total	11450		$2,188,000

Total - Turkey Run to I-495 - Low Bridge Crossing			
Condition	Distance (L.F.)	Unit Price	Total
Trail-Level Terrain	1200	$43.60	$52,320
Trail-Hilly Terrain	4800	$47.40	$227,520
Trail-Steep Terrain	100	$50.00	$5,000
Boardwalk/Retaining Wall Edges	5750	$280.40	$1,612,300
Mid Span Bridge 80 - 120 feet	150	$966.00	$144,900
Long Span Bridge 120-200 feet	150	$1,176.00	$176,400
Total	12150		$2,218,440

10.4 Appendix D - Summary Cost Estimates by Option

Option A - Trail Option Most on GWMP Property

Segment		Segment Location	Subtotal Costs	Comments	Segment Length (Miles)	Ownership
Segment 1		**Theodore Roosevelt Island to Old Glebe Road Overpass**			4.5	
	Road 1	Custis Trail/ Lorcom Lane/ Nelly Custis Drive/ Military Road/ Old Glebe Road	N/A	On the road		Arlington County
Segment 2		**Old Glebe Road Overpass to Chain Bridge Road**			1.1	
	South 2	Old Glebe Road/Richmond Street throught the park to Chain Bridge	$556,650	On the road/ Through the park		Arlington County/GWMP
Segment 3		**Chain Bridge Road to CIA Interchange**			2.0	
	North 3	Across Chain Bridge Road overpass, along Crest Lane, through the park to CIA Interchange	$1,023,055	On the road/ Through the park		Fairfax County / GWMP
Segment 4		**CIA Interchange to Turkey Run**			1.7	
	North 4	CIA Interchange to Turkey Run	$580,125	Through the park; mid level bridge over Turkey Run		GWMP
Segment 5		**Turkey Run to I- 495**			2.2	
	North 5	Turkey Run to I- 495	$2,188,000	Through the park; mid level bridge over Turkey Run		GWMP
Trailheads		**Trailheads 1-4 & 6**	$47,866			Arlington County/ GWMP
Subtotal			$4,395,696		11.4	
Contingency (avg. 10%)			$439,570			
Pre-Design Costs (avg. 5%)			$219,785			
Supplemental Services (avg. 2%)			$87,914			
Design (ave.10%)			$439,570			
Contract Administration (ave. 8%)			$351,656			
Total			$5,934,190			

Option B - Trail Option Utilizing GWMP Property & Improved County Trails

Segment		Segment Location	Subtotal Costs	Comments	Segment Length (Miles)	Ownership
Segment 1		**Theodore Roosevelt Island to Old Glebe Road Overpass**			4.5	
	Road 1	Custis Trail/ Lorcom Lane/ Nelly Custis Drive/ Military Road/ Old Glebe Road	N/A	On the road		Arlington County
Segment 2		**Old Glebe Road Overpass to Chain Bridge Road**			1.1	
	South 2	Old Glebe Road/Richmond Street throught the park to Chain Bridge	$556,650	On the road/ Through the park		Arlington County/GWMP
Segment 3		**Chain Bridge Road to Colonial Farm Road**			1.0	
	Road 3	Along Chain Bridge Road; south to Georgetown Pike; to Colonial Farm Road	$235,440	Along the road, within the road right-of-way		Fairfax County
Segment 4		**Colonial Farm Road to Turkey Run**			1.4	
	Road 4A	Claude Moore Colonial Farm Road to Crossing at Turkey Run	$714,040	Along the road, through the park; mid level bridge over Turkey Run		GWMP
Segment 5		**Turkey Run to I- 495**			2.2	
	North 5	Turkey Run to I- 495	$2,188,000	Through the park; mid level bridge over Turkey Run		GWMP
Trailheads		**Trailheads 1-6**	$57,591			Arlington & Fairfax Counties/ GWMP
Subtotal			$3,751,721		10.2	
Contingency (avg. 10%)			$375,172			
Pre-Design Costs (avg. 5%)			$187,586			
Supplemental Services (avg. 2%)			$75,034			
Design (ave.10%)			$375,172			
Contract Administration (ave. 8%)			$300,138			
Total			$5,064,824			

Option C - Trail Option Utilizing Improved County Trails

Segment		Segment Location	Subtotal Costs	Comments	Segment Length (Miles)	Ownership
Segment 1		**Theodore Roosevelt Island to Old Glebe Road Overpass**			4.5	
	Road 1	Custis Trail/ Lorcom Lane/ Nelly Custis Drive/ Military Road/ Old Glebe Road	N/A	On the road		Arlington County
Segment 2		**Old Glebe Road Overpass to Chain Bridge Road**			1.1	
	South 2	Old Glebe Road/Richmond Street throught the park to Chain Bridge	$556,650	On the road/ Through the park		Arlington County/GWMP
Segment 3		**Chain Bridge Road to Colonial Farm Road**			1.0	
	Road 3	Along Chain Bridge Road; south to Georgetown Pike; to Colonial Farm Road	$235,440	Along the road, within the road right-of-way		Fairfax County
Segment 4		**Colonial Farm Road to Langley High School**			0.9	
	Road 4	Claude Moore Colonial Farm Road to Langley High School	$251,340	Along the road, within the road right-of-way		Fairfax County
Segment 5		**Langley High School to I-495**			1.4	
	Road 5	Langley High School to I- 495	$362,520	Along the road, within the road right-of-way		Fairfax County
Trailheads		**Trailheads 1-5**	$47,866			Arlington & Fairfax Counties/ GWMP
Subtotal			$1,453,816		9.0	
Contingency (avg. 10%)			$145,382			
Pre-Design Costs (avg. 5%)			$72,691			
Supplemental Services (avg. 2%)			$29,076			
Design (ave.10%)			$145,382			
Contract Administration (ave. 8%)			$116,305			
Total			$1,962,652			

11.0 List of Preparers

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Cooperating Agencies
Arlington County
Fairfax County
Central Intelligence Agency

12.0 References

[i] Extending the Mount Vernon Trail from Key Bridge to the American Legion Bridge: Options and Recommendations, Virginia Bicycling Federation and Washington Area Bicyclist Association, January 1998, p.2.

[ii] Ibid., p.2.

[iii] American Association of State Highway and Transportation Officials (AASHTO), Guide for the Development of Bicycle Facilities, 1999, pp. 10-13.

[iv] Ibid., p. 8.

[v] Ibid., p. 10-11.

[vi] Ibid., p. 16.

[vii] Ibid., p. 23.

[viii] Ibid., p. 22.

[ix] Ibid., p. 5.

[x] Ibid., p. 33.

[xi] Ibid., p. 36.

[xii] Ibid., p. 39.

[xiii] Extending the Mount Vernon Trail from Key Bridge to the American Legion Bridge: Options and Recommendations, Virginia Bicycling Federation and Washington Area Bicyclist Association, January 1998, p.2.

[xiv] Ibid., p.2.

[xv] Ibid., p.2.

[xvi] Ibid., p. 1.

[xvii] The designation of a Potomac Heritage National Scenic Trail corridor, enacted and signed in 1983 as an amendment to the National Trails System Act, is being used by communities in Virginia, Maryland, the District of Columbia and Pennsylvania to develop and make connections among trails, historic sites and a range of recreational and educational opportunities. Three trails are currently recognized as "official" segments of the Potomac Heritage National Scenic Trail: the 184.5-mile C & O Canal Towpath, managed by Chesapeake & Ohio Canal National Historical Park; the 17-mile Mount Vernon Trail, managed by George Washington Memorial Parkway; and the 75-mile Laurel Highlands Trail, managed by Laurel Ridge State Park, Pennsylvania Department of Conservation and Natural Resources. Source: http://www.nps.gov/pohe/. Designated a National Scenic Trail corridor - March 28, 1983.

13.0 Maps