

Chapter 4.0

Environmental Resources, Impacts, and Mitigation

Chapter 4.0 assesses the impacts of the Preferred Alternative and the No Build Alternative upon the built and natural environment within the Purple Line study area. The No Build Alternative is the future condition of transportation facilities and services in 2040 within the corridor if the Purple Line is not implemented. The Preferred Alternative is the future of transportation facilities and services in 2040 within the corridor if the Purple Line is implemented.

The Preferred Alternative and the No Build Alternative assume the implementation of the funded transportation improvement projects, excluding the Purple Line in the No Build Alternative, that are included in the National Capital Region Transportation Planning Board's (TPB) *Financially Constrained Long-Range Transportation Plan* (CLRP) for implementation by 2040 within the Purple Line corridor. The No Build Alternative provides the basis against which the Preferred Alternative is compared.

A consolidated discussion of the effects of the No Build Alternative is presented in Section 4.1.2. The findings in this discussion are based on the information available about the planned projects at the time of this writing. Detailed assessment of the effects of the No Build Alternative projects will be the responsibility of each project sponsor at the time each project design is developed sufficiently to complete such an assessment. MTA compared the effects of the No Build and Preferred Alternatives where reasonably feasible. Additional discussion of the No Build Alternative is presented in Sections 4.10 and 4.17 in which quantitative comparisons of air quality effects and energy use are made by MTA.

4.1 Overview and Summary of Effects

Chapter 4.0 assesses long-term operational impacts and short-term construction-related impacts. Sections 4.2 through 4.19 describe these effects to individual resources. Each section identifies the regulatory context and methodologies for assessment of a resource and describes the effects of the Preferred Alternative on the resource within a study area appropriate to that resource.

Definitions of the study area vary according to the environmental resource evaluated. For some impacts, the study area extends a specified distance from the centerline (e.g., 500 feet), while for others the study area is confined to the project's limit of

disturbance (LOD). The LOD is the boundary within which construction, materials storage, grading, landscaping, and related activities would occur.

Each section also describes the work the Maryland Transit Administration (MTA) has done to avoid or minimize impacts, MTA's commitments to further minimize impacts where possible as the project advances, and its commitments to mitigate impacts.

Section 4.20 provides a summary of these commitments. Section 4.21 describes the irreversible and irretrievable commitment of resources, and Section 4.22 lists anticipated permits and approvals needed to build and operate the Preferred Alternative.

The following terms are used frequently in this FEIS:

Adverse: A negative or unfavorable condition.

Avoidance: The act of avoiding impacts to, or keeping away from, something or someone.

Minimization: Measures taken to reduce the severity of adverse impacts.

Mitigation: Measures taken to alleviate adverse impacts that remain after minimization.

4.1.1 No Build Alternative

The No Build Alternative is the future condition of transportation facilities and services in 2040 within the corridor if the Purple Line is not implemented; it provides the basis against which the Preferred Alternative is compared. While the Preferred Alternative assumes the implementation of the funded transportation improvement projects included in the National Capital Region Transportation Planning Board's CLRP for implementation by 2040 within the Purple Line corridor, the No Build Alternative assumes all the projects in the CLRP except the Purple Line. The list of No Build Alternative projects has been updated since the publication of the Alternatives Analysis/Draft Environmental Impact Statement (AA/DEIS) in 2008. Section 2.3.1 provides details on the 12 projects included in the No Build Alternative, including five transit projects, three roadway projects, three bicycle-pedestrian projects, and a new public parking facility as part of a mixed-use development project.

4.1.2 Impacts of No Build Alternative

The following is a summary assessment of the potential effects of the No Build Alternative projects on the natural and built environment. The sponsors of these projects will be responsible for addressing impacts and providing mitigation as appropriate.

Transportation

The transportation projects in the No Build Alternative would provide some transportation system benefits, including benefits for public transit users from the two transit center projects and the enhanced bus projects. Also, the No Build Alternative would include improvements to the trail system within the corridor; improve traffic operations on US 1, Kenilworth Avenue, and Dale Drive; and increase the parking inventory in downtown Bethesda. In the No Build Alternative, however, MTA determined through quantitative analysis that overall traffic volumes, roadway congestion, and delays would continue to increase, as would transit travel times (see Chapter 3.0). Therefore, the No Build Alternative would not provide faster, more direct and reliable east-west transit service in the corridor; it would not connect major activity centers, better connect to Metrorail services, or improve connectivity to the communities between the Metrorail lines.

Land Use, Public Policy and Zoning, Economics

The projects in the No Build Alternative would generate some short-term economic activity. The transit center projects would complement transit-oriented development initiatives in downtown Silver Spring and the Takoma Park/Langley Park area. Also, the improvements to US 1 would complement the planned development of the East Campus of the University of Maryland (UMD). In the absence of the Preferred Alternative, however, development would not capitalize fully upon the transportation-land use interrelationships built into state, regional, and local plans that were developed based on an assumption that the Preferred Alternative would be implemented. Furthermore, the corridor and region would not be likely to realize the economic development potential that it could under the Preferred Alternative.

Neighborhoods and Community Facilities

The No Build Alternative projects are not anticipated to affect neighborhood cohesion and community facilities as the proposed improvements to existing transit, roadway and pedestrian facilities are intended to improve access and connectivity.

Property Acquisition and Displacements

The sponsors of the No Build Alternative projects may seek to acquire small strips of land alongside existing transit, roadway and pedestrian facilities to implement some planned improvements, such as sidewalks, trails, and roadway widening if insufficient land area occurs within existing public rights-of-way. Larger site development projects such as Takoma/Langley Transit Center and the Bethesda Lot 31 Parking garage may require relocation of existing users of the affected properties. However, where reasonably feasible, project sponsors would design planned facilities to avoid or minimize property acquisition and displacements by using existing public rights-of-way.

Parks, Recreational Land, Open Space, Historic and Archeological Properties

Where reasonably feasible, project sponsors of No Build Alternative projects would design planned facilities to avoid or minimize acquisition of land within parks, recreational land, open space, and historic and archeological properties by using existing public rights-of-way. When land acquisition cannot be avoided, the sponsors may seek to acquire small strips of land alongside existing transit, roadway and pedestrian facilities to implement some planned improvements, such as sidewalks, trails, and roadway widening. Displacement of parks, recreational land, open space, and historic properties is unlikely. The No Build Alternative projects have potential for affecting archeological properties if land disturbance occurs outside existing developed transportation facilities.

Visual Resources

No Build Alternative projects such as the planned bus enhancements, sidewalk and trail improvements introduce minimal facility elements (bus routing and pedestrian infrastructure), and are unlikely to substantially change the visual environment in which they are implemented. Larger facilities such as the Takoma/Langley Transit Center and Silver Spring Transit Center will change the localized visual environment by introducing transportation-focused structures and infrastructure.

Air Quality, Noise and Vibration

MTA determined through quantitative air quality analyses that by 2040, the No Build Alternative is predicted to cause slightly higher mesoscale pollutant levels compared to the Preferred Alternative within the study area. MTA's microscale analysis of air quality determined that no violations of the National Ambient Air Quality Standards are predicted for either the Preferred Alternative or the No Build Alternative (see Section 4.10).

No Build Alternative projects such as the Takoma/Langley Transit Center, the Silver Spring Transit Center, and the Bethesda Lot 31 Parking Garage, may affect localized noise and vibration levels by changing bus and traffic operations on and near existing roadways.

Habitat and Wildlife, Water Resources, Topography, Geology and Soils

The No Build Alternative projects are planned primarily on sites already in transportation use, thereby minimizing impacts to the natural environment. Nonetheless, the No Build Alternative potentially would result in some impacts. Right-of-way acquisition, if needed, could remove portions of existing wildlife habitat and/or encroach upon wetlands and waterways. Stormwater run-off could be caused by new impervious surfaces and introduce transportation-related pollutants to receiving waterways. As most No Build Alternative projects involve surface improvements, such as sidewalk and bus service enhancements, substantial changes to topography, geology and soils are not expected to occur. Larger projects, such as the Silver Spring Transit Center and Bethesda Lot 31 Parking Garage will require deeper excavations and considerable grading, thereby resulting in a localized change in topography.

Hazardous Materials

Residual contaminants potentially exist along portions of the study area in underlying soils resulting from former industrial sites, existing and former gas service stations, and railroad yards. The sponsors of the No Build Alternative projects have the potential to encounter these materials and will need to establish procedures for identifying and

addressing such materials during design and construction.

Utilities

The sponsors of the No Build Alternative projects have the potential to encounter utilities and will need to establish procedures for identifying and addressing the need to relocate utilities during design and construction.

Energy Use

MTA's quantitative analysis indicates that total energy consumption is expected to be slightly higher under the No Build Alternative than the Preferred Alternative in 2040 (see Section 4.18).

Environmental Justice

As most of the project corridor is home to minority and low-income populations meeting the criteria under Executive Order 12898 Environmental Justice, the sponsors of the No Build Alternative projects may be subject to demonstrating their projects do not cause a disproportionately high and adverse effect on environmental justice populations.

4.1.3 Preferred Alternative

Transportation

Chapters 3.0 and 9.0 of the FEIS describe the transportation benefits of the Preferred Alternative. The main benefits would be faster, more direct, and more reliable east-west transit service connecting major activity centers in the corridor, better connections with Metrorail services located in the corridor, and improved connectivity to the communities located between Metrorail lines in the corridor. In addition, in the Preferred Alternative, the permanent Capital Crescent Trail would be constructed within the Georgetown Branch right-of-way for a distance of 3.3 miles between Bethesda and the CSXT Metropolitan Branch (railroad right-of-way). At the junction with the CSXT the trail is planned to continue on the north side of the CSXT corridor to the SSTC.¹ The

permanent Capital Crescent Trail would replace the existing Georgetown Branch Interim Trail which currently extends from Bethesda to Stewart Avenue within the Georgetown Branch right-of-way.

Land Use/Development

The Preferred Alternative would have substantial short-term and long-term economic development benefits. It would result in increases in employment, earnings, and output in the region. Also, importantly, it would complement and support the many state, regional, and local land use plans that have proposed transit-oriented development focused around the Preferred Alternative stations.

Natural and Built Environment

The Preferred Alternative is planned primarily within or adjacent to existing transportation rights-of-way, thereby minimizing impacts to the natural and built environment, but as this chapter describes, it would result in some impacts, including the following:

- Right-of-way acquisition and some residential, commercial, and institutional displacements
- Partial right-of-way acquisition and access impacts to some community facilities, parks, recreational, and open space facilities
- Impacts to some historic properties
- Visual effects in some locations
- Noise and vibration impacts in some locations
- Impacts to natural and water resources, primarily at stream valley crossings

MTA has coordinated extensively with agencies with jurisdiction and the public to refine the Preferred Alternative to avoid or minimize impacts and address concerns that were made during the AA/DEIS process. MTA will continue to do so as the project design advances. Despite these avoidance and minimization efforts, some adverse impacts would occur, and MTA is committed to mitigating the impacts of the Preferred Alternative to the extent reasonably feasible, as well as striving to further minimize effects, through the specific

¹ The Preferred Alternative assumes that the permanent Capital Crescent Trail between Talbot Avenue and Silver Spring would be located in CSXT right-of-way in accordance with the County's land use plan. The completion of the trail in the CSXT corridor is contingent on agreement with CSXT on the use of its property on

the north side of the CSXT tracks for the trail. If agreement is not reached by the time the Purple Line construction occurs, MTA would construct the trail from Bethesda to Talbot Avenue. From Talbot Avenue to Silver Spring, an interim signed bike route on local streets would be used.

strategies and actions described in this chapter. Section 4.20 lists the various minimization efforts and mitigation commitments of MTA.

The key benefits and effects of the Preferred Alternative are the higher transportation and land use/development benefits when compared with the No Build Alternative. Some natural and built environment impacts of the Preferred Alternative are unavoidable, despite MTA's refinements to minimize impacts. However, in several cases MTA's mitigation measures will provide a net benefit. In contrast, the No Build Alternative incurs relatively few impacts to the natural and built environment, but its transportation, land use and development benefits are also few.

Table 4-1 summarizes the effects of the Preferred Alternative on the natural and built environment, as well as MTA's minimization and mitigation commitments which are part of the Preferred Alternative. The Preferred Alternative effects and mitigation are the net result of MTA's refinements to avoid or minimize impacts, and address agency and public issues and concerns heard during and since publication of the AA/DEIS.

4.2 Land Use, Public Policy, and Zoning

This section describes the existing and future land use within the Purple Line corridor—based on general plans, master plans, sectional plans, functional plans, and transit-oriented development (TOD) studies—and it discusses the compatibility of the Preferred Alternative with the land use of the study area. It also discusses the minimization strategies MTA has taken to eliminate or reduce land use impacts and the mitigation measures MTA would undertake to offset adverse effects. A more detailed evaluation of land use, zoning, and the plans and policies pertinent to the corridor is included in *Purple Line Social Effects and Land Use Planning Technical Report* (2013).

4.2.1 Regulatory Context and Methodology

The following regulations and guidance apply to land use:

- **Code of Maryland Regulations (COMAR) 66B**—delegates planning and zoning controls to local government to encourage orderly development and use of land and structures.
- **COMAR 28**—establishes the Maryland-National Capital Park and Planning Commission (M-NCPPC) as a bi-county agency responsible for the administration of parks and land use planning in Montgomery and Prince George's Counties.

In addition, the Maryland Neighborhood Conservation and Smart Growth Initiative empowers land use planning through the following legislation:

- 2012 Sustainable Growth and Agricultural Preservation Act (Senate Bill 236)
- 2010 Sustainable Communities Act (House Bill 475)
- 2009 Smart and Sustainable Growth Act (Senate Bill 280/House Bill 297)
- 2006 Planning legislation (House Bill 1141/House Bill 2)
- 1997 Priority Funding Areas Act (§5-7B of the State Finance and Procurement Article of the Annotated Code)
- 1992 Economic Growth, Resource Protection, and Planning Act (§5-7A-01 of the State Finance and Procurement Article of the Annotated Code)

Land use, zoning, and public policy information was obtained from the state of Maryland, M-NCPPC, and Washington DC, Prince George's County, and Montgomery County agencies. Field surveys were conducted to verify existing conditions and to supplement information where it was not otherwise available. The study area for land use is approximately 500 feet on either side of the Preferred Alternative alignment and a 1/2-mile radius around each station location.

Table 4-1. Summary of Effects—Minimization and Mitigation

Resources	Preferred Alternative Effects	Minimization and Mitigation
Land Use, Public Policy, and Zoning (Section 4.2)	<ul style="list-style-type: none"> The Preferred Alternative supports current land use plans and zoning because these anticipate the Purple Line project 	<ul style="list-style-type: none"> MTA will provide alternative access for properties that would be subject to changes in access or closures of portions of their property during construction, as necessary.
Neighborhoods and Community Facilities (Section 4.3)	<ul style="list-style-type: none"> Vehicular and pedestrian access would be affected at some community facilities by changes in driveway locations and circulation patterns Public parking would be permanently affected at some locations where existing parking is removed Neighborhood cohesion effects are not anticipated because the proposed transit service would operate largely on existing roadways or transportation corridors 	<ul style="list-style-type: none"> MTA will continue to refine and adjust the alignment and will consider adjustments to the construction plan to avoid or minimize impacts to community facilities. The Purple Line Fire Life/Safety & Security Committee will continue to meet prior to and during construction with emergency responders to identify and resolve issues arising from construction and operation. MTA will work to negotiate just compensation or mitigation to the First Korean Presbyterian Church on Kenilworth Avenue. MTA will construct the Glenridge Maintenance Facility at a lower grade than the existing park maintenance facility and provide a landscape buffer, as appropriate, to the adjacent park and school; MTA will install retaining walls to minimize the area of grading needed. MTA will coordinate with the counties to identify alternative access or temporary off-site parking for community facilities and businesses where access or parking may be temporarily removed, as appropriate. MTA will coordinate with UMD, Rosemary Hills Elementary School, Sligo Creek Elementary School, and Silver Spring International Middle School to minimize disruptions to the extent reasonably feasible. MTA will provide alternative access to community facilities if access is temporarily removed, where practical.
Property Acquisitions and Displacements (Section 4.4)	<ul style="list-style-type: none"> 388 full or partial property acquisitions Full acquisitions result in 60 commercial, 53 residential, and 3 institutional displacements 	<ul style="list-style-type: none"> MTA will perform property acquisition and relocation activities in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act) as amended and Federal Transit Administration (FTA) Circular 5010.1D, Grants Management Requirements and all applicable Maryland State laws that establish the process through which Maryland Transit Administration (MTA) may acquire real property through a negotiated purchase or through condemnation. <ul style="list-style-type: none"> For areas that would be subject to construction easements for staging or access areas, MTA will compensate owners based on fair market appraisal. MTA will use vacant or publicly-owned property, rather than privately-owned, developed property, for temporary construction activities to the extent reasonably feasible. MTA will restore properties affected through a temporary easement to an acceptable pre-construction condition following construction activities, in accordance with the individual easement agreements. MTA will provide a parking facility for both County and MTA employees in Lyttonsville.
Economic Activity (Section 4.5)	<ul style="list-style-type: none"> Regional and local economic benefits of improved east-west travel, access to and between activity centers, connections to other transit services, better access to jobs, creation of MTA jobs 	<ul style="list-style-type: none"> MTA will continue to coordinate with affected commercial property owners to identify strategies to minimize the effects of temporary construction easements, lane or road closures, and other property restrictions on existing corridor businesses. MTA will implement a Business Impact Minimization Plan as described in the Environmental Justice section.

Table 4-1. Summary of Effects—Minimization and Mitigation (continued)

Resources	Preferred Alternative Effects	Minimization and Mitigation
Parks, Recreational Land, and Open Space (Section 4.6)	<ul style="list-style-type: none"> ▪ Road and intersection widening or transitway construction would require partial land acquisition from several parks ▪ Land would be acquired from Glenridge Community Park for the Glenridge Maintenance Facility ▪ The bridges carrying the Baltimore-Washington Parkway over Riverdale Road would be replaced ▪ Access to Long Branch Local Park would be changed to right-in/right-out only ▪ Direct connections would be created between many parks and the Capital Crescent Trail 	<ul style="list-style-type: none"> ▪ MTA will include drainage improvements and water quality facilities in four stream valley parks (Sligo Creek, Long Branch, Northwest Branch, and Anacostia River), Long Branch Local Park, and New Hampshire Estates Neighborhood Park. ▪ MTA, through coordination with M-NCPPC, the NCPC, the NPS, and the public, will implement the following measures: <ul style="list-style-type: none"> — Expand and upgrade facilities and plant trees in Glenridge Community Park, as well as convert approximately 2 acres of land currently used for the Prince George's County Parks' Northern Area Maintenance—Glenridge Service Center either to parkland within Glenridge Community Park or to upgrade and expand athletic fields at the Glenridge Elementary School; — Restore park properties that are disturbed as a result of construction activities to acceptable conditions through coordination with the park owners; — Provide replacement parkland for all park impacts; the amount and location of replacement parkland will be determined by MTA in consultation with park owners; and — Coordinate selective tree clearing and identification of significant or champion trees with agencies having jurisdiction. ▪ MTA will continue to coordinate with the public and agencies to develop appropriate minimization strategies during construction. Efforts will include the following: <ul style="list-style-type: none"> — Roadway or sidewalk closures will be staged to maintain pedestrian and vehicular access. — Trail detours needed during construction will be coordinated with the agency having jurisdiction over the trail to identify and develop a plan for a temporary detour route, and the trail routes would be restored at the end of construction. ▪ MTA will continue to coordinate during further design development with the agencies having jurisdiction over the affected parks to develop additional appropriate long-term minimization and mitigation.

Table 4-1. Summary of Effects—Minimization and Mitigation (continued)

Resources	Preferred Alternative Effects	Minimization and Mitigation
Historic Properties (Section 4.7) and Archeological Resources (Section 4.8)	<ul style="list-style-type: none"> Adverse effect on three eligible properties: Talbot Avenue Bridge, Metropolitan Branch, and Falkland Apartments; overall project finding of Section 106 effect is adverse effect 	<ul style="list-style-type: none"> MTA and the Maryland Historical Trust (MHT), in coordination with Consulting Parties, are preparing a Programmatic Agreement that outlines commitments and mitigations concerning historic and archeological resources under Section 106. MTA will implement the project in accordance with the Section 106 Programmatic Agreement. Preliminary Section 106 mitigation concepts include: <ul style="list-style-type: none"> Prepare Historic American Buildings Survey/Historic American Engineering Record documentation for the historic properties that will be demolished Prepare web-based map providing documentation and educational information on historic properties within the APE Develop an interpretive plan that will include historically themed signage or incorporation of historic images at stations Provide Consulting Parties with the opportunity to review and comment on project plans during engineering design phases Develop a plan to monitor impacts to historic properties during construction Continue coordination with Consulting Parties throughout design and construction MTA will continue to plan and implement the project design elements negotiated with the Columbia Country Club and the MHT minimize impacts to the Club. MTA, in coordination with the M-NCPPC, will provide transitway and pedestrian structures through the Rock Creek Park that include design elements to minimize the effects of the project. MTA will continue to coordinate with UMD regarding the aesthetic design of the transitway. Minimization measures for the Baltimore-Washington Parkway, in addition to what is listed above for Parks, Recreational Facilities and Open Space (4.6), are as follows: <ul style="list-style-type: none"> The permanent replacement bridges of the Baltimore-Washington Parkway over Riverdale Road will have a similar arch design as the existing bridge structures and would include horizontal arched shields above the transitway overhead wires. The stone façade from the existing bridge abutments will be re-used on the new bridge abutments. If additional stone is required, it will come from the same source or would be selected in consultation with the NPS to match the existing stone. The catenary wires will be attached to the bridges to minimize the number of poles throughout the Parkway. Landscape plans for the Baltimore-Washington Parkway will be developed in accordance with the Baltimore-Washington Parkway Design Elements-Section 2: Parkway Landscape-Recommendations, and submitted to NPS for review and approval. Protected resources will be identified and marked for protection in field prior to construction activities (i.e., trees, archeological sites). The proposed temporary bridges to carry Baltimore-Washington Parkway over Riverdale Road will be constructed between the existing ramps and the existing bridges to completely avoid the archeological site identified in the median.

Table 4-1. Summary of Effects—Minimization and Mitigation (continued)

Resources	Preferred Alternative Effects	Minimization and Mitigation
Visual Resources (Section 4.9)	<ul style="list-style-type: none"> New visual features introduced; of 10 visual units in the study area, the project would have an overall “Low” visual effect on three units, a “medium” effect on four units, a “medium to high” effect on two units, and a “high” on one unit An extensive change to visual character constituting a high visual effect would occur along the Georgetown Branch right-of-way, along Wayne Avenue, and as a result of the aerial structure and Riverdale Park Station across the intersection of Kenilworth Avenue and Riverdale Road 	<ul style="list-style-type: none"> MTA and Montgomery County will continue to coordinate and consult on the design of the future Capital Crescent Trail to provide an aesthetically pleasing facility while meeting safety and ADA requirements. MTA will continue to coordinate with the Columbia Country Club on the visual and aesthetic elements of the transitway. MTA will continue to coordinate and consult with Montgomery County and the local community regarding the aesthetic treatment of the bridge structures over Connecticut Avenue. MTA will continue to coordinate with M-NPPC and the NCPC regarding the design and construction of the Rock Creek bridges. MTA will continue to coordinate and consult with affected communities regarding the aesthetic treatments of the transitway elements. MTA will require that the construction contractor utilize best management practices to maintain an orderly appearance of active work zones and staging areas. MTA will use the state-funded Art-In-Transit program to enhance key elements of the project as appropriate. MTA will build traction power substations with landscaping or appropriate architectural treatments to be compatible with adjacent land uses in areas of moderate or high visual sensitivity
Air Quality (Section 4.10)	<ul style="list-style-type: none"> Annual regional VMT would be slightly less than in the No Build Alternative No violations of air quality standards are predicted 	<ul style="list-style-type: none"> MTA will require the construction contractor to implement dust control measures in accordance with MDE requirements and assure that construction equipment complies with EPA’s Tier 2 engine emission standards. Possible dust and emission control measures include the following: <ul style="list-style-type: none"> Minimizing land disturbance Constructing stabilized construction site entrances per construction standard specifications Covering trucks when hauling soil, stone, and debris Using water trucks or calcium chloride to minimize dust Stabilizing or covering stockpiles Minimization of dirt tracking by washing or cleaning trucks before leaving the construction site Using ultra-low sulfur diesel fuel for diesel equipment Equipping some construction equipment with emission control devices such as diesel particulate filters Permanently stabilizing and seeding any remaining disturbed areas

Table 4-1. Summary of Effects—Minimization and Mitigation (continued)

Resources	Preferred Alternative Effects	Minimization and Mitigation
Noise (Section 4.11)	<ul style="list-style-type: none"> Moderate noise impacts to a few properties, largely due to train horns 	<ul style="list-style-type: none"> MTA will minimize noise resulting from Purple Line operations as follows: <ul style="list-style-type: none"> Between Bethesda and Rock Creek Stream Valley Park, there will be a minimum four-foot noise wall or retaining wall adjacent to residential areas. LRT vehicles will include vehicle skirt panels to reduce the noise caused by the vehicles on the track. Public address systems at stations will have volume adjustment controls designed to maintain announcement volume at the specified noise levels, as appropriate. The traction power substations will be designed in accordance with MTA design criteria intended to minimize the noise from transformer hum. Possible noise minimization measures during construction include the following: <ul style="list-style-type: none"> Conducting the majority of construction activities during the daytime as reasonably feasible. Routing construction equipment and other vehicles carrying spoil, concrete, or other materials, where reasonably feasible, over designated truck routes that would minimize disturbance to residents. Locating stationary equipment away from residential areas to the extent reasonably feasible within the site/staging area Employing control technologies to limit excessive noise when working near residences Adequately notifying the public of construction operations and schedules.
Vibration (Section 4.12)	<ul style="list-style-type: none"> Vibration impacts to three properties 	<ul style="list-style-type: none"> MTA will perform site-specific assessments of those areas identified in the FEIS as having potential vibration impacts. MTA will develop appropriate mitigation measures. MTA will analyze extremely vibration-sensitive buildings located within the UMD campus, as agreed upon by MTA and UMD. The study will establish criteria, and measures for mitigation of vibration will be specified in the MTA UMD agreement. MTA will develop appropriate mitigation measures. MTA will identify control measures be implemented by the contractor during construction activities to minimize the potential for vibration impacts.

Table 4-1. Summary of Effects—Minimization and Mitigation (continued)

Resources	Preferred Alternative Effects	Minimization and Mitigation
Habitat and Wildlife (Section 4.13)	<ul style="list-style-type: none"> Partial land acquisitions impact forest edge habitat Impact of roadway widening and culvert extensions at stream crossings on stream habitat, affecting fish and aquatic biota No long-term impacts on known rare, threatened or endangered species 	<ul style="list-style-type: none"> MTA will prepare a Forest Conservation Plan, or similar, during the design phase of the project. This plan will detail additional impact avoidance and minimization techniques to be applied during construction. MTA will comply with MDNR requirements for reforestation. MTA will continue to coordinate with the NMFS and other regulatory agencies to identify measures to avoid or minimize such as: <ul style="list-style-type: none"> Creation of in-stream barriers that block migratory fish from upstream spawning grounds Alterations of stream configuration, characteristics, and hydrology Incremental changes to in-stream water quality from deforestation of the riparian zone MTA will provide a spill management plan and water quality and quantity controls for work area containment, use and storage of fuels and other potential contaminants based on current regulations and project permit conditions. MTA will design culverts and bridges to MDE standards to avoid or minimize secondary and cumulative impacts to migratory fish and the alteration of habitat. MTA will restore and stabilize temporarily disturbed aquatic habitat at the end of construction according to a restoration plan developed in coordination with the USACE and MDE permits. MTA will not undertake in-stream construction during state-mandated stream closure periods. MTA will coordinate with the MDNR regarding the heron colony located within Coquelin Run.
Water Resources (Section 4.14) and Topography, Geology, and Soils (Section 4.15)	<ul style="list-style-type: none"> Increased impervious surfaces, stormwater run-off, and non-point source water pollution Minor wetland impacts primarily due to roadway widening and culvert extensions at stream crossings Relocate Sligo Creek north of Wayne Avenue Minor floodplain impacts primarily due to roadway widening and culvert extensions at stream crossings 	<ul style="list-style-type: none"> MTA will mitigate project impacts to Waters of the US, including wetlands, by complying with the Federal Compensatory Mitigation Rule, as well as stipulations from federal and state resource agencies. MTA will coordinate with regulatory agencies to develop a project-wide compensatory mitigation strategy to offset impacts to wetlands and aquatic resources. MTA will minimize the area of disturbance to Maryland-designated wild and scenic rivers by clearly marking and fencing the work area and prohibiting activity outside the work area. MTA will restore Sligo Creek approximately 180 feet upstream and 180 feet downstream of the project bridge to provide long-term benefits and enhance its inherent characteristics. MTA will submit project plans to MDNR for evaluation in compliance with the Maryland Scenic and Wild Rivers Act to assure that the project will not jeopardize the scenic value of the designated rivers. MTA will perform hydraulic and hydrologic studies. If these studies find that flood elevation would change, floodplain storage mitigation will be implemented, if required. MTA will submit project plans to MDE for approval of structural evaluations, fill volumes, proposed grading elevations, structural flood-proofing, and flood protection measures in compliance with FEMA requirements, USDOT Order 5650.2 "Floodplain Management and Protection," and Executive Order 11988. MTA will obtain applicable environmental permits for water resources. MTA will develop an Erosion and Sediment Control Plan, in accordance with the Stormwater Management Act of 2007, which will specify proper slope and soil stabilization techniques, erosion and sediment controls, and stormwater management facilities.

Table 4-1. Summary of Effects—Minimization and Mitigation (continued)

Resources	Preferred Alternative Effects	Minimization and Mitigation
Hazardous Materials (Section 4.16)	<ul style="list-style-type: none"> Residual contaminants potentially exist along portions of the study area in the underlying soils resulting from former industrial sites, existing and former gasoline service stations, and railroad yards. While effects are not anticipated, the operation and maintenance of the Purple Line could be associated with petroleum releases from the equipment and materials stored at yard and maintenance facility. 	<ul style="list-style-type: none"> MTA will establish procedures and staff training for proper storage and maintenance of equipment and hazardous materials. MTA will develop a site-specific health and safety plan including: <ul style="list-style-type: none"> Equipment and procedures to protect the workers and general public Procedures for monitoring contaminant exposures Identification of the contractor's chain of command for health and safety MTA will perform a Phase II Environmental Site Assessment (ESA) prior to acquisition of any property with a high potential for concern (sites ranked 1 or 2 in the Phase I ESA) unless the property can be classified accurately by other means or methods. MTA also will perform further records research on sites with a ranking of 4 to determine potential presence of PCBs. MTA will identify remediation actions to be implemented as needed, if unexpected soil or groundwater contamination is encountered. If contaminated soils are identified or encountered during construction, MTA will evaluate off-site remediation, chemical stabilization, or other treatments and disposal options, in cooperation with MDE. MTA will coordinate with MDE to determine the mitigation response and reporting required should a release of hazardous materials occur during operations
Utilities (Section 4.17) and Energy Use (Section 4.18)	<ul style="list-style-type: none"> Relocation of some utilities in advance of or during construction Overall reduction in total study area energy consumption by 0.033 percent compared to the No Build Alternative 	None

Table 4-1. Summary of Effects—Minimization and Mitigation (continued)

Resources	Preferred Alternative Effects	Minimization and Mitigation
Environmental Justice (Section 4.19)	<ul style="list-style-type: none"> No disproportionately high and adverse effects on environmental justice populations. However, many of the commercial areas in the corridor are in environmental justice communities; MTA understands small, local, and EJ businesses will require some unique engagement. 	<p>In addition to the commitments described above, MTA will work with Montgomery and Prince George's Counties on business improvement initiatives, including:</p> <ul style="list-style-type: none"> To address access restrictions or detours to businesses, MTA will work with local business liaisons to understand the characteristics of local businesses (customer origins, peak business times, etc.) and to establish construction stage plans to minimize business disruptions. MTA will implement a business impact mitigation plan. MTA will develop this plan after evaluation of best practices and lessons learned from other light rail construction projects (see Sections 8.2.2). These practices could include: <ul style="list-style-type: none"> Maintaining Spanish-speaking outreach staff Constructing the project in segments to keep disruption to a small area at a time Maintaining access to businesses during construction for customers and deliveries Maintaining or relocating bus stops Maintaining parking lot access Providing directional signage Developing "open for business" marketing and advertising tools for use during construction, translated where appropriate Promotion of local businesses Providing a construction hotline open 24/7 Maintaining open communication between the project outreach team and local businesses Maintaining communication with local support and advocacy groups MTA will continue communication with local businesses during construction to monitor effects and modify construction plans, if possible, to further reduce impacts. MTA will work with the counties and other stakeholders to leverage existing resources to support and strengthen small businesses in the corridor. MTA will work with Montgomery and Prince George's counties to create opportunities for project-related local economic benefits including workforce development programs. MTA will continue working with the counties and advocacy groups to support engagement of local elected officials regarding affordable housing and increased commercial rents resulting from increased property values as the project moves forward

4.2.2 Affected Environment

Land Use

The Purple Line study area comprises a variety of urban and suburban land uses, including residential, commercial, recreational, institutional, and industrial (Figure 4-1). Land use in the Montgomery County portion of the corridor is largely residential, with commercial development in Bethesda and Silver Spring. In the Prince George's County portion of the corridor, land uses include relatively large areas of recreational, institutional, and commercial uses scattered among primarily residential communities. Housing types and densities within the study area include single-family dwellings and both low-rise and high-rise apartment buildings.

Clusters of higher density mixed-use development characterize the five major activity centers of Bethesda, Silver Spring, Takoma/Langley Park, College Park, and New Carrollton. With the exception of the area surrounding the UMD campus and M Square, most of the remainder of developed land in the study area contains low- to medium-density residential and commercial uses.

Zoning

Zoning is directed by land use planning efforts, including the Master Plans and Sector Plans discussed in the following section. Existing land use is generally reflective of the established zoning codes in Montgomery and Prince George's Counties. In Montgomery County, zoning and permitted land uses are defined in Volume 4 of the Montgomery County Code, Chapter 59. In Prince George's County zoning regulations are found in the 2007 Edition of the County Code of Prince George's County, Subtitle 27.

Current zoning concentrates urban growth around activity centers to support TOD. Specialized TOD zoning districts where mixed-use development is permitted are located in downtown Bethesda and in the areas around the following proposed Purple Line stations, East Campus, College Park Metro Station, Annapolis Road, and New Carrollton. The mixed-use and commercial development zoning at

other proposed Purple Line station locations also would be compatible with transit stations.

Planned Development

Figure 4-1 and Table 4-2 show the developments that are planned in the Purple Line corridor.

Plans and Policies

The land use plans, master plans, and sector plans discussed below establish a conceptual structure and direct the development of overall land use in the Purple Line corridor.

Local and Countywide Land Use Plans and Policies

M-NCPPC authored *On Wedges and Corridors, a General Plan for the Maryland-Washington Regional District in Montgomery and Prince George's Counties* (1964), a General Plan that established regional policies for land use and development in Montgomery and Prince George's Counties. The plan, which has shaped development patterns within the counties by channeling growth into the radial corridors, recommends that urban development be concentrated into four corridors, radiating out from Washington DC, with wedges of agriculture uses or large-lot residential areas in between.

Both counties and several municipalities in the study area have developed plans and policies with more detailed visions for land use in their respective jurisdictions. These plans include land use initiatives that support improved transit in the corridor and, in many cases, recommend the Purple Line.

Regional, State, and Federal Land Use Plans and Policies

The Washington, DC region and the State of Maryland have several smart growth, transit-focused planning policies and initiatives that apply to the study area. The region has been successful in concentrating mixed-use development in regional activity centers, especially those served by transit, through the guidance of the National Capital Region TPB's *Metropolitan Washington Regional Activity Centers and Clusters* (2007). The TPB is the federally designated metropolitan planning organization under the Metropolitan Washington Council of Governments (MWCOC).

Figure 4-1. Existing Land Use and Planned Development

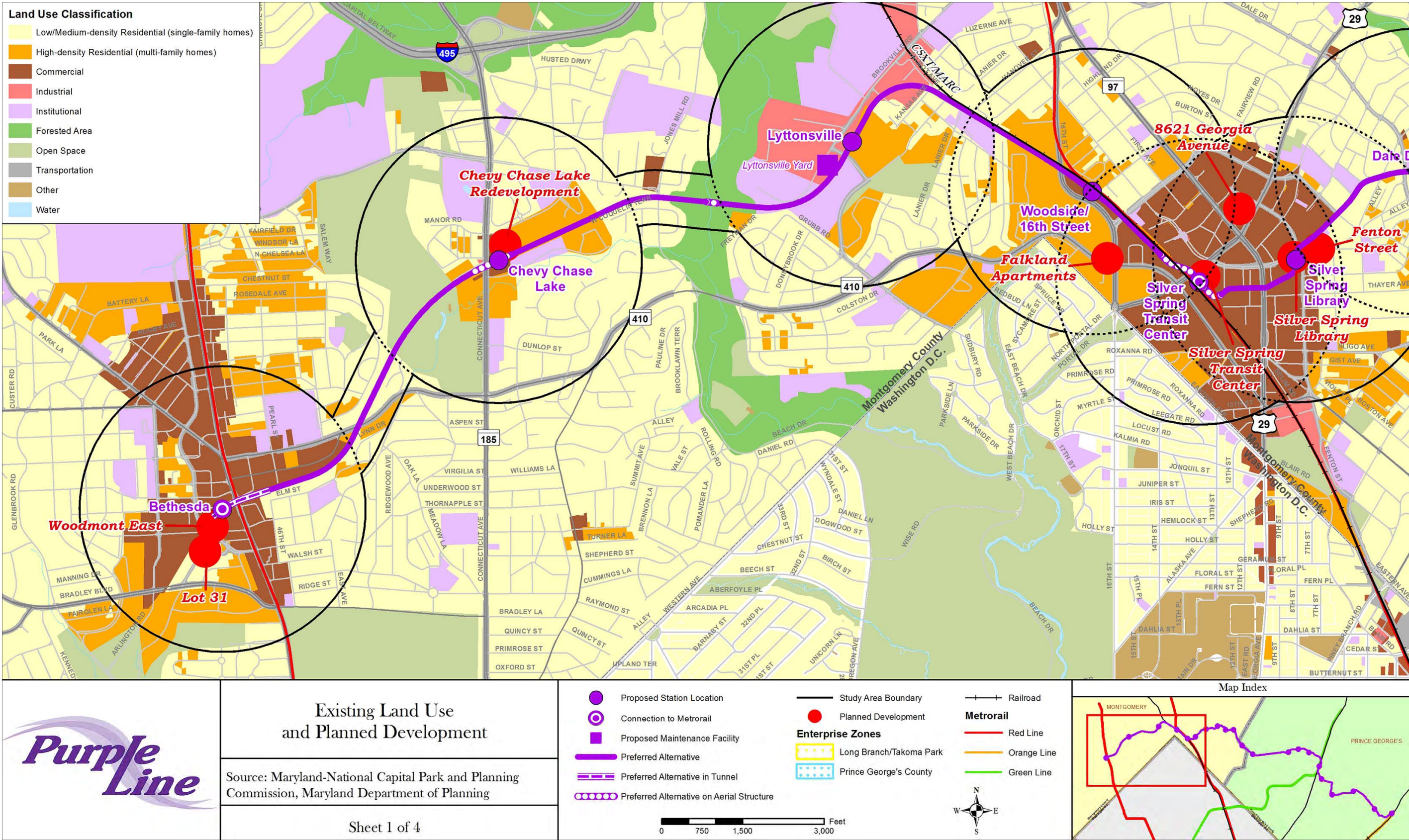


Figure 4-1. Existing Land Use and Planned Development (continued)

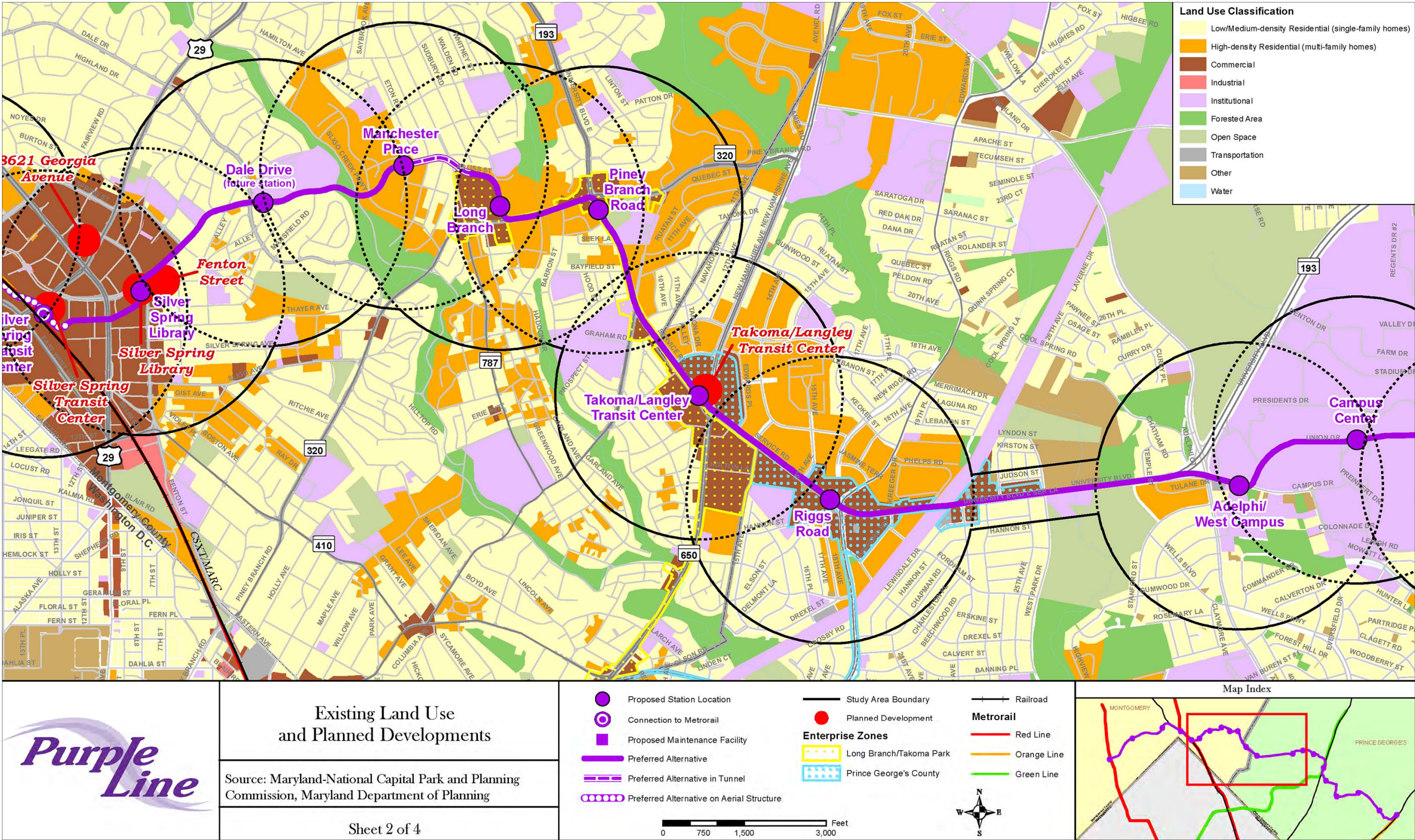


Figure 4-1. Existing Land Use and Planned Development (continued)

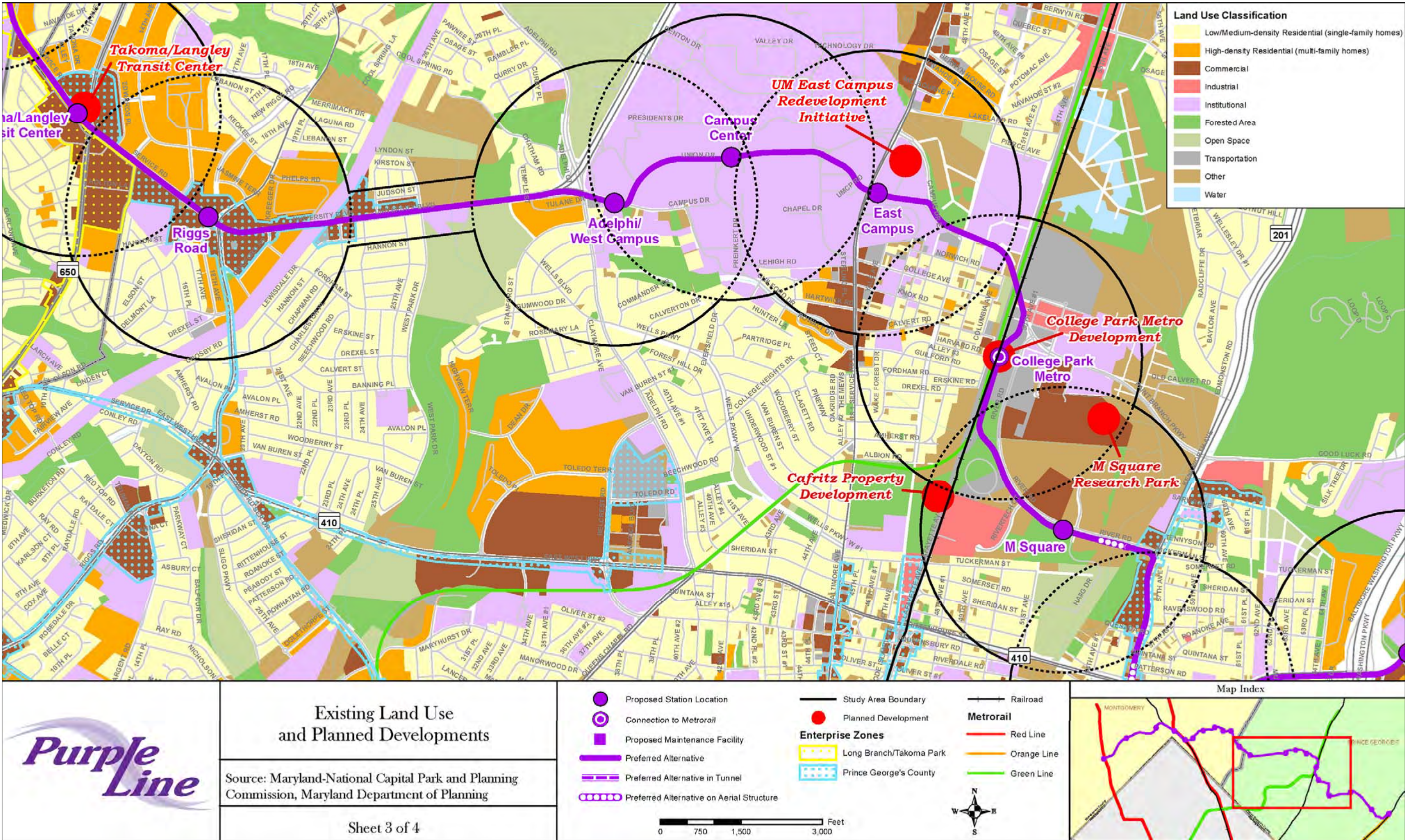


Figure 4-1. Existing Land Use and Planned Development (continued)

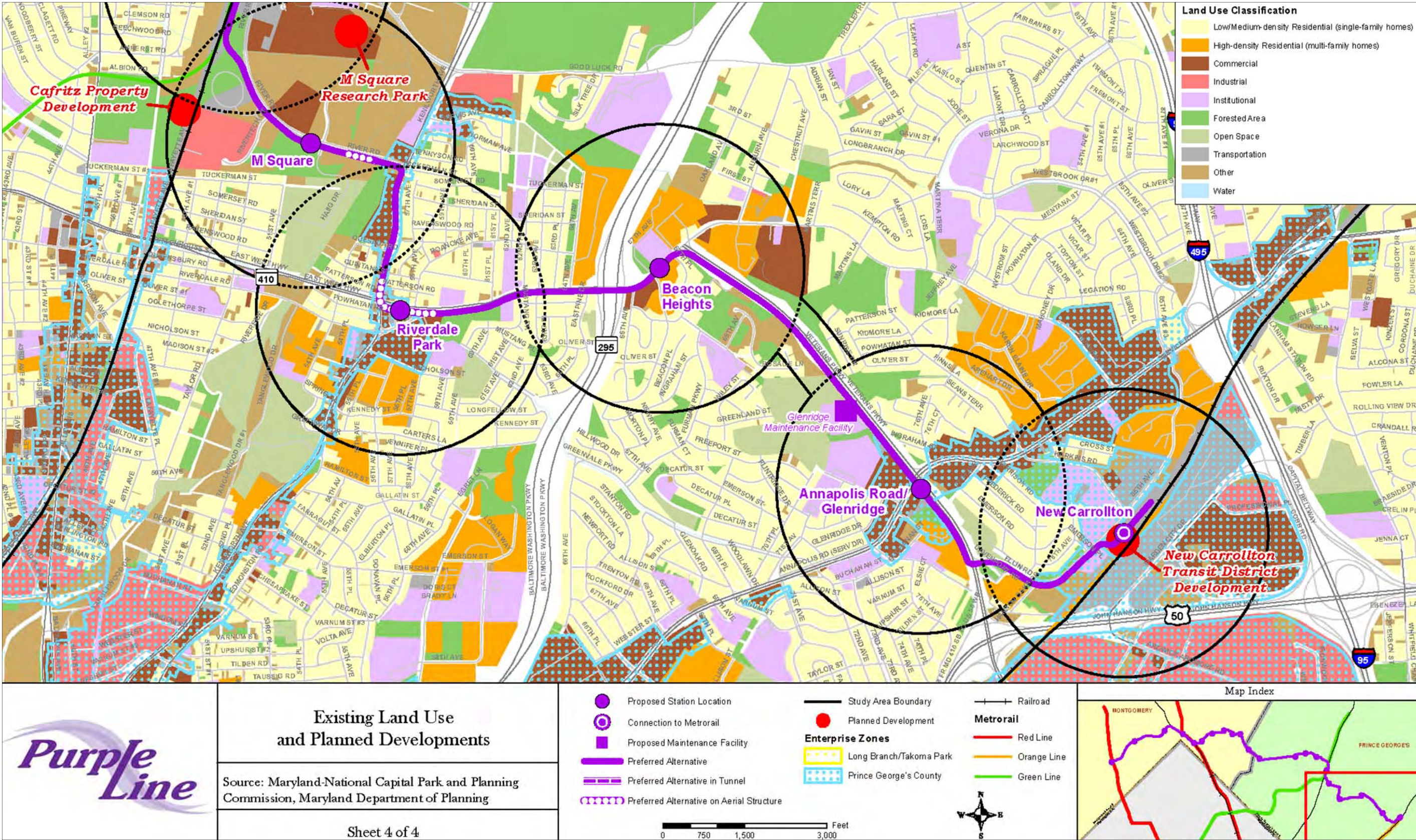


Table 4-2. Planned Developments

Development Name	Location	Existing Land Use of Site	Description of Future Development	Estimated Completion
Woodmont East — Private	Northeast corner of Woodmont Avenue and Bethesda Avenues	Office and retail uses, including movie theater	1.2 million total square feet with 210 multi-family dwelling units, 42,370 square feet of public use space, a 1,882,950-square-foot hotel, 81,165 square feet of retail, and 755,739 square feet of office space	Undetermined
Lot 31 — Public/Private	Southeast and southwest quadrants of Woodmont and Bethesda Avenues	Parking lot	250 multi-family dwelling units, 40,000 square feet of retail uses, and underground parking facility providing 940 public spaces and 290 private spaces	2014/2015
Chevy Chase Lake Redevelopment	Connecticut Avenue between Chevy Chase Lake Drive and Manor Road	Garden apartments, townhomes, and single-family homes surrounding centralized commercial area	Montgomery County planning staff is evaluating concepts for mixed commercial retail and residential uses in Chevy Chase Lake. Anticipated to include approximately 1.5 million square feet of commercial development and 1,000 housing units.	Undetermined
Falkland Chase Apartments	Northeast quadrant of 16th Street and East West Highway intersection	Garden-style apartments	The site has been approved for redevelopment, but the status of development is uncertain. The site has been approved for the construction of four buildings which could include 1,250 apartments and townhouse dwelling units, 70,000 square feet of retail space, and approximately 65,100 square feet for a public plaza/garden and pedestrian areas. The site plans reserve a portion of the site for use by the Purple Line.	Undetermined
Silver Spring Transit Center	Colesville Road and Wayne Avenue	High-density office space, supporting retail and restaurants, and high-rise apartments	Three-tiered, multi-modal transit facility with 32 bus bays, 54 kiss-and-ride spaces and taxi spaces, two residential towers, and direct access to Metrorail and MARC. Would also include Purple Line transitway as well as integrated private TOD of 450 apartments and condominiums, and a 200-room hotel.	Fall 2013
Silver Spring Library	Fenton Street and Wayne Avenue intersection	Montgomery County-owned property cleared for development	Six-story, 63,000-square-foot library to serve the central business district. The site would include an art gallery and incorporate a Purple Line station.	2015
8621 Georgia Avenue	Southeast quadrant of Cameron Street and Georgia Avenue	Surface parking lot	13-story office building with 6,200 square feet of retail and 289 parking spaces	Undetermined
Fenton Street	Fenton Street between Wayne Avenue and Bonifant Street	Place of worship and associated buildings and single-family dwelling units	Approximately 30,000 square feet of new institutional uses (new church sanctuary, religious education, and child day care center), 18,650 square feet of commercial retail space, and 259 dwelling units	Undetermined
Takoma/Langley Transit Center	Northwest corner of University Boulevard and New Hampshire Avenue	Commercial strip center	New Transit Center featuring enclosed bus shelter and waiting areas	2016
UMD East Campus Redevelopment Initiative	US 1 and Paint Branch Parkway near UMD entrance	Institutional physical plant, service operations, and undergraduate housing	38-acre mixed-use, urban, college town environment comprising retail, hotel/conference, residential, and affordable graduate student housing towers	Undetermined
Cafritz Property Development	Bounded by Baltimore Avenue, Albion Road, MARC tracks, and Tuckerman Street	Forested area and single-family residential	Development of 37.6 acres, including over 200,000 square feet of retail and restaurants and 26,400 square feet of office space; 995 residential units and a 120-room hotel are anticipated to eventually be constructed.	Undetermined
College Park Metro Development	Surrounding College Park Metro Station	Bus transfer facility and surface parking	Transit waiting area plus 348,000 square feet of office space, 34,000 square feet of retail/commercial, 290 residential units, and a new 600-space parking garage	Undetermined
M Square Research Park	River Road and Paint Branch Parkway	Undeveloped land	At full build-out, 2 million square feet of research and office facilities on 130 acres, estimated to employ 6,500 people	Undetermined
New Carrollton Transit District Development	Within 1/2 mile of the New Carrollton Metrorail Station	Parking and transit facilities	5 million square feet of offices, stores, hotels and entertainment space, and up to 5,500 new homes	Prior to 2040

The TPB's Transportation/Land-Use Connections (TLC) program also provides technical assistance to local governments to enhance community planning. The TLC program addresses issues of regional congestion, future growth, pedestrian safety, affordable housing, and changes in community identity by providing information about best practices and model projects through the TLC Clearinghouse. The TLC Technical Assistance Program provides consulting services focused on improving transportation and land use coordination and assists in planning and designing more vibrant and livable communities. In 2010, the TLC Program prepared a *Purple Line Bicycle Access and Bicycle Hub Location Study* for M-NCPPC and Prince George's County to assist in planning for bicycle hubs and multi-use trail facilities around proposed Purple Line stations. Currently, the FY 2013 TLC Technical Assistance Program includes the College Park Metro Station TOD Analysis and the City of Takoma Park New Hampshire Avenue Multi-Way Boulevard Feasibility Study.

The National Capital Planning Commission (NCPC) is responsible for planning activities involving federal land and federal facilities and operations in the Washington DC region. It influences existing and planned land use through the *Comprehensive Plan for the National Capital: Federal Elements* (2004).

The federal government states in Executive Order 13514 *Federal Leadership in Environmental, Energy and Economic Performance* (2009) that access to public transit must be a priority when locating new federal facilities or leases.

The State of Maryland has instituted initiatives intended to create "Sustainable Communities" by focusing transportation improvements in older communities and enhancing the role of the Smart Growth Subcabinet (SGSC) in community revitalization. Under the Priority Funding Areas Act of 1997, the State has established priority funding areas (PFA), which provide a geographic focus for state investment in growth, as well as enterprise zones that offer state and local incentives (e.g., tax credits) to encourage the expansion of existing businesses and to attract new business investment

resulting in job creation. The entire area inside the Capital Beltway is designated as a PFA. Also, two enterprise zones are within the project corridor—the Long Branch/Takoma Park Enterprise Zone and the Prince George's County Enterprise Zone (Figure 4-1).

The most recent policies and plans that are applicable to the study area are listed in Table 4-3 by area. As shown, all of these plans and policies endorse transit. Further details on these planning documents can be found in the *Purple Line Social Effects and Land Use Planning Technical Report* (2013).

4.2.3 Preferred Alternative

Long-term Operational Effects

Land Use, Zoning, and Planned Development

The Preferred Alternative would be compatible with the existing mixed urban and suburban character of the study area land use, and its implementation would support existing and planned land use as well as planned developments. The Preferred Alternative would be located on or along existing roadways, railroad rights-of-way, and the Georgetown Branch right-of-way. Therefore, it is not expected to substantially change the current land uses within the study area. Many of the future development projects anticipate construction of the Preferred Alternative. However, the intensity of the land use could change, as the Preferred Alternative would be expected to attract additional development, which is considered an indirect and secondary effect of the Preferred Alternative.

The Preferred Alternative would be consistent with zoning regulations, which encourage the development of land uses that are compatible with transportation uses along transportation corridors. For example, the *Comprehensive Amendment to the Bethesda CBD District Sector Plan* directs higher density development near activity centers and transit serviceable locations, while promoting lower density infill and housing outside these areas. Likewise, the *College Park US 1 Corridor Sector Plan and Sectional Map Amendment* supports dense transit-oriented mixed-use development within a half-mile radius of transit stations.

Table 4-3. Planning Areas and Associated Plans

Planning Area	Planning Document	Endorses Transit
Montgomery County		
Countywide	<i>General Plan Refinement of the Goals and Objectives for Montgomery County</i> (Approved and Adopted, December 1993)	Y ¹
Purple Line Corridor	<i>Purple Line Functional Plan</i> (Approved and Adopted, September 2010)	Y ^{1,2}
Bethesda Central Business District (CBD)	<i>Comprehensive Amendment to the Bethesda Central Business District Sector Plan</i> (Approved and Adopted, July 1994)	Y ¹
Bethesda Chevy Chase	<i>Comprehensive Amendment to the Bethesda/Chevy Chase Master Plan</i> (Approved and Adopted, April 1990)	Y ¹
Chevy Chase Lake	<i>Chevy Chase Lake Sector Plan</i> (Draft, September 2012, Pending Approval)	Y ^{1,2}
North and West Silver Spring	<i>North and West Silver Spring Master Plan</i> (Approved and Adopted, August 2000)	Y ¹
Lyttonsville-Rosemary Hills	<i>Greater Lyttonsville Sector Plan</i> (Initiated, July 2012, Pending Approval)	Y ^{1,2}
Silver Spring CBD	<i>Silver Spring Central Business District and Vicinity Sector Plan</i> (Approved and Adopted, April/March 2000)	Y ^{1,2}
East Silver Spring	<i>East Silver Spring Master Plan</i> (Approved and Adopted, December 2000)	Y ^{1,2}
Long Branch	<i>Long Branch Sector Plan</i> (Draft, January 2013)	Y ^{1,2}
Takoma/Langley Cross-roads—Montgomery County	<i>Takoma/Langley Crossroads Sector Plan</i> (Draft, May 2010, Pending Approval)	Y ^{1,2}
Prince George's County		
Countywide	<i>Prince George's County Approved General Plan</i> (October 2002) ³	Y ^{1,2}
Purple Line Corridor	<i>Purple Line Transit Oriented Development Study</i> (Initiated, October 2011)	Y ^{1,2}
Takoma/Langley Cross-roads—Prince George's County	<i>Takoma/Langley Crossroads Sector Plan</i> (Approved, November 2009)	Y ^{1,2}
Langley and Vicinity	<i>Master Plan for Langley Park-College Park-Greenbelt and Vicinity</i> (Approved, October 1989) Sectional Map Amendment (Approved, May 1990)	Y
College Park-Berwyn Heights	<i>Master Plan for Langley Park-College Park-Greenbelt and Vicinity</i> (Approved, October 1989) Sectional Map Amendment (Approved, May 1990)	Y
University of Maryland Campus	<i>University of Maryland Facilities Master Plan 2011-2030</i> (Adopted, 2012)	Y ^{1,2}
US 1 Corridor in College Park	<i>College Park US 1 Corridor Sector Plan and Sectional Map Amendment</i> (Approved, June 2010)	Y ^{1,2}
College Park-Riverdale Transit District	<i>Approved Transit District Development Plan for the College Park-Riverdale Transit District Overlay Zone</i> (Approved, October 1997)	Y ¹
Hyattsville-Riverdale-Mt. Rainier-Brentwood	<i>Approved Master Plan and Sectional Map Amendment for Planning Area 68</i> (Approved, May 1994)	Y ¹
Bladensburg-New Carrollton and Vicinity	<i>Bladensburg, New Carrollton and Vicinity Approved Master Plan and Sectional Map Amendment for Planning Area 69</i> (Approved, May 1994)	Y ¹
Central Annapolis Road Corridor	<i>Central Annapolis Road Corridor Sector Plan and Proposed Sectional Map Amendment</i> (Approved, October 2010)	Y ^{1,2}
New Carrollton Transit District	<i>New Carrollton Transit District Development Plan and Transit District Overlay Zoning Map Amendment</i> (Approved, May 2010)	Y ^{1,2}
Regional		
Metropolitan DC	<i>Regional Activity Centers and Clusters</i> (WMATA, 2007)	Y ¹
Metropolitan DC	<i>Joint Development Policies and Corridors</i> (WMATA, November 2008)	Y ¹
Bi-County	<i>On Wedges and Corridors, a General Plan for the Maryland-Washington Regional District in Montgomery and Prince George's Counties</i> (Approved and Adopted, January 1964)	Y
State		
Statewide	Smart Growth Legislation	Y ¹
Statewide	<i>PlanMaryland</i> (December 2011)	Y ^{1,2}
Federal		
Metropolitan DC	<i>Comprehensive Plan for the National Capital: Federal Elements</i> (2004)	Y

¹Denotes inclusion of land use planning oriented toward future transit station areas.

²Denotes inclusion of references to the Purple Line specifically.

³*Plan Prince George's 2035*, scheduled for completion in December 2013, will provide policy direction, development priorities, and broad based strategies for future land use and economic development plans for Prince George's County.

In addition, several of the planned developments in the study area (listed in Table 4-2) would be constructed to accommodate, and would benefit from, the implementation of the Purple Line.

The following sections discuss the long-term effects on land use and development within the vicinity of station locations, the yard, the maintenance facility, and the traction power substations.

Station Locations

The Preferred Alternative station locations would be compatible with existing zoning that reflects the land use patterns recommended by *On Wedges and Corridors*. At several of the proposed station locations, particularly Bethesda, East Campus, College Park, M Square, Annapolis Road, and New Carrollton, zoning supports opportunities for re-development and for TOD, emphasizing a pedestrian-friendly, mixed-use environment with a multi-modal transit network. Several developments, listed in Table 4-2, are already planned to be constructed close to stations.

The anticipated development and high-density infill surrounding key activity centers and the transportation corridors served by the Preferred Alternative would promote employment by creating new permanent jobs and supporting access to employment opportunities. Commercial, office, and industrial uses throughout the study area would benefit from this improved transit access, as employers in the study area would be able to draw from a larger pool of potential employees. In addition, their customers and clients would have improved access. Businesses also may be influenced by transit service when selecting new sites, resulting in increased intensity of these land uses.

Yard and Maintenance Facility

The proposed Lyttonsville Yard would be located primarily on property currently used as a parking lot for an adjacent Montgomery County maintenance facility. Land uses surrounding the Lyttonsville Yard site, with the exception of a nearby multi-family residential building, are light industrial and are zoned as such. Therefore, the yard generally would be consistent with the existing land uses and zoning.

The proposed Glenridge Maintenance Facility would be located primarily on property that currently is developed as the Prince George's County Parks—Northern Area Maintenance—Glenridge Service Center, a comparable land use. Some portions of adjacent land, however, also would be acquired. This land is forested parkland and zoned as reserved open space. Adjacent land uses include single-family residences, a school, and parkland.

Traction Power Substations and other Ancillary Facilities

As described in Chapter 2.0 of this Final Environmental Impact Statement (FEIS), the Preferred Alternative would introduce several other ancillary elements to the study area, including signal bungalows, catenary poles and wires, and traction power substations. The latter must be spaced at approximately one-mile intervals along the transitway. Because these facilities are small and located generally along existing transportation rights-of-way, it is not expected that surrounding land uses would be affected. Table 4-4 identifies the proposed locations and the existing land use in the immediate area of each. These facilities have been sited based on current land uses and plans to minimize impacts. See *Volume 2—Environmental Resource Mapping*.

Consistency with Plans and Policies

The Preferred Alternative would be consistent with local, regional, and statewide planning, as the Purple Line is recommended in 15 of the 29 plans referenced in Table 4-3. All 29 plans support the implementation of transit and 25 of them support land use planning oriented toward future transit stations.

The Preferred Alternative would be consistent with the TPB planning initiatives, which recognize the interdependency of transportation and land use. The most recent *Metropolitan Washington Regional Activity Centers and Clusters* references studies for the Bi-County Transitway (former name of the Purple Line) and identifies Bethesda CBD, Silver Spring CBD, US 1 Green Line (College Park vicinity), and New Carrollton as regional activity centers where transportation and planning decisions should be focused. The TLC program is

Table 4-4. Proposed Traction Power Substation Locations and Existing Land Uses

TPSS ID	Description of Proposed Location	Adjacent Land Use
Q1	Montgomery Avenue, approximately 1,600 feet beyond Wisconsin Avenue	Single-family homes, converted residential dwellings for office and commercial use, high-density residential and large office buildings.
Q2	Georgetown Branch right-of-way, approximately 300 feet prior to Connecticut Avenue	Commercial uses
Q3	Lyttonsville Yard	Industrial and county maintenance facility
Q4	Approaching CSX tracks, near Kansas Avenue	Single-family residential
Q5	Intersection of Colesville Road and CSX tracks	Commercial (Rite Aid Pharmacy), transportation
Q6	Wayne Avenue, just past Cloverfield Road	Single-family residential units and Springvale Terrace Retirement Community
Q7	Arliss Street, just past Flower Avenue	Low-rise commercial and multi-family townhomes
Q8	University Boulevard, just past Seek Lane	Multi-family townhomes and University Manor Apartment complex
Q9	Intersection of University Boulevard and New Hampshire Avenue	Large-lot commercial developments
Q10	University Boulevard, just before 23rd Avenue	Commercial, power line easement
Q11	Intersection of Campus Drive and Presidential Drive	UMD parking and University Baptist Church
Q12	UMD campus, just past proposed East Campus Station	UMD parking, future location of East Campus Development
Q13	UMD property, approximately 820 feet past College Park Metrorail Station	WMATA tracks, College Park Metrorail parking
Q14	River Road, approximately 315 feet prior to Kenilworth Avenue	Office and commercial units, First Korean Presbyterian Church parking lot
Q15	Intersection of Riverdale Road and 61st Place	Residential, forested area, Refreshing Spring Church of God, and Professional Building
Q16	Veterans Parkway, approximately 750 feet beyond Riverdale Road	Forested area, State Highway Administration right-of-way
Q17	Intersection of Veterans Parkway and Annapolis Road	Large-lot commercial developments and office space
Q18	Ellin Road, approximately 340 feet beyond Emerson Place, adjacent to WMATA	New Carrollton Metrorail Station parking facility, power distribution facility

Note: TPSS stationing as of preliminary engineering September 28, 2012. Based on *Purple Line Light Rail Transit Concept PE Submission-Volume 9: Systems* and subject to change.

already providing technical assistance to local jurisdictions in planning for the Preferred Alternative.

NCPC's *Comprehensive Plan* and other federal policies pertaining to federal workplaces in the corridor, such as Executive Order 12514 *Federal Leadership in Environmental, Energy and Economic Performance* (2009), encourage employee use of transit and other non-single occupant vehicle modes. The implementation of the Preferred Alternative to service the Fort Detrick United States Army Garrison-Forest Glen Section in Lyttonsville, the National Oceanic and Atmospheric Administration (NOAA) campus in Silver Spring, U.S. Department of Agriculture and the Food and Drug Administration in M Square, and the Internal Revenue Service (IRS) headquarters in New

Carrollton would be consistent with the NCPC plans.

The Preferred Alternative also would support statewide principles of the Smart Growth Program by facilitating mixed-used redevelopment of currently built-up areas, taking advantage of existing infrastructure, providing transportation options, and strengthening existing communities. Located within the Inner Beltway PFA, the Preferred Alternative would reinforce the principles of Smart Growth, while linking designated enterprise zones located in both Montgomery and Prince George's Counties.

Avoidance and Minimization

The Preferred Alternative generally follows existing transportation corridors; therefore, it avoids any substantial changes to existing land use. MTA has

coordinated extensively with Montgomery County and Prince George's County planning departments to ensure that the Preferred Alternative would be compatible with planned development. MTA will continue to meet with M-NCPPC, planning departments, and developers to facilitate effective incorporation of the Preferred Alternative into corridor communities and to avoid or minimize negative land use effects.

Mitigation

Mitigation is not warranted.

Short-term Construction Effects

Short-term land use changes are anticipated during the construction, resulting from easements needed for staging areas and construction access, and from temporary parking loss.

Most construction staging areas would be obtained as temporary construction easements. Staging areas also would provide additional access points to the construction of the transitway and trail, where possible. Temporary construction easements may result in short-term change of access or closures of certain areas of the properties in the easement, or to adjacent properties; where this is the case, alternative access would be provided. See Section 4.4 for information on the mitigation of construction easements. Chapter 5.0 presents the locations of the staging areas that are currently anticipated. These specific locations are subject to change, however, as the project advances. MTA anticipates that multiple staging areas would be used simultaneously, although some would be utilized for only a portion of the expected 5-year construction period.

Avoidance and Minimization

To minimize any short-term construction related land use changes, where practicable MTA would locate staging areas on sites designated for permanent non-transitway elements of the Preferred Alternative, such as the power substations, the yard, and the maintenance facility.

Mitigation

Mitigation is not warranted.

4.3 Neighborhoods and Community Facilities

This section describes the existing neighborhoods and community facilities in the Purple Line corridor and assesses the effects of the Preferred Alternative on these resources. Also discussed are strategies MTA has taken to avoid or minimize the effects to neighborhoods and community facilities, and the mitigation measures MTA would undertake to offset adverse effects. Further information regarding the neighborhood and community facility analysis is included in the *Purple Line Social Effects and Land Use Planning Technical Report (2013)*

4.3.1 Regulatory Context and Methodology

As FTA does not have neighborhood assessment guidelines, MTA used the FHWA 1996 publication, *Community Impacts Assessment: A Quick Reference for Transportation*, as a guide to review potential effects of the proposed project on neighborhoods and community facilities since there are no regulations governing impacts to neighborhoods or community facilities.

The study area for the analysis of neighborhood impacts is 500 feet to each side of the Preferred Alternative alignment. The analysis of potential impacts of the Preferred Alternative on neighborhoods considers the following key neighborhood and community issues: changes in neighborhood quality and community cohesion, effects on human health, impacts on community facilities, and safety and security, as discussed in Section 3.7. Much of the basis for the evaluation of impacts in this section comes from analyses done for Chapter 3.0 and other sections of Chapter 4.0 of this FEIS. Demographics for each neighborhood are based upon the census tracts within 500 feet of the alignment or within a half-mile radius of proposed stations.

Community facilities are facilities that provide a variety of services for public benefit, including schools, health care facilities, religious institutions, emergency services facilities, government services, and museums. They were identified through a review of data from local agencies, discussions with local agency staff members, and field verification. Effects to community facilities were determined by

analyzing how the proposed project could directly affect the specific properties where facilities are located, such as changes to property access or parking.

4.3.2 Affected Environment

The study area lies within southeastern Montgomery County and northern Prince George's County in the Washington DC metropolitan area. A small portion lies within Washington DC. Although the study area is within the suburbs of Washington DC, many communities are highly urbanized with high population densities. The study area contains 16 neighborhoods listed. They are shown on Figure 4-2 and described in the following subsections.

The demographic data is from the 2010 U.S. Census and the American Community Survey 2006-2010.

Bethesda

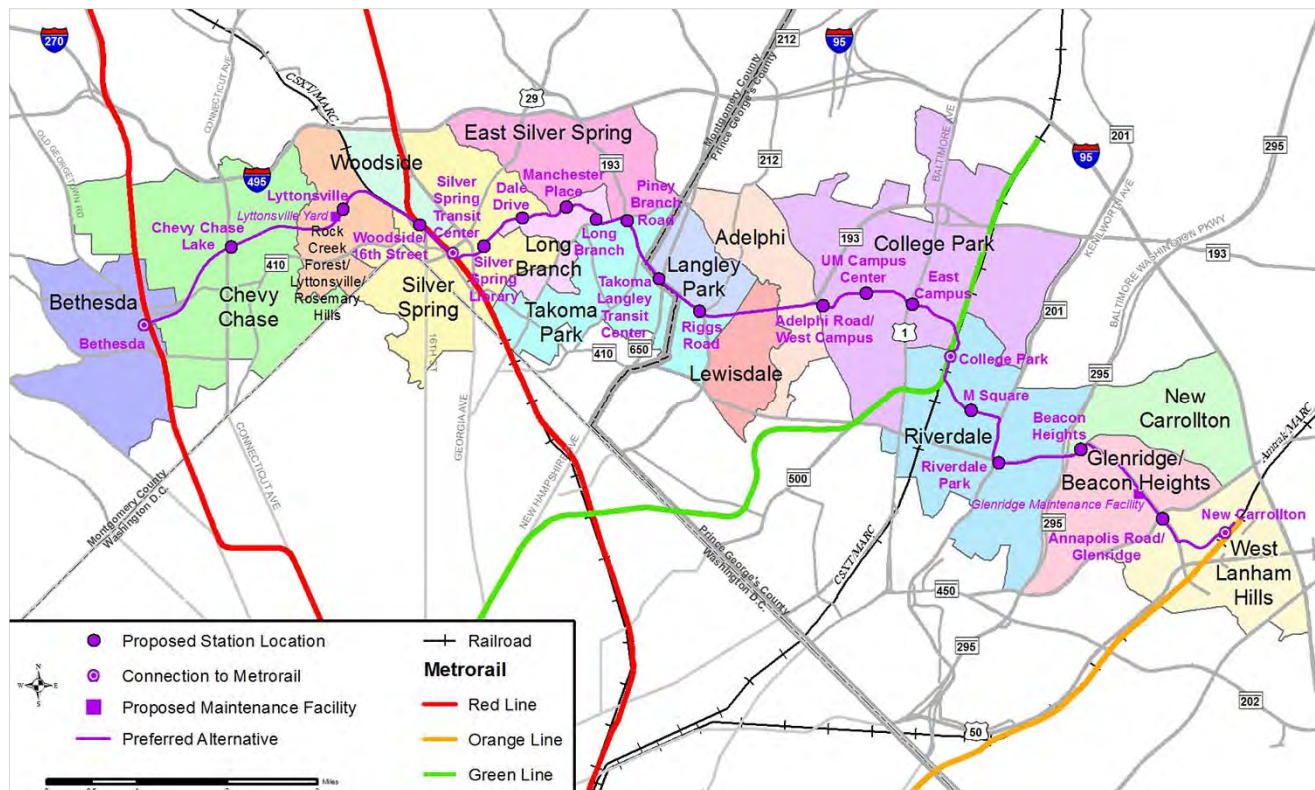
Bethesda is a mixed-use area with single and multi-family residences surrounding the dense

urban center. Major facilities include the National Institutes of Health and the Walter Reed National Military Medical Center (formerly the National Naval Medical Center). With approximately 17,300 people, 83 percent of the population is White, 4 percent African American, 9 percent Asian, and 7 percent Hispanic. Forty-four percent of the housing units in the community are owner-occupied. Three percent of the population lives at or below the Federal poverty guidelines. Twenty-six percent of the workers use public transportation to commute to work. Seventeen percent of Bethesda households have no vehicle available.

Chevy Chase

The Chevy Chase community is primarily residential in character. It was developed in the late 19th century as a streetcar suburb by the Chevy Chase Land Company. The majority of the housing in Chevy Chase is single-family detached houses, with some townhouses and multifamily buildings. The community includes some small specialty retail

Figure 4-2. Study Area consisting of 16 Neighborhoods



centers. With approximately 15,600 people, the population in Chevy Chase is 88 percent White, 4 percent African American, 4 percent Asian, and 5 percent Hispanic. Eighty-two percent of the housing units in the community are owner-occupied. Two percent of the population lives at or below the Federal poverty guidelines. Thirteen percent of the workers use public transportation to commute to work. The percentage of households with no vehicle available is 8 percent.

Rock Creek Forest/Lyttonsville/Rosemary Hills

The Rock Creek Forest/Lyttonsville/Rosemary Hills community is mostly residential with a mix of high-rise, townhouse, garden apartment, and single family houses. There is a small light industrial area located along Brookville Road. With approximately 6,800 people, the community is 50 percent White, 25 percent African American, 7 percent Asian, 13 percent Other Race, and 25 percent Hispanic. Forty-nine percent of the housing units are owner-occupied. Eight percent of the population lives at or below the Federal poverty guidelines. Twenty-five percent of the workers use public transportation to commute to work. Sixteen percent of the households have no vehicle available.

Woodside

The Woodside community is predominantly suburban and residential, with extensive commercial uses along Georgia Avenue. Bordered by the Metropolitan Branch railroad right-of-way, currently used by freight, MARC commuter rail, Metrorail, and Amtrak, the community also contains major arterials carrying large volumes of traffic into and out of Washington DC. This community is on the outskirts of downtown Silver Spring.

With approximately 4,600 people, the community is 63 percent White, 24 percent African American, 6 percent Asian, and 9 percent Hispanic. Fifty-one percent of housing units in the community are owner-occupied. Three percent of the population lives at or below the Federal poverty guidelines. Twenty-nine percent of the workers use public transportation to commute to work. Fourteen percent of the households have no vehicle available.

Silver Spring

Silver Spring is an older commercial center and residential community that has been experiencing dramatic revitalization in the last ten years. The downtown is largely high-rise buildings containing a mix of office, retail, and residential uses. Much of the redevelopment has been retail and entertainment oriented, and Silver Spring now boasts a lively nightlife. Residential development includes both single and multi-family housing.

With approximately 27,100 people, Silver Spring is 48 percent White, 38 percent African American, 7 percent Asian, 4 percent Other Race, 4 percent Two or More Races, and 10 percent Hispanic. Thirty-four percent of the housing units are owner-occupied. Seven percent of the population lives at or below the Federal poverty guidelines. Thirty-four percent of the workers use public transportation to commute to work. The percentage of households with no vehicle available is approximately 18 percent.

East Silver Spring

The East Silver Spring community is bounded by Sligo Creek to the west and Northwest Branch Stream Valley Park to the east. The community includes a mix of single-family homes and garden apartments, with some commercial development along the major roadways. With approximately 14,100 residents, East Silver Spring is 45 percent White, 27 percent African American, 8 percent Asian, 14 percent Other Race, 5 percent Two or More Races, and 28 percent Hispanic. Sixty-three percent of the housing is owner-occupied. Six percent of the population lives at or below the Federal poverty guidelines. Twenty-one percent of the workers use public transportation to commute to work, and 10 percent of the households have no vehicle available.

Long Branch

The Long Branch community is bounded by Sligo Creek to the west and Long Branch Creek to the east. This is a suburban community consisting of single-family houses, townhouses, garden-style apartment buildings, and a small commercial area of shops and restaurants at Flower Avenue and Piney Branch Road. With approximately 6,200

people, 47 percent of the population is White, 27 percent African American, 5 percent Asian, 15 percent Other Race, and 29 percent Hispanic. Fifty-four percent of the housing in the community is owner-occupied. Eight percent of the population lives at or below the Federal poverty guidelines. Twenty-eight percent of the workers use public transportation to commute to work, and 15 percent of the households have no vehicle available.

Takoma Park

The Takoma Park community as defined for this study is located primarily in Montgomery County but includes the Carole Highlands and Hillwood Manor communities in Prince George's County. The community is predominately residential. Commercial areas are located along the major roadways of University Boulevard, New Hampshire Avenue, Piney Branch Road, and Carroll Avenue. With approximately 22,600 people, the population of Takoma Park is 36 percent White, 32 percent African American, 5 percent Asian, 20 percent Other Race, 6 percent Two or More Races, and 37 percent Hispanic. Approximately 41 percent of housing is owner-occupied. Eleven percent of the population lives at or below the Federal poverty guidelines. Twenty-six percent of the workers use public transportation to commute to work, and 18 percent of the households have no vehicle available.

Langley Park

The Langley Park community is located primarily in Prince George's County but also includes a small portion in Montgomery County. University Boulevard, commonly referred to as the "International Corridor" in the Langley Park area, contains restaurants, shops, and services that cater to a large immigrant population. The major immigrant groups are Latino, South Asian, and Vietnamese. Housing in Langley Park consists of a mix of housing types with many garden-style apartments near University Boulevard and New Hampshire Avenue. With approximately 17,300 people, the population of Langley Park is 26 percent White, 15 percent African American, 45 percent Other Race, 8 percent Two or More Races, and 79 percent Hispanic. Twenty-one percent of the housing is

owner-occupied. Fifteen percent of the population lives at or below the Federal poverty guidelines. Approximately 28 percent of the workers use public transportation to commute to work, and 33 percent of the households have no vehicle available.

Lewisdale

The Lewisdale community, bordered by the Northwest Branch Stream Valley Park, is almost entirely residential with the exception of one shopping center on University Boulevard. Housing consists of single-family and duplex residences. With approximately 8,600 people, the community is 19 percent White, 31 percent African American, 40 percent Other Race, 5 percent Two or More Races, and 61 percent Hispanic. Seventy-six percent of the housing is owner-occupied. Fourteen percent of the population lives at or below the Federal poverty guidelines. Nineteen percent of the workers use public transportation to commute to work, and 12 percent of the households have no vehicle available.

Adelphi

The Adelphi community is primarily residential and includes a mix of single family homes and garden apartments. It has approximately 7,600 people; the population of Adelphi is 27 percent White, 39 percent African American, 9 percent Asian, 19 percent Other Race, and 34 percent Hispanic. Thirty-seven percent of the housing is owner-occupied. Eight percent of the population lives at or below the Federal poverty guidelines. Twenty percent of the workers use public transportation to commute to work, and 8 percent of the households have no vehicle available.

College Park

The College Park community includes the City of College Park and the University of Maryland. The campus is the dominant feature of College Park. The US 1 corridor is the main commercial area serving the community. Residential areas include graduate housing, generally garden apartments, and single family homes in the City of College Park. With approximately 28,200 people, the population of the College Park community is 67 percent White, 12 percent African American, 12 percent Asian, 5 percent Other Race, and 10 percent Hispanic.

Fifty-four percent of housing units in College Park are owner-occupied. Three percent of the population lives below the poverty level, although some of this is due to the large number of students, many of whom have low or no income while they attend school. Eleven percent of the workers use public transportation to commute to work, and 9 percent of the households have no vehicle available.

Riverdale

The Riverdale community includes portions of the Town of Riverdale Park and other unincorporated communities such as Riverdale Heights. Residential development characterizes most of the area, along with federal agencies' offices, and the University of Maryland Research Park. There is some older auto-oriented commercial development on Kenilworth Avenue and East West Highway. With approximately 25,700 people, the population is 26 percent White, 40 percent African American, 27 percent Other Race, and 31 percent Hispanic. Thirty-nine percent of the housing is owner-occupied. Nine percent of the population lives at or below the Federal poverty guidelines. Eighteen percent of the workers use public transportation to commute to work, and 18 percent of the households have no vehicle available.

Glenridge/Beacon Heights

The Glenridge/Beacon Heights community is predominantly residential with a mix of single-family homes and garden apartments. With approximately 12,700 people, the population is 16 percent White, 58 percent African American, 20 percent Other Race, and 33 percent Hispanic. Sixty-two percent of the housing units are owner-occupied. Five percent of the population lives at or below the Federal poverty guidelines. Eighteen percent of the workers use public transportation to commute to work, and 12 percent of the community's households have no vehicle available.

New Carrollton

The New Carrollton community is primarily residential with two shopping centers located on Riverdale Road. With approximately 10,000 people, the population is 20 percent White, 49 percent African American, 4 percent Asian, 24 percent Other Race, and 35 percent Hispanic. Seventy-four

percent of the housing is owner-occupied. Six percent of the population lives at or below the Federal poverty guidelines. Twenty percent of the workers use public transportation to commute to work, and 4 percent of the households have no vehicle available.

West Lanham Hills

The West Lanham Hills community surrounds the New Carrollton Metro Station, and it includes the CSXT rail corridor and the rail yards used by CSXT, Amtrak, MARC, and Metrorail. In addition to the transportation facilities, the community includes some residential properties and industrial and office parks.

With approximately 7,600 people, the population is 14 percent White, 65 percent African American, 15 percent Other Race, and 25 percent Hispanic. Fifty-three percent of the housing is owner-occupied. Seven percent of the population lives at or below the Federal poverty guidelines. Twenty-two percent of workers use public transportation to commute to work, and 15 percent of the households have no vehicle available.

Community Facilities

Table 4-5 provides a list, by neighborhood, of the community facilities located within the study area. These resources are also identified in Figure 4-1. Note that parks and recreational facilities, as well as impacts to these resources, are discussed separately in Section 4.6.

4.3.3 Preferred Alternative

Long-term Operational Effects

Neighborhood Quality and Community Cohesion

Community cohesion refers to the quantity and quality of interactions among people in a community, as indicated by the degree to which residents know and care about their neighbors. Barriers to accessibility or improvements to accessibility (such as trails and public transportation) affect the ease with which neighbors meet and build positive relationships. Transportation facilities can adversely impact communities by creating barriers that constrain or prohibit movement within the community.

Light rail is typically compatible with pedestrian environments and likely would not have an adverse impact on neighborhood quality or community cohesion. The Preferred Alternative would not result in a major change in community cohesion or neighborhood quality, as it would operate in or adjacent to existing roadways along most of its alignment.

The major arterials in the corridor, such as University Boulevard or Veterans Parkway, currently constrain pedestrians to formal crossing points at intersections. The addition of the Preferred Alternative in or adjacent to these roadways and others of similar scale would not change this condition. On smaller roadways, such as Wayne Avenue, the Preferred Alternative would function as an additional type of vehicle in the existing roadway. As today, pedestrians would cross at pedestrian crosswalks.

Along the Georgetown Branch right-of-way, where many residents on both sides now have direct access to the trail from their backyards, the Preferred Alternative would result in some changes in access to the trail. Residents on the south side of the right-of-way would no longer be able to access the trail directly from their yards because the transitway would be between their yards and the trail. These trail users would need to use the 21 formal access points being constructed as part of the Capital Crescent Trail, as described in Section 2.3.2. These access points would include paving, sidewalks, and ramps/stairs where necessary. While this is a change, it is not a barrier precluding access to the trail within the community.

Along some roadways, access from private driveways or unsignalized side-street intersections would be limited to right-in/right-out only, such as along Wayne Avenue and Piney Branch Road. In these locations, U-turns would be provided at nearby signalized intersections. While this would have an effect on existing traffic patterns, it would not have an effect on community cohesion or quality.

Table 4-5. Community Facilities within the Study Area, by Neighborhood

Neighborhoods with Community Facilities	Community Facility
Bethesda	Montgomery County Police District 2
Rock Creek Forest/Lyttonsville/Rosemary Hills	Pilgrim Baptist Church Rosemary Hills Elementary School Coffield Community Center
Silver Spring	Silver Spring Main Post Office District Court of Maryland—Silver Spring Bethel World Outreach Church International Gospel Ministries House of Pentecost First Baptist Church of Silver Spring St. Michael the Archangel Catholic Church Sligo Creek Elementary School Silver Spring International Middle School
East Silver Spring	Clifton Park Baptist Church
Long Branch	Long Branch Library Long Branch Community Center
Takoma Park	Iglesia Cristiana Canaan New Hampshire Estates Elementary School Takoma Park Spanish Seventh Day Adventist Church Faith Worship Center Maryland Drafting Institute
Langley Park	Greater Grace Church Chillum-Adelphi Fire Co. #34
College Park	University of Maryland University Baptist Church University United Methodist Church
Riverdale	College Park Post Office Niels Bohr Library First Korean Presbyterian Church Kenilworth Post Office St. Bernard School St. Bernard Catholic Church St. John Evangelical Lutheran Church Refreshing Spring Church of God in Christ S.S. Ministries—Visionary Church Emmanuel Grace Tabernacle
Glenridge/Beacon Heights	Word of Faith Church Glenridge Elementary School
West Lanham Hills	Walls for Christ Ministries West Lanham Hills Volunteer Fire Department Co. #28

Sources: M-NCPPC Montgomery County Planning Department, Montgomery County GIS, and M-NCPPC Prince George's County Planning Department Information Management Division

Transit in general, and the Preferred Alternative in particular, would support community cohesion by adding stations and improving walkability in station areas. The reconstruction of roadways with bicycle lanes; the addition of new sidewalks, such as along the east side of Kenilworth Avenue; and the construction of the Capital Crescent Trail between

Lyttonsville and Silver Spring, where no off-road trail exists today, would all promote community cohesion by improving access and connectivity within neighborhoods.

Substantial displacements can have an adverse impact on community cohesion. The largest group of single-family residential displacements would occur along Riverdale Road in Riverdale, where roadway widening would displace 22 homes. As described in Section 2.2.2 and *Supporting Document for Alternatives Development (2013)*, MTA conducted an extensive dialogue with these residents prior to the adoption of this design and learned that the majority of residents supported the shift in the alignment which resulted in full rather than partial property acquisition. These houses face a wide and extremely busy roadway and are already effectively separated from the communities behind them and across Riverdale Road.

Redevelopment near stations could enhance economic activity by expanding neighborhood business districts. Section 4.5 gives additional information on the economic benefits from redevelopment near stations. Some of the properties acquired by MTA in the corridor could be sold after construction and redeveloped consistent with existing zoning.

Human Health

The Preferred Alternative would provide the opportunity to improve the overall health of the users of the Purple Line corridor in the following ways:

- Improvements and extensions of the trail system leading to increased physical activity and the use of active transportation modes for some trips. These improvements include the following:
 - The construction of the Capital Crescent Trail from Bethesda to Silver Spring
 - The connection of the Capital Crescent Trail to the Rock Creek Trail, Metropolitan Branch Trail and the Green Trail
 - Accommodating the extension of the Green Trail to the Sligo Creek Trail
 - Other improvements to sidewalks and bicycle lanes

- The safety (crash reduction) improvements resulting from the general upgrade of pedestrian and bicycle facilities that will be implemented in conjunction with the Purple Line.
- The project-related drainage improvements in four stream valley parks and actions planned to maintain, and in the case of Sligo Creek to improve, the water quality of the streams crossing the transitway.
- Sligo Creek, which has been channelized as it flows through a highly developed road network, would be restored 180 feet upstream and 180 feet downstream of Wayne Avenue to provide long-term benefits by improving access to its floodplain, decreasing sediment loads, and reestablishing natural flow patterns.

While these benefits are not easily measureable on an individual level, expanded opportunities for recreation and alternate modes for commuters, and upgraded safety measures all provide the opportunity for a healthier lifestyle. Considered in the context of the proposed higher-density, pedestrian-oriented development planned for several station areas and the improved transit system, the opportunities for additional pedestrian and bicycle trips, as well as better access to employment, healthcare, and community facilities, all point to an overall improvement in human health.

Community Facilities

One community facility, the Silver Spring Main Post Office located at 8653 16th Street in Silver Spring, would be displaced due to the Purple Line Project. The addition of the transitway also would result in minor modifications to the access to several community facilities and would require partial acquisitions of property from some facilities.

As was discussed above, access to some facilities would now be right-in/right-out only, but these would not impact the community facilities as a whole. The same is true for the partial acquisitions of property from the community facilities.

The vestibule of the First Korean Presbyterian Church on Kenilworth Avenue is within the project limits of disturbance, and will need to be removed. MTA has met with the church leadership to discuss

this impact. There also will be some loss of parking from the adjacent lot; however, the capacity of the existing lot is larger than the need, as also discussed with the church leadership. MTA will negotiate just compensation or mitigation with the church.

Impacts to community facilities are listed in Table 4-6, at the end of this section. Additional detail is available in the *Purple Line Social Effects and Land Use Planning Technical Report* (2013).

Safety and Security

Maintaining safety and security at the stations and the neighborhoods surrounding these facilities is an important consideration for many residents within the surrounding neighborhoods. As described in Chapter 5.0, the Purple Line Safety and Security Management Plan (SSMP) sets forth the policy and describes the integration of safety and security activities that are designed to reduce the frequency and severity of accidents and security incidents to MTA's customers, employees, and the general public.

Avoidance and Minimization

MTA worked throughout the alternatives development process to address community concerns by refining the Wayne Avenue surface alignment to include key design elements. Under the Preferred Alternative, the transitway would share the center lanes with vehicular traffic, which would allow on-street parking to continue during off-peak periods in most areas. In addition, by adding left turn lanes at key intersections, overall traffic operations would improve along the corridor, even with the addition of the Purple Line. Further, allowing the light rail vehicles to share the center lanes with vehicular traffic minimizes the taking of private property, with most of the acquisitions being near the intersections due to the addition of turn lanes.

The Preferred Alternative incorporates measures to minimize the impacts on neighborhoods, including the shifting and design of the alignment to reduce property and community impacts. Enhanced pedestrian crosswalks, particularly where Purple Line stations are in or on the sides of busy arterial roadways, have been designed to improve pedestrian safety both for Purple Line passengers and for

all pedestrians who use them. On University Boulevard, the station platforms will function as refuges for pedestrians who cannot cross the entire span of the roadway in one signal phase. Specific measures to improve safety and security are discussed in Section 3.7.

Mitigation

MTA will coordinate with the First Korean Presbyterian Church on Kenilworth Avenue and will negotiate just compensation or mitigation.

The Preferred Alternative would provide a net benefit to neighborhood quality, community cohesion, and human health during operation, and, therefore, no mitigation related to these issues is proposed.

Short-term Construction Effects

As discussed in Chapter 5.0, construction would result in temporary reduction of neighborhood quality due to construction barriers and reduced convenience in access, and it may result in impacts on use of community resources during construction.

The Chillum-Adelphi Fire Company #34 is located approximately 500 feet north of the Preferred Alternative alignment on Riggs Road. Purple Line construction activities may hamper emergency access between this fire company and the part of its service area that lies south of University Boulevard.

During construction, modifications to existing access to community facilities could be necessary, and could result in delays for people using the facilities. The creation of temporary construction easements on the property of community facilities may be required in cases where short-term excavation and construction disturbance are anticipated.

There also would be construction-related impacts to school bus routes and stops. Bus stops located in or near the limits of disturbance would be temporarily relocated, and the location of the temporary bus stops would be communicated to students, parents, and bus drivers. Construction activities might lead to temporary delays with buses transporting students to schools. When necessary, temporary detours would be established, and the detour routes would be clearly marked.

Table 4-6. Long- and Short-term Effects to Community Facilities, by Neighborhood

Neighborhood	Community Facility	Long-term Effects	Short-term Effects
Rock Creek Forest/Lyttonsville/Rosemary Hills	Rosemary Hills Elementary School	No long term effects.	Reconstruction of Talbot Avenue would encroach on school property. A signed detour route would be provided for those using Talbot Avenue while Talbot Avenue Bridge is replaced.
	Pilgrim Baptist Church	No long term effects.	A signed detour route would be provided for those using Talbot Avenue while Talbot Avenue Bridge is replaced.
Silver Spring	Silver Spring Post Office	The facility would be displaced.	The facility would be displaced prior to construction.
	St. Michael Catholic Church	The sidewalk and the concrete walkway at the church entrance would be modified.	Pedestrian access would be modified during construction.
	Silver Spring International Middle School	Partial acquisition of property for widening of Wayne Avenue; driveway would be shifted approximately 400 feet east to accommodate future station; the parking lot would be reconfigured.	Pedestrian and vehicular access would be modified during construction.
Long Branch	Long Branch Library	Partial acquisition of property for roadway reconfiguration; the driveway would be converted to right-in/right-out only; pedestrian entrance on Walden Avenue would also be modified.	Pedestrian and vehicular access would be modified during construction.
Langley Park	Chillum-Adelphi Fire Co. #34	No long term effects.	There would be possible delays in responding to calls south of University Boulevard East during construction.
College Park	University Baptist Church	The driveway entrance would be relocated.	Pedestrian and vehicular access would be modified during construction.
	University United Methodist Church	No long term effects.	Pedestrian and vehicular access would be modified during construction.
	University of Maryland	No long term effects.	Pedestrian access would be modified during construction.
Riverdale	Niels Bohr Library	Partial acquisition of property. Direct sidewalk access to River Road would be removed. Access from River Road to Physics Ellipse Drive would be shifted approximately 1000 feet west.	No short term effects.
	St. Bernard Church and School	Partial acquisition of property; changes in grade would affect pedestrian access and secondary access to school.	Pedestrian access would be modified during construction.
	First Korean Presbyterian Church	Partial acquisition of property, removing approximately 10 parking spaces and the building's vestibule.	Pedestrian and vehicular access would be modified during construction.
	Kenilworth Post Office	No long term effects.	Pedestrian and vehicular access would be modified during construction.
	Refreshing Spring Church of God in Christ	Partial acquisition of property.	No short term effects.

Note: Community facilities with minor strip takes were not identified as having short-term effects as long as pedestrian and vehicular access would continue to function for the majority of the construction period.

Sources: M-NCPPC Montgomery County Planning Department, Montgomery County GIS, and M-NCPPC Prince George's County Planning Department Information Management Division.

Construction-generated noise, dust, and congestion also may affect the use of some community resources.

Table 4-6 lists the specific community facilities, by neighborhood, that likely would be subject to these short-term construction effects.

Avoidance and Minimization

MTA will continue to refine and adjust the alignment and will consider adjustments to the construction plan to avoid or minimize impacts to community facilities.

MTA will provide alternative access to community facilities if access is temporarily removed, where practical.

MTA will coordinate with the counties to identify alternative access or temporary off-site parking for community facilities and businesses where access or parking may be temporarily removed, as appropriate.

MTA will coordinate with UMD, Rosemary Hills Elementary School, Sligo Creek Elementary School, and Silver Spring International Middle School to minimize disruptions to the extent reasonably feasible.

Mitigation

MTA will construct the Glenridge Maintenance Facility at a lower grade than the existing park maintenance facility and provide a landscape buffer, as appropriate, between the maintenance facility and the adjacent park and school; MTA will construct retaining walls to minimize the area of grading needed.

The Purple Line Fire Life/Safety & Security Committee will continue to meet prior to and during construction with emergency responders to identify and resolve issues arising from construction and operation.

4.4 Property Acquisitions and Displacements

This section describes the property acquisitions and displacements that would result from the need for right-of-way and other real property to construct and operate the Purple Line. It also describes minimization strategies MTA has taken to eliminate

or reduce the need for acquisition and displacements, as well as mitigation measures MTA would undertake to offset adverse effects. For further details, see *Purple Line Economic Effects Technical Report (2013)*.

4.4.1 Regulatory Context and Methodology

All activities related to acquisitions and displacements would be conducted in conformance with the following:

- Uniform Relocation and Real Property Acquisitions Policies Act of 1970 (42 United States Code [USC] 4601), as amended (the Uniform Act) and Public Law 105-117. These statutes mandate that certain relocation services and payments be made available to eligible residents, businesses, and nonprofit organizations displaced as a direct result of projects undertaken by a federal agency or with federal financial assistance. The Uniform Act provides for uniform and equitable treatment for persons displaced from their homes and businesses, and it establishes uniform and equitable land acquisition policies.
- The Real Property Article of the Annotated Code of Maryland, Title 2, Section 2-112 and Titles 12, Subtitle 2, Sections 12-201 to 12-212 govern relocation and assistance for displacements associated with state actions.

Properties to be fully or partially acquired, or which would be subject to an easement, were identified based on the project's LOD, as defined in Section 4.1. Aerial photography, project engineering design, and county land parcel data were used to determine the properties or portions of properties, within the LOD and to determine the extent of impact on each property. For partial acquisitions, a determination was made whether acquisition would affect the use of the property as currently designed and/or whether modifications to the property would be required to maintain use.

Field reconnaissance was performed to verify information assembled through studies of available land use information. The estimates of employees affected by commercial displacements are based upon average square footage per worker for various commercial building types published in the Energy

Information Administration's *Commercial Buildings Energy Consumption Survey* (2003).

The following types of real estate transactions and impacts are discussed in this section:

- **Full Acquisition**—This is the purchase of all fee simple land ownership rights of a property.
- **Partial Acquisition**—This is the purchase of a portion of an overall property. A partial acquisition would include fee simple or easement acquisitions. See below for a description of easement property rights.
- **Displacement**—Displacement results from full acquisitions and the conversion of the existing land use to a transportation use. Displacements are measured by housing unit or business, not tax parcel. For example, the acquisition of an apartment building on a single tax parcel with six units would result in six residential displacements.
- **Easement**—An easement provides for the temporary (during construction) or permanent use of a property for a particular purpose. The Purple Line will have need for both temporary and permanent easements within the project limits. A temporary easement may be purchased from a property for the purpose of storage of materials and equipment, access to construction areas, site grading, or other construction-related activities. Properties affected by easements would be restored to an acceptable pre-construction condition depending upon the individual easement need and agreement. A permanent easement may be purchased from a property to permanently locate infrastructure without completely diminishing property owner use of the land. Examples of permanent easements include storm water management, drainage channels or storm drains, utilities, slope/grading and subsurface/tunnels.

4.4.2 Affected Environment

As described in Section 4.2, the study area is an urban area comprising a mix of uses including residential, commercial, and institutional uses. Mapping showing the existing conditions within the

LOD is provided in *Volume 2—Environmental Resource Mapping*.

4.4.3 Preferred Alternative

Long-term Operational Effects

Implementing the Preferred Alternative would require acquiring property and, in some cases, displacing commercial, residential, and institutional uses. Property acquisitions and displacements in this section have been determined based upon the preliminary engineering to date.

Acquisitions

Table 4-7 summarizes the property acquisitions by neighborhood and land use. Fee simple property acquisition would affect 388 properties with a combined area of 70.2 acres. Approximately 30.0 acres, or 321 parcels, would be partial acquisitions, most commonly involving a strip of frontage to widen a right-of-way.

Residential and commercial property acquisitions are spread throughout the project corridor. Riverdale, Takoma Park, and Silver Spring would have the largest numbers of property acquisitions. The largest acquisition of residential acreage would occur in Riverdale, and the largest acquisition of commercial acreage would occur in Rock Creek Forest/Lyttonsville/Rosemary Hills. Institutional land use would have the largest number of acres acquired, in keeping with MTA's effort to minimize residential and commercial land acquisition. This would be accomplished by acquiring publicly owned land where possible. The largest publicly owned institutional land acquisitions would occur in Rock Creek Forest/Lyttonsville/Rosemary Hills for the Lyttonsville Yard, in Glenridge/Beacon Heights for the Glenridge Maintenance Facility, and in Riverdale for right-of-way.

Easements

The Purple Line will need to acquire easement property rights from 315 additional properties within the study area. The project easement acreage need totals approximately 90 acres. The property easement areas would be needed by the project for a variety of potential uses, including drainage, storm-water management, utilities, slope easements, storage of materials and equipment, access to

Table 4-7. Partial and Full Property Acquisitions, Preferred Alternative

Neighborhood	Full Acquisitions				Partial Acquisitions				Total Acreage (acres)		
	Residential	Commercial	Institutional	Total	Residential	Commercial	Institutional	Total	Residential	Commercial	Institutional
Bethesda	0	3	0	3	0	1	1	2	0.0	0.3	0.0
Chevy Chase	1	0	0	1	2	0	0	2	0.2	0.0	0.0
Rock Creek Forest/ Lyttonsville/Rosemary Hills	1	3	3	7	9	10	3	22	0.5	3.8	5.6
Woodside	0	0	2	2	3	4	3	10	0.1	2.4	0.3
Silver Spring	0	4	1	5	22	6	17	45	1.4	2.5	2.3
East Silver Spring	0	0	0	0	3	5	1	9	0.3	0.2	0.1
Long Branch	1	1	0	2	20	3	2	25	1.8	1.3	0.2
Takoma Park	1	2	0	3	15	30	7	52	1.1	1.7	0.4
Langley Park	0	3	0	3	6	18	0	24	0.1	1.6	0.0
Lewisdale	0	0	0	0	4	11	2	17	0.0	0.3	0.5
Adelphi	0	0	0	0	2	0	5	7	0.0	0.0	0.4
College Park	0	0	0	0	0	0	5	5	0.0	0.0	1.1
Riverdale	22	8	0	30	31	20	28	79	5.1	3.2	10.0
Glenridge/Beacon Heights	2	2	2	6	4	3	0	7	1.7	1.6	13.3
New Carrollton	0	0	0	0	0	1	1	2	0.0	0.4	0.9
West Lanham Hills	0	2	3	5	6	3	4	13	0.4	2.0	1.1
Total	28	28	11	67	127	115	79	321	12.7	21.3	36.2

construction areas, or other project related needs. For temporary easement needs, the use of the property will be only for the duration of construction activity.

Displacements

Of the 70.1 acres of fee simple land acquired, 24.3 acres would require displacements. There would be 116 displacements resulting from the Preferred Alternative, including 53 residential units, 60 commercial facilities, and three institutional properties. These are described below.

Residential

The largest group of single-family residential displacements would occur along Riverdale Road, where roadway widening would displace 22 homes. Three other single family homes would be displaced in three other neighborhoods (Table 4-8). Multi-family residential displacements would include 12 units in the Falkland Chase Apartments in Silver Spring, 12 units in two 6-unit buildings in Long Branch, and a 4-unit building in Takoma Park. Regarding the Falkland Chase Apartments, it should be noted that a redevelopment plan exists that would include the demolition of these apartments, and the plan reserves a portion of the site for the Purple Line. This plan has been approved by Montgomery County, and therefore might occur under the No Build Alternative. However, as no schedule has been established, the 12 units are included in the total potential displacements for the Preferred Alternative.

Commercial

The 60 commercial facilities to be displaced provide goods and services typical of the businesses in the LOD, as listed below:

- 6 gas stations
- 2 auto care businesses
- 1 light industrial property
- 21 retail businesses
- 10 food service businesses
- 20 commercial offices

The commercial displacements would affect an estimated 246 employees, primarily in Silver Spring and Takoma Park (Table 4-9). Commercial displacements in Silver Spring include a strip retail shopping center and a 42,000 square foot office

building. Commercial displacements in Takoma Park include the Mega Super Market, occupied by several small businesses providing specialty ethnic food and products (see *Purple Line Social Effects and Land Use Planning Technical Report* for more detailed information).

Institutional

Two of the institutional properties that would be displaced are county-owned facilities. MTA coordination with the counties indicates that these facilities would be relocated elsewhere within the respective counties (Table 4-10). No net loss of employment is anticipated. The Silver Spring Post Office would be relocated elsewhere within the Silver Spring area.

Property acquisitions and displacements are not expected to substantially affect economic conditions in the region or in the study area neighborhoods. There is a sufficient supply of vacant commercial and residential space available within the study area neighborhoods if property owners wish to relocate within the study area. The number of affected jobs would be relatively small in comparison to both the overall level of neighborhood employment and the level of employment in the retail and office sectors that the impacts primarily represent. Employment opportunities affected by commercial property displacements could be offset by relocating the businesses within the neighborhoods surrounding the LOD.

Avoidance and Minimization

Through the public involvement process described in Chapter 8.0, MTA has coordinated, and would continue to coordinate, with affected property owners and tenants to develop means to avoid or minimize property acquisitions and displacements.

Through targeted outreach activities, residential property owners in Riverdale were provided opportunities to offer input on design concepts for the transitway. Their participation led to the decision to shift the alignment to the south of Riverdale Road, despite the need to acquire the properties.

Table 4-8. Residential Displacements by Neighborhood

Neighborhood	Location	Structure Type
Rock Creek Forest/Lyttonsville/Rosemary Hills	Leonard Drive	1 single-family home
Silver Spring	North Falkland Lane	12 units of the Falkland Chase Apartments
Long Branch	Plymouth Street	1 single-family home and 12 apartment units
Takoma Park	East University Boulevard	4 apartment units
Riverdale	Riverdale Road and Patterson Street	22 single-family homes
Glenridge/Beacon Heights	Riverdale Road	1 single-family home
Total Residential Displacements		53

Table 4-9. Commercial Displacements by Neighborhood

Neighborhood	Location	Property Description	No. of Businesses Displaced ¹	Estimate of Employees Displaced ²
Bethesda	Montgomery Avenue	Newtown Auto Body shop, Design in a Day studio, and Maloney Design Build	3	5
Rock Creek Forest/Lyttonsville/Rosemary Hills	Brookville Road	Carpentry and Millwork Casework LTD	1	4
Silver Spring	16th Street	Spring Center shopping center (Blockbuster Video, Dollar Power, El Aquila, Jerry's Subs, Spring Discount Beer and Wine, Beauty Supply, Popeye's, Baskin Robbins, SS Package and Shipping, McDonalds, 7-Eleven, Famous Pawnbrokers, Kessler's Dry Clean, Spring Garden Restaurant, Pizza Hut, Jeweler's Warehouse, Crest Opticians, Cameron's Seafood, Signs by Tomorrow and The Laundromat)	20	34
	East West Highway	Rite Aid Pharmacy, FedEx Office	2	15
	Bonifant Street	1110 Bonifant Building (Abode, Inc., CRP, Inc., Donahue Real Estate Services, Dakota Consulting, Financial and Realty Services, LLC, FRS Securities, Futrek, GAI FRS JV, LLC, Interior Facilities Design, LLC, International Leadership Association, Kest, Forte and Rottenberg, KADA, Property Cop, Riverside Technology Inc., United Way, Maryland Service Center, and Vetstreet)	17	98
Long Branch	Piney Branch Road	Washington Express gas station	1	5
Takoma Park	Piney Branch Road	Precision Tune Auto Care	1	5
	University Boulevard	Mega Super Market (Mega Latino Market, Community Thrift Store, Jireh Restaurant, BanRural/UTS Corporation)	4	36
Langley Park	University Boulevard	Exxon gas station, Domino's Pizza, and Citgo gas station	3	14
Riverdale	Kenilworth Avenue	Image 1 Hair Design, Sophisticat Boutique and Art Gallery, Superior Tax	3	5
	57th Avenue	Shell gas station	1	5
	East West Highway	Lawyers Professional Building	1	5
Glenridge/Beacon Heights	Riverdale Road	Sunoco gas station and Exxon gas station	2	10
West Lanham Hills	Annapolis Road	Dulce Vida Bakery	1	5
Total Commercial Displacements and Estimated Employee Displacements			60	246

¹Number of businesses is estimated to describe magnitude of impacts. Normal business cycle fluctuations may cause variation in the total number or location of specific businesses over time.

²Estimated number of employees is based on 2003 Energy Information Administration *Commercial Buildings Energy Consumption Survey*, Table B1., Mean Sq. Ft. per worker for food sales, food service, retail, office, service, warehouse and storage, and other buildings. Estimated number of employees at gas stations is based on an average of EIA survey and National Retail Federation "Retail Sales per Establishment and Employee and Employees per Establishment, 2010." NRF data compiled from U.S. Department of Commerce, Census Bureau and Bureau of Labor Statistics.

Table 4-10. Institutional Displacements by Neighborhood

Neighborhood	Location	Property
Silver Spring	Bonifant Street	Montgomery County Division of Building, Design and Construction
Silver Spring	16th Street	Silver Spring Main Post Office
Glenridge/Beacon Heights	Veterans Pkwy	Prince George's County Parks—Northern Area Maintenance Office

To avoid several displacements along Kenilworth Avenue, the transitway was moved to the median.

To minimize the impact of the acquisition of the Montgomery County maintenance facility's parking lot for the Lyttonsville Yard, MTA will provide a parking facility for both County and MTA employees in Lyttonsville.

Mitigation

Property acquisition activities, including relocations, will be performed in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act) as amended and Federal Transit Administration (FTA) Circular 5010.1D, Grants Management Requirements and all applicable Maryland State laws that establish the process through which MTA may acquire real property through a negotiated purchase or through condemnation.

Displaced persons and businesses within the area needed for the project may be eligible for benefits under MTA's Relocation Assistance Program. Benefits could include advisory services, moving and reestablishment costs, and other payments and services as provided by law.

Short-term Construction Effects

Temporary easements would be required for a variety of potential uses during project construction, including storage of materials and equipment, access to construction areas, or other construction related activities, as discussed in Chapter 5.0. Short-term impacts such as dust and noise could result in temporary displacement. These impacts are discussed in Chapter 5.0.

MTA will restore properties affected through a temporary easement to an acceptable pre-construction condition following construction activities, in accordance with the individual easement agreements.

Avoidance and Minimization

Where reasonably feasible, vacant or publicly owned property, rather than privately-owned, developed property, will be identified for temporary use during construction activities. In addition, many of the proposed staging areas are to be located on properties that will be acquired for the project (e.g., the Lyttonsville Yard site, displaced homes along Riverdale Road, and the Glenridge Maintenance Facility site).

In order to reduce construction-related impacts to properties, construction scheduling will help to reduce the duration of temporary easements required. A variety of measures will be taken to minimize the effects of access restrictions on residential and commercial properties. For example, in each zone where heavy construction would occur, an analysis will be conducted prior to construction to consider the access needs of the affected properties, and a Transportation Management Plan will be prepared in consultation with the affected property owners and businesses. See Chapter 5.0 for a description of the Transportation Management Plan.

Coordination also will occur with affected neighborhoods and businesses regarding the use of signage or other mitigation methods where access restrictions impact customer access to retail and commercial establishments.

Mitigation

No mitigation is warranted.

4.5 Economic Activity

This section describes the employment and income trends of the study area, assesses the effects of the Preferred Alternative on regional and local businesses, employment levels, and tax revenue, and discusses mitigation measures MTA will undertake to offset adverse effects. For further detail regarding

the methodology and results of the economic analysis, see the *Purple Line Economic Effects Technical Report (2013)*.

4.5.1 Regulatory Context and Methodology

The study area for economics includes the census block groups fully or partially within 500 feet of the Preferred Alternative alignment or within a ½-mile radius around each station location. For some of the analyses, as well as for comparison purposes, larger areas were examined to reflect the fact that the study area is part of a larger integrated economic region.

Effects are presented qualitatively at the neighborhood level and quantitatively at the regional level, which includes Montgomery County, Prince George's County, and Washington DC.

Data regarding regional employment and unemployment, major employers, and income are from the U.S. Census Bureau, American Community Survey, Maryland Department of Business and Economic Development, and Dun and Bradstreet Selectory, Inc. Current labor force trends were measured at the census tract geographic level and reflect the number of residents, from any one place, who are employed or are seeking work (unemployed). GIS analysis was used to aggregate census tracts by study area neighborhood boundary.

Data regarding future employment trends came from the Cooperative Forecasting program administered by the MWCOG. MWCOG's Round 8.0a, which forecasts to the year 2040, informed the analysis. (Note: the Round 8.0a forecasts assume the construction of the Purple Line.) Employment projection data represent the number of people who are working in any one place and were measured using traffic analysis zones (TAZ), the geographical boundaries used within the MWCOG employment model. The boundaries of the TAZs and census tracts are very similar. Therefore, it was considered methodologically appropriate to present future employment data using TAZ boundaries.

The following analyses were performed to understand the project-related economic effects:

- **Job Creation and Earnings Impact**—the effects of operations and maintenance spending (long-

term) and construction expenditures (short-term) on employment, earnings, and output (a measure of economic activity, representing the annual dollar value of all goods and services produced) were estimated using regional multipliers (Regional Input-Output Modeling System, also known as RIMS II) from the U.S. Department of Commerce, Bureau of Economic Analysis (BEA). The regional multipliers cover the Washington DC, Montgomery and Prince George's Counties. Type II multipliers for 2008, which include direct, indirect², and induced impacts, were used. Direct effects would result from construction and operation expenditures, while indirect effects would result when direct purchases generate sales and supporting jobs in supplier industries. Induced effects would result when the earnings of construction workers and public transportation operations workers, as well as growth in earnings at suppliers, lead to further retail sales for businesses that provide consumer goods and services.

- **Tax Revenue**—the effect of proposed displacements associated with the Preferred Alternative and the subsequent projected change in tax revenue were quantified using the 2011-2012 real property tax rates for Montgomery and Prince George's Counties.

4.5.2 Affected Environment

Employment

Between 2000 and 2010, the total number of employed residents of the study area grew by 14 percent; in Montgomery and Prince George's Counties, it grew 12 and 13 percent, respectively. The number of employed persons grew 11 percent in the state of Maryland, and 13 percent in Washington DC (Table 4-11).

² Indirect effects, in relation to the regional multipliers, refers to the changes in sales, jobs, and income within industries that supply the goods and services to the firms that will be constructing, operating, or maintaining the project. This term is used differently in this analysis than it is in the Indirect and Cumulative Effects analysis in Chapter 7.0 of the FEIS.

Table 4-11. 2000 and 2010 Employment Trends by Area of Residence

Region/Neighborhood	Employed			Unemployment Rate	
	2000	2010	% Change 2000–2010	2000	2010
Washington DC	263,108	297,027	13%	7%	9%
Maryland	2,608,457	2,904,475	11%	3%	7%
Montgomery County	458,824	511,790	12%	2%	5%
Bethesda	10,171	9,632	-5%	2%	5%
Chevy Chase	7,413	7,756	5%	1%	3%
Rock Creek Forest/Lyttonsville/Rosemary Hills	3,263	3,509	8%	3%	8%
Woodside	2,795	2,722	-3%	1%	5%
Silver Spring	14,871	16,819	13%	3%	4%
East Silver Spring	6,820	7,638	12%	3%	9%
Long Branch	3,347	4,169	25%	2%	3%
Takoma Park	12,075	13,116	9%	6%	9%
Prince George's County	399,355	452,459	13%	4%	8%
Langley Park	7,052	10,535	49%	5%	12%
Lewisdale	3,507	4,576	30%	4%	13%
Adelphi	4,435	4,080	-8%	4%	7%
College Park	11,072	11,833	7%	12%	11%
Riverdale	11,174	13,132	18%	7%	9%
Glenridge/Beacon Heights	5,978	6,470	8%	6%	12%
New Carrollton	4,625	4,666	1%	3%	9%
West Lanham Hills	3,237	3,537	9%	7%	9%
Study Area	111,835	124,190	11%	5%	8%

Notes:

(1) Employed here means the number of individuals residing in each geography who were employed. (i.e., these numbers are based on residents of these areas and do not reflect the number of jobs in these areas)

(2) Unemployment data is also based on the residents of these geographies and indicate the number of individuals who are actively seeking work, as a percentage of the population 16 years and older.

(3) County data in this table is for the entire county, not the portion of the county within the study area.

(4) The U.S. Census Bureau divided census tract 8059.01 into 8059.08 and 8059.09 and divided census tract 7055 into 7055.01 and 7055.02 between the 2000 and 2010 Decennial Censuses. Therefore the change in income levels in the Adelphi and Bethesda neighborhoods may vary slightly from the results shown.

Source: U.S. Census Bureau, 2000 Census and 2010 American Community Survey.

The unemployment rate also was examined for people living in the study area. The unemployment rate in the study area and in the two study area counties and the state of Maryland each increased between 2000 and 2010, largely due to the national recession of 2007-2009. Depending on population growth and the number of people entering and leaving the labor force, unemployment can increase even as the number of jobs grows.

As Table 4-11 shows, the unemployment rate in the study area increased to 8 percent from 5 percent in 2000. In Montgomery County, the unemployment rate increased to 5 percent, and in Prince George's County, the unemployment rate increased to

8 percent in 2010. The overall unemployment rate for the State of Maryland in 2010 was 7 percent, higher than the Montgomery County unemployment level but lower than the Prince George's County unemployment level. The 2010 unemployment rate in Washington DC (9 percent) also increased over the decade, and in 2010, was greater than the two neighboring counties and the state of Maryland.

According to the Bureau of Labor Statistics (BLS), since 2010, overall unemployment in the two study area counties, Washington DC and the state of Maryland has decreased somewhat. While BLS data varies in collection methodology from the U.S.

Census Bureau, the regional trend in unemployment is clear. Between 2010 and the first half of 2012, unemployment fell by 0.7 percent in Montgomery County and 1.0 percent in Prince George's County. Unemployment decreased by 0.9 percent in Maryland and 0.7 percent in Washington DC between 2010 and the first half of 2012 (BLS 2012).

Major Employers

The federal government employs a large number of Montgomery County, Prince George's County, and Washington DC residents. Approximately 16 percent and 20 percent of the employed civilian workforce in Montgomery and Prince George's Counties, respectively, worked for the federal government in 2010 (Table 5 in the *Purple Line Economic Effects Technical Report*). In comparison, approximately 13 percent of the employed workforce for the state of Maryland was employed by the federal government. In Washington DC, 20 percent of the employed civilian workforce worked for the federal government in 2010.

Eleven federal government agencies are located within Montgomery and Prince George's Counties, which makes the federal government the largest employer in the two counties. Other major employers include county school districts and governments, healthcare and hospital facilities, higher education (Montgomery College and the University System of Maryland), and a variety of private businesses.

Regional Activity Centers, as defined by MWCOG, in the regional study area include the Bethesda CBD, Silver Spring CBD, and New Carrollton (MWCOG 2007). The MWCOG Regional Activity Center designation has been used extensively as a technical and policy tool to analyze the effects of growth and change in the region. Other activity centers in the study area include Takoma Park/Langley Park and UMD in College Park. Each activity center contains a mix of retail, office, warehousing, light manufacturing, commercial, and residential land uses that support major employment and residential bases. In addition, a number of regional shopping areas are located in the project corridor, including downtown Silver Spring, University Boulevard in Takoma Park/Langley

Park, and Annapolis Road in New Carrollton. Smaller local retail and service establishments are interspersed along the roadways that connect the activity centers.

Employment Projections

The MWCOG projections of future regional job growth reveal large increases in employment between 2010 and 2040 (Table 4-12). These projections assume constructing the Purple Line. The greatest employment growth, 43 percent between 2010 and 2040, is projected for Montgomery County, while Prince George's County and Washington DC also show strong employment gains (32 percent and 24 percent, respectively).

By 2040, employment growth is expected to occur in all study area neighborhoods except Long Branch. The largest percentage increases in neighborhood employment are projected to occur in East Silver Spring (65 percent), Langley Park (217 percent), and Riverdale (67 percent). The largest absolute job growth is projected to occur in the Bethesda, Chevy Chase, Silver Spring, College Park, Riverdale, and West Lanham Hills neighborhoods.

Table 4-13 shows employment projections, divided into four land use/employment categories: Industrial, retail, office, and other. In Montgomery County, between 2010 and 2040, the largest increase in both the number and percentage of jobs is projected to occur in the office employment category. In Prince George's County, the largest absolute employment increase would occur in "other" employment, while the largest percentage increase would occur in office employment. In Washington DC, the greatest absolute employment increase is projected to occur in office employment, while industrial employment is expected to grow at the fastest rate.

For the study area overall, job growth between 27 and 33 percent is predicted in all categories of employment. Employment in the study area neighborhoods is expected to grow or remain stable during the three decades between 2010 and 2040, with the exception of Takoma Park, which shows a substantial decline in "other" employment by 2040. While this decline will be offset by an increase in

office employment, these estimates demonstrate that the Takoma Park employment base is expected to undergo major changes, as redevelopment and shifts in land use occur in the area (e.g., due to the Takoma Langleigh Crossroads Sector Plan and the Washington Adventist Hospital move to White Oak campus).

Bethesda, Silver Spring, and Riverdale are projected to have the greatest absolute increases in office employment. The office employment gains can be expected since Bethesda and Silver Spring are growing regional employment centers, and Riverdale contains UMD's recently established M Square research park. Office employment is projected to grow at the fastest rate in East Silver Spring.

Chevy Chase and College Park are projected to show the strongest absolute gains in "other" employment, which can be expected since "other" employment includes college and universities; College Park is home to UMD's main campus and University College campus, while the Chevy Chase neighborhood abuts American University, Trinity Washington University, and a branch of Georgetown University.

Riverdale and West Lanham Hills also show substantial growth in "other" employment by 2040, and they would likely benefit from future planned TOD around Metrorail, MARC, and the proposed Purple Line rail stations.

Table 4-12. Employment Projections by Job Location

Geographic Area	Employment		Projected % Change in Employment 2010–2040
	2010	2040	
Washington DC	785,788	977,163	24%
Montgomery County	506,000	723,000	43%
Bethesda	38,543	44,286	15%
Chevy Chase	29,572	36,071	22%
Rock Creek Forest/Lyttonsville/Rosemary Hills	3,390	3,863	14%
Woodside	1,462	1,512	3%
Silver Spring	36,448	44,710	23%
East Silver Spring	1,311	2,167	65%
Long Branch	674	677	0%
Takoma Park	5,010	5,359	7%
Prince George's County	358,385	474,635	32%
Langleigh Park	1,649	5,228	217%
Lewisdale	1,460	2,076	42%
Adelphi	1,399	1,597	14%
College Park	22,830	33,926	49%
Riverdale	13,385	22,407	67%
Glenridge/Beacon Heights	2,406	3,008	25%
New Carrollton	1,403	1,625	16%
West Lanham Hills	20,456	28,011	37%
Study Area	181,395	236,523	30%

Notes:

- (1) MWCOC does not publish data for the State of Maryland as a whole, so statewide data could not be included for comparison in this table.
- (2) Employment data presented in this table represent the number of jobs located in each geographic area listed above and are not reflective of the number of employed persons residing in these areas.
- (3) County data in this table is for the entire county, not the portion of the county within the study area.

Source: Metropolitan Washington Council of Governments. November 2011. Round 8.0A Cooperative Forecasting: Employment Forecasts to 2040 by Traffic Analysis Zone.

Table 4-13. Employment Projections by Employment Category and Geographic Area, 2010–2040

Geographic Area	2010 Baseline Employment (# of employees)				Projected Change by Employment Category, 2010-2040			
	Industrial	Retail	Office	Other	Industrial	Retail	Office	Other
Washington DC	63,893	86,811	452,268	182,816	67% (+42,810 emp.)	25% (+22,083 emp.)	19% (+85,818 emp.)	21% (+39,164 emp.)
Montgomery County	47,231	90,830	247,631	120,308	41% (+19,296 emp.)	24% (+21,750 emp.)	61% (+150,497 emp.)	21% (+25,457 emp.)
Bethesda	207	4,695	29,765	3,876	2% (+4 emp.)	12% (+573 emp.)	17% (+5,034 emp.)	4% (+135 emp.)
Chevy Chase	0	310	860	28,402	0% (+0 emp.)	131% (+407 emp.)	67% (+574 emp.)	19% (+5,518 emp.)
Rock Creek Forest/ Lyttonsville/ Rosemary Hills	1,372	50	77	1,891	1% (+18 emp.)	0% (+0 emp.)	5% (+4 emp.)	24% (+451 emp.)
Woodside	813	238	181	230	3% (+28 emp.)	3% (+8 emp.)	4% (+7 emp.)	3% (+7 emp.)
Silver Spring	1,129	6,923	25,666	2,730	3% (+31 emp.)	23% (+1,573 emp.)	24% (+6,125 emp.)	19% (+533 emp.)
East Silver Spring	26	426	126	733	0% (+0 emp.)	18% (+78 emp.)	618% (+778 emp.)	0% (+0 emp.)
Long Branch	2	30	52	590	0% (+0 emp.)	0% (+0 emp.)	0% (+0 emp.)	1% (+3 emp.)
Takoma Park	43	1,447	715	2,805	14% (+6 emp.)	25% (+365 emp.)	142% (+1,013 emp.)	-37% (-1,035 emp.)
Prince George's County	56,652	83,653	84,639	133,441	15% (+8,414 emp.)	36% (+30,228 emp.)	40% (+33,499 emp.)	33% (+44,109 emp.)
Langley Park	72	1,224	156	197	225% (+162 emp.)	217% (+2,657 emp.)	213% (+332 emp.)	217% (+428 emp.)
Lewisdale	52	645	239	524	42% (+22 emp.)	50% (+319 emp.)	34% (+82 emp.)	37% (+193 emp.)
Adelphi	136	371	206	686	15% (+20 emp.)	14% (+53 emp.)	8% (+17 emp.)	16% (+108 emp.)
College Park	1,410	2,125	1,649	17,646	37% (+518 emp.)	27% (+567 emp.)	36% (+597 emp.)	53% (+9,414 emp.)
Riverdale	1,627	2,443	4,798	4,517	46% (+745 emp.)	63% (+1,547 emp.)	77% (+3,696 emp.)	67% (+3,034 emp.)
Glenridge/Beacon Heights	130	1,477	343	456	30% (+39 emp.)	22% (+325 emp.)	28% (+95 emp.)	31% (+143 emp.)
New Carrollton	133	536	189	545	25% (+33 emp.)	4% (+19 emp.)	4% (+8 emp.)	30% (+162 emp.)
West Lanham Hills	3,472	6,441	4,509	6,034	36% (+1,246 emp.)	20% (+1,302 emp.)	51% (+2,309 emp.)	45% (+2,698 emp.)
Study Area	10,621	29,381	69,531	71,862	27% (+2,872 emp.)	33% (+9,793 emp.)	30% (+20,671 emp.)	30% (+21,792 emp.)

Notes:

(1) MWCOG does not publish data for the State of Maryland, so it could not be included for comparison.

(2) County data in this table is for the entire county, not the portion of the county within the study area.

Source: Metropolitan Washington Council of Governments. November 2011. Round 8.0A Cooperative Forecasting: Employment Forecasts to 2040 by Traffic Analysis Zone.

Income

Table 4-14 summarizes median household income in Montgomery and Prince George's Counties, Washington DC, and the state of Maryland. It shows annual income in inflation-adjusted 2012 dollars, to allow for appropriate comparison between time periods. Median household income in the two counties and a majority of study area neighborhoods decreased or remained flat over the decade from 1999-2010. This decline corresponded with a smaller decline at the state level.

A number of trends come together to affect household income. The lack of growth in the overall study area median income reflects both national and local

economic trends. The 2007-2009 national recession likely contributed to the decline in household income for many residents of the study area.

Locally, two demographic trends: 1) an influx of immigrants who tend to initially earn lower wages, and 2) a moderate rise in average population age (increasing the proportion of residents who rely on pensions and Social Security income instead of salary income), may have contributed to the lack of growth in median household income. In contrast, median household income rose in Washington DC between 1999 and 2010.

Table 4-14. Median Household Income, 1999–2010

Geographic Area	Median Household Income in 1999 (2012 \$)	Median Household Income in 2010 (2012 \$)	Percent Change, 1999–2010
Washington DC	\$57,935	\$61,780	7%
Maryland	\$76,331	\$74,575	-2%
Montgomery County	\$103,305	\$98,565	-5%
Bethesda	\$105,339	\$122,476	16%
Chevy Chase	\$174,519	\$174,484	0%
Rock Creek Forest/Lyttonsville/Rosemary Hills	\$95,095	\$81,334	-14%
Woodside	\$86,094	\$90,032	5%
Silver Spring	\$83,707	\$82,079	-2%
East Silver Spring	\$88,759	\$78,645	-11%
Long Branch	\$76,925	\$90,722	18%
Takoma Park	\$58,005	\$65,973	14%
Prince George's County	\$79,779	\$75,222	-6%
Langley Park	\$57,326	\$53,439	-7%
Lewisdale	\$78,593	\$77,709	-1%
Adelphi	\$63,734	\$51,770	-19%
College Park	\$78,689	\$78,521	0%
Riverdale	\$57,447	\$57,744	1%
Glenridge/Beacon Heights	\$65,882	\$58,864	-11%
New Carrollton	\$96,933	\$72,524	-25%
West Lanham Hills	\$54,026	\$56,994	5%
Study Area	\$83,715	\$83,762	0%

Notes:

- (1) Income data in the 2000 Census was collected based on respondents' prior 12-month income, or income in 1999.
- (2) Median household income for each neighborhood is based on the average of the median household incomes for the census tracts within each neighborhood, weighted by the number of households for each census tract.
- (3) County data in this table is for the entire county, not the portion of the county within the study area.
- (4) The U.S. Census Bureau divided census tract 8059.01 into 8059.08 and 8059.09 and divided census tract 7055 into 7055.01 and 7055.02 between the 2000 and 2010 Decennial Censuses. Therefore, growth in employed persons possibly may be higher in the Adelphi and Bethesda neighborhoods than the results show.

Source: U.S. Census Bureau, 2000 Census, and 2010 American Community Survey.

Income declines were the steepest in the Adelphi, New Carrollton, Glenridge/Beacon Heights, East Silver Spring, and Rock Creek Forest/Lyttonsville/Rosemary Hills neighborhoods. However, median household income increased in several study area neighborhoods. The greatest increases in median household income occurred in the Bethesda (16 percent), Long Branch (18 percent), and Takoma Park (14 percent) neighborhoods. The West Lanham Hills and Woodside neighborhoods also experienced modest gains in median household income.

4.5.3 Preferred Alternative

Long-term Operational Effects

The Preferred Alternative would foster employment growth in the study area both by supporting existing and future employment opportunities in the corridor, and also by creating new permanent jobs (the latter is discussed under “Employment, Earnings, and Output Effects” below).

Implementing the Preferred Alternative would support employment growth in both Montgomery and Prince George’s Counties by providing faster, more direct, and more reliable east-west transit service between existing high density residential areas, regional shopping centers, and major employment centers in the corridor, such as Bethesda, Silver Spring, UMD in College Park, and New Carrollton, as well as other commercial areas, including Langley Park and Riverdale. By connecting directly with Metrorail and other public transportation services, the Preferred Alternative also improves connections not just within the corridor, but between the corridor and the other parts of the regional economy.

Long-term effects on business conditions resulting from the Preferred Alternative are anticipated to be positive. Increased transportation capacity and new/improved connections created by the Preferred Alternative would create competitive advantages for businesses in the study area by improving connections between businesses and their employees and customers. From the labor force perspective, the Preferred Alternative would improve connections for study area residents to access jobs and

educational opportunities. In addition, the project is expected to support planned TOD at some station locations (see Section 4.2 and Chapter 7.0).

The industries, occupations, and major employers that dominate the study area are of the type that could take advantage of additional transit opportunities and may be influenced by transit access when selecting employment locations. The federal government, a major employer in the region and corridor, prioritizes access to public transit when locating new federal facilities as per *Executive Order 13514 Federal Leadership in Environmental, Energy and Economic Performance* (2009). The federal focus on site sustainability is echoed in the growing private sector demand for locations with Leadership in Energy and Environmental Design (LEED) certification. The Preferred Alternative can thus be expected to improve the study area’s ability to retain existing employment and attract new employment opportunities.

To the extent that the Preferred Alternative creates and/or supports employment and educational opportunities, it would have a positive effect on the income of affected households in the study area.

Displace small businesses will have an impact of lost revenue to shop owners and tenants. As described in Section 4.4.1, MTA will work with all the displaced businesses under the precepts of the Uniform Relocation and Real Property Acquisitions Policies Act of 1970 to ensure that all eligible business are provided the full protection of the law. Benefits could include advisory services, moving and re-establishment costs.

Employment, Earnings, and Output Effects

Implementing the Preferred Alternative would create positive employment, earnings, and output effects to the regional and local economies. The overwhelming majority of operations and maintenance spending is expected to occur within the regional study area economy (defined as Montgomery and Prince George’s Counties and Washington DC). Employment associated with operating and maintaining the Preferred Alternative would fall under the transit and ground passenger transportation industry sector. Table 4-15 shows the applicable regional multipliers and the

employment, earnings, and output effects from Preferred Alternative operations and maintenance expenditures. The multiplier effect for the transit and ground passenger transportation industry indicates that every million dollars of spending supports approximately 12 jobs in the study area economy.

Table 4-15. Regional Operations and Maintenance Jobs, Earnings, and Output Created Annually by the Preferred Alternative

Industry	# of Jobs ¹	Earnings (2012 \$)	Output (2012 \$)
Transit and Ground Passenger Transportation ¹	425	\$9,165,000	\$50,330,000

Note: Based on total O&M cost of \$38.3 million over the No Build Alternative and BEA RIMS II Direct Effect Multipliers, 2011 (1.956 for employment; 0.2393 for earnings; 1.3141 for output). To calculate employment effects, O&M costs were deflated to 2008 using BLS price index (Series id: PCU482).

¹One job is defined as a job for one person for one year.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, 2011.

Purple Line operations and maintenance expenditures (\$38.3 million annually over the No Build Alternative) would result in 425 additional permanent jobs for the regional study area economy. This employment would support a \$9.165 million annual increase in household earnings for the regional study area. This effect can also be expressed as a \$50.33 million increase in regional output. Because the MWCOG employment projection model assumed construction of the Purple Line, these jobs are included in the study area employment projections, and would not be in addition to the MWCOG estimates shown in Table 4-12. The numbers in Table 4-15 reflect the

difference between the No Build and the Preferred Alternative.

Tax Revenue Impacts

Table 4-16 shows the tax revenue effects resulting from the residential and commercial displacements related to the Preferred Alternative. A total of \$294,300 in property tax revenue would be lost in Montgomery County, and \$129,800 would be lost in Prince George's County once these properties are transferred to MTA ownership. These losses are small (0.02 percent) relative to the total tax base for the two counties, as is shown in Table 4-16. In addition, the Preferred Alternative has the potential to have a net positive effect on the tax base by increasing property values in the corridor (see Chapter 7.0). While the overall effect on a municipal scale is positive, on an individual scale there will be adverse impacts to some small businesses with lost earnings and lost wages.

Slight decreases in municipal tax revenue would also result from displacements related to the Preferred Alternative. The impact would be small relative to the tax bases of the study area municipalities. In addition, eight of the 16 study area neighborhoods would not experience any displacements. The largest number of residential displacements in a neighborhood (22) would occur in the Riverdale neighborhood.

The overall tax base in Riverdale Park is steadily growing due to the build-out of the M Square Research Park and will likely continue to grow with the 37-acre Cafritz future mixed-used development. The greatest value of commercial real estate would

Table 4-16. Tax Revenue Effects Resulting from Preferred Alternative Displacements

Region	2011–2012 Real Property Tax Rate (per \$100 assessed value)	Reduction in Assessed Value due to Displacements	Change in Tax Revenue Resulting from Project Displacements	% of Total Projected 2011–2012 Property Tax Revenue
Montgomery County	0.713	-\$41,277,400	-\$294,300	0.02%
Prince George's County	0.960	-\$13,525,000	-\$129,800	0.02%
Total: Purple Line Study Area	n/a	-\$54,802,400	-\$424,100	0.02%

Note: The results presented are for the counties only; the tax loss to the municipalities is not quantified. Tax loss was calculated for full acquisitions (which result in displacements) only; partial acquisitions were not included in the analysis.

Source: Tax rates from Montgomery County Approved FY 2012 Operating Budget, Prince George's County Budget in Brief, FY 2012; tax revenue analysis by PL GEC. Analysis based on total tax revenues of \$1.472 billion in Montgomery County, \$721 million in Prince George's County, and \$2,192 billion for the combined county region.

be displaced in Silver Spring and Takoma Park. However, these neighborhoods have large and diverse commercial tax bases. For these reasons, the immediate effect on municipal tax revenue is expected to be negligible, and the long-term effect is anticipated to be positive.

Local businesses that are displaced may choose to relocate within the same general area, minimizing the impact on the local tax base.

Avoidance and Minimization

MTA has worked to avoid or minimize property acquisition and displacement throughout the design and planning of the project. Recent design refinements such as the Lyttonsville Yard and Kenilworth Avenue are two areas where the number of commercial displacements was substantially reduced.

See Section 8.2.2 for a description of the Purple Line business outreach program and the activities conducted throughout the development of the project.

Minimization

No mitigation is warranted.

Short-term Construction Effects

Construction Impacts on Businesses

As described in Chapter 5.0, in selected areas of the corridor, temporary construction easements, lanes or road closures, or other property restrictions could have negative impacts to some businesses, thus negatively affecting the economy within the study area. Losses of parking and difficulty accessing businesses could deter customers and disrupt deliveries. Small businesses in particular could have difficulty withstanding the resulting loss of commerce. MTA is committed to supporting local businesses in the Purple Line corridor during construction. The Purple Line public outreach program includes a specific outreach effort to businesses. See Section 8.2.2 for more information on this program.

MTA will develop a Business Impact Minimization Plan to support small businesses in the corridor during construction. MTA is evaluating the experiences of other cities to minimize or mitigate

impacts and will use the “best practices” to support local businesses as much as possible. The following strategies have been used successfully in other locales, and may be included in the Purple Line plan:

- Construction of the project in segments, to keep disruption to a small area at a time
- Maintaining access to business during construction both for customers and deliveries
- Maintaining or relocating bus stops
- Maintaining parking lot access
- Providing directional signage
- Developing “Open for Business” marketing and advertising tools for use during construction
- Promotion of corridor businesses through social media and the project website
- Construction hotline open 24/7

MTA has reached out to the Montgomery and Prince George’s County Economic Development offices as well as CASA de Maryland to identify support services and resources available for small businesses. MTA will continue to coordinate with CASA de Maryland and other local business advocacy groups such as the Takoma Langley Crossroads Development Authority, and local Chambers of Commerce, and will continue to coordinate with the counties on how to facilitate use of these services and resources by Purple Line corridor businesses.

Most importantly, MTA will maintain open communication between the Purple Line public outreach team and local businesses, so business have no surprises and know who to call when they have questions or problems. As noted above, MTA coordination with affected commercial property owners has already started and will continue through project construction and implementation.

Employment and Output Effects from Capital Expenditures

The Purple Line will provide new employment opportunities in the project corridor, consisting mostly of short-term (construction) but some long-term (operations and maintenance) as well. MTA and the Maryland Department of Labor, Licensing and Regulation (DLLR) have identified the most common jobs that would be needed for the construction and operation of the Purple Line. They

have identified the skills and qualifications that workers would need for those jobs, and have compared that to the existing labor pool in the region. Where a shortage of particular workers exists, local job training and certification programs would be created. MTA and DLLR are in the process of identifying partners, i.e. labor unions, local workforce agencies, contractors, schools, and community-based organizations, in Montgomery and Prince George's Counties, with whom coordinated training efforts and pathways to employment can be developed.

The expenditures associated with the construction of the project would, like the ongoing O&M expenditures, impact jobs, earnings, and output in the regional study area (defined as Montgomery and Prince George's County and Washington DC). The economic impact of these capital expenditures to the region is dependent upon whether the goods and services in each spending category are produced locally. Two categories—general construction and professional services—are expected to be predominantly produced within the regional study area economy and would therefore affect local employment. Two cost categories—vehicles and right-of-way—were excluded from the Purple Line analysis because they would not cause an economic effect on the region. Light rail vehicles are not manufactured within the region and thus would not be purchased locally; right-of-way purchases do not involve the production of goods or services.

Table 4-17 shows the impacts of expenditures in construction and professional services (engineering) that would be required for the implementation of the Preferred Alternative. These impacts show the jobs, earnings, and output impacts within the

regional study area, including direct, indirect, and induced effects.

In total, the construction of the Preferred Alternative would result in approximately 6,300 new person-years of employment in the regional study area over the approximate five-year construction period. These jobs are associated with the construction of the project and do not represent an ongoing change to regional employment. This new employment would result in a \$334 million increase in household earnings for the regional study area. This effect can also be expressed as a \$2.1 billion change in output, or the value of goods and services produced, for the regional study area.

Avoidance and Minimization

Where reasonably feasible, vacant or publicly owned property, rather than developed property, would be identified for temporary use during construction activities. In addition, project design and the construction staging plans are continuing to be developed to reduce economic and other impacts on the surrounding communities. These avoidance and minimization efforts are described in other parts of this document (e.g., Chapter 3.0 and Section 4.4). Some of the more relevant measures include the careful scheduling and staging of construction activities to reduce the duration of short-term impacts and the development of a Transportation Management Plan considering the needs of affected properties, which would be developed in consultation with affected property owners and businesses.

Mitigation

As described in Chapter 8.0 MTA has and will continue to coordinate with affected commercial property owners to identify strategies to minimize

Table 4-17. Regional Jobs, Earnings, and Output Created by Capital Expenditures of the Preferred Alternative

Industry	# of Jobs ¹	Earnings (2012 \$)	Output (2012 \$)
Construction	4,800	\$235,039,000	1,539,613,000
Professional, Scientific and Technical Services	1,500	\$89,600,000	485,300,000
Total	6,300	\$324,639,000	\$2,024,913,000

Note: These impacts are based on construction cost of \$1,071 million and a professional services cost of \$316 million, plus a 5% unallocated contingency for construction and a 2% unallocated contingency for professional services (\$75 million and \$22 million, respectively).

¹One job is defined as a job for one person for one year. A job that lasts five years would equate to five jobs in this table.

Source: BEA 2011

the effects of temporary construction easements, lane or road closures, and other property restrictions on existing corridor businesses. MTA will implement a Business Impact Mitigation Plan as described in Section 4.19, Environmental Justice.

4.6 Parks, Recreational Land, and Open Space

This section describes the effect of the Preferred Alternative on parks, recreational land, and open space. Also discussed are minimization strategies MTA has taken to reduce effects on parks, recreational land, and open space, and mitigation measures MTA will undertake to offset impacts.

4.6.1 Regulatory Context and Methodology

The following regulations and guidance apply to parks, recreational land, and open space:

- **Section 6(f) of the U.S. Land and Water Conservation Fund (LWCF) Act of 1965 (16 USC 4601-4 to 4601-11, et seq.)**—regulates the use of parklands that were purchased or developed with LWCF funds.
- **U.S. Capper-Cramton Act of 1930**—authorizes funding for acquiring lands within Washington DC and the area immediately surrounding the Capital for the park and parkway system of the National Capital Region. It provides that “The development and administration thereof [lands acquired with funding under the Act] shall be under the Maryland National Capital Park and Planning Commission and in accordance with plans approved by the National Capital Park and Planning Commission.” NCPC has interpreted this Act to mean that any proposed development within lands acquired with funding under the Capper-Cramton Act must be submitted to NCPC for review and to the M-NCPPC for review and approval. In the Purple Line project study area, this requirement applies to the following parks: Rock Creek Stream Valley Park, Sligo Creek Stream Valley Park, Northwest Branch Stream Valley Park, Paint Branch Stream Valley Park, and Anacostia River Stream Valley Park. In compliance with the Capper-Cramton Act, the NCPC would review the analysis of the impacts of the

project to these stream valley parks, and the M-NCPPC would approve the analysis based upon the comments received from the NCPC. During their review of the AA/DEIS, the NCPC sent correspondence, dated January 16, 2009, informing FTA and MTA that it will consider the following factors when reviewing plans for development in these parks:

- Conformance with the *Comprehensive Plan for the National Capital: Federal Elements*
- Whether there is any federal transfer of properties, e.g., right-of-way acquisition from the National Park Service (NPS)
- Approval of the alignment of the future extension of the Capital Crescent Trail
- Impacts to water resources, including water quality, visual impacts, tree canopy removal, and ground disturbance
- Impacts to wildlife habitat

The following additional regulations and guidance also apply to parks, recreational land, and open space in the study area:

- Maryland Department of Natural Resources (MDNR) Open Space Program
- Moving Ahead for Progress in the 21st Century Act (P.L. 112-141) (MAP-21)
- U.S. Department of the Interior, National Park Service Code of Federal Regulations 36 Parts 1 to 199- Parks, Forests, and Public Property

The following additional regulations and guidance also apply to parks, recreational land, and open space in the study area:

- MDNR Open Space Program: The MDNR’s Program Open Space (POS) is a nationally recognized program that administers funds for the purchase and development of recreation areas and open space for public use. The conversion of land acquired or developed using POS funds requires the approval of the Secretary of MDNR, the Secretary of the Department of Budget and Fiscal Planning, and the Director of the Department of Planning. In addition, land conversion requires the replacement of the land used with land of at least equivalent area and of equal recreation or open space value.

- U.S. Department of the Interior, National Park Service Code of Federal Regulations 36 Parts 1 to 199—Parks, Forests, and Public Property, and

This assessment addresses parks and recreational resources owned or operated by M-NCPPC, the NPS, and the Town of Chevy Chase. No parks or recreational resources within the study area defined below are owned or operated by any other entities. Resources were identified using electronic data provided by M-NCPPC, NCPC, and NPS, through coordination with these agencies, and through field reconnaissance.

This assessment of impacts to parks, recreational lands, and open space resources has been coordinated with NCPC, M-NCPPC, and NPS; Appendix G includes correspondence from these agencies.

Section 4(f) of the U.S. Department of Transportation Act of 1966 requires the USDOT to demonstrate that no reasonable and feasible alternative exists to the use of property listed, or eligible for listing, on the National Register of Historic Places (NRHP) and of publicly-owned parks, recreational land, and wildlife or waterfowl refuges and to obtain concurrence from the U.S. Department of the Interior. See Chapter 6.0 for the Section 4(f) Evaluation for the Purple Line.

4.6.2 Affected Environment

The study area for assessing the impacts on parks, recreational land, and open space is a corridor of 500 feet on either side of the Preferred Alternative alignment. All resources within the study area have been evaluated to determine any direct or indirect impacts resulting from constructing or operating the project.

Twenty-five parks, recreational land, and open space resources are located within the study area. As the study area contains no properties purchased or developed using LWCF funding, Section 6(f) does not apply. The five stream valley parks (Rock Creek, Sligo Creek, Northwest Branch, Paint Branch, and Anacostia River) are subject to NCPC review and M-NCPPC review and approval under the Capper-Cramton Act.

MTA had a kickoff meeting with NCPC on February 22, 2012 regarding the Capper-Cramton Act funded parks within the study area. MTA held several additional meetings since that time to provide NCPC with updates for the proposed project and to receive input from NCPC. NCPC will have the opportunity to review and provide comments on the FEIS. As needed, additional coordination will occur between MTA and FTA and NCPC prior to finalizing the FEIS.

There are several different park categories within the proposed project area. While countywide parks serve all residents within Montgomery or Prince George's County, community use parks serve residents of surrounding communities. Parks are further classified as either recreational or conservation oriented. Following is a brief description of the types of parks found within the proposed project area:

- Stream valley parks are primarily countywide conservation-oriented parks that can be described as interconnected linear parks along major stream valleys that provide conservation and recreation areas. Stream valley parks vary in size and typically include hiker-biker trails, fishing, and picnic and playground areas.
- Local parks are community use parks that provide both programmed and unprogrammed recreational facilities. Local parks are typically approximately 15 acres in size and include facilities such as ball fields, play equipment, tennis and multi-use courts, sitting and picnic areas, shelters, buildings, and other facilities.
- Neighborhood parks are small community use parks, typically approximately 2.5 acres in size that provide informal recreation in residential areas. Facilities typically include a playground and fields, sitting areas, shelters, and tennis and multi-use courts.
- Urban parks are typically at least 0.1 acre in size and serve residents and workers from the surrounding area. These parks are designed for active recreation and include such facilities as athletic courts, playgrounds, or similar neighborhood recreational facilities.
- A parkway can typically be described as a broad, landscaped roadway that varies in

length. The recreational use of a parkway is typically driving.

The existing parks, recreational land, and open space resources are shown on Figure 4-3 and are described in Table 4-18.

4.6.3 Preferred Alternative

Long-Term Operational Effects

The Preferred Alternative would affect several parks, recreational lands, and open space resources adjacent to or crossed by the Preferred Alternative. The proposed project would improve some resources, e.g., by providing a direct connection between the Rock Creek National Recreational Trail and the Capital Crescent Trail.

For several park resources, the Preferred Alternative would require the permanent acquisition of strips of land immediately adjacent to existing roadways that would be widened along the boundaries of these resources. Such widening also generally would require removing trees.

The only developed facilities within parks that would be affected would be sitting areas, landscaped structures, artwork, decorative brick paving, and a parking lot within New Hampshire Estates Neighborhood Park. Access from major roadways to the Long Branch Community Center and Northwest Branch Stream Valley Park would be affected, with the new access being restricted to right-in/right-out, with no left turns into or out of these resources. Table 4-19 lists the affected resources and describes the nature of the project's impact.

NCPC Criteria for Approval

This section describes how the Preferred Alternative satisfies the NCPC's criteria for approval under the Capper-Cramton Act, identified in Section 4.6.1.

- **Conformance with the Comprehensive Plan for the National Capital: Federal Elements—**The Purple Line is generally consistent with the *Smart Growth and Sustainable Development Planning Principles* of the Comprehensive Plan as the Purple Line would improve mobility. In addition, as discussed in this FEIS the Purple Line would contribute to addressing poor air

quality, alleviating traffic congestion, and increasing access to parkland.

- **Federal transfer of properties—**MTA would acquire 0.61 acre of land from the NPS to reconstruct the Baltimore-Washington Parkway bridges over Riverdale Road (Table 4-19). MTA is coordinating with NCPC and NPS regarding the design of the new bridges, right-of-way needs, as well as construction and operational elements of the Purple Line where it intersects the parkway.
- **Approval of the alignment of the future extension of the Capital Crescent Trail—**MTA is coordinating with NCPC regarding the proposed alignment of the Capital Crescent Trail, especially with regards to how it would traverse Rock Creek Stream Valley Park. Beginning in February 2012, MTA met with NCPC to present the proposed project, including the proposed transitway and trail bridges through Rock Creek Stream Valley Park. MTA's coordination with NCPC is ongoing.
- **Impacts to water resources—**NCPC requested that MTA assess project impacts to water resources in its parks. MTA has determined that through intended compliance with state stormwater management regulations and use of best management practices, the Purple line would have minimal effect on water resources in the parks. The assessment is provided in Section 4.14 of this FEIS.
- **Impacts to wildlife habitat—**NCPC requested that MTA assess potential impacts of the project to wildlife habitat in its parks. MTA has determined that through its use of existing roadway corridors crossing most parks, impacts to and particularly loss of wildlife habitat in parks from right-of-way acquisition would be minimized. The assessment is provided within Section 4.13 of this FEIS.

Avoidance and Minimization

MTA has adjusted the alignment and/or limits of disturbance of the Preferred Alternative in several locations in an effort to minimize impacts to the parks, recreational lands, and open space resources. For example, Montgomery County would convey

0.03 acres that it currently owns to the Sligo Valley Creek Stream Park to reduce the permanent land impacts within this park. In addition, the project would include drainage improvements and water quality facilities in four stream valley parks (Sligo Creek, Long Branch, Northwest Branch, and Anacostia River), Long Branch Local Park, and New Hampshire Estates Neighborhood Park.

Mitigation

MTA will continue to coordinate with the agencies having jurisdiction over the affected parks to develop appropriate mitigation strategies. MTA, through coordination with M-NCPPC, the NCPC, the NPS, and the public, will implement the following measures:

- Expand and upgrade facilities and plant trees in Glenridge Community Park, as well as convert 2.04 acres of land currently used for the Prince George's County Parks' Northern Area Maintenance—Glenridge Service Center either to parkland within Glenridge Community Park or to upgrade and expand athletic fields at the Glenridge Elementary School. This strategy will reduce the permanent land impacts within the park from 5.32 acres to 3.28 acres.
- Restore park properties that are disturbed as a result of construction activities to acceptable conditions through coordination with the park owners.
- Provide replacement parkland for all park impacts; the amount and location of replacement parkland will be determined by MTA in consultation with park owners.
- Coordinate selective tree clearing and identification of significant or champion trees with agencies having jurisdiction.

MTA will continue to coordinate with the agencies having jurisdiction over the affected parks to develop additional appropriate long-term minimization and mitigation.

Short-term Construction Effects

The construction phase of the Preferred Alternative would result in short-term impacts to several parks, recreational lands, and open space resources. These impacts generally involve MTA obtaining an easement to occupy a portion of the park property

during construction to access the transitway work area, install temporary bridges in the case of the Baltimore-Washington Parkway, and install drainage pipes (see Chapter 5.0 for more detail on construction activities). Baltimore-Washington Parkway visitors using the exit ramps at Riverdale Road would experience a visual impact during construction as the temporary bridges would be located between the existing bridges and the exit ramps.

Parking and access would be temporarily affected at New Hampshire Estates Neighborhood Park. Other short-term impacts would occur to trails that would require temporary detours during construction to protect public safety. Table 4-19 summarizes these short-term effects by resource.

Avoidance and Minimization

MTA will continue to coordinate with the public and with the agencies having jurisdiction over the affected parks, to develop appropriate minimization strategies during construction, including advance public notice of planned activities and temporary changes in access. MTA will continue to coordinate with the agencies with jurisdiction for the duration of the proposed project, as appropriate.

Additional minimization efforts during construction will include the following:

- Roadway or sidewalk closures will be staged to maintain pedestrian and vehicular access.
- For trail detours needed during construction, MTA will coordinate with the agency having jurisdiction over the trail to identify and develop a plan for a temporary detour route; the trail routes will be restored at the end of construction.
- MTA will continue to coordinate with M-NCPPC and the NCPC regarding the design and construction of the Rock Creek Bridges and the trail connection to the Rock Creek Trail.

Figure 4-3. Parks, Recreational Lands, and Open Space within the Study Area

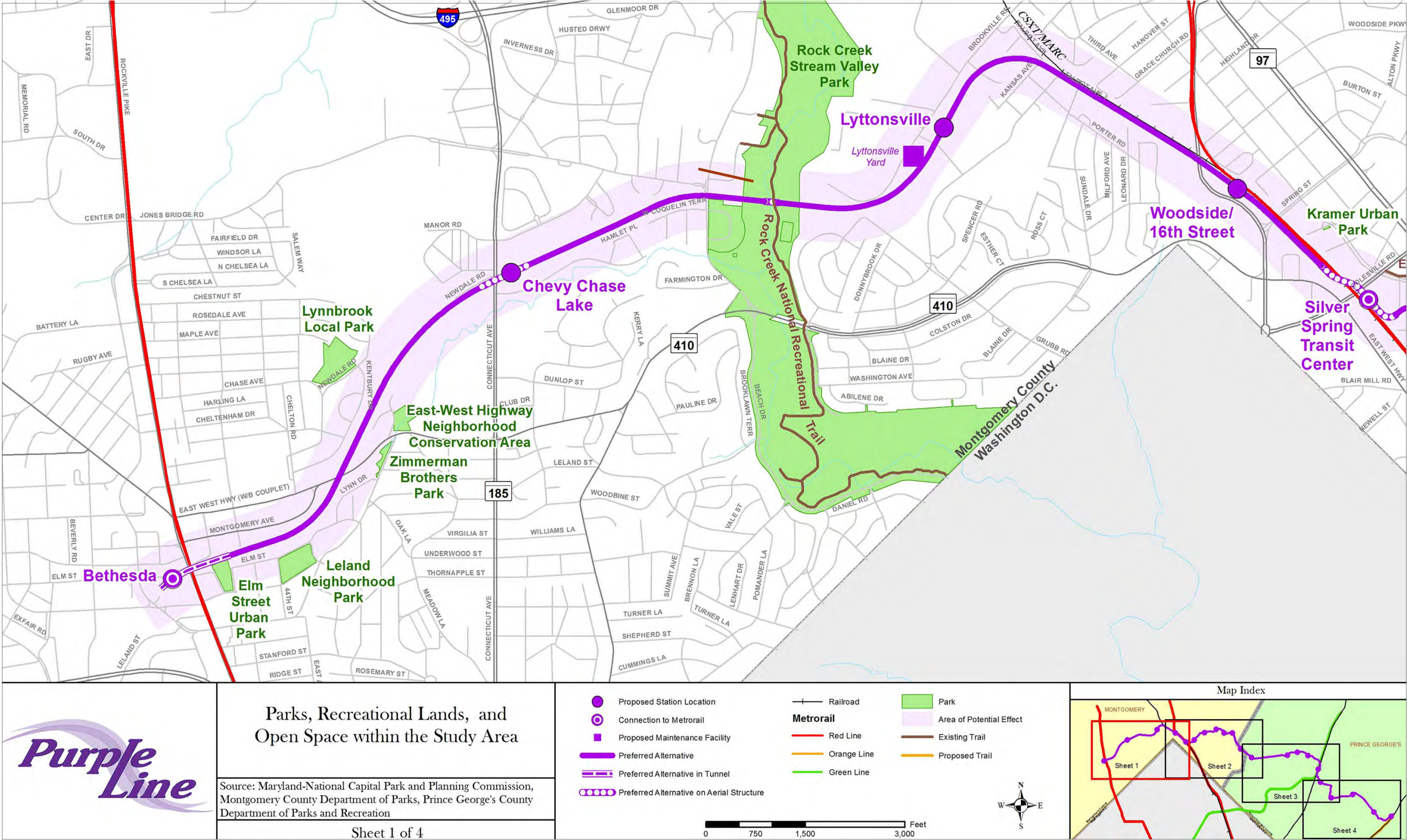


Figure 4-3. Parks, Recreational Lands, and Open Space within the Study Area (continued)

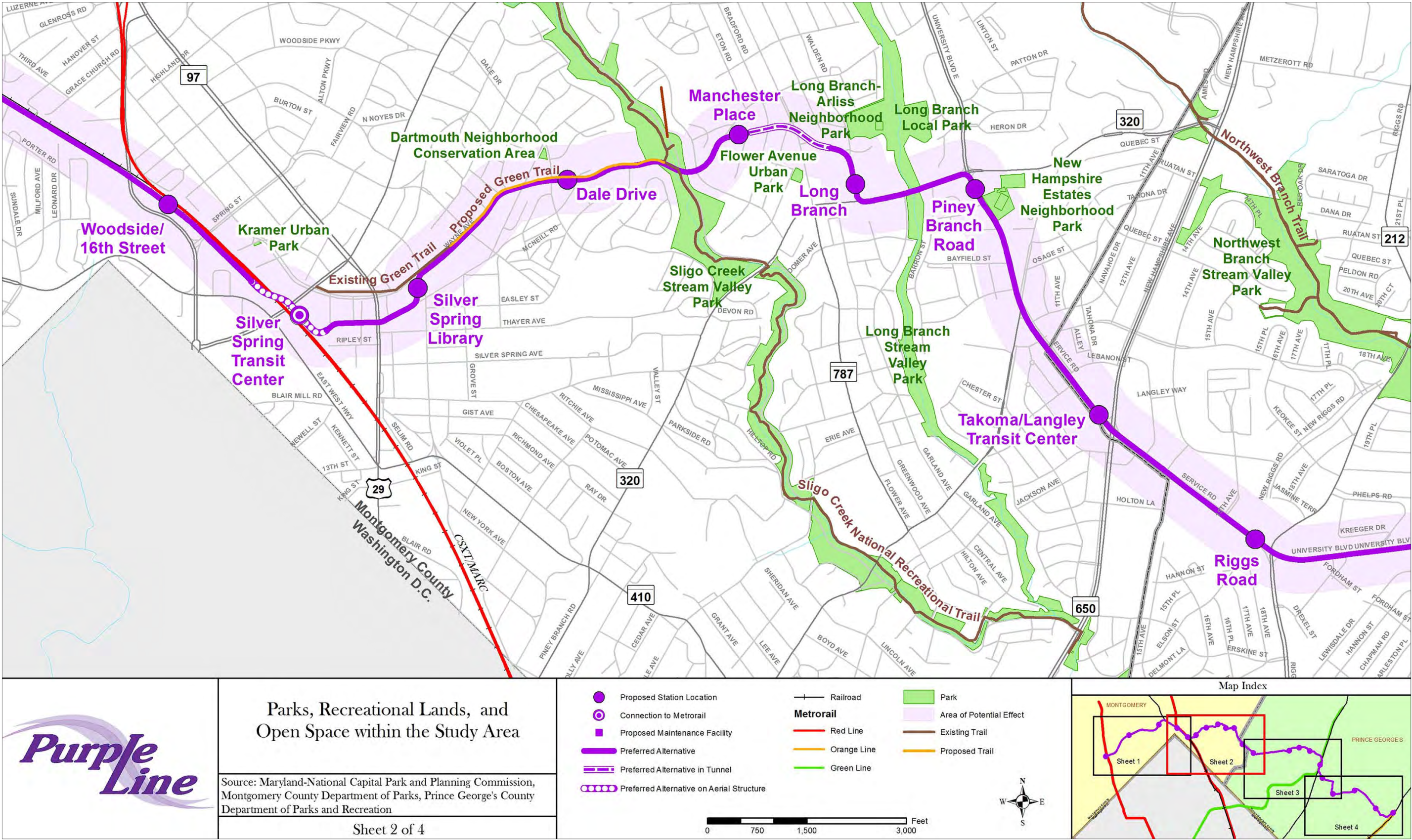


Figure 4-3. Parks, Recreational Lands, and Open Space within the Study Area (continued)

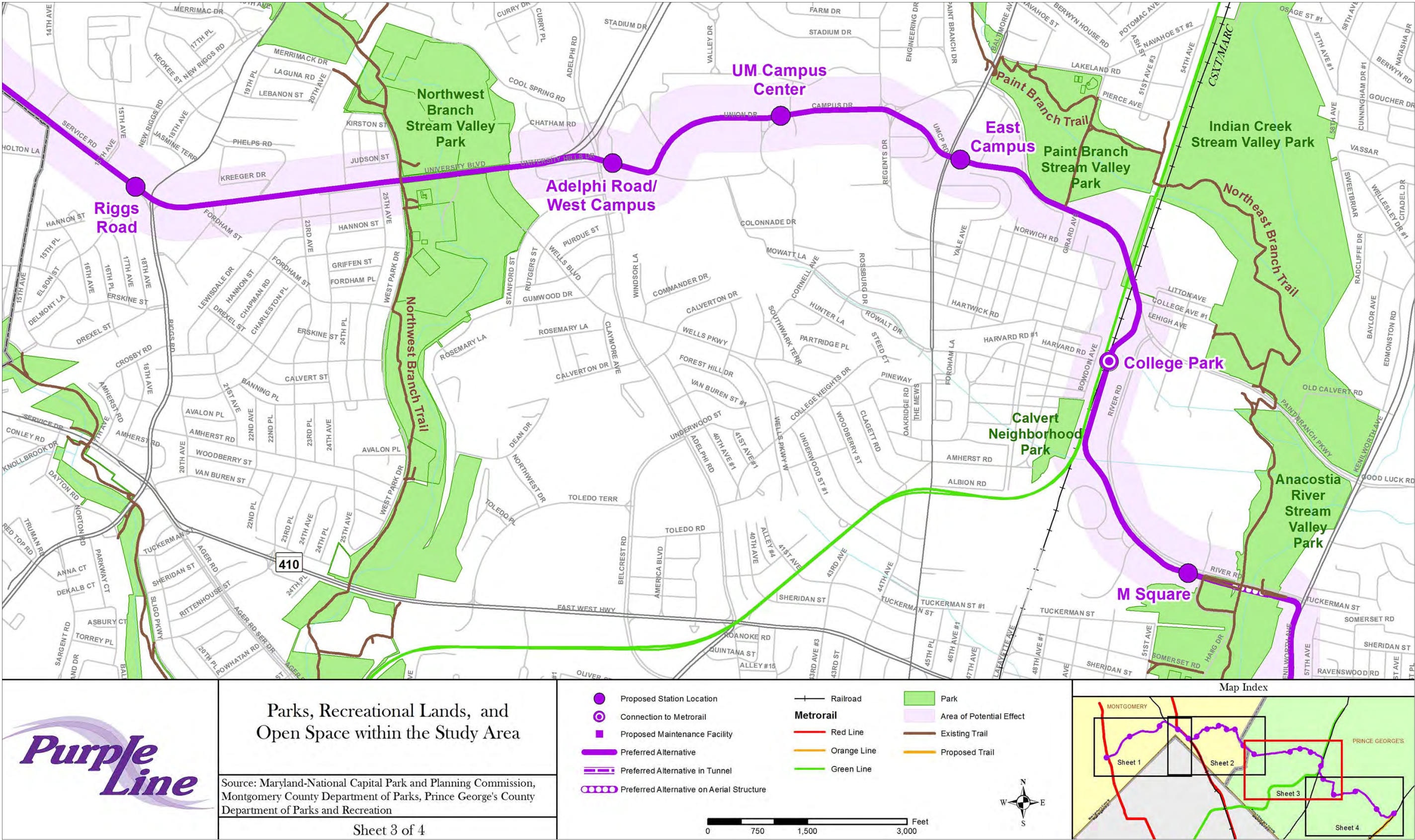


Figure 4-3. Parks, Recreational Lands, and Open Space within the Study Area (continued)

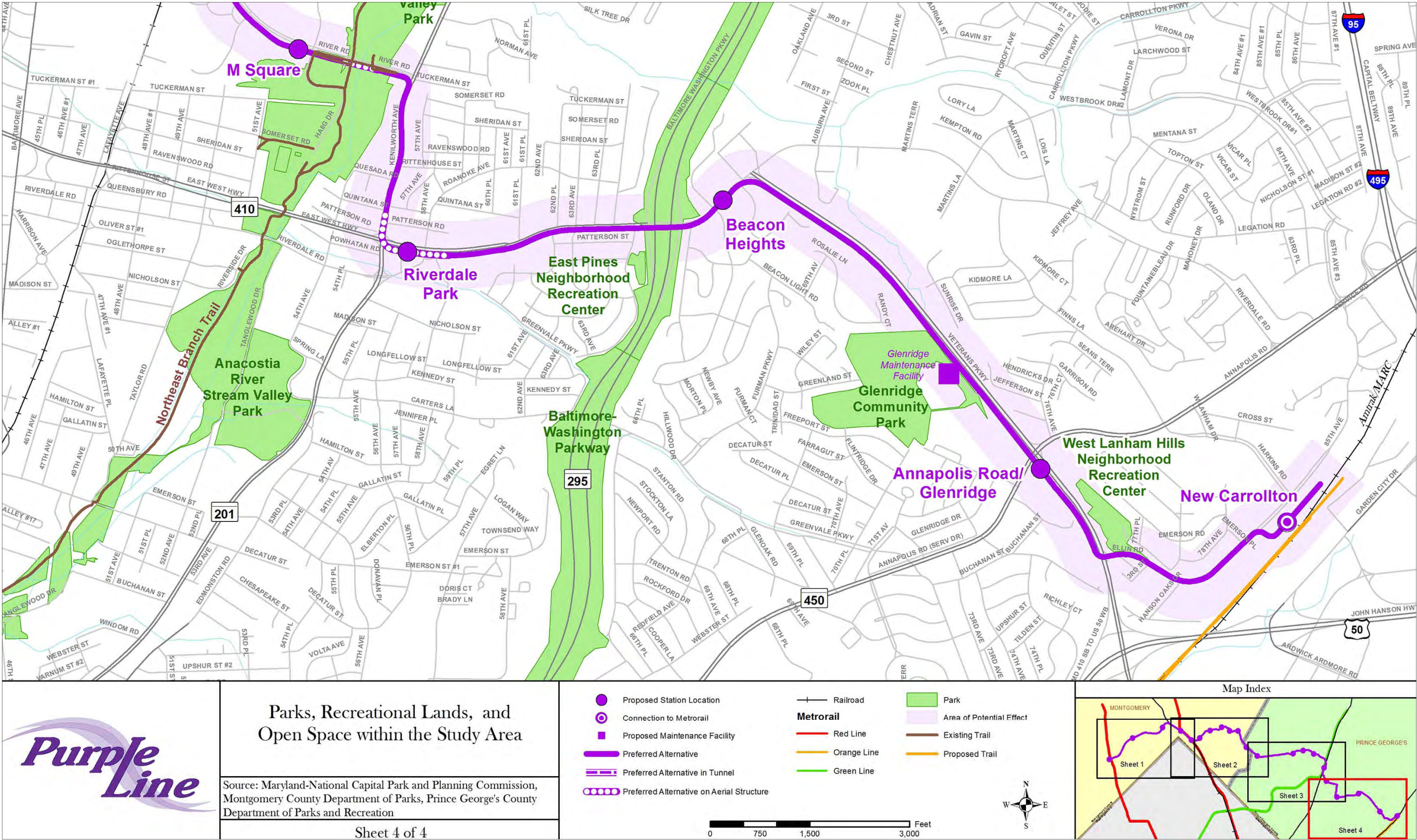


Table 4-18. Park Size, Location, and Description

Resource	Size	Owner	Location and Description
Elm Street Urban Park	2.1 acres	M-NCPPC	Urban park bounded by the Georgetown Branch ROW, 47th Street, Willow Lane, and 46th Street, south of transitway; includes playgrounds, a gazebo, several picnic tables, benches, trails, and public art. Reconstruction expected within the next few years.
Leland Neighborhood Park	3.7 acres	M-NCPPC	Neighborhood park bounded by Elm Street, Oakridge Avenue, Willow Lane, and 44th Street, south of transitway; includes a playground, a basketball court, two tennis courts, and a recreation center.
Zimmerman Brothers Park	1 acre	M-NCPPC	Local park bounded by East West Highway, Maple Avenue, Lynn Drive, and residential development, east of transitway; includes water spigots, landscaping, and a dog waste receptacle.
East West Highway Neighborhood Conservation Area	1.75 acres	M-NCPPC	Undeveloped neighborhood conservation area located to the east of Edgevale Street and north of East West Highway; east of the proposed alignment.
Lynbrook Local Park	5.8 acres	M-NCPPC	Local park bounded by Newdale Road, Kentbury Road, Rosedale Avenue, Maple Avenue, and Lynbrook Drive, west of transitway; includes playground, picnic, and softball and tennis facilities.
Rock Creek Stream Valley Park	3,960 acres	M-NCPPC	Stream valley park along Rock Creek from Olney-Laytonville Road in Montgomery County to the Washington DC line, crossed by transitway; includes the Rock Creek National Recreational Trail and other trails, lakes, historic plantations, athletic fields, playgrounds, and picnic areas. This park is eligible for the NRHP. The park and trail were purchased and developed, in part, using the POS funds.
Kramer Urban Park	0.25 acres	M-NCPPC	Urban park located at 2nd Avenue and Fenwick Lane, east of the transitway; includes sitting areas.
Dartmouth Neighborhood Conservation Area	0.6 acres	M-NCPPC	Neighborhood conservation area located north of Wayne Ave., south of the Dartmouth Avenue-Dale Drive intersection, north of transitway.
Green Trail (existing)	0.4-mile trail	M-NCPPC	A shared use bicycle and pedestrian trail located between Colesville Road and Cedar Street, north of transitway.
Sligo Creek Stream Valley Park	543 acres	M-NCPPC	Stream valley park located along the Sligo Creek floodplain, crossed by transitway, consists of seven different units, which include Sligo Creek National Recreational Trail and a network of other trails, playgrounds, softball fields, tennis courts, natural areas, picnic amenities and the Sligo Creek Parkway, which is NRHP eligible.
Flower Avenue Urban Park	0.4 acres	M-NCPPC	Urban park located west of Flower Avenue and north of Piney Branch Road, south of transitway; includes a playground and picnic area.
Long Branch Stream Valley Park	41 acres	M-NCPPC	Stream valley park located along Long Branch Creek from Franklin Avenue to Piney Branch Road, abuts transitway along the park's northern border; includes playgrounds, athletic facilities, picnic areas, natural areas, and trails. The park was acquired, in part, using POS Funding.
Long Branch Arliss Neighborhood Park	6 acres	M-NCPPC	Neighborhood park located east of Walden Road and west of Long Branch Local Park, north of transitway; includes a playground, tennis courts, basketball courts, and a picnic area.
Long Branch Local Park	14 acres	M-NCPPC	Local park located along Piney Branch Road, abuts transitway along the park's southern border; includes a playground, softball field, multi-use field, tennis courts, and a picnic area. The park was purchased and developed using POS funds.
New Hampshire Estates Neighborhood Park	4.7 acres	M-NCPPC	Neighborhood park located along Piney Branch Road and University Boulevard; abuts transitway along its southeastern edge; includes playgrounds, athletic facilities, and picnic areas. Facilities within the park were developed, in part, using POS Funding.
Northwest Branch Stream Valley Park	510 acres	M-NCPPC	Stream valley park located along the Northwest Branch of the Anacostia River between Riggs Road and Adelphi Road, crossed by the transitway; includes playgrounds, the Lane Manor Community Recreation and Aquatic Center, the Adelphi Manor Community Recreation Center, and the University Hills Neighborhood Park. The park contains trails including the Northwest Branch Trail along the Northwest Branch of the Anacostia River, and it links the Anacostia River Tributary Trail System and Wheaton Regional Park. The park was purchased and developed using Capper-Cramton Act and POS funding.
Paint Branch Stream Valley Park	Over 1,000 acres	M-NCPPC	Stream valley park located west of Paint Branch Parkway and UMD, south of Lakeland Road, north of transitway; includes the Paint Branch Trail and other trails and athletic fields. The portion within study area is undeveloped. The park was purchased in part using POS Funds.
Indian Creek Stream Valley Park	70 acres	M-NCPPC	Stream valley park located along the Indian Creek Stream Valley, north of Paint Branch Parkway, east of transitway; includes trails, recreational amenities, and forested areas.

Table 4-18. Park Size, Location, and Description (continued)

Resource	Size	Owner	Location and Description
Calvert Neighborhood Park	9 acres	M-NCPPC	Neighborhood park located along the existing CSX corridor in College Park, south of Erskine Road and east of Dartmouth Avenue, west of transitway; includes a playground, basketball courts, a softball field, and wooded recreational areas.
Anacostia River Stream Valley Park	794 acres	M-NCPPC	Stream valley park located along the Anacostia River Stream Valley, crossed by transitway; includes numerous playgrounds, athletic fields, various courts, trails, Edmonston Neighborhood Recreation Center, and Riverdale Community Recreation Center. The park was purchased and developed using Capper-Cramton Act and POS funding. Part of the Anacostia Tributary Trail system, the Northeast Branch Trail runs northeast from Baltimore Avenue near Hyattsville to Lake Artemesia, crossed by transitway; two national bicycle routes, the American Discovery Trail and the East Coast Greenway, converge to create one trail in the vicinity of the proposed project area.
East Pines Neighborhood Recreation Center	2 acres	M-NCPPC	Neighborhood park located to the west of the Baltimore-Washington Parkway, south of Riverdale Road and east of Eastpine Drive, south of transitway; includes playground space, basketball courts, a tennis court, and a community center.
Baltimore-Washington Parkway	19 miles of NPS roadway	NPS	Parkway extending from the eastern border of Washington DC to US 40 in Baltimore, crossed by transitway. Designed as a defense highway and alternative commuter route, it is listed in the NRHP.
Glenridge Community Park	53.5 acres	M-NCPPC	Community park located west of Veterans Parkway and the transitway, adjacent to the M-NCPPC Northern Area Maintenance — Glenridge Service Center (site of the Glenridge Maintenance Facility; includes a playground, athletic fields, basketball courts, tennis courts, a trail network, shelters, and picnic areas). The purchase of land and construction of the facilities within the park were funded in part using POS Funds.
West Lanham Hills Neighborhood Recreation Center	9 acres	M-NCPPC	Neighborhood park located in Landover Hills, abuts transitway along Ellin Road, as well as along portions of the west side of the park; includes a playground, recreation center, basketball court, tennis court, trail, and picnic area. POS funds were used to develop the playground, tennis and basketball courts, trail, and picnic facilities.

Source: M-NCPPC Montgomery County Department of Parks, M-NCPPC Prince George's County Department of Parks and Recreation, and National Park Service.

Table 4-19. Long-term and Short-term Effects

Affected Resource	Long-term Effects	Short-term Effects
Elm Street Urban Park	No long-term effects.	A 0.02-acre temporary construction easement for a trail connection from the park to the Capital Crescent Trail.
Rock Creek Stream Valley Park	The project would provide a direct connection between the Rock Creek National Recreational Trail and the Capital Crescent Trail. Removal of trees from the existing county-owned right-of-way would be required, resulting in visual impacts to the park, including the alteration of views from the trail and of the trail from adjacent properties.	Temporary trail detour during bridge construction.
Sligo Creek Stream Valley Park	Acquisition of 0.24 acre north and south of Wayne Avenue for roadway widening; 0.03 acres of land currently owned by Montgomery County would be conveyed to the park for use as parkland. This would reduce the permanent land impacts within the park to 0.21 acres. Tree removal would be required for the realignment of Sligo Creek (see Section 4.13 for more details).	A 1.68-acre temporary construction easement for the bridge, drainage upgrades and stream realignment; vegetation removal for construction, grading, and access.
Long Branch Stream Valley Park	Acquisition of 0.11 acres to widen Piney Branch Road and reconstruct sidewalks; access would be changed to right-in/right-out only. Tree removal would be required for the roadway widening and drainage improvements.	A 0.36-acre temporary construction easement for grading, bridge construction and culvert extension; vegetation removal for construction, grading, and access.
Long Branch Local Park	Acquisition of 0.02 acres to widen Piney Branch Road and reconstruct sidewalks; access from Piney Branch Road would be changed to right-in/right-out only. Tree removal would be required for the roadway widening and drainage improvements.	A 0.28-acre temporary construction easement for grading, bridge construction and culvert extension; vegetation removal for construction, grading, and access.

Table 4-19. Long-term and Short-term Effects (continued)

Affected Resource	Long-term Effects	Short-term Effects
New Hampshire Estates Neighborhood Park	Acquisition of 0.20 acres to widen University Boulevard to accommodate the proposed transitway and construct the proposed Piney Branch Station at the intersection of University Boulevard and Piney Branch Road; impacts would occur to sitting areas adjacent to University Boulevard, a parking lot and some of the existing aesthetic features such as landscaped structures, artwork, and decorative bricks, would be removed.	A 0.35-acre temporary construction easement for grading associated with roadway widening and upgrading existing stormwater culvert; temporary change to parking and access.
Northwest Branch Stream Valley Park	Acquisition of a combined total of 0.80 acres north and south of University Boulevard for roadway widening; access to the park would be changed to right-in/right-out only, due to closure of the median openings on the University Boulevard between West Park Drive and Adelphi Road. Tree removal would be required for the roadway widening and drainage improvements.	A 3.45-acre temporary construction easement for drainage upgrades, bridge construction, and temporary stream diversion; temporary trail detour.
Anacostia River Stream Valley Park	Acquisition of 1.36 acres to accommodate transitway on the south side of River Road. Tree removal would be required for the roadway widening and drainage improvements.	A 2.58-acre temporary construction easement for staging and bridge construction; temporary trail detour during bridge construction; vegetation removal for construction, grading, and access.
Baltimore-Washington Parkway	Acquisition of 0.61 acres to accommodate transitway along Riverdale Road; replacement of the existing bridges with two longer structures and the replacement of the southern abutments. Minor tree removal would be required within the median of the parkway directly south of Riverdale Road for the lengthening of the parkway bridges.	A 6.72-acre temporary construction easement for bridge and transitway construction; temporary bridges; includes minor tree removal within the median of the parkway directly south of Riverdale Road for the lengthening of the parkway bridges.
Glenridge Community Park	Acquisition of 5.32 acres for the Glenridge Maintenance Facility and its connection to the transitway, requiring approximately 4.1 acres of tree removal within an existing forest conservation area to the west and south of the existing Northern Area Maintenance Yard; 2.04 acres of land currently owned by M-NCPPC and used as part of the Northern Area Maintenance Yard would be conveyed to the park for use as parkland, reducing the permanent land impacts within the park to 3.28 acres.	A 0.37-acre temporary construction easement for the Glenridge Maintenance Facility; includes tree removal and grading.
West Lanham Hills Neighborhood Recreation Center	No long-term effects.	A 0.08-acre temporary construction easement to replace an existing drainage culvert; includes grading existing channel.

4.7 Built Historic Properties

This section describes the effects of the Preferred Alternative on built historic properties, which include historic districts, sites, buildings, structures, and objects that are listed in or eligible for listing in the NRHP. It presents quantitative data regarding the presence of historic properties that are listed in, or eligible for, the NRHP, along with assessments of the Preferred Alternative's effects to these historic properties. Also discussed are minimization strategies MTA has taken to eliminate or reduce effects on historic properties, mitigation measures MTA would undertake to offset adverse effects, and the consultation MTA has undertaken with the

affected property owners. Additional information regarding the effects assessment is presented in the *Purple Line Section 106 Assessment of Effects Report for Historic Properties*.

4.7.1 Regulatory Context and Methodology

Section 106 of the National Historic Preservation Act of 1966, as amended, (16 USC 470) requires federal agencies to consider the effects of their project undertakings on any district, site, building, structure, or object that is either listed in the NRHP or are eligible for listing. Section 106 also provides an opportunity for the Advisory Council on

Historic Preservation (ACHP) to comment on federal undertakings.³

Area of Potential Effects

The study area for historic properties is referred to as the Area of Potential Effects (APE). The APE defines the area within which the project would possibly directly or indirectly adversely affect historic properties (36 CFR 800.16(d)). For this project, the APE includes a 1,000-foot corridor centered on the Preferred Alternative alignment. This APE was established in consultation with the MHT in November 2011, which is the State Historic Preservation Office in Maryland. Built resources within the APE were assessed for NRHP eligibility. The APE is illustrated in the aforementioned Figure 13 of the *Purple Line Section 106 Assessment of Effects Report for Historic Properties*.

Section 106 Consultation

The guiding regulations, 36 CFR 800, provide the process to carry out Section 106 requirements including giving the State Historic Preservation Officer (SHPO), other consulting parties and the public the chance to comment on projects. The FTA and MTA have included the Montgomery and Prince George's County Historic Preservation Commissions in the planning process. They have been invited to participate in the Section 106 consulting party process and have been solicited for comments on the AA/DEIS and FEIS.

Under Section 106, federal agencies are required to provide the public with information about a proposed project and its effects on historic properties and to seek public comment and input. As required by Section 106, consulting and interested parties for historic properties in the Purple Line APE were identified. These parties were invited to discuss effects to historic properties and provide comments on the effects. MHT is a consulting party. FTA and MTA will coordinate with MHT and other consult-

ing parties to develop appropriate mitigation measures for adverse effects to historic properties.

The public was initially provided with an opportunity to comment on the historic properties identification and evaluation process at three series of public open houses held in June 2006, December 2007, and May 2008. These were held in Bethesda, Silver Spring, Takoma/Langley Park, College Park, and New Carrollton. An environmental resources map showing all recorded historic properties (NRHP and Maryland Inventory of Historic Properties [MIHP]) was on display at each public meeting. In addition, a display board explaining Section 106 and the public involvement process was provided.

Beginning during the AA/DEIS and continuing during the FEIS, MTA invited consulting parties to participate in the Purple Line project Section 106 process. The consulting parties invited were the following:

- Anacostia Trails Heritage Area, Inc.*
- Columbia Country Club*
- Falkland Chase
- Friends of Sligo Creek
- Hawkins Lane Historic District*
- Heritage Tourism Alliance of Montgomery County
- Historic Takoma, Inc.*
- Hyattsville Preservation Association, Inc.*
- Lincoln Park Historical Foundation*
- Maryland Historical Trust*
- Maryland-National Capital Parks and Planning Commission, Montgomery County*
- Maryland-National Capital Parks and Planning Commission, Prince George's County*
- Montgomery County Historic Preservation Commission
- Montgomery Preservation, Inc.
- National Institutes of Health, Office of Communications and Public Liaison
- National Capital Planning Commission*
- National Park Service*
- North College Park Citizens Association*
- Old Town College Park Preservation Association
- Peerless Rockville Historic Preservation, Ltd.

³ Applicable laws include Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA) (36 CFR 800), Section 101(b)(4) of the National Environmental Policy Act of 1969, Section 1(3) and 2(b) of Executive Order 11593, the Maryland Environmental Policies Act of 1973, and the Maryland Historical Trust (MHT) Act of 1985.

- Prince George's County Historical and Cultural Trust*
- Prince George's County Historic Preservation Commission
- Prince George's County Historical Society
- Prince George's Heritage, Inc.
- Redevelopment Authority of Prince George's County
- Riverdale Historical Society
- Rockville Historic District Commission
- Silver Spring Historical Society*
- University Hills Civic Association
- University of Maryland*

On March 9, 2012, a follow up letter was sent to all parties requesting confirmation of their continued interest. Those who responded (noted with an asterisk [*]) were provided information regarding planning for meetings.

A series of meetings with the public and the consulting parties has been initiated and a dialogue opened regarding historic properties, project effects, and mitigation measures to treat properties determined to be adversely affected. The first consulting party meeting took place on June 11, 2013 to discuss MHT's NRHP-eligibility determinations and the NRHP-listed resources within the study area. A subsequent consulting party meeting on August 8, 2013 discussed the Purple Line's effect on NRHP eligible or listed resources. The consulting parties will be invited to participate in the development of a programmatic agreement to address adverse effects to historic properties, which would be signed by MTA and the entities with jurisdiction over the affected properties.

A preliminary Draft Section 106 Programmatic Agreement for the Purple Line is included in this FEIS for review in accordance with 36 CFR Part 800.6, and is subject to change based on comments from the public and consulting parties. The preliminary Draft Section 106 Programmatic Agreement is provided in Appendix H of the FEIS. FTA will have an executed Programmatic Agreement prior to the Record of Decision. In addition to the consulting party requests, in a letter dated February 20, 2013 FTA invited the following tribal organizations to consult on the

on-going historic resource studies for the Purple Line project:

- Tuscarora Nation
- Shawnee Tribe
- Saint Regis Mohawk Tribe
- Delaware Tribe of Indians
- Onondaga Nation
- Oneida Indian Nation
- Eastern Shawnee Tribe
- The Delaware Nation
- Absentee-Shawnee Tribe of Oklahoma

These tribes were also invited to the consulting party meeting by telephone.

Identification of Properties

The Purple Line historic resources evaluations included efforts to identify previously identified and/or evaluated properties within the APE and field investigations to identify any previously unidentified resources more than 40 years of age within the corridor. In general, properties less than 50 years of age are presumed to be ineligible for the National Register, unless they possess exceptional importance. Assessments of properties for potential eligibility focus on properties that are reasonably expected to be 50 years of age or older at the time of construction. Because construction is expected to occur over a period of several years following completion of the environmental review process, the eligibility assessment include all resources 40 years of age or older at the time the assessment was performed. Efforts were designed to identify and evaluate all resources within the APE that meet the basic NRHP age threshold.

Once the APE was established for the Preferred Alternative, the properties identified in the AA/DEIS became the focus for additional research and evaluation. These properties had been identified using MHT databases, field reviews, and public input as noted above. The information from the AA/DEIS was presented in technical reports (*Architectural History Technical Report*, MTA, 2008; *Phase Ia Archeological Assessment Survey Technical Report*, MTA, 2008).

Architectural fieldwork and archival research on resources in the Purple Line corridor were completed from 2010 through 2012. The MTA

conducted additional data collection, archival research, and fieldwork, and then produced MHT Determination of Eligibility (DOE) forms for each historic property. The MTA also evaluated nine previously identified properties that had not been evaluated for NRHP eligibility and/or required an addendum form and 266 previously unidentified properties within the APE. In total, 278 architectural resources were evaluated for the Purple Line study.

Among properties re-evaluated are the Columbia Country Club, the University of Maryland, and the portion of the Baltimore-Washington Parkway traversed by the project. The properties were re-evaluated to assess the contributing and non-contributing elements in greater detail.

Additional information and correspondence related to the Section 106 process, including concurrence on the APE and DOE forms, is provided in Appendix G.

4.7.2 Affected Environment

Twelve historic properties within the APE were previously recorded and are either eligible for, or are listed in, the NRHP. The additional eleven properties identified through MTA's research bring the total number of historic properties eligible for, or listed in the NRHP within the APE to 23. These properties are shown on Figure 4-4 and described in Table 4-20 and are arranged geographically from west to east along the Preferred Alternative alignment.

4.7.3 Preferred Alternative

Effects Assessments

To assess the effects of a proposed project on historic properties, the criteria of adverse effect are applied to each resource studied (36 CFR 800.5(a)). Adverse effects occur when a proposed project undertaking alters, directly or indirectly, any characteristics that make a historic property eligible for the NRHP. Chapter 5.0 provides information on the anticipated construction activities for the Preferred Alternative. Alterations involve diminishing the integrity of location, design, setting, materials, workmanship, feeling, or

association of the historic property. Adverse effects from a proposed project take into account reasonably foreseeable effects that occur later in time, are removed from the resource in distance, or are cumulative in nature.

FTA has made preliminary effects findings for each of the eligible or listed historic properties summarized in Table 4-21. FTA is seeking input from the consulting parties and concurrence from MHT regarding these preliminary effects findings. The preliminary findings are included in the *Purple Line Section 106 Assessment of Effects on Historic Properties Report*.

Each historic property that had a finding of No Adverse Effect or Adverse Effect is described below, followed by a discussion of avoidance, minimization, and proposed mitigation measures. A programmatic agreement is being prepared that contains all of the minimization and mitigation commitments related to historic properties. A draft of the programmatic agreement is contained in Appendix H of this FEIS. Preliminary Section 106 mitigation concepts include:

- Prepare Historic American Buildings Survey/ Historic American Engineering Record documentation for the historic properties that will be demolished
- Prepare web-based map providing documentation and educational information on historic properties within the APE
- Develop an interpretive plan that will include historically themed signage or incorporation of historic images at stations
- Provide consulting parties with the opportunity to review and comment on project plans during engineering design phases
- Develop a plan to monitor impacts to historic properties during construction
- Continue coordination with consulting parties throughout design and construction

Potential noise and vibration effects of the project have been analyzed in Sections 4.11 and 4.12. None of the historic properties would be impacted by project-related noise or vibration; thus, those effects are not described individually below.

Figure 4-4. Maryland Historical Trust/National Register Eligible or Listed Properties

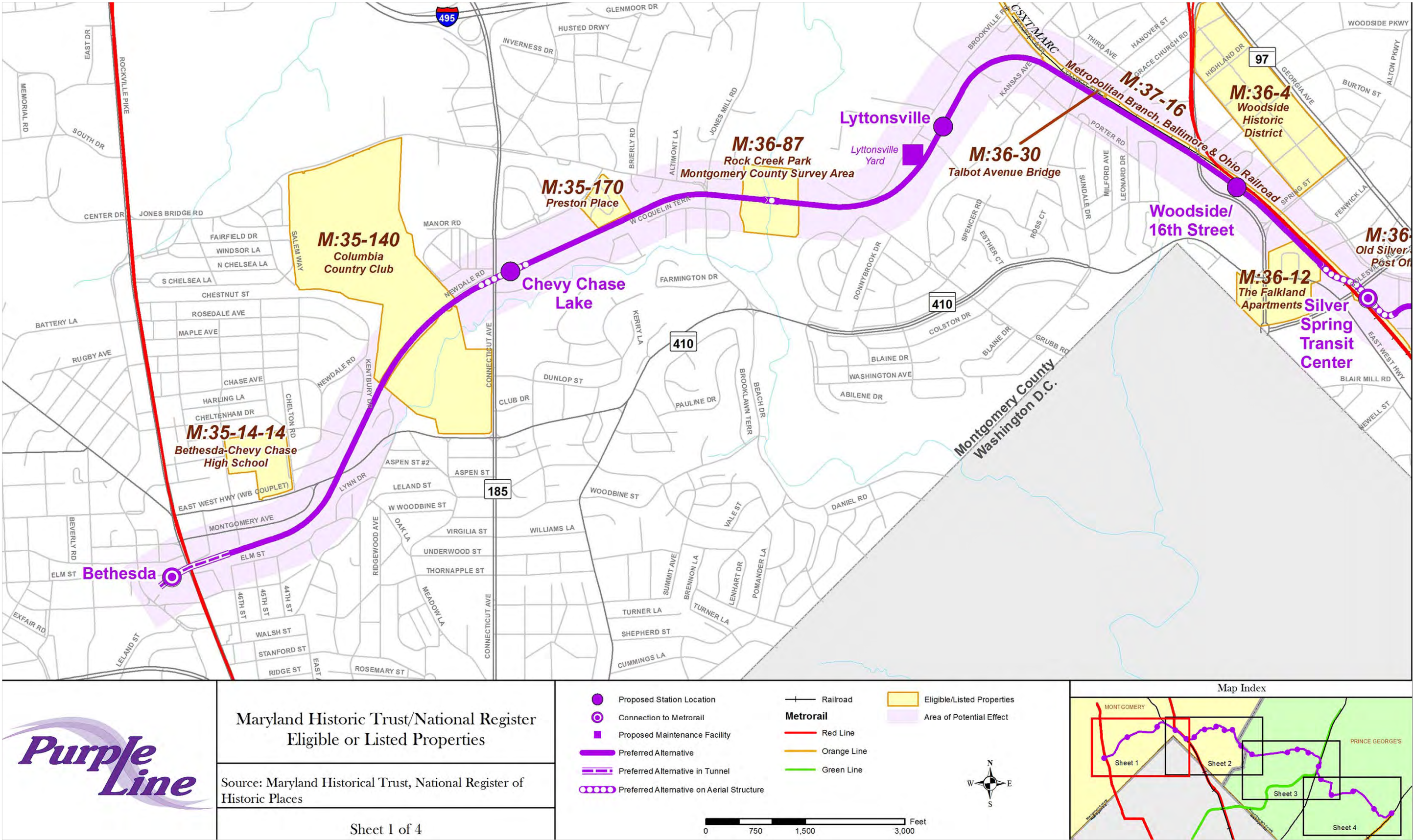


Figure 4-4. Maryland Historical Trust/National Register Eligible or Listed Properties (continued)

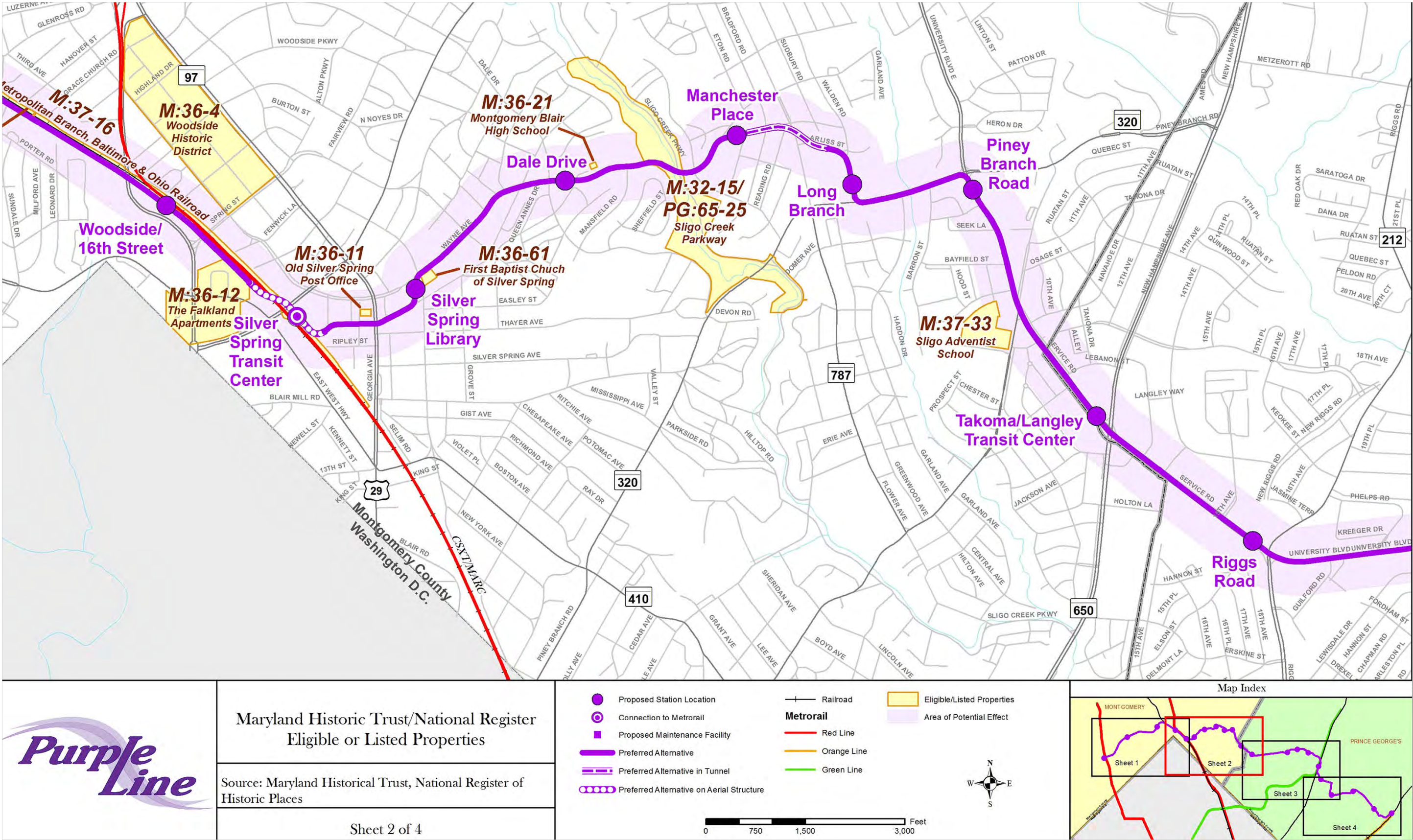


Figure 4-4. Maryland Historical Trust/National Register Eligible or Listed Properties (continued)

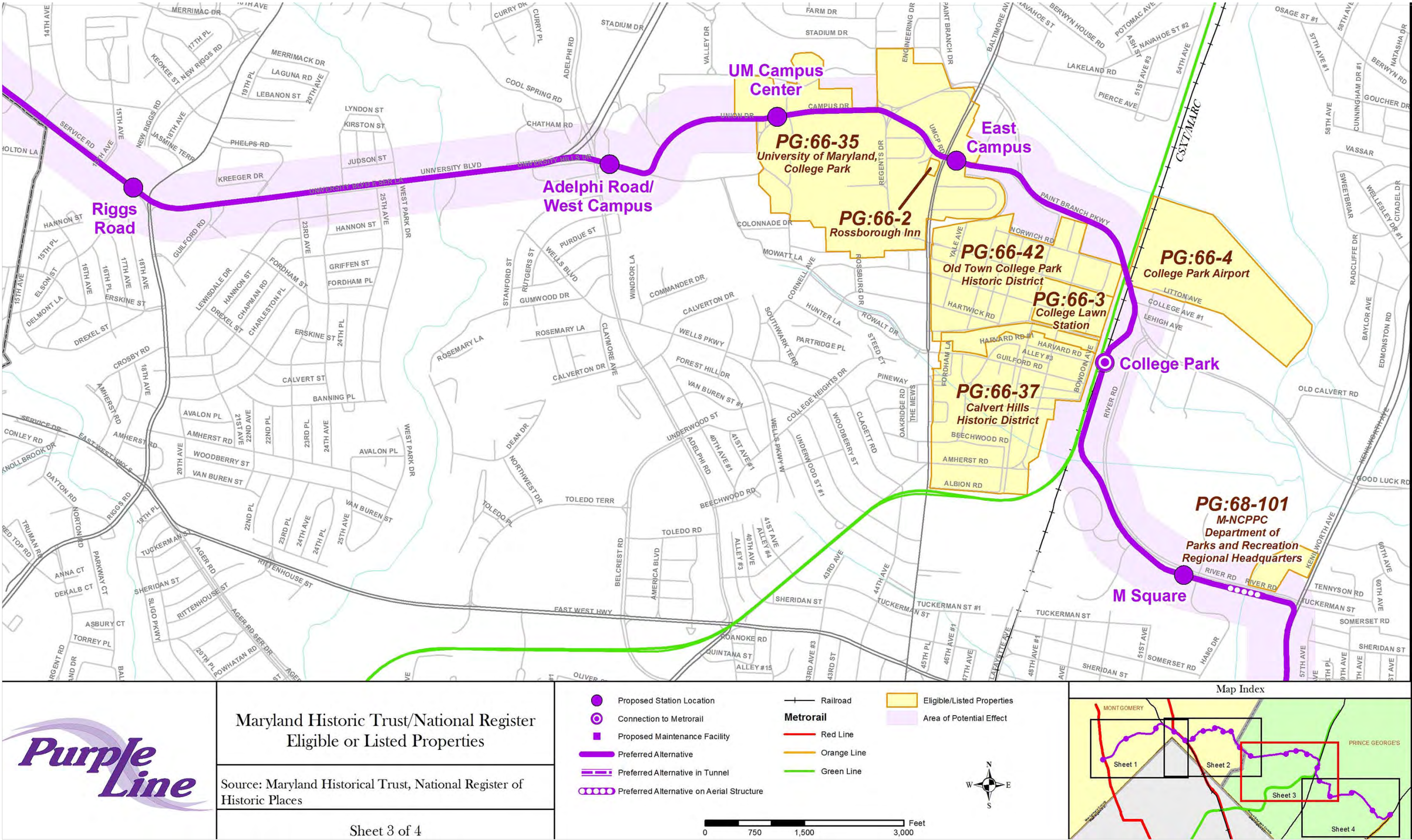


Figure 4-4. Maryland Historical Trust/National Register Eligible or Listed Properties (continued)

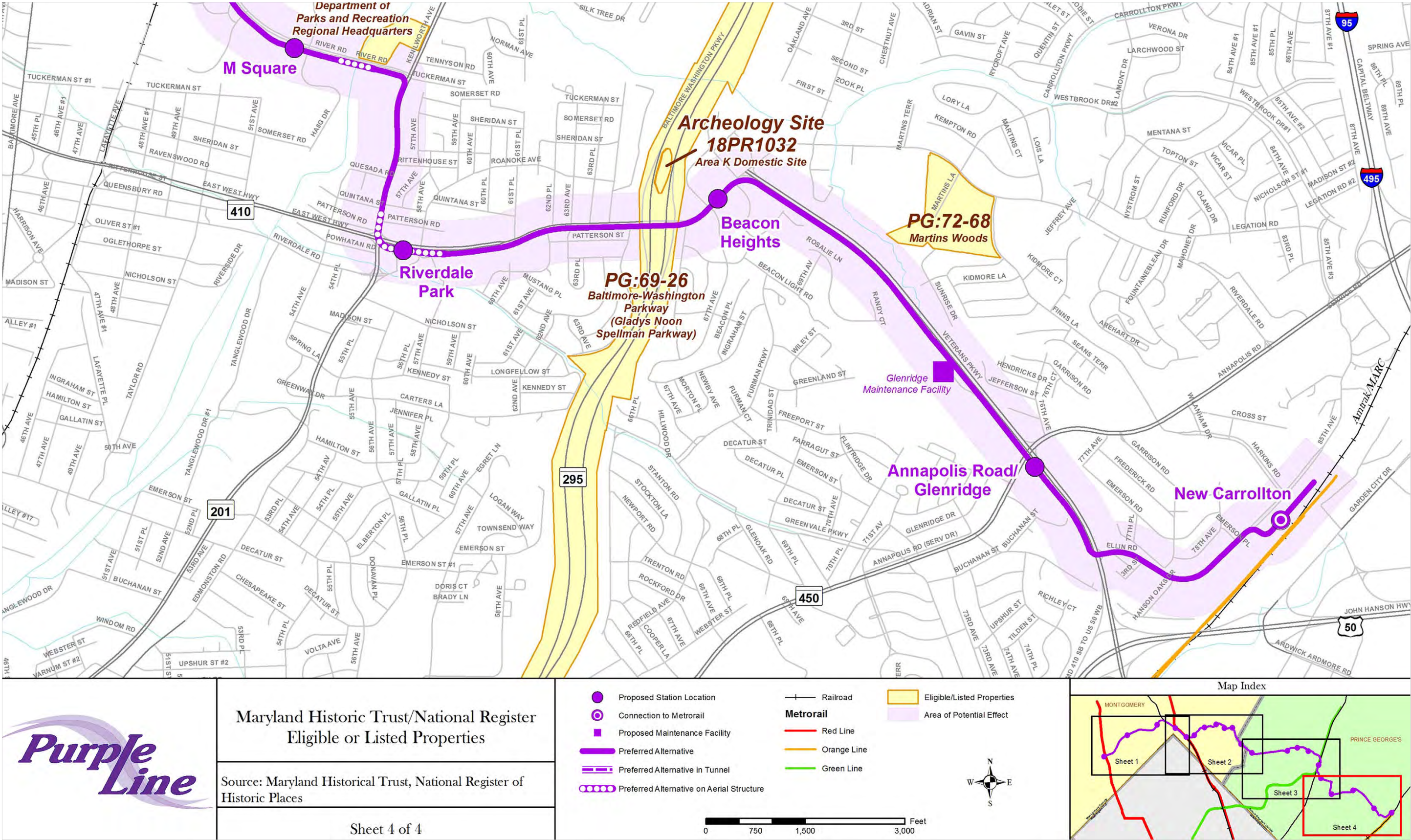


Table 4-20. Eligible/Listed Historic Properties within the Purple Line APE

Inventory #	Historic Property	Description	Eligibility & Applicable Criteria ¹
M: 35-14-14	Bethesda-Chevy Chase High School	The Colonial Revival civic structure was built circa 1935. Built to accommodate the increasing population of the intra-war period; it emulates contemporary civic structures. A separate Administration Building was built in 1952.	Eligible, A & C 10/2012
M: 35-140	Columbia Country Club	The golf course and club house were built in 1911. The course was reconfigured in 1917 to its basic current layout.	Eligible, A & C 11/2002 (11/2012)
M: 35-170	Preston Place	This multi-family residential neighborhood south of Manor Road is comprised of nine groupings of 67 residential units constructed in 1958. It was built to accommodate the growing post-war population and served as a model for other suburban townhome complexes in the Washington DC area.	Eligible, A & C 03/2012
M: 36-87	Rock Creek Park Montgomery County Survey Area	This Montgomery County portion of a nearly 4,000-acre park protects the watershed by preserving the natural landscape in an urban park; the Survey Area includes the creek, a trail and an athletic field.	Eligible, A 11/2012
M: 37-16	Metropolitan Branch, B&O Railroad	Constructed between 1866 and 1873 to carry passengers and goods, the line spurred growth along its 40-mile corridor. Although some features have been replaced or upgraded, new elements have retained the general configuration of the previous components.	Eligible, A & C 10/2000
M: 36-30	Talbot Avenue Bridge	The structure was built in 1918 to cross the Metropolitan Branch, and it contains most of the original elements of the three-span, single-lane metal girder bridge. It is a contributing element to the NRHP-eligible Metropolitan Branch B&O Railroad.	Eligible, C 04/2001
M: 36-4	Woodside Historic District	Benjamin Leighton created the Woodside neighborhood in 1899 primarily for commuters who worked in DC. Houses were constructed using popular turn-of-the-century architectural features and styles such as the Queen Anne, Colonial/Tudor Revival, and Craftsman/Bungalow. The bucolic, tree-lined streets and wide roads continue to lend a park-like atmosphere to the subdivision. The district is bounded by George Avenue, Second Avenue, Spring Street, and Grace Church Road in Silver Spring.	Eligible, A & C 06/1994
M: 36-12	The Falkland Apartments	One of the Federal Housing Administration's first projects, the complex was built in 1937 to accommodate the growing population. It consists of 450 residential units on 22 acres of land. The buildings, most of which include Colonial Revival decorative elements, are two- and three-stories tall, clad in brick, and decorated with a projecting cupola.	Eligible, C 08/1999
M: 36-11	Old Silver Spring Post Office	Built in 1935 under the guidance of the Works Progress Administration, this Colonial Revival Style building had several Beaux Arts decorative motifs. It ceased operation in 1981, and in 1997 it was converted for use as the Silver Spring Library.	Eligible, A & C 04/1981
M: 36-61	First Baptist Church of Silver Spring	The church property includes several contributing resources: a 1956 Modernist church designed by Ronald Senseman, a 1925 Colonial Revival former parsonage building, a 1950 temporary sanctuary, two 1930s bungalows, a playground, and parking lots. Founded in 1924, the church used the parsonage for all church-related events until the construction of the formal church building in 1956.	Eligible, C 09/2012
M: 36-21	Montgomery Blair High School	Constructed in the Colonial Revival style in 1934, it was modeled after the "Wren Building" at the College of William and Mary in Williamsburg, Virginia. Large additions were added to the rear elevation in 1951 and the 2000s, while the windows were replaced in 1984.	Eligible, C 09/1998
M: 32-15 PG:65-25	Sligo Creek Parkway	This resource includes both the parkway and the surrounding viewshed. The five-mile long, 300-foot-wide parkway property runs from University Boulevard in Silver Spring to New Hampshire Avenue in Takoma Park. Designed in the 1920s, the parkway includes a two-lane road and access to several recreational sites along the meandering road, including a golf course, playgrounds, and pedestrian paths. Many of the recreational components and associated infrastructure remain intact.	Eligible, A & C 10/2000

Table 4-20. Eligible/Listed Historic Properties within the Purple Line APE (continued)

Inventory #	Historic Property	Description	Eligibility & Applicable Criteria ¹
M: 37-33	Sligo Adventist School	The building was designed to replace several temporary facilities in 1964; the Adventists had established an elementary school in the area as early as 1917. The school site included elements such as linear massing, a blend of natural and modern components, a zigzag canopy, and articulated fenestration.	Eligible, A & C 08/2011
PG: 66-35	University of Maryland, College Park	The campus covers more than 1,250 acres, with the historic core surrounding McKeldin Mall. Established in 1856, a fire destroyed many of the original buildings. A rebuilding campaign in the early twentieth century embodied tenets of the Colonial Revival style, a theme maintained by many subsequently built campus buildings. The buildings are physically and spatially tied together by an extensive set of walkways and roadways.	Eligible, A & C 11/2012
PG: 66-2	Rossborough Inn	The inn was built in 1803 to cater to travelers along the Baltimore Turnpike (Route 1). The building and surrounding land were donated to the state in the 1850s for the creation of an agricultural college, and it has served as faculty housing, an agricultural experiment station, and an administrative office. The Federal style building was more than doubled in size during a 1930 expansion. The building is also contributing to the University of Maryland, College Park historic district.	Eligible, A & C 09/2012
PG: 66-42	Old Town College Park Historic District	Established in 1889 as a gridded subdivision, the district includes 32 blocks and 250 properties designed as a residential community for middle and upper class residents generally associated with the adjacent university. Homes range in size from small, one-story Bungalows to three-story, high-style homes built in the Queen Anne, Colonial Revival, Mission, and Art Moderne styles, among others. The district is bounded by UMD, Baltimore Avenue, Paint Branch Parkway, Columbia Avenue, and Calvert Road	Eligible, A & C 12/2012
PG: 66-4	College Park Airport	Founded in 1909, the airport is believed to be the world's oldest continually operating air facility. The grounds were leased by the U.S. Army to establish an airfield and training facility; Wilbur Wright was an early instructor. Although none of the original airport buildings exist today, the foundations of five wooden hangars are visible in the landscape.	Listed, A 09/1977
PG: 66-3	College Lawn Station	Located within the Old Town College Park historic district (as a contributing resource), this district is a small subset of residential development constructed during the late nineteenth and early twentieth centuries. The four-block area, which includes single-family homes and multi-family buildings, is bounded by College Avenue, CSXT Railroad, Calvert Road, and Rhode Island Avenue.	Eligible, A 09/12
PG: 66-37	Calvert Hills Historic District	The district is an early twentieth century planned subdivision which partially overlaps with the Old Town College Park Historic District. The Calvert family's Rossborough farm and Riversdale Plantation was platted out into hundreds of single-family lots between 1907 and 1921, with additional expansion after 1928. The district includes 375 properties along gridded streets lined with plantings and sidewalks. Architectural styles include Colonial Revival, Tudor Revival, and Craftsman; non-residential buildings include a school and a post office. The district is bounded by Calvert Road, Bowdoin Avenue, Erskine Road, Calvert Park, Albion Road, and Baltimore Avenue.	Listed, A & C 12/2002
PG: 68-101	M-NCPPC Dept. of Parks and Recreation Regional Headquarters	Situated on a 9.5-acre parcel, the M-NCPPC Regional Headquarters complex includes a main office building, surrounding parking areas, and a series of connecting trails. The Prince George's County headquarters is housed in a 1965 International-style structure on this site.	Eligible, C 03/2012
PG: 69-26	Baltimore-Washington Parkway (Gladys Noon Spellman Pkwy)	The central 19-mile segment of the parkway is owned and operated by the NPS. The roadway was designed in 1942 to standards that would facilitate war-time traffic associated with defense activities; its primary purpose upon completion was to alleviate commuter congestion. Comprising a divided highway with four wide travel lanes, tree-lined medians, and perimeter greenways, the parkway contains picturesque structural elements with decorative treatments. The bridges over Riverdale Road within the Purple Line APE were reconstructed in 1995 and are therefore not considered as contributing elements to the historic district.	Listed, A & C 05/1991 11/2012
18PR1032	Area K Domestic Site	This 2.7-acre site, located in the median of the Baltimore-Washington Parkway, was identified by a Phase I archeological survey in 2011. It is characterized by artifact scatter and the presence of concrete foundation remains dating from the late 19 th Century through the early 20 th Century.	Phase II Testing Needed, A&D

Table 4-20. Eligible/Listed Historic Properties within the Purple Line APE (continued)

Inventory #	Historic Property	Description	Eligibility & Applicable Criteria ¹
PG: 72-68	Martins Woods	This small, heavily wooded neighborhood was originally designed as the summer residence of Dean Martin, a U.S. Forest Service employee. Six wooden and one stone dwelling were built in the late 1930s and early 1940s to provide a purposeful connection to the natural environment for residents. The buildings embody the characteristics of a Rustic-style vernacular and are located along a long, curvilinear drive.	Eligible, C 06/2012

¹Applicable Criteria: (A) properties that are associated with events that have made a significant contribution to the broad patterns of our history; (B) properties that are associated with the lives of persons significant in our past; (C) properties that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.

Table 4-21. Summary of Effects to Eligible/Listed Historic Properties

Historic Property	Effect
Bethesda-Chevy Chase High School	No Effect; no direct or indirect impacts to this property
Columbia Country Club	No Adverse Effect; introduction of the overhead contact system and reintroduction of rail service primarily within county ROW; minor changes to the existing golf cart underpasses, greens and modification of the north side of the existing berm on which the former railroad operated; project would not compromise the ability of the resource to convey its significance.
Preston Place	No Adverse Effect; alteration of viewshed due to the overhead contact system
Rock Creek Park Montgomery County Survey Area	No Adverse Effect; introduction of two new bridges and the overhead contact system
Metropolitan Branch, B&O Railroad	Adverse Effect ; removal of contributing element
Talbot Avenue Bridge	Adverse Effect ; removal
Woodside Historic District	No Effect; no direct or indirect impacts to this property
The Falkland Apartments	Adverse Effect ; demolition of contributing elements
Old Silver Spring Post Office	No Effect; no direct or indirect impacts to this property
First Baptist Church of Silver Spring	No Adverse Effect; introduction of the overhead contact system and physical elements
Montgomery Blair High School	No Adverse Effect; introduction of the overhead contact system
Sligo Creek Parkway	No Adverse Effect; introduction of the overhead contact system and physical elements
Sligo Adventist School	No Effect; no direct or indirect impacts to this property
University of Maryland, College Park,	No Adverse Effect; introduction of the overhead contact system and physical elements through the campus; project would not compromise the ability of the resource to convey its significance. Majority of improvements will be along existing roadways which have been altered over the past 25 years.
Rosborough Inn	No Adverse Effect; introduction of the overhead contact system
Old Town College Park Historic District	No Effect; no direct or indirect impacts to this property
College Park Airport	No Adverse Effect; the Preferred Alternative would be aligned in existing travel lanes on Paint Branch Parkway. The Parkway occupies a corner of the historic property, having been built in 1977 subsequent to the National Register listing and historic boundary definition. Paint Branch Parkway is not a contributing element to the historic property. MTA would not acquire the property the Preferred Alternative would occupy. The Preferred Alternative would not diminish the integrity of character-defining features that render the College Park Airport eligible for the NRHP.
College Lawn Station	No Effect; no direct or indirect impacts to this property
Calvert Hills Historic District	No Effect; no direct or indirect impacts to this property
M-NCPPC Dept. of Parks and Recreation Regional Headquarters	No Effect; no direct or indirect impacts to this property
Baltimore-Washington Parkway (Gladys Noon Spellman Pkwy)	No Adverse Effect; introduction of the overhead contact system and physical elements
Area K Domestic Site	No Effect; no direct or indirect impacts to this property
Martins Woods	No Effect; no direct or indirect impacts to this property

As a result of the effects assessments documentation, the FTA determined that there will be an adverse effect to three historic properties. The project was determined to have no effect to ten properties and no adverse effect to ten properties.

Based on the Section 106 effects assessments, the FTA determined that the proposed project would have an **Adverse Effect** on historic properties.

Columbia Country Club (No Adverse Effect)

The Columbia Country Club is located on two irregularly shaped parcels of land separated by the Georgetown Branch of the B&O Railroad (now occupied by the Georgetown Branch Interim Trail). The railroad predates the Columbia Country Club, having been completed in 1909 as a short freight line running between Silver Spring and Georgetown in Washington, DC. The Columbia Country Club was designed around the railroad.

The Columbia Country Club is an early 20th century golf course designed by noted architect Frederic Pyle and is Eligible under NRHP Criteria A and C. The alignment of the Preferred Alternative has been shifted slightly to the north outside the county-owned Georgetown Branch right-of-way. The right-of-way was previously determined not eligible for the NRHP on April 11, 2002 as the corridor was found to have lost integrity. The Georgetown Branch Interim Trail, which is located within the County-owned land, is enclosed by a chain link fence.

The Purple Line transitway (including its overhead contact system) and the Capital Crescent Trail would be primarily within the existing County right-of-way. No stations or other large-scale, above-ground elements are proposed where the corridor runs between the two parcels that comprise the Columbia Country Club.

Montgomery County, MTA, and the Columbia Country Club have agreed on the design of the Preferred Alternative through the Club. The Preferred Alternative minimizes impacts to the golf course facilities located within and adjacent to the county-owned right-of-way, including parts of Holes 14, 15, and 17, as well as landscaping, two existing cart tunnels under the right-of-way, and cart paths.

Consultation

Initially, MTA proposed the Preferred Alternative on an alignment centered in the County-owned right-of-way. In this configuration, MTA would not have had to acquire additional right-of-way from the Columbia Country Club to accommodate the transitway and trail. Because several greens and tees are located in the County-owned right-of-way, the project would have impacted golf course elements and landscaping on both sides of the existing trail. During extensive consultation between MTA and the Columbia Country Club, the Club expressed concerns about potential effects to the views from the clubhouse to the south. Consequently, the County, MTA, and the Club agreed to design modifications in this location, including a slight shift of the Preferred Alternative to the north. By making the shift, existing golf course elements (historic Holes 1, 15, 17, and 18) and landscaping in right-of-way on the south side of the alignment would be preserved. On the north side of the right-of-way, the shift will require a relocation of Hole 14.

As part of building the Preferred Alternative, MTA would construct retaining walls along the right-of-way to minimize the limits of project disturbance from construction. To overcome the large difference in elevation, MTA will construct a series of shorter walls in a terraced configuration along part of the north side of the alignment. In many places, 4-foot high solid parapet noise panels would be installed. MTA is coordinating with the Club regarding the re-design of the green at Hole 14; this minor change would not diminish the characteristics that render the hole a contributing element.

Preliminary Finding of Effect

The reintroduction of rail service in the former railroad right-of-way would create an effect but would not diminish the integrity of the historic property and would not constitute an adverse effect. The project elements to be within the county-owned right-of-way and within the boundary of the Club property are relatively minor; close consultation with the property owner has led to an agreed-upon context sensitive design.

In summary, although the Preferred Alternative would introduce new elements into the landscape, within the historic property boundary, these

changes would not alter the Columbia Country Club's historic integrity related to location, design, setting, materials, workmanship, feeling, and association. The resource would retain its integrity and ability to convey its significance. The property would remain intact with its early 20th century clubhouse, panoramic views, and historic course layout. The Preferred Alternative would have no adverse effect on the Columbia Country Club.

Preston Place (No Adverse Effect)

Preston Place is eligible under NRHP Criteria A and C. Although the Preston Place property is adjacent to the Preferred Alternative, a rail corridor had existed there for over 50 years prior to the construction of these dwellings. Therefore, while the Preferred Alternative would alter the setting and feeling of the viewshed from the historic property, it would not diminish the characteristics that render the Preston Place property eligible for the NRHP. The Preferred Alternative would have no adverse effect on Preston Place.

Rock Creek Park Montgomery County Survey Area (No Adverse Effect)

The Rock Creek Park Montgomery County Survey Area is eligible under NRHP Criterion A. To satisfy Section 106 requirements for identifying and assessing the effects of this project, only the area of the park within the APE was evaluated rather than the entire Rock Creek Park. The proposed transitway and Capital Crescent Trail would be aligned within the existing county-owned right-of-way, which is the non-eligible Georgetown Branch rail corridor. In 2002, the MHT determined that the Georgetown Branch of the B&O Railroad was not eligible for the NRHP because its historic integrity had been compromised. The new elements would be entirely within the former rail corridor. While the Preferred Alternative would introduce new visual elements (i.e., the transitway including its overhead contact system, the Capital Crescent Trail, and the bridges carrying the transitway and the trail across Rock Creek), it would not diminish the park's location, design, setting, materials, workmanship, feeling, or association. Therefore, the Preferred Alternative would have no adverse effect on the Rock Creek Park Montgomery County Survey Area.

Metropolitan Branch of the B&O Railroad (Adverse Effect)

The Metropolitan Branch of the B&O Railroad is eligible under NRHP Criteria A and C. The project includes two elements that would affect the resource: a portion of the right-of-way would be acquired for the Preferred Alternative and trail, and the Talbot Avenue Bridge would be removed and replaced.

A portion of the Preferred Alternative and trail would be located within the CSXT right-of-way, impacting approximately 1.83 acres of the historic resource. The impacted land area is primarily ballast track bed with no aboveground railroad infrastructure.

Removal of the historic Talbot Avenue Bridge⁴, a contributing element to the Metropolitan Branch of the B&O Railroad, would alter the integrity of this historic property by diminishing the property's design, setting, materials, workmanship, feeling and association. The removal of bridge would render the bridge no longer eligible for the NRHP. Because Preferred Alternative would require removing the contributing Talbot Avenue Bridge, the project would have an adverse effect on the Metropolitan Branch of the B&O Railroad.

Talbot Avenue Bridge (Adverse Effect)

Talbot Avenue Bridge is eligible under NRHP Criterion C. The bridge would be removed as part of the Purple Line project. It is representative of the industrial modifications that occurred along the rail system in the first quarter of the twentieth century. The modifications were typically associated with improvements in technology related to both materials and structural components. Removal of the bridge would render it no longer eligible for the NRHP as an individual property as it would remove all integrity of location, design, setting, materials, workmanship, feeling, and association. The Preferred Alternative would have an adverse effect on the Talbot Avenue Bridge.

⁴ It should be noted that Talbot Avenue Bridge, is both individually eligible for the NRHP and eligible as a contributing element within the Metropolitan Branch of the B&O Railroad historic property. Impacts are assessed to the property first as a contributing element, and second as an individual historic property.

Falkland Apartments (Adverse Effect)

The Falkland Apartments is eligible under NRHP Criterion C. The northeastern boundary of the Falkland Apartments complex overlaps the Preferred Alternative limit of disturbance. Two sections of two apartment buildings and surrounding lands, identified as contributing elements to the historic property, would be demolished to implement the Preferred Alternative. In addition, parking areas within the historic property boundary would be removed from the apartment complex to incorporate the land into the project. Demolition of portions of the historic property would diminish its design, setting, materials, workmanship, feeling and association. The Preferred Alternative would have an adverse effect on The Falkland Apartments.

First Baptist Church of Silver Spring (No Adverse Effect)

The First Baptist Church of Silver Spring is eligible under NRHP Criterion C. The Preferred Alternative would be located in the center of Wayne Avenue, which is bounded by sidewalks and lined with above-ground utilities. The transitway would be a new element within the viewshed of the historic Church property; however, as a transportation use, the Preferred Alternative would not be a visual departure from other transportation-related elements and utilities already in the viewshed. This alteration would not diminish the church's location, design, setting, materials, workmanship, feeling, or association. The Preferred Alternative would have no adverse effect on the First Baptist Church of Silver Spring.

Montgomery Blair High School (No Adverse Effect)

The Montgomery Blair High School is eligible under NRHP Criterion C. The Preferred Alternative would be located in the center of Wayne Avenue in the vicinity of the building. MTA would relocate the existing driveway to the school and redesign the school's parking lot, west of the building to enable roadway widening to accommodate the transitway. The driveway and parking lot modifications would occur well outside of the boundary of the property and would not detract from the significance of the resource.

The introduction of the Preferred Alternative in the center of Wayne Avenue would not impact the characteristics that make the Montgomery Blair

High School significant. The school's viewshed has previously been modified by the addition of non-contributing elements associated with the building (most notably, building additions and parking lots). Additionally, Wayne Avenue contains a variety of modern transportation-related elements. Finally, there are currently many above-ground transmission lines, cable lines, and electrical lines carried on poles along both sides of Wayne Avenue in front of the building, adding visual clutter to the setting. Due to all of these existing setting characteristics, the Preferred Alternative would not diminish the characteristics that render the historic property eligible for the NRHP. The Preferred Alternative would have no adverse effect on the Montgomery Blair High School.

Sligo Creek Parkway (No Adverse Effect)

The Sligo Creek Parkway is eligible under NRHP Criteria A and C. The Preferred Alternative would be located on Wayne Avenue through Sligo Creek Park, crossing the Sligo Creek Parkway at grade. The Preferred Alternative would include the overhead contact system, but no other associated aboveground elements would be visible from the historic parkway. The current setting is mature trees and shrubs; no significant viewsheds are present either toward the crossing or from the crossing to the north or south. The bridge carrying Wayne Avenue over Sligo Creek was reconstructed in 2004 and is not a contributing element. While the proposed overhead contact system would be a minor change to the viewshed to and from the parkway, the transitway would not diminish the characteristics that render the Sligo Creek Parkway eligible for the NRHP. The Preferred Alternative would have no adverse effect on Sligo Creek Parkway.

University of Maryland, College Park (No Adverse Effect)

The district is significant under NRHP Criterion A for its role in the development of higher education and agriculture in Maryland and NRHP Criterion C for its collection of Colonial Revival and Georgian Revival collegiate buildings. The period of significance of the historic district is from 1856 to 1961. The Preferred Alternative would cross through a portion of the NRHP-eligible historic district boundaries. Within the APE of the project, there are

38 contributing resources and 25 non-contributing resources to the district.

Stations within the District

MTA planned the Purple Line in consultation with UMD officials to provide access to the center of the UMD campus for students, faculty, and campus visitors. Two transit stations are proposed within the historic district.

Campus Center station would be toward the western end of the district on Campus Drive near the Cole Student Activities Building. It would have a side platform configuration and would generally occupy the existing Campus Drive footprint, with minor widening, to the east of the Cole Student Activities Building. Cole Student Activities Building is a contributing resource within the district. The station would be at grade; the platform and shelter would not detract from the contributing status of the property, or from the Historic District as a whole. At this location, Campus Drive currently has two through travel lanes, a parking lane on the south side, and a bus pull-out with bus shelters on the north side of Campus Drive. All of the contributing buildings in the vicinity of Campus Center station are set well back from the road. The station in this location would not have an adverse effect on any of the contributing buildings in this vicinity or on the historic district as a whole.

East Campus station would be built along Rossborough Drive, east of US 1. The station would consist of an at-grade platform and shelter along the roadway. Rossborough Drive in this location has three travel lanes, a concrete sidewalk along the north side of the road, and a narrow island, concrete walkway, and parking lot along the south side of the road. Given the existing transportation features of Rossborough Drive and its surroundings, as well as the minimal elements of the station, East Campus station would not diminish the characteristics that make the district or its contributing elements eligible for the NRHP. East Campus station would have no adverse effect on the elements of the district or the historic district as a whole.

Transitway within the District

The Preferred Alternative transitway would be a new transportation element crossing through the historic district. However, the transitway would run primarily within existing roadways within the western two-thirds of the district, on Campus Drive and Union Drive, both of which have been upgraded and widened during the late 20th century. Additional modifications to the roadways have included new sidewalks, street furniture, modern lighting, bus pull outs, and planting and landscaping. The introduction of the transitway along these existing streets would not create any adverse effects to the historic district as it is a continuation of transportation use along these routes. The introduction of the overhead contact system along these routes would be a new visual element, but there are currently modern street lights, signage, and bus shelters along the roads, which are all modern elements. The introduction of the overhead contact system would be a change, but would not be an adverse effect.

The transitway would cross the modern traffic circle at Regents Drive before traversing a small portion of lawn to the north of the Eppley Recreation Center, and then continuing eastward, adjacent to a modern parking lot, to US 1. The transitway would cross over US 1 along Rossborough Drive between the two contributing buildings as well as large modern parking lots. In consultation with UMD officials, MTA integrated the Preferred Alternative into the campus and aligned it primarily on existing roadways and other non-contributing elements. As a result, the transitway would not diminish the characteristics that make the district or its contributing elements eligible for the NRHP.

No contributing buildings would be impacted by the Preferred Alternative. Small portions of open land would be crossed by the Preferred Alternative, but these areas were undeveloped through the 1960s and post-date the district's period of significance. Overall, the Preferred Alternative would be a new element crossing through the historic district, creating an effect, but the project would not create impacts that would substantially diminish the resource's integrity of design, setting, workmanship, feeling, and association. All elements that make the

University of Maryland, College Park, Historic District eligible, including its buildings, overall layout, and contributing historic open spaces, would remain intact and the district would retain its integrity and ability to convey its significance. The Preferred Alternative would have no adverse effect on the University of Maryland, College Park Historic District.

Rosborough Inn (No Adverse Effect)

The Rosborough Inn is eligible under NRHP Criteria A and C. It is historically associated with adjacent transportation facilities since the building was originally erected in 1803 as a roadside tavern. Over the years, the original roadway (US 1) to which the inn is oriented has been widened, while the area around the historic inn has developed from a rural enclave to an educational campus, and ultimately to what is now a suburban corridor. The proposed transitway would be on the roadway on the north side of the inn, in an area where a roadway, a parking lot, and other modern transportation-related elements already exist. While the proposed project would add the transitway and an overhead contact system, no other above-ground, project-related changes are proposed. The setting adjacent to the inn has been heavily altered, and the construction of the transitway would not change any of the characteristics that make the resource eligible for the NRHP. The Preferred Alternative would have no adverse effect on the Rosborough Inn.

College Park Airport (No Adverse Effect)

Founded in 1909, College Park Airport claims to be the world's oldest continually operating airport. The grounds on which the airport stands were leased by the U.S. Army in 1909 for the establishment of an inaugural airfield for this portion of the country. The airport also offered flight instructions to local individuals. One of the first instructors was aviation pioneer Wilbur Wright, who achieved fame with his brother at Kitty Hawk, North Carolina, a decade earlier. Although none of the original airport buildings is extant, the foundations of five wooden hangars are still in existence. One of these was later reused as the underpinning of a maintenance building. This structure now houses an aviation museum. Because of its notable association with

aviation history, the College Park Airport was listed in the NRHP in 1977 under Criterion A.

The Preferred Alternative would run to the west of the airport and will be located on a portion of the historic property, where the alignment barely clips the historic property boundary. In this area, the line runs on Paint Branch Parkway, an existing roadway that is included in the 1977 NRHP boundary, which appears to adhere to an earlier parcel boundary that the parkway now occupies. No significant changes will occur in this area because the parkway already exists within this small area of the airport's historic property boundary. A retaining wall and a grade separation exist between the roadway and the airport parcel, thus the roadway (which would include the Preferred Alternative) would not be visible from most of the airport property.

Although the project involves the installation of above-ground wiring along Paint Branch Parkway, the new rail components would not be visible from most of the airport or any of the early-twentieth century foundations due to existing conditions in this area. The project would not diminish the integrity of character-defining features that render this historic property eligible for the NRHP, including its location, design, setting, materials, workmanship, feeling, or association. The Preferred Alternative would have no adverse effect on the historic College Park Airport.

Baltimore-Washington Parkway (No Adverse Effect)

The Baltimore-Washington Parkway is listed in the NRHP under Criteria A and C. The transitway would cross under the Parkway, along the south side of Riverdale Road. The Preferred Alternative alignment would intersect the southern abutments of the existing bridges, thereby necessitating replacement of the parkway bridges over Riverdale Road with longer bridges. The existing bridges, constructed in 1995, are non-contributing elements within the historic parkway property. Although the Preferred Alternative would result in longer parkway bridge spans over Riverdale Road, no contributing elements to the historic resource would be altered since the parkway bridges are not contributing elements to the historic resource. Through coordination with the National Park Service, the officials with jurisdiction over the

affected portion of the parkway, MTA developed a compatible replacement bridge design with an integrated screen to protect the overhead contact system. The screen is designed to protect the wires while being visually unobtrusive from the parkway. Thus, while bridge replacement and the protective screening would slightly alter the parkway's setting and design, the Preferred Alternative would not diminish characteristics that make the parkway eligible for the NRHP. The Preferred Alternative would have no adverse effect on the Baltimore-Washington Parkway.

Avoidance, Minimization and Consultation

Columbia Country Club

MTA, through its consultations with the Columbia Country Club, has refined the Preferred Alternative design by shifting the alignment slightly to the north on to Country Club property. This shift avoids and minimizes impacts to golf course elements, landscaping, and particularly views from the clubhouse on the south side of the county-owned right-of-way. The shift results in minor impacts to the golf course and landscaping on the north side of the right-of-way. Minimization strategies include shifting the green of Hole 14 (in consultation with the Columbia Country Club, and constructing terraced retaining walls on the north side immediately adjacent to the northern right-of-way line. These elements would be designed in consultation with the Country Club. The terraced area would contain planting areas for suitable landscape materials. The shift would avoid impacts to four holes, and would results in impacts to Hole 14, and minor landscape impacts outside of the right-of-way.

MTA will continue to plan and implement the project design elements in consultation with the Columbia Country Club and the MHT.

Rock Creek Park Montgomery County Survey Area

MTA, in coordination with the M-NCPPC, will provide transitway and pedestrian structures through the Rock Creek Park that include design elements to minimize the effects of the project.

University of Maryland College Park

MTA has coordinated with the University extensively and MTA will continue to coordinate with UMD regarding the design of the transitway.

Baltimore-Washington Parkway

MTA coordinated extensively with the National Park Service on the design and construction plans for the Purple Line. In addition to what is listed in Section 4.6, MTA will implement the following minimization measures for the Baltimore-Washington Parkway to maintain its historic integrity:

- The permanent replacement bridges of the Baltimore-Washington Parkway over Riverdale Road will have a similar arch design as the existing bridge structures and would include horizontal arched shields above the transitway overhead wires.
- The stone façade from the existing bridge abutments will be re-used on the new bridge abutments. If additional stone is required, it will come from the same source or would be selected in consultation with the NPS to match the existing stone.
- The catenary wires will be attached to the bridges to minimize the number of poles throughout the parkway.
- Landscape Plans will be developed in accordance with the *Baltimore-Washington Parkway Design Elements-Section 2: Parkway Landscape-Recommendations*, dated April 1984 and submitted to NPS for review and approval.
- Protected resources will be identified and marked for protection in field prior to construction activities (i.e. trees, archeological sites).

Mitigation

In accordance with Section 106 of the National Historic Preservation Act, MTA and the Maryland Historical Trust are preparing a Programmatic Agreement that outlines commitments and mitigations concerning historic and archeological resources under Section 106. Preliminary Section 106 mitigation concepts include:

- Prepare Historic American Buildings Survey/Historic American Engineering Record

documentation for the historic properties that will be demolished

- Prepare web-based map providing documentation and educational information on historic properties within the APE
- Develop an interpretive plan that will include historically themed signage or incorporation of historic images at stations
- Provide Consulting Parties with the opportunity to review and comment on project plans during engineering design phases
- Develop a plan to monitor impacts to historic properties during construction
- Continue coordination with Consulting Parties throughout design and construction

FTA will have an executed Programmatic Agreement prior to the Record of Decision. MTA will implement the project in accordance with the Section 106 Programmatic Agreement.

Short-term Construction Effects

Short-term and temporary effects were considered in all effects assessments. Construction could cause short-term effects to listed or eligible sites. MTA expects relatively small areas of the proposed project corridor would potentially experience vibration and noise effects from construction activities at any one time. The duration of exposure to construction-related vibration and noise at any one property would, therefore, be limited.

Avoidance and Minimization

MTA will minimize temporary vibration or noise effects during construction by evaluating and implementing specific materials and construction methods as deemed necessary. Additional details on avoidance, minimization, and mitigation of temporary noise and vibration impacts can be found in Sections 4.11 and 4.12.

Mitigation

MTA will restore all landscaping or other visible elements at listed or eligible sites to a condition acceptable to the parties with jurisdiction. This commitment will be specified in the Programmatic Agreement.

4.8 Archeological Resources

This section describes the effects of the Preferred Alternative on archeological resources, along with strategies MTA has taken to eliminate or reduce effects on archeological resources. Additional information regarding the archeological resources assessment and project effects is presented in *Section 106 Effects Report/Light Rail Alignment Areas Associated with the Purple Line Project* as well as the *Phase IB Archeological Survey of Light Rail Alignment Areas Associated with the Purple Line Project, Montgomery and Prince George's Counties, Maryland*.

4.8.1 Regulatory Context and Methodology

One potentially NRHP eligible archeological site is located within the APE. The Area K Domestic Site (#18PR1032) is a large historic site identified by an artifact scatter, along with the presence of concrete foundation remains dating from the late-nineteenth century through the early-twentieth century, possibly associated with the Young tenant farm. The 2.7-acre site is located within the property of the Baltimore-Washington Parkway. Because of the quantity and nature of the artifacts recovered, along with existing building foundation remains, the site is considered potentially eligible for listing in the NRHP under both Criterion A, because of the potential for the deposits to offer additional information regarding urbanization of the Riverdale area, and Criterion D because of the potential to reveal additional information on life in the Western Shore Coastal Plain of Maryland during the Industrial Urban Dominance Period (1870–1930).

Results of Phase IA and IB Surveys⁵

Two previous Phase IA archeological reconnaissance level surveys (A.D. Marble, 2002 and PB, 2010) were undertaken for the alternatives evaluated in the AA/DEIS. The initial Phase IA

⁵ Phase I investigations consist of a combination of background research and fieldwork designed to identify resources and define site boundaries within a given project area or Area of Potential Effect (APE). Phase IA refers to the background research portions of these efforts. Frequently, Phase IA efforts are sufficient to demonstrate that an area has no potential for archeological resources. Phase IB efforts involve fieldwork and archeological testing of locations identified during the Phase IA as having archeological potential.

survey identified 21 areas of archeological potential (AAP). Once the Locally Preferred Alternative (LPA) was selected, the number of AAPs was reduced to 17, as four AAPs were located outside the LPA's area of potential effect. Subsequently, after the identification of the Preferred Alternative including stations, yard, maintenance facility, and TPSS locations, some of the AAPs were expanded or adjusted; however, no new AAPs were identified.

Between April and October 2011, a Phase IB archeological survey was completed to investigate the 17 AAPs and to re-evaluate the Fire Site (18PR0263) and Engineering Research Corporation Site (18PR0258), two previously recorded archeological sites located within the APE. MTA was not granted access to one AAP, Area P. The remaining AAPs (Areas A-O, and Q) were evaluated through field surveys, which involved walking the AAPs looking for surface evidence of disturbance to assess whether testing was warranted. Seven AAPs had extreme disturbance or excessive slope, reducing their potential for preserved archeological deposits to the point that further investigation is not warranted. Subsurface testing employing shovel test pits was performed at the nine remaining AAPs. Four of these AAPs (Areas F, H, I, and K) contained archeological deposits. Within these four AAPs, five new archeological sites were identified (18PR1035 within Area F, 18PR1036 within Area H, and sites 18PR1032, 18PR1033, and 18PR1034 within Area K). Site 18PR1032 (Area K Domestic Site), identified as a late nineteenth to early twentieth century domestic site, was determined to be potentially eligible for listing in the NRHP. The remaining four sites were found to be historic artifact scatters and concentrations and determined not eligible for the NRHP.

During the Phase IB survey, the two previously recorded sites within the APE were re-evaluated and determined to be not eligible for the NRHP. Specific information on both previously recorded sites is listed below:

- The Fire Site (18PR0263), identified as a prehistoric lithic scatter site, was determined eligible in 1985; however, the portion of the site within the LPA APE was documented as being extensively disturbed and determined to not be eligible for listing in the NRHP.
- The Engineering Research Corporation (ERCO) Site (18PR0258), identified in 1985 as a mid-twentieth century airfield and factory site, was reevaluated due to redevelopment of the property. It was observed that the archeological site had suffered significant disturbances and was determined not eligible for listing in the NRHP.

4.8.2 Preferred Alternative

Long-term Operational Effects

MTA has designed the Preferred Alternative to entirely avoid the only potentially eligible resource within the APE, the Area K Domestic Site (#18PR1032). Therefore, no effect to archeological resources is expected as a result of the Preferred Alternative.

Mitigation

Because no effect to the Area K Domestic Site will occur, no mitigation is necessary.

Short-term Construction Effects

The proposed temporary bridges to carry Baltimore-Washington Parkway over Riverdale Road will be constructed between the existing ramps and the existing bridges. This will completely avoid the archeological site identified in the median (see Chapter 5.0 for more information on construction activities).

Short-term project-related effects to the Area K Domestic Site would, therefore, not occur as all construction access, activities, and disturbance would avoid the resource.

Mitigation

Mitigation is not warranted.

4.9 Visual Resources

This section describes the effect of the Preferred Alternative on visual resources. It discusses the methodology used, identifies existing visual resources in the study area, and discusses long-term and short-term impacts of the Preferred Alternative, including minimization strategies and mitigation measures.

4.9.1 Regulatory Context and Methodology

As FTA does not have visual assessment guidelines, MTA used FHWA's *Visual Impact Assessment for Highway Projects* (FHWA 1988) in this analysis.

The visual assessment study area is 500 feet on either side of the Preferred Alternative. An inventory was completed to identify the visual environment, character, and quality; identify visually sensitive areas; and determine viewers.

The visual environment is the setting of an area, including the resources that affect an observer's visual experience of an area. Visual character is a composite description of the visual resources, considering the form, scale, and diversity of man-made and natural landscape components. Visual quality is the value placed on the visual environment according to viewer observation and preference.

A visually sensitive area is one upon which a human value has been placed for reasons of historic importance, natural beauty, or other reasons. Examples of visually sensitive areas in the study area are:

- Parks and other recreational areas, such as the stream valley parks and the Georgetown Branch right-of-way
- Roadways that are primarily residential in character
- Master planned or designed districts or facilities, such as the Columbia Country Club and the UMD campus

Viewers are the people who are likely to observe the visual environment. The major groups of viewers who would be affected by the new visual elements of the Preferred Alternative have been identified for each of the corridor's ten visual assessment units (VAU), which are described below. Such groups might include residents, workers who are employed in the VAU, visitors who come to the area, transit riders, pedestrians, cyclists, or roadway users (including motorists, transit riders, pedestrians, and cyclists) who travel in or through the VAU.

To analyze the potential visual effects of the Preferred Alternative on the visual environment, as experienced by viewers, the study area was divided into ten visual assessment units generally based on

the cohesiveness of land use and development patterns. The VAUs are defined as follows:

- **VAU 1**—Bethesda station to Stewart Avenue
- **VAU 2**—Stewart Avenue to Colesville Road
- **VAU 3**—Colesville Road to Fenton Street
- **VAU 4**—Wayne Avenue to western Plymouth Street tunnel portal
- **VAU 5**—Eastern Plymouth Street tunnel portal to Adelphi Road/West Campus station
- **VAU 6**—Adelphi Road/West Campus station to US 1
- **VAU 7**—US 1 to College Park Metro Station
- **VAU 8**—College Park Metro Station and River Road
- **VAU 9**—Kenilworth Avenue and Riverdale Road
- **VAU 10**—Veterans Parkway to New Carrollton Metro station

The elements of the Preferred Alternative were examined to determine whether or not they would affect the visual environment of any sensitive areas within each VAU. Effects were rated based on the potential for viewers to discern the visual change, considering existing visual character and quality of the affected area.

Effects were rated as low, moderate, or high as defined below, based on a composite assessment of visual character, quality, sensitivity, and the changes introduced by the Preferred Alternative:

- **Low visual effect**—a slight change in visual character or quality, with no substantive effect on a visually sensitive area. New visual elements would be generally compatible with existing visual character, and little to no viewer response to visual changes is expected.
- **Moderate visual effect**—either (1) a slight change in visual character or quality, resulting in a high level of viewer response, or (2) an extensive change in visual character or quality with only a minimal viewer response. New visual elements would be somewhat compatible with existing visual character and quality.
- **High visual effect**—an extensive change to visual character or quality, or substantial effect on a visually sensitive area. New visual elements would be generally incompatible with existing visual character and quality, resulting in a high level of viewer response.

4.9.2 Affected Environment

The sections below describe the visual environment and quality, and identify likely viewer groups and sensitive areas for each of the VAUs.

VAU 1: Bethesda Station to Stewart Avenue

VAU 1 is comprised of moderately to heavily developed urban land along the Georgetown Branch right-of-way from downtown Bethesda, the western terminus of the Purple Line, to Stewart Avenue in Lyttonsville, the eastern terminus of the Georgetown Branch Interim Trail (Figure 4-5).

Figure 4-5. Georgetown Branch Interim Trail



Bethesda is a mature inner ring suburb of Washington DC that developed as a streetcar suburb. It has an urban central business district and residential neighborhoods. To the east are Chevy Chase, primarily a low density, lightly wooded residential area, and the Columbia Country Club, a distinctive, intentionally designed landscape (Figure 4-6). Farther east is the forested Rock Creek Stream Valley Park (Figure 4-7 and Figure 4-8). Beyond the park is Lyttonsville, a mixture of single family homes, high-rise apartment buildings, and commercial uses, with light industrial uses along the Georgetown Branch right-of-way.

The Georgetown Branch right-of-way, a former railroad corridor, is lined with mature trees and a scrub-shrub understory that is separated from adjacent properties along much of its length by fencing. Also located in this VAU is Rock Creek Stream Valley Park, a wooded stream valley with several grass recreation fields and a paved trail along the creek. The Rock Creek Bridge, a 280-foot long, 70-foot tall trestle, is the only prominent

Figure 4-6. Columbia Country Club Looking North from the Georgetown Branch Interim Trail



Figure 4-7. Rock Creek Bridge



Figure 4-8. Rock Creek Stream Valley Park Looking South from the Georgetown Branch Interim Trail



man-made structure in the park within the study area. East of Rock Creek Stream Valley Park, the buffer of vegetation along the Georgetown Branch right-of-way becomes thin. The VAU is bisected by Connecticut Avenue, a suburban corridor, with office, retail, and light industrial uses mixed in scale and form.

Viewers in this VAU include trail users, residents, pedestrians, and roadway users.

This area is considered to have a high degree of visual sensitivity because of the mature trees and the prominence of the natural environment that characterize this part of the park and the trail.

VAU 2—Stewart Avenue to Colesville Road

VAU 2 consists of portions of two railroad rights-of-way, one unused by rail service, and the other currently used for both freight and passenger service. For approximately 1,000 feet between Stewart Avenue and the CSXT mainline, the corridor continues in the Georgetown Branch right-of-way through the light industrial area of Lyttonsville. The separate Georgetown Branch Interim Trail ends at Stewart Avenue and continues as a signed route along local roads. The remainder of the VAU parallels the CSXT mainline and WMATA tracks that run in a depressed right-of-way that transitions from wooded banks bordering single family residential neighborhoods to apartment complexes and suburban-style commercial strip centers as it approaches downtown Silver Spring. This right-of-way, the CSXT Metropolitan Branch right-of-way, is listed on the NRHP. The Talbot Avenue Bridge which crosses the Metropolitan Branch right-of-way is also listed on the NRHP (Figure 4-9)

Viewers in this VAU include trail users, residents, pedestrians, workers, and roadway users.

Because of the light industrial uses in Lyttonsville and the active rail corridor, this area is considered one of low visual sensitivity.

Figure 4-9. CSX Corridor along Talbot Avenue—Rosemary Hills Elementary School in Background



VAU 3—Colesville Road to Fenton Street

VAU 3 is comprised of downtown Silver Spring between the Silver Spring Transit Center and the intersection of Fenton Street and Wayne Avenue. Downtown Silver Spring is a modern urban core, with a wide range of commercial, residential, and public uses in predominantly medium- and high-rise structures.

Viewers in this VAU include workers, residents, pedestrians, transit patrons, and roadway users.

Busy urban streets characterize this area. Given this, the area is considered to have a low degree of visual sensitivity.

VAU 4—Wayne Avenue to Western Plymouth Avenue Tunnel Portal

VAU 4 is the portion of Wayne Avenue in which the Preferred Alternative would be constructed on the surface. Wayne Avenue is an arterial roadway used by five local bus routes.

In the west, there is an area of mixed uses near downtown Silver Spring that transitions to a residential neighborhood of predominantly mid-twentieth century single family homes along a two- to four-lane roadway (Figure 4-10). Land uses also include several medium and high-rise apartment buildings, First Baptist Church, St. Michael's the Archangel Catholic Church, the Silver Spring International Middle School, and Sligo Creek Elementary School. Mature trees and landscaping enhance the residential character of this area. Bisected by Sligo Creek and the stream valley park

this VAU is characterized by a steep grades descending to the creek.

Viewers in this VAU include residents, pedestrians, workers, transit patrons and roadway users.

This area is considered to have a high degree of visual sensitivity due to the residences and the mature trees in the area.

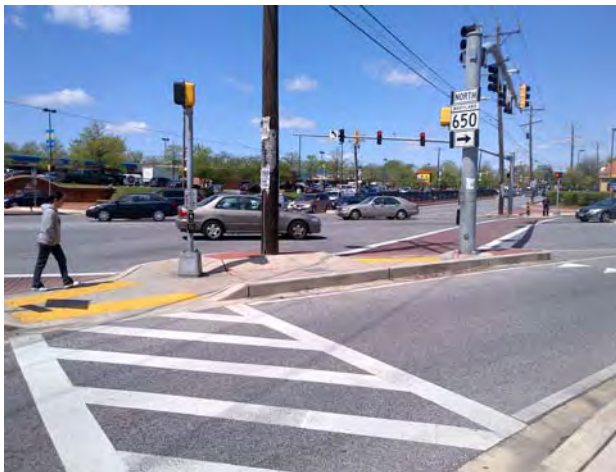
Figure 4-10. Wayne Avenue



VAU 5—Eastern Plymouth Street Tunnel Portal to Adelphi Road/West Campus Station

VAU 5 extends along Arliss Street, Piney Branch Road, and University Boulevard (Figure 4-11). It is an older suburban neighborhood and commercial area with many automobile-oriented uses with extensive parking lots bordering four- to six-lane roadways and scattered parklands.

Figure 4-11. University Boulevard at New Hampshire Avenue



Arliss Street is a five-lane road with two travel lanes, parking on both sides and a two-way left turn lane in the median. On one side are large parking lots for commercial development, and on the other are garden apartments and town houses. Piney Branch Road is a four-lane arterial flanked by aging garden apartments and strip-type commercial uses. Street trees are intermittently present along the roadway, and the road crosses Long Branch Stream Valley Park. The intersection of Piney Branch Road and University Boulevard has multiple through lanes, and accommodates large amounts of traffic.

University Boulevard is a heavily-used arterial that ranges from four to six lanes wide. In some locations parallel service roads provide access to the residential buildings, creating an even wider transportation right-of-way. The multitude of signs and utility poles and lines create a high degree of visual clutter (Figure 4-11). The road crosses Northwest Branch Stream Valley Park just west of Adelphi Road. University Boulevard is lined with older garden apartments and strip commercial development. There is a high level of pedestrian activity in this area, despite the unfavorable built environment.

Viewers in this VAU include workers, residents, pedestrians, transit patrons, and roadway users.

The wide roadway, lack of landscaping, and the quantity of signage and utilities make this an area of low visual sensitivity.

VAU 6—Adelphi Road/West Campus Station to US 1

VAU 6 is entirely on the University of Maryland campus. The transitway would be primarily on existing or planned roadways within the campus. It would enter from the west along Campus Drive; then follow Presidential Drive to join Union Drive (Figure 4-12). Currently this area is primarily surface parking lots, but the University Facilities Master Plan has identified this area for development to include buildings, parking garages, and a new street network including the Purple Line. The transitway would continue east on Campus Drive to Regents Drive. This two-lane roadway adjacent to the brick colonial revival style buildings that line McKeldin Mall is the main transportation corridor

through campus and as such is used by buses, cars, and service vehicles.

Figure 4-12. Campus Drive in University of Maryland



From Regents Drive the transitway would turn southeast and run between the Engineering Fields and Reckord Armory, leaving the campus at the intersection of US 1 and Rossborough Drive. The eastern portion of this VAU is within the university-defined “UMD Historic Core” planning district. This portion of the university campus has numerous historic buildings and developed landscaped areas. The playing fields and lawns, sited among a complex of administration and public buildings including the Rossborough Inn, form a prominent public image of the campus and serve as the backdrop for the primary campus entrance. The large grassy areas in this area of campus (intramural playing fields and open lawns) create wide vistas. The parking lots adjacent to the Armory and the Visitors Center are not prominent in the viewshed.

Viewers in this VAU include students, UMD employees, visitors, and roadway users.

As the main east-west transportation route through the university, the western portion of this VAU on Campus Drive is considered to have a moderate degree of visual sensitivity.

The eastern portion of this VAU is considered an area of high visual sensitivity due to these expansive open spaces and the historic Rossborough Inn.

VAU 7—US 1 to College Park Metro

VAU 7 includes the UMD East Campus and Paint Branch Parkway to the College Park Metro station. East Campus is a planned redevelopment project in an area that formerly housed support facilities for the University. The proposed development includes a hotel and a mix of housing and commercial

spaces. The transitway would follow Rossborough Drive to Paint Branch Parkway through this development.

The transitway would follow Paint Branch Parkway between the East Campus development and the College Park Metro station. In this VAU the land uses are a mixture of multi-family residential, light industrial, and commercial, with a number of transportation uses including an airport, the CSXT and WMATA tracks, and parking for both the Metro station and nearby uses. Paint Branch Parkway is a four-lane arterial with noise walls on the south side of the roadway.

Viewers in this VAU include residents, workers, pedestrians, transit patrons, and roadway users.

Given the intention to design the East Campus development to incorporate the Purple Line and the proposed urban character of this area, and the existing character of Paint Branch Parkway, this VAU is considered to have a low degree of visual sensitivity.

VAU 8—College Park Metro and River Road

VAU 8 is a developing area along River Road through the M Square Research Park, which is a new 130-acre office park along River Road, a four-lane street (Figure 4-13). Many of the parcels in this area are under development. The eastern end of this VAU crosses the Anacostia River Stream Valley Park.

Viewers in this VAU include residents, workers, pedestrians, park and trail users, transit patrons, and roadway users.

Figure 4-13. M Square Research Park



Given the character of this area as an office park, it is considered to have a low degree of visual sensitivity. The park is below the grade of the roadway and so has a moderate degree of visual sensitivity.

VAU 9—Kenilworth Avenue and Riverdale Road

VAU 9 contains older commercial and residential development. Kenilworth Avenue, East West Highway, and Riverdale Road are heavily-used roadways ranging from four to six lanes wide. The roadways are lined with utility poles and signage. The east side of Kenilworth Avenue is single family homes, while the west is mid-20th century commercial development. Aging commercial development surrounds the intersections of Kenilworth Avenue and East West Highway and Riverdale Road (Figure 4-14). East on Riverdale Road, the area becomes more residential, principally smaller, aging single family homes, until the Baltimore-Washington Parkway. The parkway is a National Park Service facility which crosses Riverdale Road just west of the Beacon Heights neighborhood (Figure 4-15). The parkway is a 29-mile scenic highway serving as a focal entrance to the Washington DC region. The parkway features an integrated design and aesthetic treatments that are distinct in comparison to typical highway design. The limited-access highway is visually defined by its perimeter greenways, tree-lined medians, adjacent woodlands, and decorative structural elements of its bridges, which are readily apparent from the Riverdale Road interchange. Along Riverdale Road in Beacon Heights are garden apartments and some commercial development, including a strip shopping center and several gas stations (Figure 4-16).

Viewers in this VAU include residents, workers, pedestrians, transit patrons, and roadway users. Viewers of the Baltimore-Washington Parkway include park visitors (parkway users).

Due to the wide arterial roadways, aging residential and commercial development, and existing visual clutter, this area is considered to have a low degree of visual sensitivity; except for the Baltimore-Washington Parkway which is considered to have a moderate degree of visual sensitivity.

Figure 4-14. Near Riverdale Park Looking East at the Intersection of Kenilworth Avenue and East West Highway



Figure 4-15. Baltimore-Washington Parkway over Riverdale Road



Figure 4-16. Beacon Heights



VAU 10—Veterans Parkway to New Carrollton Metro station

VAU 10 extends from the proposed Beacon Heights Station at the intersection of Riverdale Road and Veterans Parkway to the New Carrollton Metro station. Veterans Parkway is a four-lane arterial with wide shoulders, a grassy median, and no sidewalks. Suburban residential neighborhoods flanking both sides of the roadway are accessed by internal streets and set back from the parkway, buffered by a mix of deciduous trees and shrubs. The posted speed limit is 45 miles per hour. The M-NCPPC Northern Area Maintenance—Glenridge Service Center and the Glenridge Community Park are located on the south side of Veterans Parkway. Further east in the VAU, Ellin Road is a smaller, less heavily used road; here also the residential development is not oriented to the roadway and is buffered by vegetation. At the intersection of Harkins Road, the New Carrollton Metro Station is located across from the IRS New Carrollton Financial Service Center and a private office building (Figure 4-17). These developments and the Metrorail Station have extensive surface parking.

Viewers in this VAU include residents, workers, pedestrians, transit patrons, and roadway users.

Due to the width of the right-of-way and the set back of residential properties this area is considered one of low visual sensitivity.

Figure 4-17. IRS Financial Service Center on Ellin Road



4.9.3 Long-term Operational Effects

The Preferred Alternative would result in changes to the visual environment from the introduction of new visual elements, or the removal or replacement of existing elements.

In all VAUs, the transitway would add the linear elements of the tracks and overhead wire system, which includes the poles supporting the wires. These new visual elements cannot be avoided and in most locations these elements would not be anticipated to result in an adverse effect as they are not vastly different from a roadway or the existing utility infrastructure. The tracks in or adjacent to a roadway would not be a substantial visual impact in an area of low or moderate sensitivity.

Stations and power substations would also be new visual elements in the corridor. The at-grade stations have been designed to have a minimal impact on the surrounding environs. The platforms would be approximately 14 inches above the top of the rails and would be 200 feet long and 10 to 18 feet wide. The station shelters would be steel and glass structures whose transparency would minimize their appearance in the communities where they would be located. Three of the stations would be on elevated structures. Each of these has been uniquely designed to be compatible or attractive additions to the surrounding community. In areas of moderate or high visual sensitivity the power substations would be screened or landscaped to be compatible with the surrounding neighborhood character.

There are, however, visually sensitive areas and other features that characterize the corridor's visual environment that may be affected by the Preferred Alternative. The effects and the mitigation proposed for each VAU are discussed in the following sections.

VAU 1: Bethesda Station to Stewart Avenue

The Georgetown Branch right-of-way would undergo high level of visual impact. It will become the right-of-way of both the Preferred Alternative and the Capital Crescent Trail (Figure 4-18). As a result, much of the existing vegetation would be removed and most of the existing tree canopy would be eliminated. While the right-of-way would

be replanted after construction, which at maturity would assist in mitigating this visual impact, the overall appearance of the right-of-way would be substantially changed from present conditions. In addition, the right-of-way would have a four-foot retaining wall on the south side of the transitway from Bethesda Station to Rock Creek Stream Valley Park, and on the north side of the trail from East West Highway to Rock Creek Stream Valley Park. Depending upon location and topography, views from the trail and of the trail from adjacent properties would be substantially altered or essentially eliminated due to either the removal of vegetation or the addition of retaining walls.

Columbia Country Club would be affected along the north side of the Georgetown Branch right-of-way by the project, including grading changes in landform, some tree clearing, relocating portions of Holes 14, 15 and 17 and reconstructing the golf cart crossings of the Georgetown Branch right-of-way.

The bridges carrying the transitway and trail over Connecticut Avenue would generally be compatible with the existing visual character and quality of suburban land use and transportation infrastructure

already present or planned in this location. These bridges would be larger in scale and mass than much of the surrounding development.

The construction of the transitway and trail, even though they would occur within a former railroad right-of-way, would result in substantial changes in the viewshed of Rock Creek Park users and local residents. The existing embankment on which the Georgetown Branch Interim Trail is located would be lowered to create a wider base for the transitway and trail. The existing Rock Creek trestle bridge would be replaced with new transit and pedestrian bridges (Figure 4-19). These bridges would be modern steel truss bridges, and while they would provide a broader open space beneath, they would be considerably lower than the current bridge (15 feet lower for the transitway bridge and 30 feet lower for the trail bridge). The trail connection from the Capital Crescent Trail to the Rock Creek Trail would be a switchback path on the northeast side of the Preferred Alternative; while designed to minimize tree removal, it would nonetheless result in visual changes due to tree removal.

Figure 4-18: Capital Crescent Trail



Figure 4-19. Rock Creek Bridges

A major new element in this VAU would be the Lyttonsville Yard between Rock Creek Park and Stewart Avenue (Figure 4-20). The construction of the yard would include the replacement of the Lyttonsville Place bridge and the displacement of a commercial building on Brookville Road. This would have a moderate effect on the visual environment for trail users.

VAU 2 — Stewart Avenue to Colesville Road

The segment of the Georgetown Branch right-of-way east of Stewart Avenue is surrounded by light

Industrial and commercial uses. The Preferred Alternative and trail would be a change, but would only be a low visual effect.

Along the CSXT corridor there would be a number of visual effects, but all would have low visual impact. The character of the CSX mainline and WMATA right-of-way would be changed as the trees would be cleared for construction of the transitway on the south side of the CSXT corridor and the trail on the north. The single-lane Talbot Avenue Bridge that is listed on the NRHP would be replaced with a new wider bridge, altering the view of this crossing.

The view of the right-of-way from the Rosemary Hills Elementary School would be altered by the construction of the Preferred Alternative between the school and the CSXT corridor. There would be changes in the profiles of the 16th Street and Spring Street bridges across the right-of-way. The displacement of the Spring Center shopping center and its replacement by a station and potential redevelopment would be a low impact visual effect.

Figure 4-20. Lyttonsville Station with Operations Building in the Background

The displacement of two commercial buildings on East West Highway on the south side of the right-of-way near Colesville Road would not produce a highly noticeable void in local visual character in this urban area.

The removal of several units from the ends of two buildings in the Falkland Chase Apartment complex would be a low visual impact.

VAU 3—Colesville Road to Fenton Street

The bridge carrying the Purple Line over Colesville road, the station platform and shelter are large structures, but they are not dissimilar in scale to the high-rise buildings and new transit center in downtown Silver Spring (Figure 4-21). The visual effect of the new structures would be high to pedestrians, transit patrons, roadway users, and viewers from surrounding buildings.

A multi-story contemporary office building on Bonifant Street and a portion of the adjacent parking structure would be displaced. In an urban context such as downtown Silver Spring, the

removal of these buildings for other structures would be a low visual effect.

VAU 4—Wayne Avenue to Western Plymouth Street Tunnel Portal

The widening of Wayne Avenue and the construction of the transitway in the roadway would change the setting of the area by reducing the front yards of residential properties, and the removal of some street trees. In this residential area of high sensitivity the Preferred Alternative would have a high visual impact particularly to residents.

The bridge over Sligo Creek would be widened and some trees would be removed, but the general aspect of the park would not be affected.

Two six-unit apartment buildings would be displaced above the portal of the Plymouth tunnel. The overall effect of this change and the presence of the portal itself would be high.

Figure 4-21. Silver Spring Transit Center Station



VAU 5 — Eastern Plymouth Street Tunnel Portal to Adelphi Road/West Campus Station

The tunnel portal on Arliss Street and the roadway widening and retaining walls would be a new visual element with a moderate visual effect.

The widening of Piney Branch Road to accommodate the Purple Line in the median would result in the reconstruction of the entrances to some of the apartment complexes, and the removal of some trees in Long Branch Stream Valley Park, Long Branch Local Park, and along Piney Branch Road. This would be a moderate visual effect for roadway users and local residents.

The addition of the Preferred Alternative to University Boulevard would not noticeably change the character of the roadway, as it is a wide transportation corridor today in an area of low visual sensitivity. In some locations street trees would be eliminated and in New Hampshire Estates Neighborhood Park a sitting area and some landscaping would be removed. The reduction of University Boulevard to four lanes would provide opportunities for additional landscaping, both by the sidewalks, as well as in some median locations.

The change in the grade of University Boulevard east of Northwest Branch Stream Valley Park would require the median to be elevated above the roadway to accommodate the construction of the transitway. This would be a moderate visual effect, particularly for adjacent residents.

VAU 6 — Adelphi Road/West Campus Station to US 1

The addition of the Preferred Alternative to the existing roadways on campus, which are currently used by Metrobus, TheBus, and Shuttle-UM, would be a low effect. The reconstruction of Campus Drive and Union Drive with dedicated transit lanes and one lane for general traffic would be a moderate visual impact. The impact of the addition of new intersections and new signals at some intersection would be negligible.

The visual effect of the Preferred Alternative east of the “M” traffic circle would be moderate (Figure 4-22). In this open grassy area, the transitway would be visible in the background of the

viewshed and would be a moderate visual effect to pedestrians and others on campus.

Figure 4-22. Relocated UMD “M”



VAU 7 — US 1 to College Park Metro

Rosborough Lane through East Campus and Paint Branch Parkway are areas of low visual sensitivity where the impact of the changes would be low.

VAU 8 — College Park Metro and River Road

The landscape in this VAU is of low sensitivity and the anticipated degree of change from the Preferred Alternative is low. The transitway bridge over the Northeast Branch would be parallel to, and would have the same profile as the existing roadway bridge, resulting in a low visual effect.

VAU 9 — Kenilworth Avenue and Riverdale Road

The major visual change resulting from the Preferred Alternative in this VAU would be the aerial structure across the intersection of Kenilworth Avenue and Riverdale Road and the elevated Riverdale Park station (Figure 4-23). This large bridge and station would have a high visual impact.

The displacement of 22 single family residences on the south side of Riverdale Road would be a low impact visual effect because the roadway is a heavily used state highway.

The Baltimore-Washington Parkway, being an NHRP listed resource, is a visually sensitive viewshed. MTA would relocate the two southern abutments carrying the parkway bridge decks over Riverdale Road to build the Preferred Alternative. Thus, the bridge would be removed and reconstructed with the abutments approximately 30 feet

Figure 4-23. Riverdale Park Station

to the south of their current location. The existing abutments, constructed in 1995, are non-contributing elements within the historic parkway property. The same stone veneer used on the 1995 abutments would be reused on the new abutments. The new bridge spans would use a similar arch design as the existing structures. Protective screening for the overhead wire system would be used to eliminate the view of wires from the parkway. The effect of relocating the parkway bridge abutments and replacing the bridges across Riverdale Road (to accommodate the passage of the transitway beneath them) would not be high (Figure 4-24). There would be no long-term effect on the visual character as the new bridges will replicate the appearance of the existing ones.

Figure 4-24. Baltimore Washington Parkway Bridge

VAU 10—Veterans Parkway to New Carrollton Metro Station

The principal change in the visual environment in VAU 10 would be the construction of the Glenridge Maintenance Facility, which would be more visible from Veterans Parkway than the existing M-NCPPC Northern Area Maintenance—Glenridge Service Center. While a moderate change, in this area of low visual sensitivity the overall effect would be low.

There would be changes in the appearance of Glenridge Community Park as a result of the removal of trees and the exchange of land between the Maintenance Facility and the park for a net loss of 3.28 acres of park land; however the overall visual effect would be low to moderate.

Two commercial buildings would be removed east of Annapolis Road. This would have a low visual impact.

The widening of Ellin Road will reduce the wooded buffer along the south side, but the general character of the area would not be affected, resulting in a low visual effect. Figure 4-25 is a rendering of the Beacon Heights station.

Figure 4-25. Beacon Heights Station



Table 4-22 presents a summary of the effects in each VAU.

Avoidance and Minimization

In designing the Preferred Alternative, MTA has made continual efforts to respect the visual quality and integrity of the neighborhoods in which the project would be built, using context sensitive design techniques. Through its public involvement and stakeholder coordination program, MTA has worked with communities and stakeholders to understand community concerns and visions. Project elements such as the station shelters, described earlier, were developed with input from local stakeholders. MTA has been mindful of the need to consider carefully the location of traction power substations, and where appropriate provide landscaping or other screening to address the visual impacts of these structures. MTA will work with local stakeholders to identify minimization strategies and mitigation for visual impacts. The following are locations where MTA has or will coordinate with stakeholders.

- The National Park Service was concerned about visual impacts to the Baltimore-Washington Parkway from the reconstruction of the parkway bridges. MTA presented the Park Service with a range of options for the design and construction of the bridges (VAU 9). With

Park Service participation, MTA was able to develop a design and a construction plan that is acceptable to the Park Service and would maintain the visual experience of the parkway users and other viewers. See Chapter 6.0 and Section 4.7 for more details.

- The Town of Chevy Chase is concerned about the visual impacts of the Purple Line on adjacent residential properties. MTA is continuing to meet with the Town of Chevy Chase Mitigation Advisory Committee to discuss the design of the Purple Line and the Capital Crescent Trail (VAU 1). This collaboration involves identifying opportunities to minimize noise and to discuss aesthetics and trail access issues. MTA will continue to coordinate and consult with affected communities regarding the aesthetic treatments of the transitway elements.

Table 4-22. Summary of Visual Effects

VAU	Project Components/Visual Changes	Ratings*		
		Extent of Visual Change	Visual Sensitivity	Visual Effect
VAU 1 Bethesda Station to Stewart Avenue	Retaining walls	H	H	H
	Transitway in the Georgetown Branch right-of-way,			
	Removal of existing trees in the right of way and replacement with new landscaping			
	Trail bridge over the transitway for a connection to Elm Street Park at eastern end of Air Rights Building			
	Two new bridges over Connecticut Avenue			
	At-grade bridge at Jones Mill Road			
	Replacement of single wooden trestle bridge over Rock Creek with dual steel girder bridges			
	Connection of the Capital Crescent Trail to Rock Creek Trail			
	Yard facility in Lyttonsville			
	Replacement of the Lyttonsville Place bridge			
	Stations			
VAU 2 Stewart Avenue to Colesville Road	Replacement of the Talbot Avenue bridge	L	L	L
	Trail bridge over the CSXT corridor			
	At-grade transitway with ballasted tracks, overhead wire system, poles, and TPSS			
	Station			
	Displacement of the Spring Center Shopping Center			
	Replacement or modification of 16th Street bridge			
	Replacement of the Spring Street bridge			
VAU 3 Colesville Road to Fenton Street	SSTC station — elevated platform and shelter	H	L	M
	Station in the Silver Spring Library			
	Transitway (elevated and at grade) with overhead wire system, poles, and TPSS			
	Two bridges connecting the transitway and the trail with the SSTC			
	Displacement of three commercial buildings			
VAU 4 Wayne Avenue to Western Plymouth Street Tunnel Portal	Widening of Wayne Avenue	H	H	M to H
	Stations			
	Replacement of Sligo Creek bridge			
	Plymouth Street tunnel portal			
	Displacement of two six-unit apartment buildings			
	At-grade transitway with embedded tracks, overhead wire system, poles, and TPSS			
VAU 5 Eastern Plymouth Street Tunnel Portal to Adelphi Road/ West Campus Station	Tunnel portal in Arliss Street	M to L	L	M
	Street widening and associated retaining walls along Arliss Street			
	At-grade transitway with overhead wire system, poles, and TPSS			
	Stations			
	Building and commercial canopy displacements			
	Elevation of the transitway above the roadway grade along University Boulevard between Northwest Branch Stream Valley Park and Adelphi Road			
VAU 6. Adelphi/West Campus Station to US 1	At-grade transitway along roadways and across open areas with overhead wire system, poles, and TPSS	M	M to H	M
	Stations			
	Relocation of the “M” and the removal of the traffic circle where is it currently located			
	Realignment of several intersections			
VAU 7. US 1 to College Park Metro	At-grade transitway in roadways with overhead wire system, poles, and TPSS	L	L	L
	Stations			

Table 4-22. Summary of Visual Effects (continued)

VAU	Project Components/Visual Changes	Ratings*		
		Extent of Visual Change	Visual Sensitivity	Visual Effect
VAU 8. College Park Metro and River Road	Lowered elevation of Paint Branch Parkway	L to M	L	L
	Stations			
	At-grade transitway along roadways and across open areas with overhead wire system, poles, and TPSS			
	New transit bridge over the Northeast Branch Anacostia River			
	Realigned Northeast Branch Trail access			
VAU 9. Kenilworth Avenue and Riverdale Road	Transitway along at grade roadways with overhead wire system, poles, and TPSS	L to H	L to M	L to H
	Widening of and realignment of Kenilworth Avenue			
	Elevated transitway and station at East West Highway/Riverdale Road/Kenilworth Avenue intersection			
	Realignment of intersection of Mustang Drive and 62nd Avenue			
	Displacement of 22 residential properties on the south side of Riverdale Road			
	Lengthening of the Baltimore-Washington Parkway bridges			
	At grade station			
	Widening and realignment of Riverdale Road east of Parkway			
	Displacement of one residence and two commercial properties in Beacon Heights			
VAU 10. Veterans Parkway to New Carrollton Metro station	Transitway along at grade roadways with overhead wire system, poles, and TPSS	M	L	L to M
	Replacement of existing county maintenance facility with Glenridge Maintenance Facility			
	Stations			
	Displacement of two commercial buildings east of Annapolis Road			
	Signalization of Hanson Oaks Drive/Ellin Road intersection.			

*The ratings of High, Moderate, and Low are represented by H, M, and L, respectively.

- The University of Maryland expressed concerns about changes to the visual character of campus with the addition of the Purple Line and its ancillary facilities. MTA has worked with University to identify and minimize visual impacts to sensitive resources; specific issues included the design and location of the Preferred Alternative on campus, and the relocation of the “M” and the removal of the traffic circle where it is located currently (VAU 6). In 2012, the University endorsed the cooperatively developed plans in the new Campus Facilities Master Plan. MTA will continue to coordinate with the University and the Maryland Historical Trust as the project design advances.
- MTA has coordinated with the Columbia Country Club to maintain the existing views from the clubhouse and southern fairways and greens (VAU 1). The Country Club has

provided input on landscape treatments and grading on the slopes of the railroad berm to reduce visual effects to both the playing areas and landscape views from the clubhouse area. MTA will continue to coordinate with the Columbia Country Club on the visual and aesthetic elements of the transitway.

- MTA is coordinating with the county on the design of the Capital Crescent Trail to provide an aesthetically-pleasing facility while meeting safety requirements and ADA requirements (VAU 1 and VAU 2).
- Visual impacts to the Connecticut Avenue area from the proposed Connecticut Avenue bridges are a community concern. MTA will continue to coordinate and consult with Montgomery County and the local community regarding the aesthetic treatment of the bridge structures over Connecticut Avenue (VAU 1).

- The new bridges replacing the existing trestle bridge over Rock Creek would be a visual change. MTA will continue to coordinate with M-NCPPC and the National Capital Planning Commission regarding the design and construction of the Rock Creek bridges (VAU 1).
- MTA worked extensively on the location and design of the Lyttonsville and Glenridge storage and maintenance facilities to minimize visual impacts to viewers, particularly adjacent residents (VAU 1 and VAU 10).

Mitigation

MTA will use the Art-In-Transit program to enhance key elements of the project, as appropriate.

Short-term Construction Effects and Mitigation

The introduction of construction equipment, trucks, fencing, or walls surrounding proposed construction staging and laydown areas, as well as fugitive dust, would create temporary visual impacts to neighborhoods surrounding or adjacent to where these construction activities would occur. See Chapter 5.0 for a discussion of where these construction impacts are anticipated.

Some areas of the corridor likely would be affected more substantially than others during construction, including the construction staging areas and the locations of large project elements such as the aerial structures, the bridges across Rock Creek, the Plymouth Street tunnel, and demolition sites.

Baltimore-Washington Parkway visitors using the exit ramps at Riverdale Road would experience a visual impact during construction as the temporary bridges would be located between the existing bridges and the exit ramps.

Avoidance and Minimization

To minimize short-term visual effects, MTA will require that the construction contractors utilize best management practices to maintain an orderly appearance of active work zones and staging areas.

Mitigation

No mitigation is warranted.

4.10 Air Quality

This section describes the current regulations pertaining to the control of air pollutants, the pollutants of concern present in the Purple Line study area, the effect of the Preferred Alternative on air quality both within the study area and throughout the broader region, and minimization strategies MTA would take to eliminate or reduce air quality impacts. For further details, see *Purple Line Air Quality Technical Report (2013)*.

4.10.1 Regulatory Context and Methodology

The Clean Air Act (CAA) (42 USC 7401 et seq.) is the overarching statute regulating air quality in the United States. Among other things, it requires the U.S. Environmental Protection Agency (EPA) to set the National Ambient Air Quality Standards (NAAQS), designate areas that are not in attainment of the NAAQS, and subsequently approve state plans for achieving those standards.

The NAAQS include primary and secondary standards. The primary standards were established at levels sufficient to protect public health with an adequate margin of safety. The secondary standards were established to protect the public welfare from the adverse effects associated with pollutants in the ambient air.

The EPA classifies urban environments as being in “attainment,” “maintenance,” or “non-attainment.” An area that does not meet the NAAQS for one or more pollutants is said to be in “non-attainment” of the NAAQS enforced under the CAA; a previous non-attainment area that has demonstrated compliance with the NAAQS is considered a “maintenance” area.

Per 40 CFR Part 93, the USDOT is required to ensure that its actions “conform to” the state’s air quality plan in nonattainment areas, known as the State Implementation Plan (SIP). The process for determining compliance with a SIP is known as “transportation conformity.” Conformity to a SIP requires that a proposed project not cause a violation, worsen an existing violation, or delay timely attainment of the NAAQS. The USDOT is required to make a transportation conformity

determination each time it approves a transportation plan, program, or project in a nonattainment area.

NAAQS/Pollutants of Concern

The EPA has established NAAQS for six pollutants, which are commonly known as “criteria pollutants”: ozone, carbon monoxide (CO), particulate matter (PM_{2.5} and PM₁₀), nitrogen dioxide, sulfur dioxide, and lead (Table 4-23). Of the six criteria pollutants, those that can be traced primarily to motor vehicles are relevant to a transportation project’s air quality impacts. These pollutants include ozone and its precursor molecules (volatile organic compounds and nitrogen oxides—VOC and NO_x), as well as CO and particulate matter. These pollutants cause a variety of adverse health effects. In addition to the criteria pollutants, the EPA regulates mobile source

air toxics (MSAT) and greenhouse gases (GHG). Following is a brief description of each motor vehicle-related pollutant:

- **VOC and NO_x**—ground-level ozone is formed through the chemical reaction of VOC and NO_x from motor vehicle exhaust. Ozone is harmful to breathe and damages vegetation, crops, and buildings.
- **CO**—carbon monoxide is emitted from engines due to the incomplete combustion of fuel. It interferes with the oxygen-carrying capacity of the blood to the vital organs.
- **PM_{2.5} and PM₁₀**—particulate matter is emitted from engines and dust sources, and causes respiratory distress by traveling into the lungs and damaging tissues.

Table 4-23. National Ambient Air Quality Standards for Criteria Pollutants

Pollutant		Averaging Period	National Standards	
			Primary Standard	Secondary Standard
Ozone (O ₃)		8 hour ¹	0.075 ppm	Same as primary standard
		1 hour ²	0.12 ppm/revoked	No secondary standard
Particulate Matter (PM)	PM ₁₀	24 hour ³	150 µg/m ³	Particulate Matter (PM)
	PM _{2.5}	Annual	12 µg/m ³	15 µg/m ³
		24 hour ⁴	35 µg/m ³	
Carbon Monoxide (CO)		8 hour ⁵	9 ppm	No secondary standard
		1 hour ⁵	35 ppm	No secondary standard
Nitrogen Dioxide (NO ₂)		1 hour ⁶	0.010 ppm	No secondary standard
		Annual ⁷	0.053 ppm	Same as primary standard
Sulfur Dioxide (SO ₂)		1 hour ⁸	75 ppb	No secondary standard
		3 hours ⁵	No primary standard	0.5 ppm
Lead (Pb)		Rolling 3-month average ⁹	0.15 µg/m ³	Same as primary standard

Note: ppm = parts per million, ppb = parts per billion, µg/m³ = micrograms per cubic meter

¹To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentration measured at each monitor within an area must not exceed the standard.

²As of June 15, 2005, the EPA revoked the one-hour ozone standard in all areas except the 14 eight-hour ozone nonattainment Early Action Compact areas. The project is not located in one of these areas.

³Not to be exceeded more than once per year on average over three years.

⁴To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations of PM_{2.5} from single or multiple community-oriented monitors must not exceed the standard.

⁵Not to be exceeded more than once per year.

⁶To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed the standard.

⁷Annual mean, arithmetic average.

⁸To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed the standard.

⁹Not to be exceeded.

Source: EPA, *National Ambient Air Quality Standards (NAAQS)* October 2011.

- **MSATs**—mobile source air toxics such as benzene, formaldehyde, etc. are emitted from a variety of stationary and mobile sources such as engines, and are known or suspected to cause cancer or other serious health ailments.
- **GHGs**—greenhouse gases such as carbon dioxide (CO₂) are emitted in motor vehicle exhaust and have been attributed to climate change and global warming.

Mesoscale Pollutant Emissions Methodology

For NEPA disclosure and alternative comparison purposes, a quantitative mesoscale emissions burden analysis was conducted in Prince George's and Montgomery Counties for the criteria pollutants for which the region is designated as non-attainment or maintenance. Both counties are currently classified as "nonattainment" areas for the 1997 PM_{2.5} and 1997 8-hour ozone standards, "maintenance" areas for the 1990 CO standard, and attainment areas for all other criteria pollutants.

The analysis estimated air pollutant levels for 2014 Base Year, 2020 Interim Year, and 2040 Design Year. Using the average weekday loaded network from the Maryland Alternatives Analysis Phase II (MDAA II M80) Travel Demand Model, in combination with emission factors (developed using Mobile6.2⁶), an evaluation of emissions for both the Preferred Alternative and the No Build

Alternative was completed to determine how each would affect the Prince George's County and Montgomery County ozone (precursor VOC and NO_x), CO and PM_{2.5} emissions.

⁶ Mobile6.2 is an emission factor model used for predicting gram per mile emissions under various conditions. It was used for emission factor development in this air quality analysis in an effort to demonstrate consistency with related planning documents such as the 2012 CLRP. The Mobile6.2 emission factors were also used for the Microscale CO hot analysis for the same reason. Note that MOVES is a new model being phased in by USEPA. CO analyses started before 12/20/12 may continue to use the Mobile6.2 software.

Microscale Pollutant Emissions Methodology

Both CO and PM_{2.5} can have major localized impacts on air quality, in addition to their mesoscale impacts, which contribute to the nonattainment or maintenance designation for the region. The microscale analysis methodology used for these two pollutants is discussed below.

Microscale CO

In accordance with the EPA's 1992 *Guideline for Modeling Carbon Monoxide from Roadway Intersections*, CAL3QHC Version 2.0 was used as the preferred air pollutant dispersion modeling software. Emission factors were derived from Mobile6.2. Synchro7 was used in support of this dispersion modeling software to supply intersection volumes, level of service, delay, and signal phasing information.

Fifty intersections affected by the Purple Line were screened for microscale CO analysis. The following criteria were used to select a representative set of intersections for detailed analysis for microscale CO impacts:

- The top three intersections with the highest entering traffic volume
- The top three intersections with the highest delay were selected from the intersections whose Level of Service was at a "D" or worse, and were also in the top twenty intersections by volume.

This screening method is recommended by EPA, as the intersections with the highest volumes and worst LOS represent a cross section of the "worst case" intersections. It is assumed that if these "worst case" intersections do not violate the NAAQS, then all other intersections in the study area with lower volumes and a better LOS should also not violate the NAAQS.

Microscale PM_{2.5}

A microscale analysis is typically completed for fine particulate matter (PM_{2.5}). However, the Purple Line meets the CAA and 40 CFR 93.116 requirements for PM_{2.5} without a microscale analysis because its electric light rail vehicles would not increase the amount of diesel vehicles in the study area, which are primary contributors of PM_{2.5} emissions.

In addition, a project-level analysis of PM_{2.5} impacts was not required because LRT projects are not projects “of air quality concern” as defined in 40 CFR 93.123(b) (1) and *Transportation Conformity Guidance for Qualitative Hot-spot Analyses in PM_{2.5} and PM₁₀ Nonattainment and Maintenance Areas* (EPA, 2006).

Mobile Source Air Toxics Emissions Methodology

To analyze the Preferred Alternative’s effect on on-road MSAT levels, the available FHWA’s *Interim Guidance Update for Mobile Source Air Toxic Analysis in NEPA Documents* (2012) was used. This FHWA’s interim guidance is the only guidance that provides specific procedures for analyzing potential MSAT impacts for the NEPA purpose. The guidance identifies a three-tiered approach for MSAT analysis, based upon the potential of a project to affect MSAT levels in the region. The Purple Line is classified as a Tier II project under that guidance, because it is a project that improves operations of highway, transit, or freight, without adding substantial new vehicle capacity to the roadways, and without creating a facility that is likely to meaningfully increase MSAT emissions. Tier II projects require a qualitative (not quantitative) analysis, which is based on comparing changes in VMT (assuming the vehicle mix does not change) between the Preferred Alternative and the No Build Alternative.

Although a qualitative analysis cannot measure the health impacts from MSATs particularly on local conditions, such an analysis can identify and compare relative differences in MSAT emissions levels between the Preferred Alternative and the No Build Alternative.

Greenhouse Gas Emissions Methodology

For NEPA disclosure and alternative comparison purposes, a quantitative mesoscale greenhouse gas emissions analysis was also conducted. The analysis

estimated greenhouse gas pollutant levels for 2014 Base Year, 2020 Interim Year, and 2040 Design Year for both the No Build Alternative and Preferred Alternatives. MOVES 2010b was used per EPA guidance to prepare greenhouse gas emission factors since the MOVES model accounts for revisions to GHG emissions and fuel economy standards; it also incorporates new emissions test data. The criteria by which the No Build Alternative is compared to the Preferred Alternative are the outputs of the greenhouse gas emissions analysis in tons of CO₂, CH₄, N₂O, elemental carbon PM_{2.5}, hydrocarbons, and BTU of total energy.

4.10.2 Affected Environment

The Air and Radiation Management Administration within the Maryland Department of the Environment (MDE) is responsible for implementing and enforcing air quality regulations in Maryland. This work occurs through several methods, including air pollution monitoring. Table 4-24 summarizes the reported air quality data for the years 2009 through 2011.

The project corridor encompasses both Prince George’s County and Montgomery County. Both counties are in the Metropolitan Washington DC-MD-VA region. The region is currently classified as “nonattainment” for the 1997 PM_{2.5} and 1997 8-hour ozone standards; as “maintenance” (formerly nonattainment) areas for the 1990 CO standard; and as an attainment area for all other criteria pollutants. As noted above, a SIP is developed for each criteria pollutant for which the region is in nonattainment or maintenance status. The most recent SIPs in place for the region are the 8-hour ozone SIP (May 2007), the fine particulate matter (PM_{2.5}) SIP (March 2008), and the carbon monoxide maintenance plan (September 1995).

Table 4-24. Maximum Monitored Pollutant Concentrations (2009 to 2011)

Pollutant and Averaging Period	NAAQS	Units	Monitored Values		
			2009	2010	2011
Carbon Monoxide, 1-hour 2nd Max	35	ppm	4.2	3.7	4.2
Carbon Monoxide, 8-hour 2nd Max	9	ppm	3.8	3.1	2.4
Nitrogen Dioxide, 1-hour 98th Percentile	100	ppb	63	59	55
Ozone, 8-hour 4th Max	0.075	ppm	0.071	0.086	0.086
SO ₂ , 1-hour 99th Percentile	75	ppb	39	21	20
PM _{2.5} , 24-hour 98th Percentile	35	µg/m ³	26	28	25
PM _{2.5} , Annual Mean	12	µg/m ³	10.5	11.4	10.4
PM ₁₀ , 24-hour 2nd Max	150	µg/m ³	47	85	40
Lead	0.15	µg/m ³	Not avail	Not avail	Not avail

Note: Values obtained from the following representative monitoring sites, which are between 4 and 12 miles from the study area: Rockville (Montgomery County); Beltsville and Upper Marlboro (Prince George's County); and L & 20th, 420 34th St N.E., 2500 1st St N.W (Washington DC).

PM_{2.5} is a regional pollutant and the nonattainment designation was made based on the levels monitored over a regional monitoring network as compared to those from selected stations near the study area.

Source: EPA AirData, 2012. <http://www.epa.gov/airdata/>

4.10.3 Preferred Alternative

Long-term Operational Effects

Mesoscale Pollutant Emissions

As discussed previously, for NEPA disclosure and alternative comparison purposes, the mesoscale emissions burdens were predicted for Base Year 2014, Interim Year 2020, and Design Year 2040 and are presented in Table 4-25. The year of peak emission burden is anticipated to be the nearest year, Base Year 2014, after which emission control technology is expected to reduce mesoscale emissions, despite the expected increase in overall VMT in the future.

The predicted mesoscale emissions burdens indicate that the Preferred Alternative would yield slightly higher PM_{2.5} pollutant levels (0.2 percent), slightly lower ozone precursor NO_x (0.1 percent) levels, and virtually no change in other mesoscale pollutant levels compared to the No Build Alternative in Interim Year 2020. The Preferred Alternative is predicted to decrease all mesoscale pollutant levels (between 0.1 to 0.3 percent) compared to the No Build Alternative in Design Year 2040 within the study area in Prince George's and Montgomery Counties.

Microscale CO Emissions

Fifty-two intersections affected by the Purple Line were screened for microscale CO analysis following the EPA's 1992 *Guideline for Modeling Carbon Monoxide from Roadway Intersections*. Seven intersections from the screening evaluation were selected for CO microscale analysis. Table 4-26 lists the intersections selected for microscale analysis and identifies the predicted maximum CO concentrations at each intersection for Base Year 2014, Interim Year 2020, and Design Year 2040. The CO microscale analysis revealed maximum 1-hour CO concentrations below the NAAQS of 35 ppm, and maximum 8-hour CO concentrations below the NAAQS of 9 ppm for all scenarios. No violations of the NAAQS are predicted for either the Preferred Alternative or the No Build Alternative.

Mobile Source Air Toxics Emissions

The amount of MSATs emitted along the project corridor in the future would be proportional to the total VMT predicted under each alternative, assuming the vehicle mix does not change. Vehicle mix pertains to the distribution of vehicle classifications on the roadway network (e.g., the percent of VMT by light duty gasoline vehicle, heavy duty diesel trucks, etc.)

Table 4-25. Mesoscale Pollutant Emissions

Pollutant	Season	Baseline	2014	2020			2040		
			Base	No Build Alternative	Preferred Alternative	% Change Between Alternatives	No Build Alternative	Preferred Alternative	% Change Between Alternatives
PM _{2.5} (Tons)	Annual	605	321.6	270.9	271.4	0.2%	270.7	270.4	-0.1%
Ozone precursor VOC (Tons)	Ozone season daily	43.8	16.54	12.67	12.67	0%	12.19	12.18	-0.1%
Ozone precursor NO _x (Tons)	Ozone season daily	102.32	32.72	16.87	16.86	-0.1%	10.94	10.91	-0.3%
CO (Tons)	Winter season daily	1702.90	230.23	209.7	209.7	0%	212.0	211.6	-0.2%

Note: CO = carbon monoxide; VOC = volatile organic compounds; NO_x = nitrogen oxides; PM_{2.5} = fine particulate matter.

The baseline year for the 1997 PM_{2.5} standard and 1997 8-hr ozone standard is 2002. The baseline year for the 1990 CO standard is 1990.

Source: MDAA II M80 Travel Demand Model; emission factors referenced from MWCOG

Table 4-26. Microscale CO Emissions

Intersection	NAAQS	2014	2020		2040	
		Base	No Build Alternative	Preferred Alternative	No Build Alternative	Preferred Alternative
Maximum 1-hour CO Concentrations (ppm)						
University Blvd (MD 193) at Piney Branch Rd (MD 320)	35	4.4	4.5	4.4	4.0	4.5
University Blvd (MD 193) at New Hampshire Ave (MD 650)	35	4.7	4.0	4.3	4.1	4.5
University Blvd (MD 193) at Riggs Rd (MD 212)	35	4.9	4.2	4.1	4.3	4.1
Campus Dr at Adelphi Rd	35	4.8	5.3	4.3	4.7	4.8
Paint Branch Pkwy at Metro Parking	35	3.8	3.9	4.3	6.6	6.5
Kenilworth Ave (MD 201) at E-W Highway (MD 410)	35	4.7	4.1	4.8	4.7	5.2
Veterans Pkwy (MD 410) at Annapolis Rd (MD 450)	35	4.4	3.9	4.4	3.5	3.6
8-hour CO Concentrations (ppm)						
University Blvd (MD 193) at Piney Branch Rd (MD 320)	9	3.5	3.6	3.5	3.2	3.6
University Blvd (MD 193) at New Hampshire Ave (MD 650)	9	3.7	3.2	3.4	3.3	3.6
University Blvd (MD 193) at Riggs Rd (MD 212)	9	3.9	3.4	3.2	3.4	3.3
Campus Dr at Adelphi Rd	9	3.8	4.2	3.4	3.7	3.8
Paint Branch Pkwy at Metro Parking	9	3.1	3.1	3.4	5.2	5.2
Kenilworth Ave (MD 201) at E-W Highway (MD 410)	9	3.8	3.3	3.8	3.7	4.1
Veterans Pkwy (MD 410) at Annapolis Rd (MD 450)	9	3.5	3.1	3.5	2.8	2.8

Concentrations include a background concentration of 3 ppm and 2.4 ppm for the 1-hour and 8-hour concentrations, respectively, as recommended by the Maryland Department of the Environment

Source: CAL3QHC Version 2.0; Synchro7 traffic model; emission factors referenced from MWCOG

Table 4-27. Vehicle Miles Traveled under the No Build and Preferred Alternatives

Parameter	2014	2020			2040		
	Base	No Build Alternative	Preferred Alternative	% Change Between Alternatives	No Build Alternative	Preferred Alternative	% Change Between Alternatives
VMT (in 1,000s)	45,278	49,675	50,116	0.1%	53,383	53,292	-0.0%

Source: MDAA II M80 Travel Demand Model

Table 4-27 presents the annual VMT for each alternative for each analyzed year. VMT estimates predict that the Preferred Alternative would have a slightly higher VMT in the study area compared to the No Build Alternative in 2020 and a slightly lower VMT compared to the No Build Alternative in 2040. As such, MSATs levels within the study area under the Preferred Alternative are expected to be slightly higher in 2020 and slightly lower in 2040 than the respective levels under the No Build Alternative.

MSAT emissions per mile are also projected to decrease in the future as compared to present levels as a result of the EPA's national control programs, which are projected to reduce annual priority MSAT emissions by 83 percent between 1999 and 2050, despite the anticipated 102 percent increase in VMT over that time period⁷.

There may be localized areas where ambient concentrations of MSATs could be higher or lower under the Preferred Alternative than under the No-Build Alternative. However, the magnitude and duration of these potential increases in health effects compared to the No Build Alternative cannot be accurately quantified because of the limitation of current modeling tools. Along with these general limitations of modeling tools, there is also a lack of monitoring data in most areas for use in establishing project-specific MSAT background concentrations.

Conformity Determination

The Transportation Conformity Rule provides criteria and procedures for determining the conformity to the SIP of transportation plans, programs, and projects funded or approved under

Title 23 USC or the Federal Transit Act. The attainment status of this area is as follows (Prince George's and Montgomery Counties share the same attainment statuses):

- Maintenance area for CO
- Nonattainment area for PM_{2.5}
- Moderate nonattainment area for ozone

As such, a SIP conformity determination with the following items is required:

- The project must originate from a conforming transportation plan and program
- The project must eliminate or reduce the severity and number of violations of the NAAQS

Transportation projects that are included in a conforming transportation plan and program are considered to conform to the rule. The Purple Line project is listed as Project ID #2795 in the 2013-2018 Transportation Improvement Plan (TIP), and as Project ID #1042 in the 2012 CLRP, both approved by the National Capital Region Transportation Planning Board on July 18, 2012. Inclusion of the Purple Line in the conforming TIP and CLRP designates the Purple Line as a conforming transportation project and precludes the need for a separate regional emissions analysis. A mesoscale analysis of Prince George's and Montgomery Counties was performed for full disclosure of air quality impacts.

The project's CO microscale analysis predicts that CO levels for all future years would be below the one-hour and eight-hour NAAQS of 35 ppm and 9 ppm, respectively. According to guidance, light rail projects are not of air quality concern for PM_{2.5}. As such, the project is not expected to create or worsen violations of the PM_{2.5} NAAQS. Therefore, this project would comply with the conformity

⁷ Federal Highway Administration, *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents* (2012).

requirements, on both regional and local levels, established by the Clean Air Act.

Greenhouse Gas Emissions

Data is presented in Table 4-28 for various pollutants and processes related to GHG, including CO₂, methane, nitrous oxide, elemental carbon particulate matter, hydrocarbons, and total energy used.

CO₂ and total energy are the two most common measures of a project's impact on greenhouse gas emissions.

In 2020, mesoscale CO₂ levels and total energy consumption are expected to be slightly higher under the Preferred Alternative than under the No Build Alternative, but in 2040, mesoscale CO₂ levels and total energy consumption are expected to be slightly lower under the Preferred Alternative.

Mitigation

Since the project is included in a conforming TIP and the Preferred Alternative would not cause or contribute to a violation of the NAAQS, no long-term adverse impacts to either localized or mesoscale air quality are anticipated. Therefore, no mitigation is proposed for long-term operational effects.

Short-term Construction Effects

The construction duration of the project is not anticipated to exceed five years in any single location; thus, any impact incurred during construction would be considered a temporary impact (see Chapter 5.0 for more information on the anticipated construction activities). According to 40 CFR 93.123(c) (5), CO, PM₁₀, and PM_{2.5} hot-spot analyses are not required for construction-related activities that cause temporary increases in emissions. The primary air quality concerns during construction would be a localized increase in the concentration of fugitive dust (including airborne particulate matter, PM_{2.5} and PM₁₀), as well as mobile source emissions both on and off the construction site from on- and off-road construction equipment and vehicles. Disruption of traffic during construction (such as temporary reduction of roadway capacity and increased queue lengths) could result in short-term elevated concentrations of localized pollutants such as CO and PM.

Avoidance and Minimization

MTA would make an effort to minimize the amount of emissions generated by traffic disruptions during construction, especially during peak hours.

Table 4-28. Annual Greenhouse Gas Emissions

Pollutants/Processes	2014	2020			2040		
	Base	No Build Alternative	Preferred Alternative	% Change between Alternatives	No Build Alternative	Preferred Alternative	% Change between Alternatives
CO ₂ (Tons)	10,327,270	10,289,952	10,360,877	0.7%	10,325,356	10,302,836	-0.2%
CH ₄ (Tons)	628	638	639	0.2%	747	746	-0.1%
N ₂ O (Tons)	261	182	182	0.1%	159	159	-0.1%
Elemental Carbon PM _{2.5} (Tons)	337	134	134	0.4%	51	51	-0.1%
Hydrocarbons (Tons)	9,849	6,876	6,888	0.2%	6,151	6,146	-0.1%
Total Energy (BTU Billions)	123,046	122,555	123,421	0.7%	122,928	122,661	-0.2%
Total Distance (Million Miles)	17,863	19,654	19,826	0.9%	21,117	21,084	-0.2%

Source: MOVES 2010b; MDAA II M80 Travel Demand Model; MOVES input tables referenced from MWCOC.

*Percent change based upon calculations of totals before rounding — refer to Appendix F.

Mitigation

MTA will require the construction contractor to implement dust control measures in accordance with MDE requirements and require that construction equipment complies with EPA's Tier 2 engine emission standards. Possible dust and emission control measures include the following:

- Minimizing land disturbance
- Constructing stabilized construction site entrances per construction standard specifications
- Covering trucks when hauling soil, stone, and debris
- Using water trucks or calcium chloride to minimize dust
- Stabilizing or covering stockpiles
- Minimization of dirt tracking by washing or cleaning trucks before leaving the construction site
- Using ultra-low sulfur diesel fuel for diesel equipment
- Equipping some construction equipment with emission control devices such as diesel particulate filters
- Permanently stabilizing and seeding any remaining disturbed areas

4.11 Noise

This section describes the existing noise environment, identifies project-related noise levels that would result from the Preferred Alternative, and describes measures that have been incorporated into the design to reduce project-related noise. More detail regarding the noise analysis findings is provided in in the *Purple Line Noise Technical Report (2013)*.

4.11.1 Introduction

A noise impact assessment was conducted in accordance with NEPA and FTA impact assessment guidelines and procedures. The details of the analysis methodology are outlined in detail in FTA's guidance manual for assessing noise and vibration impacts of proposed mass transit projects, *Transit Noise and Vibration Impact Assessment* (FTA 2006).

The noise analysis study area is a 700-foot corridor centered along the Preferred Alternative alignment which is further expanded to encompass areas within 1,000 feet of the proposed yard and maintenance facilities. The study area is based upon screening distances identified in the *Transit Noise and Vibration Impact Assessment* manual.

Methodology

The following methodology was implemented for the noise analysis:

- Identify representative noise-sensitive properties and land uses within the study area that would potentially be adversely affected by operating the Preferred Alternative
- Measure existing ambient noise levels at each representative noise-sensitive receptor location
- Estimate project-related noise exposure levels at each receptor location and compare with FTA impact criteria
- Identify reasonable and feasible design refinements that would reduce project-related noise and incorporate them into the project

FTA Criteria

The noise criteria that FTA uses to determine impacts vary based on land use, as follows:

- **Category 1**—Buildings or parks where quiet is an essential element of their intended purpose
- **Category 2**—Residences and buildings where people normally sleep, where sensitivity to noise is of the utmost importance
- **Category 3**—Institutional land uses with primarily daytime and evening use, such as schools, libraries, theaters, and churches

Land use categories 1 and 3 (primarily daytime uses) were assessed using the peak hour noise level (Leq [1 hr]) descriptor, while land use category 2 (daytime and nighttime use) were assessed using the twenty-four-hour based day-night (Ldn) descriptor. The Ldn descriptor is the average hourly sound level over a 24-hour period, which adjusts for greater sensitivity people have to noise during the nighttime sleeping hours by adding a 10-decibel adjustment from 10:00 p.m. to 7:00 a.m. Both the Leq and Ldn descriptors use an A-weighted decibel scale, referred to as dBA, which incorporates an adjustment to sound levels to account for the

frequency range which best approximates human hearing and perception to changes in sound levels.

FTA impact criteria compare existing outdoor noise levels with the noise generated solely by the transit noise source. The severity of noise impact is characterized by two curves (illustrated in Figure 4-26) that allow for higher project noise exposure where there are higher levels of existing background noise, up to a threshold level beyond which project noise exposure would result in an impact. The left vertical axis in the figure applies to FTA land use Categories 1 and 2, and the right vertical axis to Category 3. Noise levels above the top curve are considered to cause Severe Impact since a substantial percentage of people living in the area would be highly annoyed by the new noise. Noise levels in the range between the two curves are deemed to be Moderate Impacts, and levels below the bottom curve represent No Impact.

4.11.2 Affected Environment

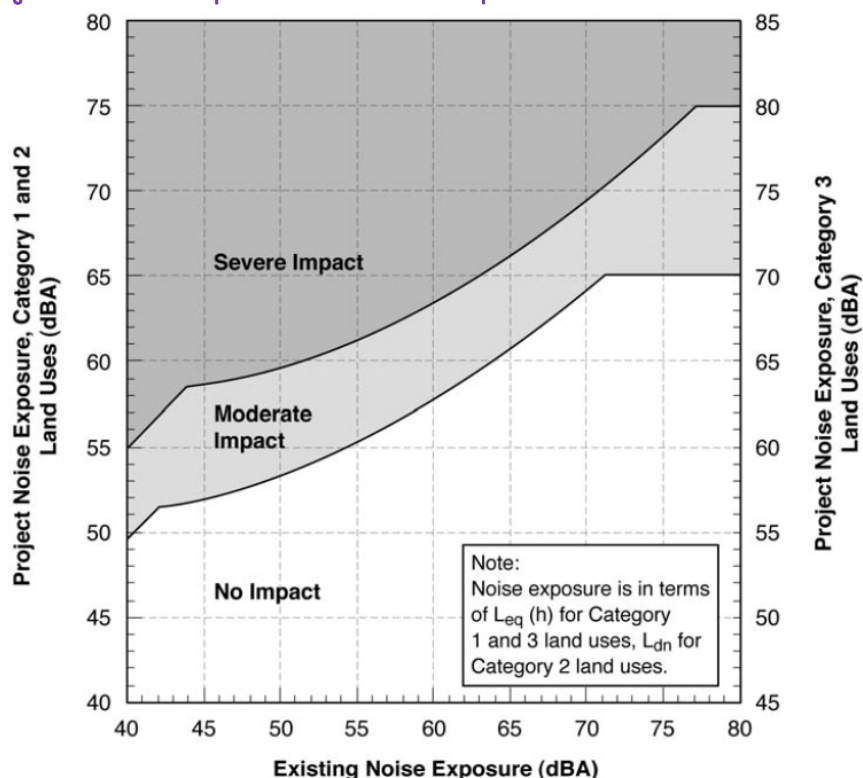
A review of aerial photography and field inspections of the study area identified residential communities, parks, and institutional uses within the project corridor. Eighty-three representative locations consistent with the three FTA use categories were chosen for monitoring and analysis, as shown on Figure 4-27. Receptor sites were selected based on their sensitivity to noise and vibration, close proximity to line operations and therefore representative of potential exposure for a larger area surrounding each representative site. Noise measurements were collected during the time period covering January 2011 to June 2012 using laboratory-calibrated sound level meters.

The measured day-night noise levels at residential land uses within the study area ranged from 55 dBA at Receptor M-5 (single-family residences along Elm Street in Chevy Chase) to

78 dBA at Receptors M-22 (multi-family residences along Falkland Lane in Silver Spring) and M-39 (a residential property on Erskine Road in College Park). In general, the lower measured noise levels occurred in suburban communities while the higher noise levels typically occurred in more urban settings adjacent to roadways with greater vehicular traffic.

Measured peak hour noise levels at parks within the study area ranged from 52 dBA at Receptor P-3 (Rock Creek Stream Valley Park) to 77 dBA at Receptor P-11 (Glenridge Community Park). Peak hour noise levels at University of Maryland receptors within the study area ranged from 57 dBA at Receptor UMD-1 (Ludwig Field & Kehoe Track) to 68 dBA at Receptor UMD-3 (Health Center on Campus Drive). Measured peak hour noise levels at institutional receptors in the study area ranged from 52 dBA at Receptor M-16 (Rock Creek Pool on Grubb Road) to 74 dBA at Receptor M-19A (Rosemary Hills Elementary School).

Figure 4-26. Noise Impact Criteria for Transit Projects



Source: Transit Noise and Vibration Impact Assessment, FTA, 2006.

Figure 4-27. Representative Noise and Vibration Monitoring and Assessment Locations

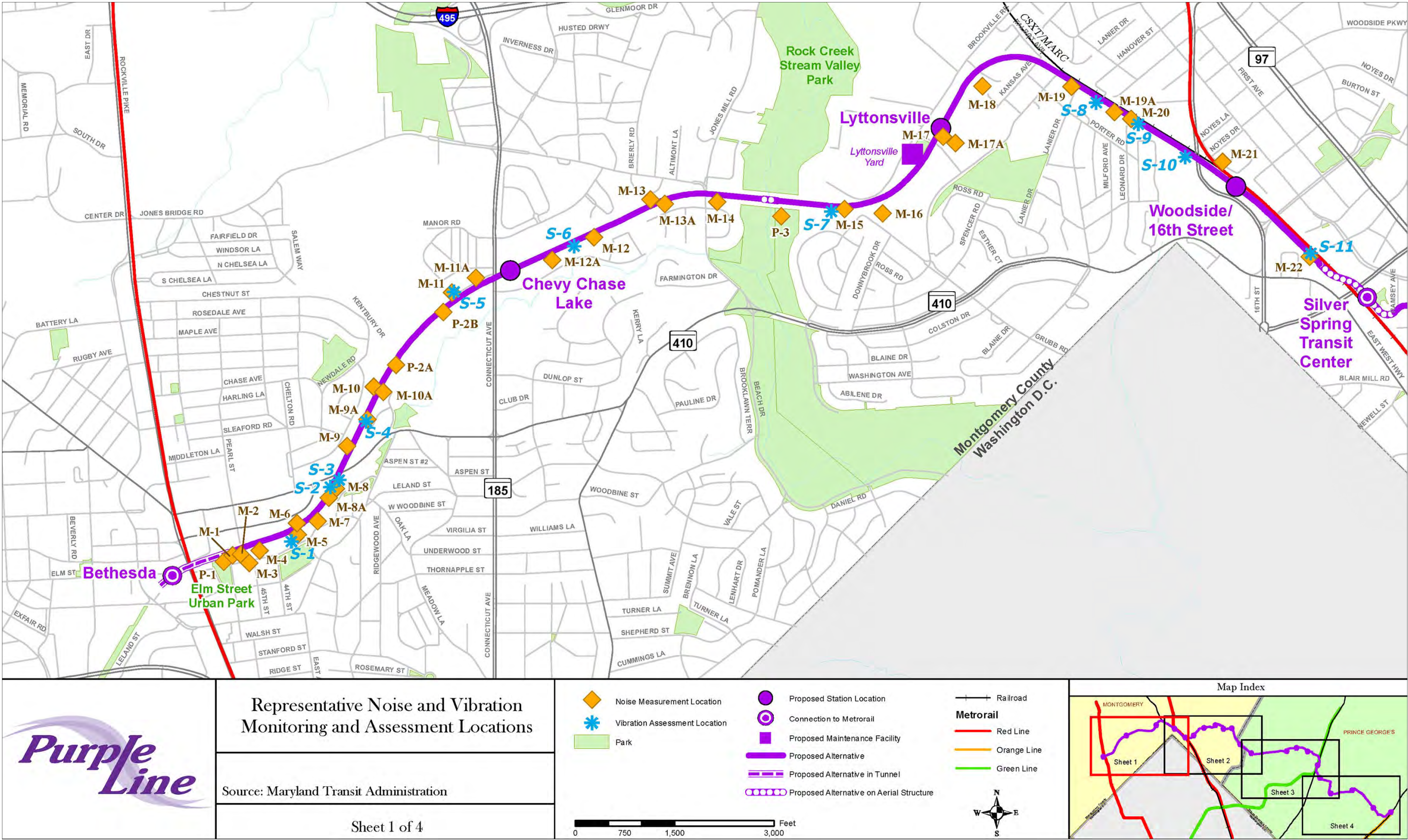


Figure 4-27. Representative Noise and Vibration Monitoring and Assessment Locations (continued)

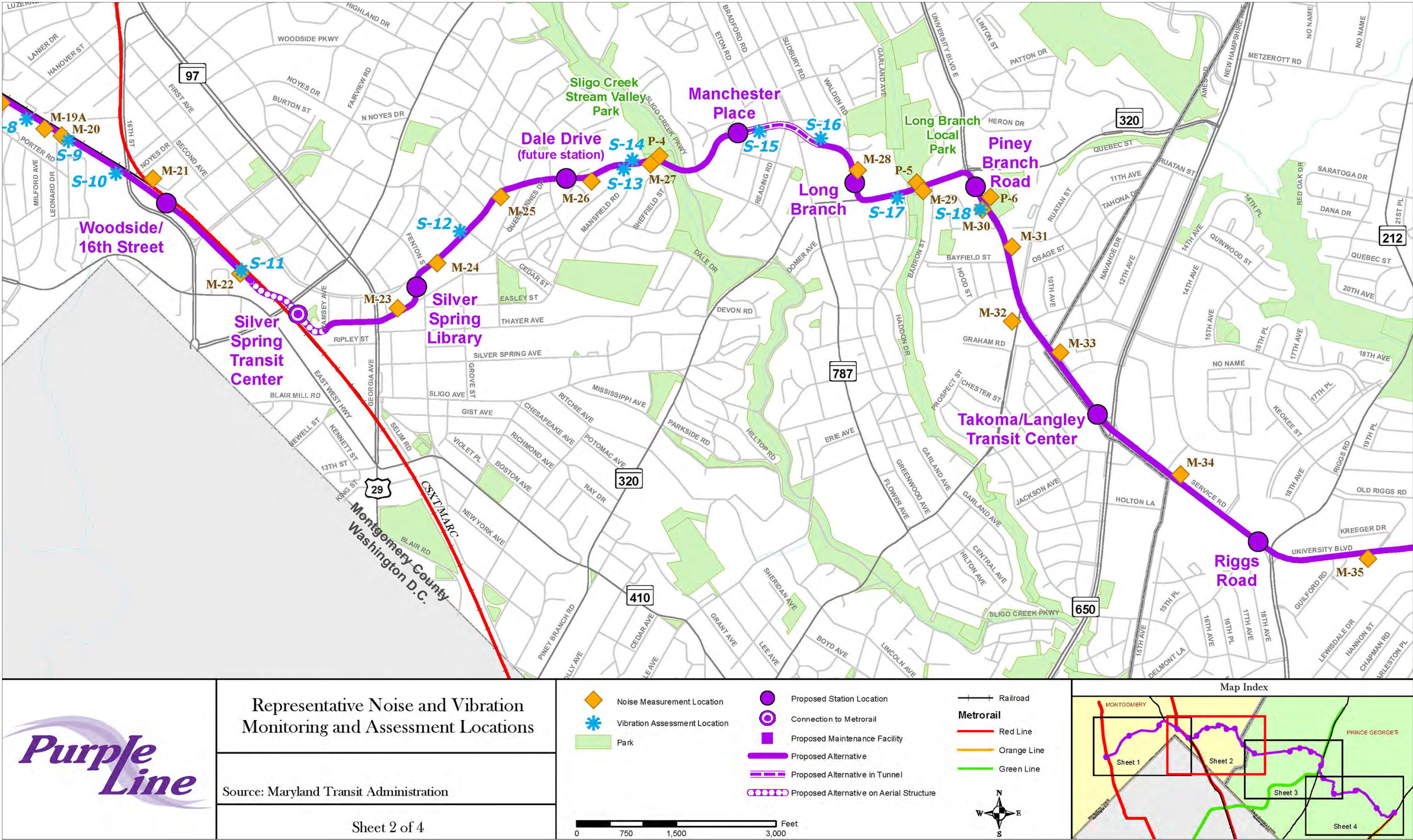


Figure 4-27. Representative Noise and Vibration Monitoring and Assessment Locations (continued)

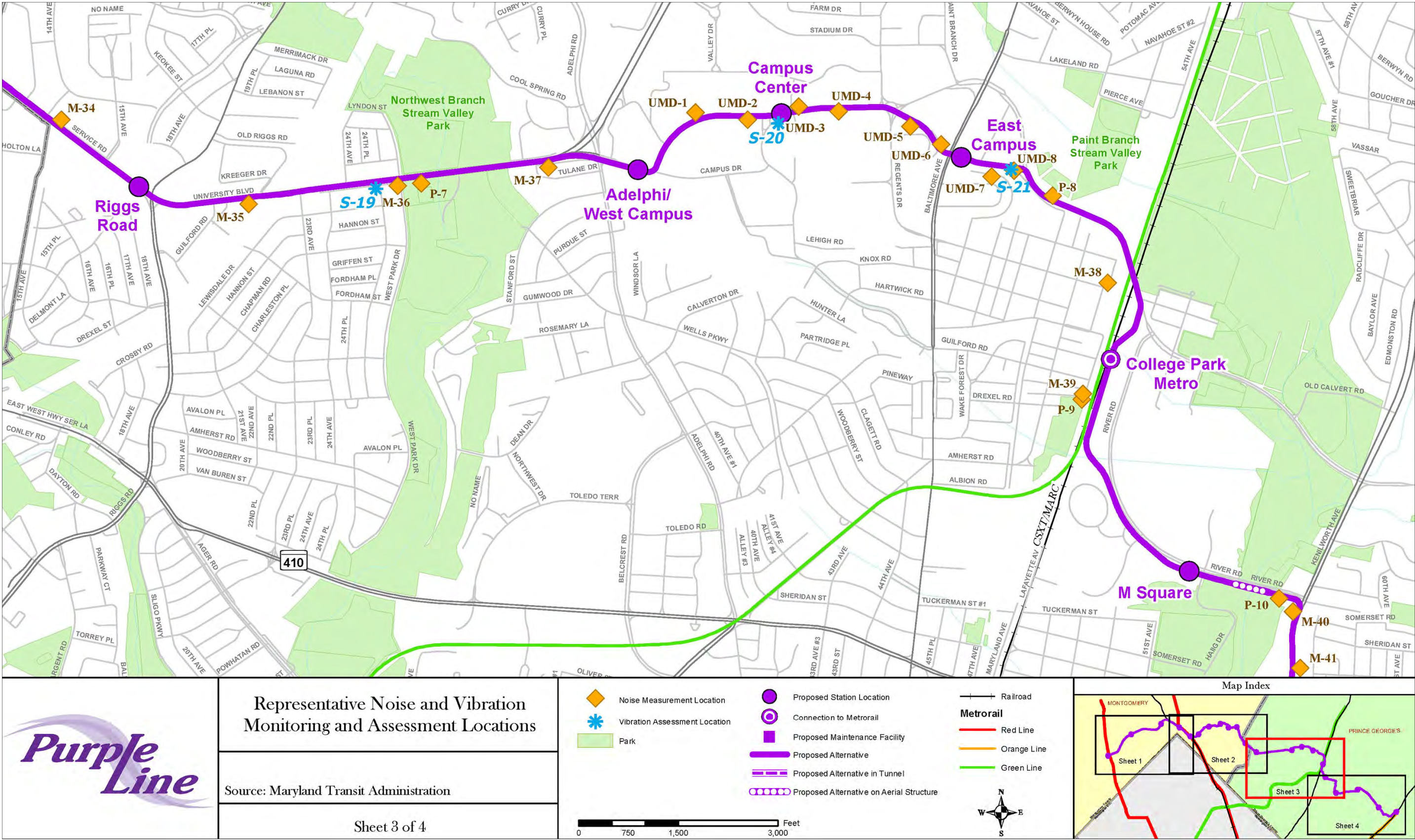
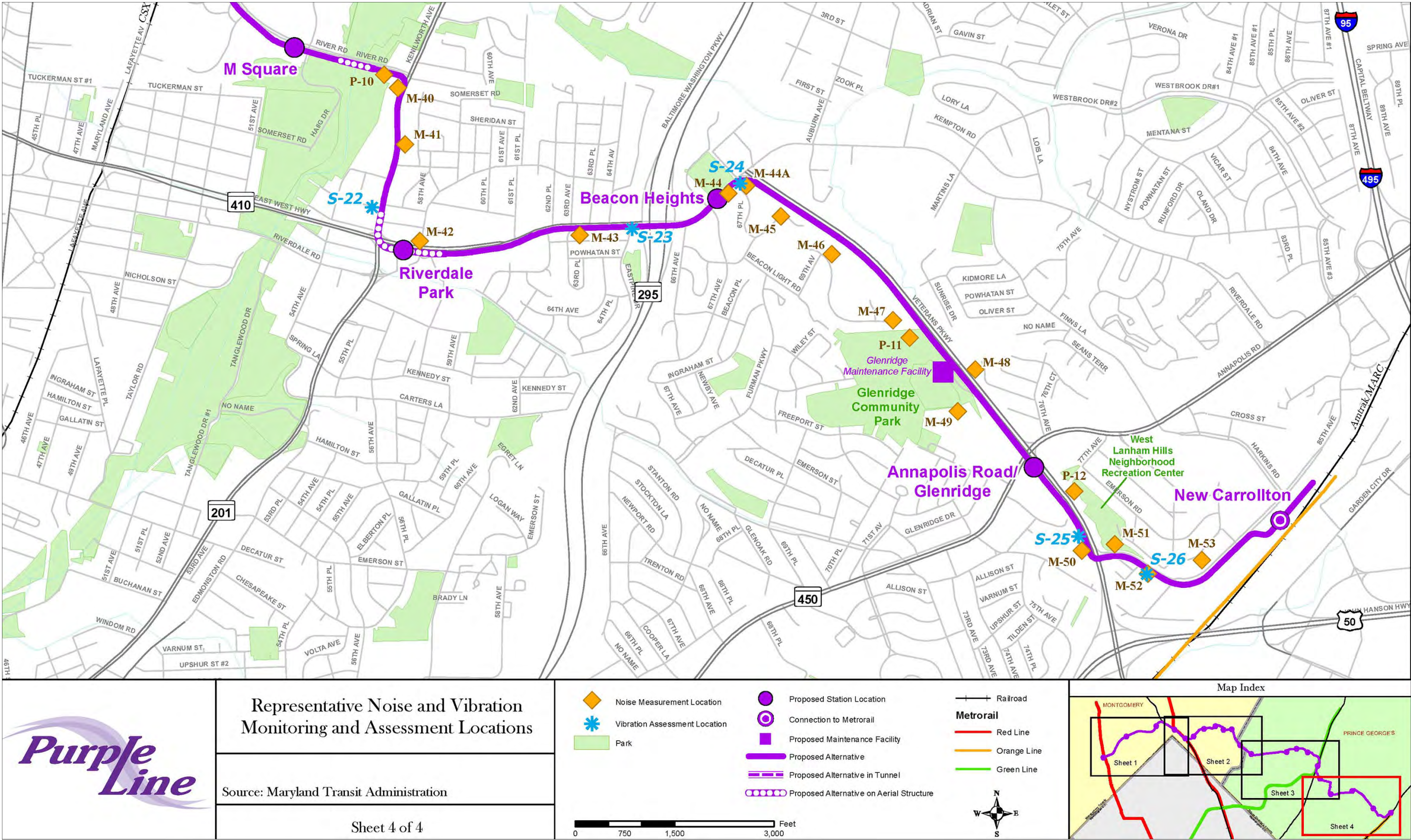


Figure 4-27. Representative Noise and Vibration Monitoring and Assessment Locations (continued)



Based on the field measurement findings, the high ambient noise conditions reported at some residential and other noise-sensitive monitoring locations reflect their close proximity to active roadways and existing freight rail corridors.

4.11.3 Preferred Alternative

Long-term Operational Effects

Noise Sources Related to LRT Vehicle Operations

Project-related sound levels were estimated for each of the 83 representative sites described in Section 4.11.2. FTA noise estimate calculation process considers distance to the transitway, type of track, train length, train speed, service operations (headways), and presence of at-grade crossovers (areas where the train and street traffic intersect). An onboard warning device or bell was included in the calculations for areas in the vicinity of stations and certain at-grade crossings, with the assumption that the device or bell would sound within approximately five seconds of approaching the station or grade crossing. MTA is currently developing a Bell and Horn Policy for the Purple Line which would indicate standard operating procedures for horn and bell use in different types of locations. This noise analysis assumed the most conservative use of horns and bells, without regard to differences in train operating conditions (for example: mixed traffic lanes versus exclusive lanes, residential areas versus non-residential). Actual operating policy for the Purple Line will likely reflect these differences.

The calculations also included noise associated with the yard and maintenance facility activities, as well as train movements into, out of, and within the yard and maintenance facilities. Receptors located within 1,000 feet of the Lyttonsville Yard included M-15, M-16, M-17, M-17A, and M-18; those nearest the Glenridge Maintenance Facility site are M-47, M-48, and M-49.

Most LRT projects incorporate various design elements to help reduce noise exposure during daily line operations. The predicted sound levels for the Preferred Alternative were calculated with the incorporation of the following measures in the project build design:

- Between Bethesda and Rock Creek Stream Valley Park, the Preferred Alignment transitway design would have a four-foot noise wall on the south side of the transitway. On the north side of the transitway, either the trail would be elevated more than four feet above the tracks, or a four-foot noise wall would be included between the Capital Crescent Trail and the adjacent community. The four-foot noise wall would provide a 4 dBA noise reduction from LRT vehicle movements.
- LRT vehicles will be constructed to include vehicle skirt panels to reduce the noise caused by the interaction of, and friction between, the wheels pressing down on the rails as the train travels along the transitway. This design feature would reduce the vehicle noise by 8 dBA along the entire length of the project corridor. For areas near the four-foot barrier/retaining walls, the combination of both measures would provide a total of 12 dBA noise reduction.

The predicted sound levels were compared to the existing sound levels at each location to identify sites that would result in future operational noise exposure constituting either an FTA-based moderate impact or severe impact condition. The analysis found that none of the studied representative sensitive receptors would experience project-related sound levels that would exceed the FTA Severe Impact threshold. Moderate impacts due to Purple Line operations are projected to occur at 11 residential properties comprising seven single-family residences represented by sites M-26, M-27A, and M-52, and four apartment buildings (containing a total of approximately 140 units) represented by sites M-23A, M-27A, M-28, and M-44. Five sites (M-23A, M-26, M-27A, M-28, and M-44) are representative of residential properties that are within 200 feet of a station. The sixth site, M-52, is located within 200 feet of a grade crossing. The noise exposure projected at all of these sites is due primarily to horn soundings which are required as the LRT approaches stations and grade crossings.

Noise exposure levels at all other receptor sites identified in Figure 4-27 are projected to remain below FTA Moderate Impact threshold. Table 4-29

summarizes the number of impacted sites by land use type.

Table 4-29. Predicted Project Noise Impacts

Type of Receptor	Number of Impacts	Locations
Residence (Ldn)	FTA Moderate Impact at 7 single-family residences and 4 apartment buildings containing approximately 140 units	M-23A, M-26, M-27A, M-28, M-44, M-52
Institution (Leq)	None	None
Park (Leq)	None	None
UMD	None	None

Other Noise Sources

In addition to LRT vehicle operations, other noise sources associated with the Preferred Alternative include the public address (PA) system at stations, wheel squeal, and the TPSS. Following is a qualitative description of each noise source:

- PA systems would be installed at stations to announce LRT arrivals and departures and provide other information to patrons.
- Wheel squeal can occur when steel-wheel LRT vehicles traverse tight radius curves. It is very difficult to predict when and where wheel squeal would occur. Generally, the potential for wheel squeal to occur is when the radius of track curvature is less than 600 feet. Within the Purple Line corridor, 20 tight radius (<600 feet) curve locations occur along the transitway alignment.
- The Preferred Alternative includes TPSS, installed at approximately one-mile intervals, to provide electrical power for light rail vehicles. The primary noise from the TPSS is the transformer hum.

With proper design and implementation of mitigation measures described below, these other noise sources would not cause additional noise impacts.

Avoidance and Minimization

As noted above, the LRT vehicles will be designed to include vehicle skirt panels to reduce the noise caused by LRT operations, and a combination of noise walls and retaining walls would be incorporated between Bethesda and Rock Creek Stream

Valley Park to reduce operational noise for the adjacent communities.

MTA will minimize the noise from the Preferred Alternative operations as follows:

- The PA systems will have volume adjustment controls designed to maintain announcement volume at the specified noise levels, as appropriate. With proper use, short-term noise from the PA system announcements is not expected to be a noise annoyance to residential communities adjacent to stations.
- The TPSS will be designed in accordance with the MTA design criteria, which are intended to minimize the noise from the transformer hum.

Mitigation

MTA's analysis found that further minimization and mitigation of operational noise at impacted sites is not reasonable. Much of the noise impact is derived from use of transit warning horns at stations and crossings, and eliminating the transit horn is not possible due to safety concerns. Another common noise-reduction measure—the construction of noise walls—is not feasible for this project because these barriers would block driveway access and pedestrian walkways, as well as introducing visual impacts. Therefore, these additional measures are not proposed.

Short-term Construction Effects

Constructing the Purple Line would involve a range of activities, including excavating the rail right-of-way; tunnel construction; constructing grade crossing areas, bridges, and yard and maintenance facilities; laying track; and constructing stations and other system elements (see Chapter 5.0 for more information on the anticipated construction activities).

Noise levels during construction are difficult to predict, and they vary depending on the type and duration of construction activity and the number and type of equipment used during each stage of work. Specifically, the location of sensitive receptors in relation to the construction activity and the duration of construction activities affect the potential for noise impact. Track-related construction would move continuously along the corridor; therefore, the duration of exposure to

construction-related noise at any one property would be limited.

Some specialized construction work does have the potential to create noise impacts. This includes:

- Tunneling (Plymouth Street tunnel)
- Pile driving
- Heavy equipment use (Silver Spring Transit Center and associated structures, and sections along the transitway with extensive bridge and retaining wall work).

However, the noise impact for these activities would be realized only for sensitive receptors in close proximity to these specific locations and not along the entire length of the transitway.

Avoidance and Minimization

As part of the Purple Line contract specification documents, MTA would establish performance standards for construction equipment to reduce noise associated with the construction activities. MTA is committed to abiding by local noise ordinances, whenever feasible and reasonable, in accordance with its own performance standards, which will include, but not necessarily be limited to, the following:

- Conduct construction activities during the daytime whenever possible.
- Conduct truck loading, unloading, and hauling operations in a manner that minimizes noise.
- Route construction equipment and other vehicles carrying spoil, concrete, or other materials over routes that would cause the least disturbance to residents in the vicinity of the activity.
- Locate site stationary equipment away from residential areas to the extent reasonably feasible within the site/staging area.
- Employ the best available control technologies to limit excessive noise when working near residences
- Adequately notify the public of construction operations and schedules including methods such as construction-alert publications and a Noise Complaint Hotline to handle complaints quickly.

4.12 Vibration

This section describes the existing vibration environment, identifies project-related ground-borne vibration (GBV) and ground-borne noise (GBN) that would result from the operation of the Preferred Alternative and short-term construction activities, identifies areas that need further study as the project design advances, and discusses mitigation measures to be implemented as part of construction to minimize the identified impacts. More detail regarding the vibration analysis can be found in the *Purple Line Vibration Technical Report* (2013).

4.12.1 Introduction

A vibration impact assessment was conducted in accordance with NEPA and the guidelines set forth by FTA. The details of the analysis methodology are outlined in FTA's guidance manual for assessing noise and vibration impacts of proposed mass transit projects, *Transit Noise and Vibration Impact Assessment* (FTA 2006).

The study area is based upon screening distances identified in the guidance manual, and varies in width depending upon FTA-defined land use categories. For residential land uses, the study area extends 150 feet on either side of the Preferred Alternative alignment. This corridor is reduced to 100 feet on either side for institutional uses and expanded to 450 feet on each side for special buildings, such as concert halls and recording studios, which may be particularly sensitive to vibration.

Methodology

The vibration analysis began with identification of representative vibration sensitive receptors within the study area that could be adversely affected by operation of the Preferred Alternative. Vibration sensitive receptors are buildings in which vibration resulting from the project could be perceived by occupants or equipment housed therein, and includes all three categories described above (residential, institutional and special buildings).

Existing ambient vibration conditions were measured at these representative vibration sensitive

receptors. The majority of the readings were taken on concrete slabs close to the affected property and on the side of the receptor closest to vibration sources, such as roadway or train traffic and nearby existing industrial land uses. As requested by UMD, the receptor location at Dorchester Hall was located within the basement.

Future vibration levels at each receptor were estimated using generalized ground-borne vibration curves provided in the FTA guidance manual. Impacts were then assessed by comparing the estimated vibration levels to applicable FTA impact thresholds to identify areas of impact. Possible refinements were then identified that would dampen project-related vibration. These refinements will be evaluated as the project design advances.

FTA Criteria

FTA vibration criteria set a threshold for the maximum ground vibration caused by a single typical LRT vehicle pass-by. Project vibration effects that fall under these levels are determined to have “No Impact.” The vibration criteria, shown in Table 4-30, depend on three indoor land use categories and provide different impact thresholds based on the daily pass-by frequency. FTA “frequent events” criteria are applicable to the Preferred Alternative because the number of LRT vehicle pass-by events would exceed 70 per day.

FTA criteria pertain to both ground-borne vibration and ground-borne noise. Ground-borne vibration is the perceivable movement of the building floors, rattling of windows, and shaking of items on shelves. Ground-borne noise is the “rumble” that can radiate from the motion of surfaces within buildings due to ground-borne vibration. As airborne noise often masks ground-borne noise where transit systems run at grade or elevated, ground-borne noise criteria are primarily applied to below-grade rail operations, such as the proposed Plymouth Street tunnel.

The FTA vibration impact threshold for residential buildings is 72 VdB. In addition, FTA has vibration impact criteria for a specific category of buildings. These “special buildings,” defined under Category 1 include buildings that contain uses such as concert halls, theaters, and recording studios which have a lower tolerance to vibration. For these “special buildings,” a frequent events criterion of 65 VdB is used for the impact threshold. Additional FTA criteria would apply for properties located adjacent to the Preferred Alternative near the existing CSXT freight railroad. In accordance with FTA guidance, a proposed project would cause additional impact if existing vibration levels in heavily-used rail corridors exceed the general vibration impact criteria and if the proposed project would at least double the number of vibration events in a day.

Table 4-30. Ground-Borne Vibration and Ground-Borne Noise Impact Criteria for General Assessment

Land Use Category	Ground-Borne Vibration Impact Levels (VdB re: 1 micro-inch/sec)			Ground-Borne Noise Impact Levels (dB re: 20 micro Pascals/sec)		
	Frequent Events ¹	Occasional Events ²	Infrequent Events ³	Frequent Events ²	Occasional Events ³	Infrequent Events ⁴
Category 1: Buildings where vibration would interfere with interior operations	65 VdB	65 VdB	65 VdB	N/A ⁴	N/A ⁴	N/A ⁴
Category 2: Residences and buildings where people normally sleep	72 VdB	75 VdB	80 VdB	35 dBA	38 dBA	43 dBA
Category 3: Institutional land uses with primary daytime use	75 VdB	78 VdB	83 VdB	40 dBA	43 dBA	48 dBA

¹“Frequent Events” is defined as more than 70 vibration events per day.

²“Occasional Events” is defined as between 30 and 70 vibration events per day

³“Infrequent Events” is defined as less than 30 vibration events per day.

⁴N/A means “not applicable.” Vibration-sensitive equipment is not sensitive to ground-borne noise

Source: FTA, *Transit Noise and Vibration Impact Assessment*, May 2006.

Criteria for Buildings with Extremely Sensitive Equipment

Several buildings within the UMD campus either contain equipment that is sensitive to vibration or utilize processes that are extremely vibration-sensitive. MTA and UMD have agreed to use the National Institute of Standards and Technology (NIST) criteria for nanotechnology, which has a limit of 42 VdB above 20 Hertz. Where the Preferred Alternative transitway centerline would be within 100 feet of existing or potential research laboratories, the transitway would be designed to meet the more restrictive of the ambient vibration levels or the NIST criterion of 42 VdB.

Construction Criteria

Although ground-borne vibration related to human annoyance (generally expressed in units of “VdB”) is the primary concern during project operation, potential building damage is the concern during the construction phase.

Building damage can occur from construction-related vibration as a result of displacement (movement) of a building over time and therefore the structural damage criteria is expressed in particle velocity rather than the vibration decibel level. Consequently, construction vibration is expressed as Peak Particle Velocity (PPV) in units of inches per second. FTA’s construction vibration damage criteria indicate that for non-engineered timber and masonry buildings, typical of structures located near the proposed transitway, the PPV should not exceed 0.2 inches per second.

4.12.2 Affected Environment

A review of aerial photography of the Preferred Alternative alignment, field visits, and adjacent land uses resulted in the identification of 23 representative vibration measurement sites consisting primarily of residential properties, with the closest building located 22 feet from the proposed transitway. Other sensitive uses include two schools and a recording studio. Figure 4-27, in Section 4.11, depicts the vibration monitoring and impact assessment locations. Vibration measurements were collected in December 2011.

Along most of the project corridor, existing vibration levels were found to be generally imperceptible

to humans, and were typically the result of traffic movement on nearby roadways. The monitored vibration levels for sites near active roadways ranged between 44 VdB and 80 VdB. In some locations, extremely low levels of vibration, ranging between 35 VdB and 38 VdB, were recorded because the traffic volume in the vicinity of the receptor was extremely light.

In one area near the Barrington Apartments, existing CSXT freight trains are the dominant cause of vibration, and existing residences are located as close as 45 feet from the existing rail line. Measured vibration levels at this receptor site reached 80 VdB.

A few vibration-sensitive locations, such as the Falkland Chase Apartments, experience some level of vibration from existing Metrorail, MARC, and Amtrak train movements; however tracks at this section of the project corridor are in a cut slope condition, which tends to reduce the effect of vibration. Vibration levels measured at the Falkland Chase Apartments reached a peak of 50 VdB.

Measured vibration levels within the UMD campus were collected as part of a 2009 study completed at the request of the Maryland Department of Transportation at non-residential buildings within the UMD Campus. The resulting measurements and analysis are in the report *Purple Line Project—University of Maryland—Ambient Vibration Study* (August 2009). Vibration levels were measured within various laboratories and research facilities and along exterior portions of buildings in which vibration sensitive equipment has historically been housed, and continues to be used. In general, ambient vibration conditions at most measured campus locations were below the FTA vibration impact criterion of 42 VdB (125 micro-inches/second) for sensitive devices. Vibration velocity levels inside the basements of several building sites averaged between 7 and 58 micro-inches/second. When comparing average building vibration levels to exterior grounds, the buildings tended to vibrate less than the ground at low frequencies. At higher frequencies, the buildings vibrated more than the outside grounds, indicating that vibration sources within the buildings themselves were a dominant source of vibration.

4.12.3 Preferred Alternative

Long-term Operational Effects

Project-related vibration levels were estimated at each of the 23 monitoring sites plus three additional locations that were identified as examples of unique building usage that are not represented by the monitoring sites. Estimated vibration levels range from 55 to 71 VdB for receptors that are 50 feet or more away from the transitway alignment. For receptors closer than 50 feet, the levels range between 67 and 78 VdB.

In most areas, no vibration impact is projected; however, within 50 feet of the transitway alignment, three receptors (Sites S3, S4, and S9), representing four single-family residences and one multi-family apartment building (containing approximately 6 units), are predicted to experience project-related vibration levels at or above the 72 VdB impact threshold.

Sites S3 and S4, both located 45 feet from the centerline of the proposed transitway alignment, would experience vibration levels in the range of 73 VdB. Site S9, the Barrington Apartments, would see vibration levels above the FTA impact threshold because of a combination of high existing vibration levels reaching 80 VdB associated with 30 CSXT freight train movements, and Purple Line operations adding 70 more pass-by events per day. The vibration levels caused by Purple Line movements are expected to reach 72 VdB at this site. Table 4-31 summarizes the vibration impact findings.

The ground-borne noise generated from operating the Purple Line operations in the proposed

Plymouth Street tunnel is predicted to be 28 dBA, which would be below the applicable FTA impact criteria.

Mitigation

MTA will perform site-specific assessments of those areas identified in the FEIS as having potential vibration impacts. MTA will develop appropriate mitigation measures.

MTA will analyze extremely vibration-sensitive buildings located within the UMD campus, as agreed upon by MTA and UMD. The study will establish criteria, and measure regarding mitigation for vibration will be specified in the MTA UMD agreement. MTA will develop appropriate mitigation measures.

Short-term Construction Effects

Constructing the Purple Line would involve a range of activities, including excavating the rail right-of-way; tunnel construction; constructing grade crossings, bridges, and the yard and maintenance facilities; laying track; constructing stations and other system elements, and the movement of heavy trucks and construction equipment (see Chapter 5.0 for more information on the anticipated construction activities). The potential for vibration impacts to occur is low for construction activities which utilize equipment such as air compressors, rubber wheeled vehicles, hydraulic loaders and other light equipment usage. However, some specialized construction work does have the potential to create vibration impacts: tunneling, pile driving, and heavy equipment use.

Table 4-31. Impacted Property Locations

Site #	Measurement Location	Distance to Transitway Centerline	Predicted Vibration Level (VdB)	Amount Over FTA Criteria Level (VdB)	Total Number of Affected Properties
S3	4230 East West Highway	32	73	1	2 residences
S4	4110 Edgevale Court	32	73	1	2 residences
S9	1946 Rosemary Hills Drive (The Barrington Apartments) ¹	22	72	n/a	1 apartment complex (approx. 6 units)

¹At the Barrington Apartments, future vibration levels would exceed the FTA impact threshold due to high existing vibration levels caused by daily CSX freight train pass-bys, in combination with the Purple Line LRT train pass-bys.

The location of sensitive receptors in relation to the construction activity and the duration of construction activities affect the potential for vibration impact. MTA expects relatively small areas of the proposed project corridor to potentially experience vibration effects from construction activities at any given time. Track-related construction would

move continuously along the corridor; therefore, the duration of exposure to construction-related vibration at any one property would be limited.

A potential does exist, however, for vibration-sensitive buildings to be impacted by non-track related types of construction. Examples include construction of the Silver Spring Transit Center, the Plymouth Street tunnel, and sections along the transitway where extensive bridge and retaining wall work would occur. However, the impact would be realized only for sensitive receptors in close proximity to these specific locations and not along the entire length of the transitway.

Construction of the Plymouth Street tunnel, which potentially would include blasting, is expected to be the longest sustained period of construction, and blasting typically would generate the most vibration. While overall construction of the tunnel would last approximately 30 months, the anticipated duration of the blasting operations, if any, would be substantially less.

Other locations where heavy construction would occur for extended periods of time are the Silver Spring Transit Center and associated structures and the Rock Creek and Lyttonsville Place bridges. Although heavy construction would occur at all three of these locations, no vibration sensitive receptors are present in close proximity to these proposed construction sites.

Certain construction activities, such as pile driving for new structures and retaining walls, would occur at numerous locations along the corridor and have the potential to create more vibration than other activities. The methods for driving the piles would include both impact and non-impact procedures. Preliminary engineering indicates that the following sensitive receptors would be in close proximity to pile driving: the Falkland Chase Apartments,

Rosemary Hills Elementary School, and the Barrington Apartments.

Avoidance and Minimization

MTA will identify control measures to be implemented by the contractor during construction activities to minimize the potential for vibration impacts.

As the project design advances, MTA will consider requiring that the construction contractor employ the following control measures to minimize the potential for vibration impacts during construction:

- Notify the community of all blasting operations well before the activities commence
- Schedule blasting or pile driving activities during hours that would least impact residents at sensitive receptors
- Divert heavy truck and construction equipment movements away from sensitive receptors by utilizing roadways that contain a limited number of residential or sensitive structures
- Hire a Blasting Consultant with adequate experience in performing controlled blasting.
- Set vibration limits for blasting.
- Monitor the vibration of each blast.
- Conduct test blasts prior to full production blasts. These test blasts will allow the Contractor to determine if their proposed blasting methodology is appropriate and meets the vibration requirements prior to completing a full blast.
- Conduct pre-construction survey and post-construction survey in sensitive areas.

Mitigation

Vibration-related effects will be addressed in advance of, or in conjunction with, the construction of the Preferred Alternative. Mitigation is not anticipated to be required.

4.13 Habitat and Wildlife

This section describes the regulatory environment and the methodology used to determine project impacts on habitat and wildlife. It defines the types of habitat and wildlife found within the study area, including forests, specimen trees, terrestrial wildlife, aquatic habitat and biota, and rare, threatened, and endangered species. It also describes the effects of

the Preferred Alternative on these resources and discusses minimization strategies that MTA has taken to eliminate or reduce impacts, as well as mitigation measures MTA will undertake to offset adverse effects.

4.13.1 Regulatory Context and Methodology

The following statutes and regulations apply to forests and specimen trees:

- **Forest Conservation Act (FCA), Natural Resources Article Section 5-1609, COMAR 15.15.03.02**—protects forests, defined as biological communities dominated by trees and other woody species that extend at least 50 feet wide and comprise 10,000 square feet. When a grading or sediment control permit is required for areas equal to or greater than 40,000 square feet, the project is required to prepare a Forest Stand Delineation (FSD) and a Forest Conservation Plan (FCP). A FCP is a long-term protective document, defining areas for permanent protection of forest and related resources through legal means such as conservation easements, deed restrictions, covenants, or other legally binding agreements ensuring that areas retained, reforested, or afforested remain as undisturbed forest in perpetuity.

The following statutes and regulations apply to terrestrial wildlife:

- **COMAR 27.02.05.12**—protects Forest Interior Dwelling Species (FIDS) located within the Chesapeake Bay Critical Area (CBCA). FIDS depend upon large, contiguous forest stands to successfully breed and produce sustainable populations. Although the project is outside the CBCA, given the widespread public awareness of the need to protect forest interior habitat, the impact of the project to FIDS habitat has been considered. FIDS habitat is defined by the CBCA as riparian forests at least 50 acres in size with an average total width of 300 feet or forest patches at least 50 acres in size with at least 10 acres of forest interior (forest greater than 300 feet from the nearest forest edge). The MDNR is responsible for identifying FIDS habitat and

encourages the conservation of these habitats during the project planning phases.

- **Migratory Bird Treaty Act**—makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such birds except under the terms of a valid permit issued pursuant to Federal regulations. The U.S. Fish and Wildlife Service (USFWS) is the lead agency for migratory birds.

The following statutes and regulations apply to aquatic biota and habitat:

- **COMAR 26.08.02.08: Stream Segment Designations (MDE 2007)**—regulates in-stream construction for the protection of aquatic habitat and fisheries resources during certain periods of the year, depending upon the Stream Use Classification of the stream segment.
- **The Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (MSRA)**—requires the National Marine Fisheries Service (NMFS) to integrate NEPA and the fisheries management process for environmental review and to regulate project effects to marine habitat and fisheries resources.
- **Section 404/401 of the Clean Water Act**—regulated by MDE and the U.S. Army Corps of Engineers (USACE) for impacts to streams and the aquatic biota and habitat within them. The associated regulation of wetlands is discussed in further detail in Section 4.14.

The following statutes and regulations apply to rare, threatened, and endangered species:

- **Endangered Species Act of 1973**—regulated by the USFWS and NMFS to protect federally-listed rare, endangered, and threatened species.
- **Nongame and Endangered Species Conservation Act (Annotated Code of Maryland 10-2A-01)**—The MDNR's Fisheries Service maintains a list of game and commercial fish species that are designated as threatened or endangered in Maryland (COMAR 08.02.12). The MDNR Wildlife and Heritage Service

(WHS) and Natural Heritage Program (NHP) track both the federal and state lists.

The study area assessed for terrestrial wildlife, aquatic biota and habitat, and rare, threatened, and endangered species is the Purple Line LOD, described in Section 4.1. The study area for forests extends an additional 50 feet to each side of the LOD, per MDNR forest regulations.

Following is a brief description of the data sources for each analysis:

- **Forests and Specimen Trees**—An FSD was previously conducted within all forested areas in the study area, as detailed in *The Forest Stand Delineation Report for the Purple Line Transit Connection* (2011). All forests within the study area were characterized, and all specimen trees (trees greater than 30 inch diameter at breast height or 75 percent of the State Champion⁸) were identified and shown on project mapping (see *Volume 2—Environmental Resource Mapping*). The FSD report was submitted to the MDNR Forestry Division for review on March 1, 2012 and was approved on June 13, 2012.
- **Terrestrial Wildlife**—Information regarding terrestrial wildlife was obtained from field observations and available data, both published and unpublished, obtained from outside sources. Specific data on breeding birds within Montgomery County were obtained from the Montgomery County Department of Environmental Protection (MCDEP) for the Lower Rock Creek and Sligo Creek portions of the study area. Additional breeding bird data were obtained and used with permission from the *Second Atlas of the Breeding Birds of Maryland and the District of Columbia* (2010). FIDS habitat, as defined above, was identified within a distance of 6,000 feet of the project area using aerial imagery.
- **Aquatic Biota and Habitat**—The NMFS was contacted in March 2007, during preparation of the AA/DEIS to determine the presence of marine fisheries resources in the study area. Follow-up letters were submitted to the NMFS

and the MDNR Environmental Review Unit (ERU) in 2011 to obtain current fisheries information. Response letters were received from NMFS in October 5, 2011 and May 9, 2012. MDNR ERU responded in January 2011. Appendix G contains agency response letters. Data relating to aquatic biota were gathered from the MCDEP, the Prince George's County Department of Environmental Resources (PGDER), and the MDNR Maryland Biological Stream Survey (MBSS).

- **Rare, Threatened, and Endangered Species**—NMFS, USFWS, and MDNR- Wildlife and Heritage Service and ERU were contacted in 2007 during preparation of the AA/DEIS to determine the presence of rare, threatened, or endangered species in the study area. In August 2011, follow-up letters were submitted to these same agencies, and the USFWS on-line certification database was queried. Responses were received on October 26, 2011 from MDNR- Wildlife and Heritage Service, while the MDNR ERU response was received on January 9, 2012. The USFWS response letter was received on October 27, 2011. Appendix G contains agency response letters.

4.13.2 Affected Environment

Forests and Specimen Trees

The largest forest tracts within the study area, which was based on the Forest Stand Delineation, are found primarily within the stream valleys of Rock Creek, Sligo Creek, Northwest Branch, Paint Branch, Northeast Branch, and an unnamed tributary to Brier Ditch. A total of 301 specimen trees are found within the study area, representing 30 different species. The *Forest Stand Delineation Report for the Purple Line Rapid Transit Connection* (2011) provides details regarding location, species, and condition of the specimen trees at the time of the FSD.

Terrestrial Wildlife

The presence of terrestrial wildlife within the study area is a function of available habitats, as follows:

- Urban and suburban areas characterized by commonly occurring opportunistic and

⁸ The State Champion is the largest tree of its species as identified by the MDNR Big Tree Program

- suburban- dwelling species of small and mid-size mammals and birds
- Less developed, forested areas, such as the riparian corridors of larger stream valleys, characterized by native wildlife species
- Larger interior forested areas serving as habitat for FIDS that depend upon large, contiguous forest stands to successfully breed and produce sustainable populations

Aquatic Biota and Habitat

Surface area streams were monitored at various locations within each subwatershed and rated for fish and macroinvertebrate community health and physical habitat by MCDEP, PGDER, and MDNR MBSS. A scale of very poor to good was used for community health, and a scale of degraded to excellent was used for physical habitat. PGDER follows the MDNR MBSS methods of sampling and analysis; consequently, PGDER and MDNR data are directly comparable. However, MCDEP has different scoring criteria. Table 4-32 shows the range of the ratings by agency, and it is explained in more detail in *Purple Line Water Resources Technical Report (2013)*. The majority of the streams were rated near the very poor end of the community health scale. However, Northwest Branch exhibited a more diverse aquatic biota community than many study area streams, resulting in evaluation scores of fair to good. The physical habitat scores varied widely, ranging from severely degraded to excellent/

good. The lowest parameter scores most often were related to bank stability, bank vegetation, and riparian vegetation, instream habitat for fish, embeddedness, and sedimentation.

In a letter dated May 9, 2012, the NMFS commented that Paint Branch, Northeast Branch, and Brier Ditch are documented as spawning grounds for anadromous fish, such as blueback herring, alewife, and hickory shad, which live in marine waters but migrate to fresh water to breed. They also serve as nursery grounds for catadromous fish, such as the American eel, which live in fresh water but migrate to marine waters to breed.

Historically, blockages within and downstream of the study area have prevented anadromous and catadromous fish from migrating. Specific blockages within Rock Creek and Northwest Branch were identified in 2004 and 2007. These blockages continue to be present downstream of the study area, which reduces the likelihood of finding anadromous and catadromous fish passing through or using the study area streams for breeding or early development. A blockage on Northeast Branch just south of River Road was modified to permit fish passage in 1991. Anadromous fish were observed just below this blockage point in 2007. However, the 1991 modification could allow for fish to move north of River Road into the study area.

Table 4-32. Fish and Macroinvertebrate Community and Physical Habitat Data in Study Area Watersheds

Subwatershed	Agency	Rating for Fish	Rating for Macroinvertebrates	Physical Habitat
Little Falls	MCDEP	Poor	Poor	Fair–Excellent/Good
Little Falls	MDNR	Very Poor	Poor	N/A
Rock Creek	MCDEP	Poor–Good	Poor–Fair	Fair/Good
Rock Creek	MDNR	Very Poor	Very Poor	Degraded
Sligo Creek	MCDEP	Poor–Fair	Poor	Fair–Good
Sligo Creek	MDNR	Very Poor	Very Poor	Degraded
Northwest Branch	MCDEP	Fair–Good	Poor	Fair–Excellent/Good
Northwest Branch	MDNR	Fair–Good	Very Poor–Fair	Partially Degraded
Northeast Branch	MDNR/PGDER	Very Poor–Good	Very Poor–Good	Severely Degraded—Minimally Degraded
Beaverdam Creek	PGDER	Poor–Fair	Very Poor–Fair	N/A

Source: MCDEP, PGDER, and MDNR MBSS rating data, reviewed 2012.

Rare, Threatened, and Endangered Species

In the October 27, 2011 letter from USFWS, the USFWS stated that there are no federally proposed or listed endangered or threatened species known to exist within the project area; therefore, no Biological Assessment or further Section 7 Consultation with the USFWS is required. In the October 5, 2011, letter from NMFS, it is stated that no federally listed or proposed threatened or endangered species and/or designated critical habitat for listed species under NMFS jurisdiction are known to exist in the vicinity of the proposed project; therefore, no further coordination with NMFS is needed. The October 26, 2011, letter from MDNR WHS did not reference any state listed species occurring within the study area. However, in a letter dated October 26, 2011, MDNR indicated that there is a waterbird (heron) colony located within the forested floodplain of Coquelin Run, in close proximity to the study area. The letter states that heronries located outside the CBCA are a rare resource of particular interest that should be protected. Disturbance to nesting herons is a violation of the U.S. Migratory Bird Treaty Act. Disturbance is defined as cutting nest trees, cutting nearby trees, or nearby construction that causes abandonment of chicks by the adults. Appendix G contains these agency letters.

4.13.3 Preferred Alternative

Long-term Operational Effects

Forests and Specimen Trees

The impact of the Preferred Alternative on forest and specimen trees would primarily take the form of partial property acquisitions at the edges of forested habitat, affecting a total of 48 acres of forested habitat and 194 specimen trees. Table 4-33 presents these impacts by project element.

Terrestrial Wildlife

Wildlife using terrestrial resources affected by the Preferred Alternative would be displaced (mobile species) or eliminated (non-mobile species) by the project. Mobile species may find suitable habitat outside the LOD. Existing wildlife corridors within the stream valley parks crossed by the transitway would be maintained. Project-related impacts to the forest resources described above would affect FIDS by slightly reducing the overall size of FIDS habitat within the project area.

The Preferred Alternative would follow an existing trail or existing roadways through riparian forested areas that are considered FIDS habitat, primarily along the major stream valleys of Rock Creek, Northwest Branch, Paint Branch, Northeast Branch, and Beaverdam Creek. The largest FIDS habitat impact of 23.4 acres would occur where the corridor crosses Rock Creek within the Georgetown Branch right-of-way. The right-of-way maintains a closed canopy along the riparian corridor of Rock Creek, maintaining contiguous FIDS habitat upstream and downstream of the crossing. However, the transitway will result in a break in the canopy, effectively splitting the FIDS habitat into two sections. The downstream section would only be 20.4 acres in size, and would not meet the minimum definition of FIDS habitat. As shown in Table 4-34, the impact to FIDS habitat is two percent of the total FIDS habitat within close proximity (up to 6,000 feet from the edge of the LOD) to the Preferred Alternative.

Aquatic Biota and Habitat

Impacts to aquatic habitats and species include loss of habitat from construction of infrastructure elements and the degradation of water quality resulting from construction and operation activities.

Table 4-33. Forest Impacts of the Preferred Alternative

Project Element	Transitway and Stations	Lyttonsville Yard	Glenridge Maintenance Facility	Traction Power Substations	Total
Acres of Forested Habitat	38.3	6.0	3.3	0.3	48
Number of Specimen Trees	169	24	1	0	194

Table 4-34. Summary of FIDS Habitat Impacts of the Preferred Alternative

Watersheds	Existing FIDS Habitat Within Close Proximity to the Preferred Alternative (Acres)*	FIDS Habitat Impact (Acres)	Remaining FIDS Habitat (Acres)
Rock Creek	416.2	23.4	392.8
Northwest Branch	385.9	0.59	385.3
¹ Northeast Branch	588	0.14	587.9
Total	1390.1	24.1	1366

*Represents only FIDS habitat within the LOD and up to 6,000 feet from the edge of the LOD. FIDS habitat within the entire watershed is not represented.

¹ Includes FIDS habitat within Paint Branch, Indian Creek, and Brier Ditch subwatersheds.

The installation of proposed infrastructure elements, such as culvert extensions and closed drainage systems, would result in the permanent loss of approximately 5,152 linear feet of stream habitat (discussed further in Section 4.14). While some of these proposed improvements are being undertaken to address local drainage and flooding problems, the proposed activities could lead to direct loss of fish and other aquatic biota within the construction zone and would permanently alter the localized habitat. Benthic organisms, such as macroinvertebrates, would be impacted by in-stream construction more so than fish, as they are relatively stationary. Northeast Branch would be affected when the in-stream piers of an existing bridge would be replaced with larger piers.

However, the species expected to be impacted are acclimated to disturbed settings and would be likely to recolonize temporarily disturbed areas, though the communities are unlikely to be identical to those present prior to construction.

Rare, Threatened, and Endangered Species

No long-term project-related impacts to federal or state listed rare, threatened, and endangered species are anticipated.

The project also would not result in long-term impacts to the heron colony located within Coquelin Run because the colony is located outside the LOD approximately one-quarter mile from the

proposed transitway alignment and is buffered by an intervening roadway and residences. No direct or long-term impacts, such as tree clearing, to the Coquelin Run stream valley and its interior are anticipated. MTA provided detailed drawings of the proposed transitway to the MDNR on April 27, 2012.

Avoidance and Minimization

MTA will minimize the amount of new impervious surface associated with the transitway, yard, and maintenance facility to avoid long-term water quality and quantity impacts to aquatic biota. Where practicable, MTA has aligned the transitway and located associated facilities in areas of existing pavement and impervious surfaces, such as the Lyttonsville Yard site.

Project-related riparian impacts to a tributary to Paint Branch along Paint Branch Parkway, impacts to migratory fish species using the Paint Branch tributary, and stormwater discharge to Paint Branch were cited as concerns by the NMFS during the agency field review of the project on May 8th and 9th, 2012. In response to these concerns, MTA shifted this portion of the transitway south to minimize impacts to the riparian zone. In addition, the project has been designed so that stormwater associated with the transitway would not be discharged directly into the tributary of Paint Branch.

As part of project-wide avoidance and minimization efforts, the footprint of the Glenridge Maintenance Facility was shifted east to minimize impacts to a tributary of Brier Ditch.

MTA will continue to coordinate with the NMFS and other regulatory agencies as project design advances to identify measures to avoid or minimize:

- Creation of in-stream barriers that block migratory fish from upstream spawning ground
- Alterations of stream configuration, characteristics and hydrology
- Incremental changes to in-stream water quality from deforestation of the riparian zone

MTA will design proposed culverts and bridges to MDE standards to avoid or minimize secondary and cumulative impacts to migratory fish and to avoid alteration of habitat.

MTA will prepare a FCP, or similar, as the project design advances and will detail additional impact avoidance and minimization techniques to be applied during construction.

Mitigation

Where forest impacts occur, MTA will comply with MDNR requirements for the final forest planting obligation. MTA will follow MDNR direction in offsetting those impacts by reforestation, which is planting trees in cleared areas, or afforestation, which is planting trees in areas not previously forested. Based on MDNR mitigation requirements, MTA has preliminarily identified reforestation sites and forest mitigation banks with available credits that could be used to satisfy the requirements.

The final forest planting obligation for the project will be negotiated between MTA and MDNR prior to construction. MDNR requires that forest mitigation sites be chosen either as reforestation or afforestation on site, which is preferred, or in close proximity to the project area, which is allowed with approval from MDNR, provided the sites are within the same watershed as the impacted area. If these options are not possible, MDNR may approve the use of forest conservation banks.

Short-term Construction Effects

Forests and Specimen Trees

Construction activities associated with utility relocations, implementation of sediment and erosion control practices, and clearing of staging areas would cause the removal of trees. Tree decline and/or mortality could occur due to significant critical root zone (CRZ) disturbance, tree limb damage, changes in soil moisture, and soil compaction as a result of grading operations and other construction related activities occurring near or adjacent to individual trees. Chapter 5.0 provides more information on the anticipated construction activities.

Terrestrial Wildlife

Temporarily displaced, mobile, disturbance-tolerant species would be expected to return to their typical edge habitats once construction is complete and the corridor edge conditions have been reestablished.

Aquatic Biota and Habitat

Short-term impacts to aquatic biota and habitat resulting from project construction include physical disturbances or alterations to habitat, accidental spills either directly into water resources or indirectly through surface runoff, and sediment releases that could affect aquatic life. Earth-moving activities would expose soils that, if left in an unstable condition, could enter waterways during storms.

Rare, Threatened, and Endangered Species

No short-term project-related impacts to federal or state listed rare, threatened, and endangered species are anticipated. The project also would not result in short-term impacts to the heron colony.

Avoidance and Minimization

The CRZ of specimen trees to be retained will be protected during construction through the installation of tree protection strategies as detailed in the FCP that will be prepared for the project.

MTA will provide a spill management plan and water quality and quantity controls for work area containment and the use and storage of fuels and other contaminants based on current regulations and project permit conditions.

MTA will not undertake in-stream construction during state-mandated stream closure periods.

MTA will coordinate with the MDNR as project design advances to ensure that its concerns are addressed relative to the heron colony located within Coquelin Run.

Mitigation

MTA will restore and stabilize temporarily disturbed aquatic habitat at the end of construction according to a restoration plan developed in coordination with the USACE and MDE. The permits related to these activities, as well as the required MDE Waterway Construction permit, are intended to protect aquatic biota and water quality and ensure that the Preferred Alternative complies with federally-mandated water quality standards.

4.14 Water Resources

This section summarizes current regulations regarding Waters of the U.S. (WUS) and wetlands, surface waters, floodplains, groundwater, and hydrogeology. It defines the existing conditions of these resources within the study area and describes the effects of the Preferred Alternative on these resources. It also discusses minimization strategies that MTA has taken to eliminate or reduce impacts and mitigation measures MTA will undertake to offset adverse effects. Further details are included in *Purple Line Water Resources Technical Report (2013)*.

4.14.1 Regulatory Context and Methodology

The federal Clean Water Act (CWA) establishes the structure for regulating discharges of pollutants into the WUS and regulating water quality standards for surface waters. WUS include unvegetated ponds, seasonal pools, and perennial, intermittent, and ephemeral stream channels. Wetlands are a subset of WUS and support a prevalence of vegetation typically adapted for life in saturated soil conditions (USACE 2012).

Requirements relating to water resources also can be found in the following statutes, regulations, and Executive Order:

- Section 404 of the CWA, which governs project activities that result in the potential discharge of dredged or fill material into WUS, including wetlands).
- Executive Order 11990, Protection of Wetlands, and USDOT Order 5660.1A, Preservation of the Nation's Wetlands
- 33 CFR Part 325 (permitting process for Section 404 permits)
- 33 CFR Part 322 (mitigation requirements for Section 404 permitting decisions)
- 40 CFR Part 230 (guidelines for Section 404 permitting decisions)
- Section 401 of the Clean Water Act–Water Quality Certificate
- Maryland Nontidal Wetlands Protection Act
- Waterway and 100-year Floodplain Construction Regulations

Under the CWA, the EPA has implemented pollution control programs and set water quality standards for all contaminants in surface waters. The CWA mandates that the State establish total maximum daily loads (TMDL) in order to bring existing water quality up to minimum established water quality standards in streams that have been categorized as “impaired.” A TMDL is an estimate of the maximum amount of a pollutant that a given waterbody can absorb without violating environmental water quality standards (MDE 2011). The State of Maryland has established water quality standards for the protection of public health or welfare, simultaneously providing enhancement of water quality and protection of aquatic resources. Additional regulations apply to streams that are designated as scenic or wild, either through the federal or state designation, or are navigable. The following regulations and standards apply to streams and water quality:

- Section 303 (d) of the Clean Water Act
- MDE Water Quality Standards
- Maryland Scenic and Wild Rivers Act of 1968
- Federal Wild and Scenic River Act
- Section 10 of the Rivers and Harbors Appropriation Act (RHA) of 1899

Floodplains are regulated to minimize flooding impacts on upstream and downstream properties, and to avoid or minimize impacts to floodplains.

The following regulations apply to floodplains:

- USDOT Order 5650.2, Floodplain Management and Protection
- Executive Order 11988, Floodplain Management
- MDE 100-Year Floodplain Construction Regulations

The study area assessed for water resources is the Purple Line project's LOD, as described in Section 4.1. For consideration of surface water quality, the nearest sampling sites, located upstream or downstream from the study area, were used.

WUS and Wetlands

WUS and wetlands data were gathered from published sources including the USFWS National Wetlands Inventory (NWI) maps and Natural Resources Conservation Service (NRCS) Soil

Surveys for Montgomery and Prince George's Counties. The study area was field investigated for potential WUS and wetlands. Wetland delineations were conducted between December 2011 and April 2012 to verify and supplement data sources in accordance with the *Regional Supplements to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region Version 2.0* (USACE 2010) and *Eastern Mountains and Piedmont Region* (USACE 2010). Wetland functions and values were assessed using the New England Method (USACE 1991) for all wetlands greater than one-half acre in size. For smaller wetlands, a formal analysis of functions and values was not conducted; however, observed functions and values were noted based on the professional experience of the wetland scientists performing the delineations.

To gain agency concurrence on field-identified WUS and wetland boundaries, USACE and MDE agency field reviews were conducted on May 8 and 9, 2012. Based on subsequent coordination with the USACE, MTA anticipates the USACE will provide an Approved Jurisdictional Determination⁹ for WUS and wetlands within the study area. This would be obtained following completion of the NEPA process.

Surface Waters

Data for the chemical characteristics of existing water resources within project-area watersheds were gathered from the MDNR, the MCDEP, the MBSS, and the PGDER. Existing data were based on studies completed over many years; however, only data collected since 2000 were considered current. The MDE has established standards regarding water quality, with parameters based on designated Stream Use Classification. These standards are listed in the COMAR 26.08.02.01-.03–Water. The State has developed and the EPA has approved TMDLs for the overall Chesapeake Bay watershed including the Purple Line study area. The study area

streams that are classified as impaired were identified in *Maryland's Integrated Report of Surface Water Quality* (MDE 2010).

Floodplains

Regulated floodplains within the study area were identified based on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) used in conjunction with GIS mapping.

Groundwater and Hydrogeology

Information regarding groundwater resources and existing hydrology within the study area was gathered from available published data sources, including the United States Geological Survey (USGS), Maryland Geological Survey (MGS), and MDE.

4.14.2 Affected Environment

Waters of the U.S. and Wetlands

Field investigations identified 48 WUS and wetlands (33 streams and 15 wetlands), shown in Figure 4-28. Most stream systems located within developed areas have been relocated, ditched, or channelized to accommodate runoff from adjacent roadways and the Georgetown Branch Interim Trail. The larger streams are channelized near roadway bridge crossings but remain stable and without channelization upstream and downstream of the transitway alignment.

Most wetlands in the study area have been degraded by road encroachments and vegetation removal. Despite the high degree of disturbance, these wetland areas continue to provide some limited functions including groundwater discharge/recharge, sediment/toxicant retention, nutrient removal, and wildlife habitat. The least affected and highest functioning wetlands in the study area are vegetated systems located in the forested floodplain of Rock Creek (Wetland GB-8).

Surface Waters

The study area is in the Chesapeake Bay watershed and contains three MDNR third order watersheds¹⁰—Potomac River Montgomery County, Rock

⁹ Approved Jurisdictional Determinations (JDs) are used by the USACE to help implement Section 404 of the CWA and Sections 10 of the RHA. An approved JD is an official USACE determination that jurisdictional "waters of the United States," or "navigable waters of the United States," or both, are either present or absent on a particular site. An approved JD precisely identifies the limits of those waters on the project site determined to be jurisdictional under the CWA/RHA. (See 33 C.F.R. 331.2.)

¹⁰ Using the Strahler stream order, stream size is defined based on a hierarchy of tributaries. When two first-order streams (those with no tributaries) come together, they form a second-order stream.

Creek, and Anacostia River. Within these watersheds are six perennial streams, as identified in Figure 4-28, each with their own subwatersheds. The majority of the subwatersheds are highly developed with little or no vegetated buffer remaining along streams, especially the more urbanized watersheds of Little Falls, Sligo Creek, and Lower Beaverdam Creek.

With the exception of a portion of Northwest Branch, all streams within the study area are classified as Water Quality Use I: Water Contact Recreation and Protection of Non-tidal Warm Water Aquatic Life, which means that these streams support water contact sports, leisure activities involving direct contact with surface water, growth and propagation of fish other than trout and other aquatic life and wildlife, and agricultural and industrial water supply. Northwest Branch, north of East West Highway, is designated as Use IV: Recreational Trout Waters. This designation means waters from this portion of Northwest Branch are capable of supporting adult trout for a put and take fishery, in addition to the uses supported by Use I streams. None of these rivers is classified as a navigable waterway.

Water Quality

Water quality data collected in the six subwatersheds in the study area generally demonstrate that typical chemical concentration levels meet state water quality standards, except for a small percentage of the samples that were below the state standards for either dissolved oxygen levels or pH levels.

Total Maximum Daily Loads

The project area is within the Chesapeake Bay TMDL. The Bay TMDL was developed by the EPA and approved in 2010 to restore clean water in the Bay. The Bay TMDL is a key part of an accountability framework to ensure that all pollution control measures needed to fully restore the Bay and its tidal rivers are in place by 2025, with practices in place by 2017 to meet 60 percent of the necessary pollution reductions.

When two second-order streams come together, they form a third-order stream. The U.S. NRCS redefined the third order watersheds creating the HUA14 file.

Impaired stream segments within the Chesapeake Bay TMDL, also known as water quality limited (WQL) segments, are required by MDE to have a TMDL developed for each segment. These WQL can be considered “impaired” by analyzing a wide variety of water quality monitoring data. Several WQL segments have been identified by MDE within the project area, and the status and results of the TMDL process are summarized as follows:

- **Little Falls subwatershed**—TMDLs for sediment and nutrient impairments; submitted to the EPA for review in 2011.
- **Rock Creek subwatershed**—TMDLs approved for bacteria and sediment impairments.
- **Sligo Creek, Northwest Branch, Northeast Branch, and Lower Beaverdam Creek subwatersheds**—TMDLs approved for bacteria, sediment impairments, nutrients, trash, and polychlorinated biphenyls (PCBs).

Maryland Scenic and Wild Rivers

Portions of the Potomac River in Montgomery County and its tributaries and the Anacostia River and its tributaries are designated as Scenic Rivers by the state of Maryland. Within the study area, the tributaries designated as Scenic Rivers are Little Falls, Sligo Creek, Northwest Branch, Northeast Branch, and Lower Beaverdam Creek. Although Rock Creek is a tributary of the Potomac River, it joins the Potomac downstream of the limits of the Scenic River designation and is not considered a Scenic River.

Federal Wild and Scenic Rivers

There are no federally-designated Wild and Scenic Rivers within the study area.

Floodplains

The 100-year floodplains within the study area are associated with the larger perennial streams. Most of these floodplains are wooded because they occur in stream valley parks, where current or future development is regulated, if not prohibited. However, substantial encroachment already has occurred from private development and the construction of public infrastructure, including streets, sewer lines, and water mains that cross or parallel the floodplains. Despite these encroachments, the 100-year floodplains along study area

Figure 4-28. Wetlands, Waterways, and Floodplains

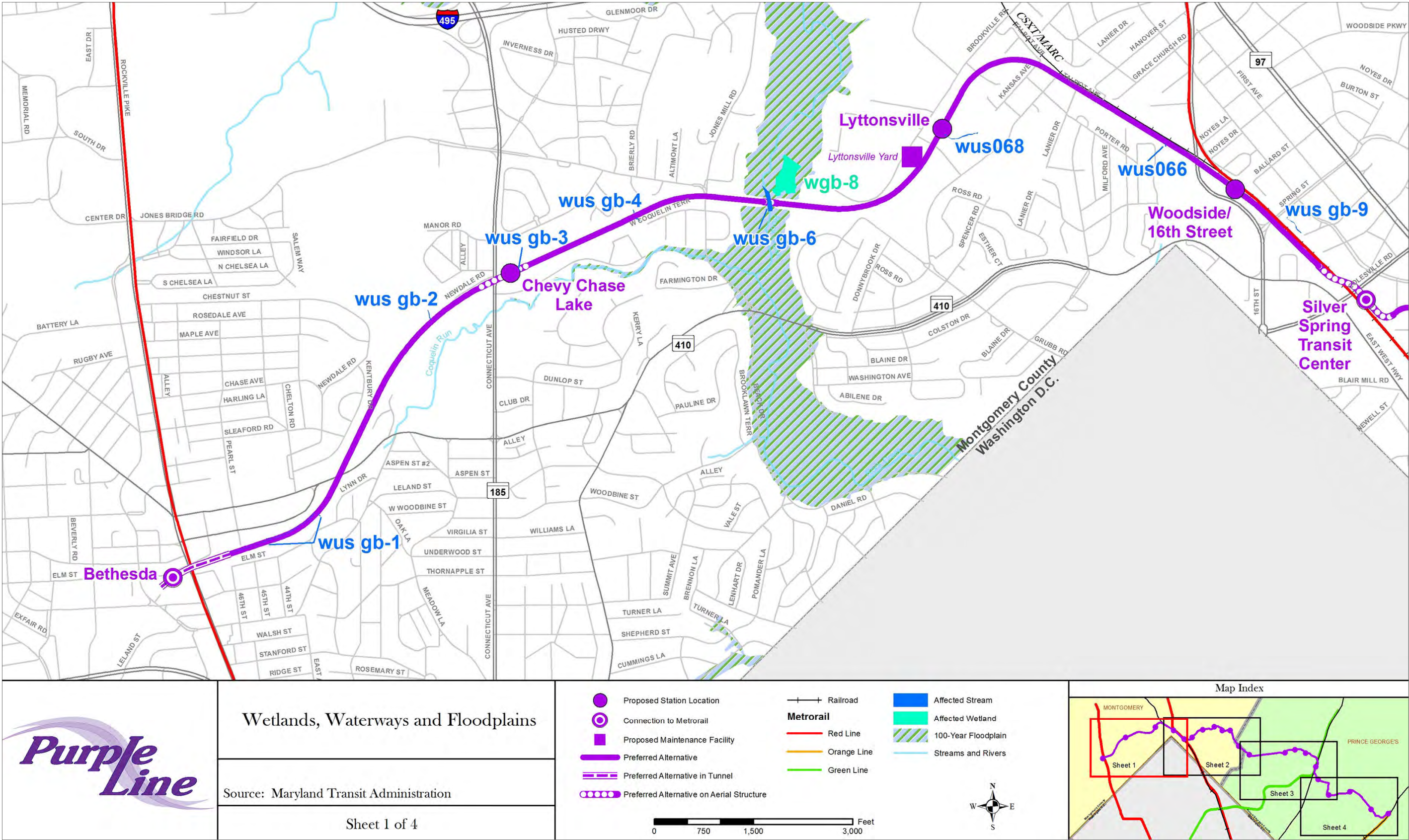


Figure 4-28. Wetlands, Waterways, and Floodplains (continued)

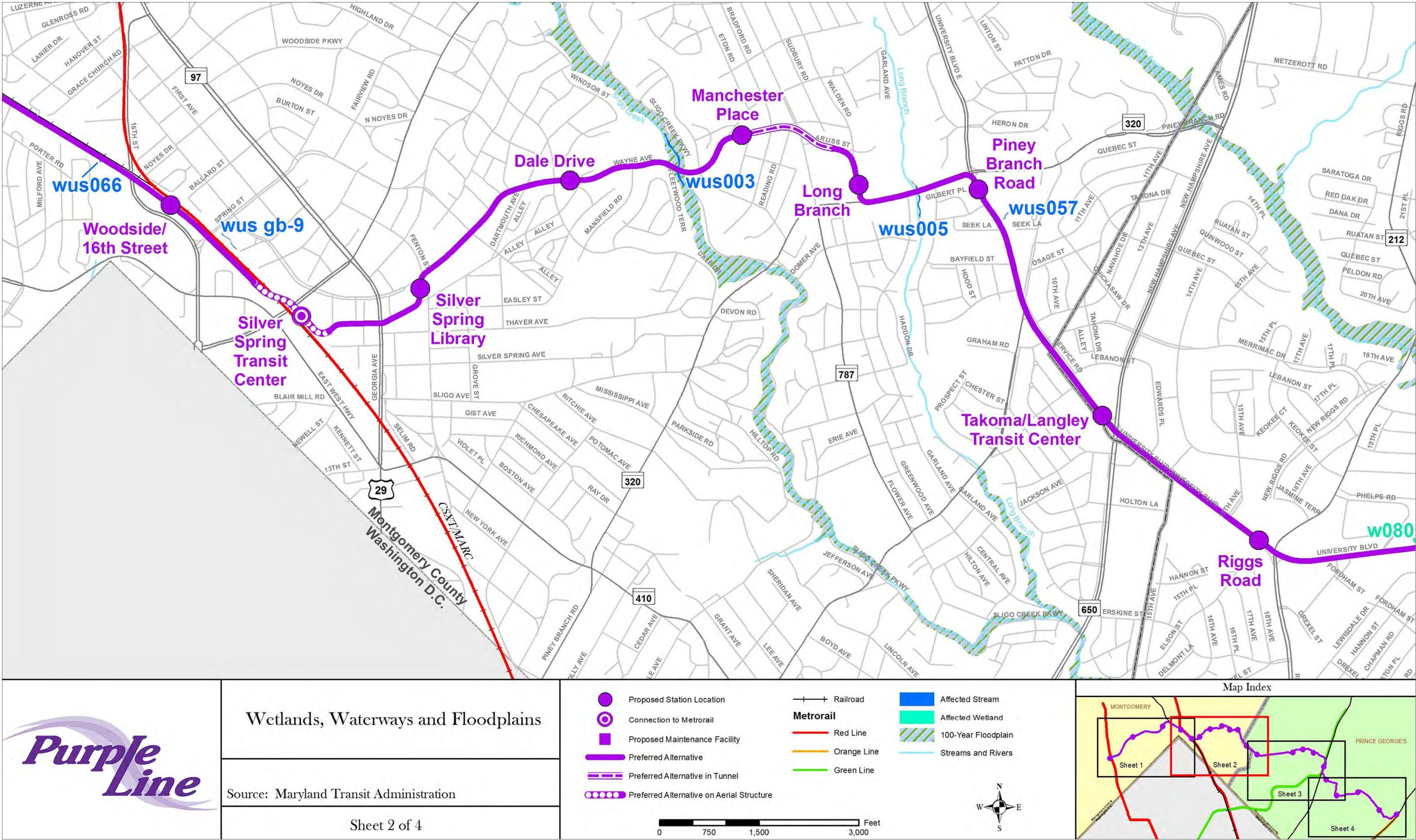


Figure 4-28. Wetlands, Waterways, and Floodplains (continued)

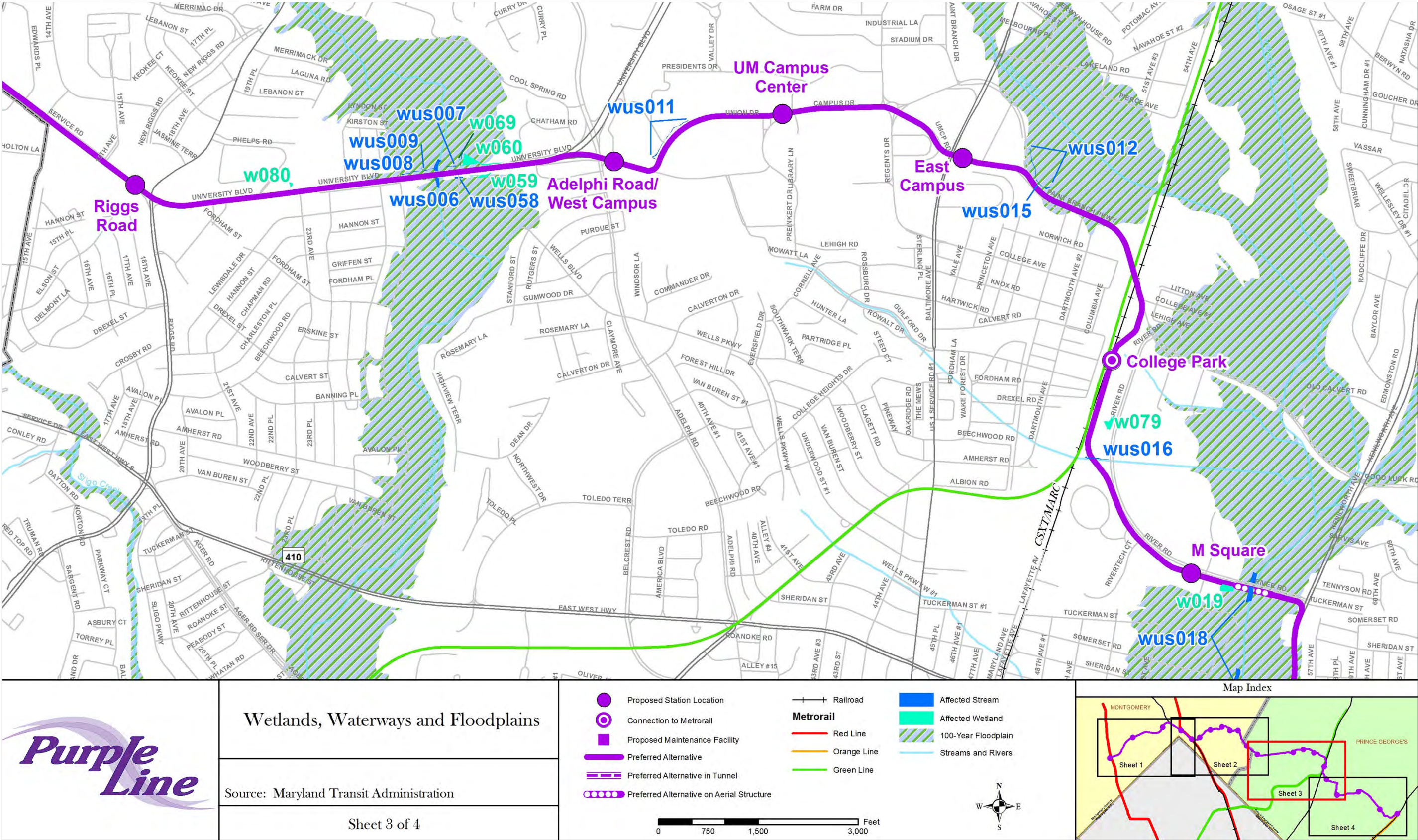
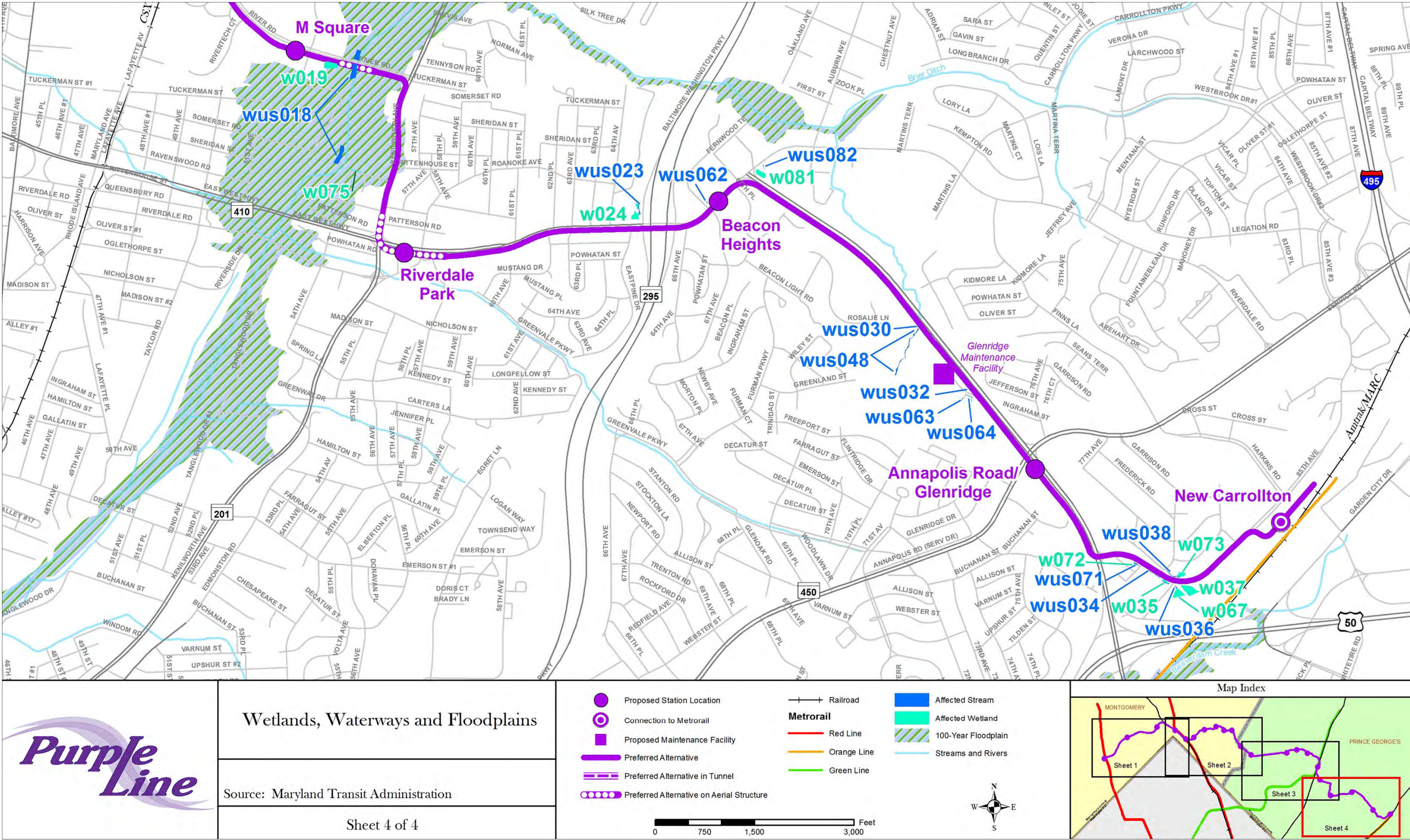


Figure 4-28. Wetlands, Waterways, and Floodplains (continued)



streams continue to serve important floodplain functions including, but not limited to, floodflow attenuation, water quality improvement, and wildlife habitat.

Groundwater and Hydrogeology

The study area overlies the Piedmont and Blue Ridge Crystalline Rock and the Northern Atlantic Coastal Plain aquifers. The former extends from west of the study area to Riggs Road, while the latter extends eastward from Riggs Road to beyond the study area. Water from groundwater wells located in both aquifers is generally suitable for drinking. Neither aquifer is classified as an EPA sole source aquifer.

4.14.3 Preferred Alternative

Long-term Operational Effects

Waters of the U.S. and Wetlands

- Impacts would occur where streams are crossed or where streams run parallel to the Preferred Alternative, within the LOD, as described below and summarized in Table 4-35.
- Approximately 0.75 acres of wetlands would be affected by widening existing roadways to accommodate the proposed transitway and TPSS, with the largest impact occurring at a vegetated wetland south of Ellin Road.
- Approximately 0.08 acres of palustrine open water and 0.02 acre of a palustrine emergent wetland that serves as an existing stormwater management basin (W019) east of the M Square station would be impacted by a proposed retaining wall along the transitway.
- Approximately 0.03 acres of two large palustrine open water systems (small, shallow, unvegetated ponds) located south of Ellin Road would be affected by the extension of a triple box culvert.
- Approximately 5,152 linear feet of intermittent or perennial stream channels would be affected by drainage improvements involving new, replaced, or extended drainage pipes, or by culverts, or bridges. The majority of these impacts would be within the Georgetown Branch right-of-way,

along Ellin Road, and at the Glenridge Maintenance Facility where stream systems would be placed in closed drainage systems or relocated into culverts for most of their length within the LOD.

- Approximately 355 linear feet of ephemeral channels would be affected by road widening and drainage improvements, with a majority of these impacts occurring along the south side of University Boulevard.

Surface Water

Water Quality

While MTA has strived to avoid or minimize the water quality impacts, the project would increase impervious surfaces in the study area, which could increase the amount of surface runoff and potentially increase the level of contaminants such as heavy metals, salt, organic molecules, and nutrients in the surface runoff (Trombulak 1999).

MTA is considering using green track, as described in Chapter 2.0, along the Georgetown Branch right-of-way and the CSXT right-of-way. Green track allows for some water absorption within the medium, thereby reducing the movement of contaminants to surface water bodies, reduces stormwater runoff, and increases local air humidity.

Most of the transitway east of Silver Spring would be located within currently paved areas along existing roadways, although some roadway expansions would be required to accommodate the transitway. Redevelopment of the Lyttonsville Yard site would almost completely overlie existing

Table 4-35. Summary of Impacts to Waters of the U.S. and Wetlands

Alternative and other Project Elements	Vegetated Wetlands (acres)	Palustrine Open Water (acres)	R2/R4 ¹ (linear feet)	Ephemeral (linear feet)
Transitway and Stations	0.73	0.11	4,616	355
Lyttonsville Yard	0	0	14	0
Glenridge Maintenance Facility	0	0	522	0
TPSS	0.04	0	0	0
Project Total	0.77	0.11	5,152	355

¹R2 = Riverine Lower Perennial, R4 = Riverine Intermittent

impervious areas, but the Glenridge Maintenance Facility and some stations and power substations would add new impervious surfaces.

Total Maximum Daily Loads

Since the study area is already developed and the Preferred Alternative includes proposed infrastructure to effectively manage stormwater runoff generated by the project, increases in nutrient and sediment levels from the project are unlikely to affect overall TMDL management. Current water quality impairment issues primarily result from bacteria in animal waste, leaking septic and sewer systems, stormwater outfalls, and sanitary sewer overflows. It is unlikely that the Preferred Alternative would affect or contribute substantially to bacteria levels within the subwatersheds. To the extent that TMDL thresholds pertain to typical contaminants from impervious surfaces and transportation operations, the project stormwater BMPs designed in coordination with the MDE would minimize adverse effects.

Scenic and Wild Rivers

The Preferred Alternative would affect tributaries of the Montgomery County portion of the Potomac River and the Anacostia River, which would result from culvert and pipe replacement and extension and from bridge crossings. The relocation of a section of Sligo Creek north of Wayne Avenue would result in the greatest impact.

Floodplains

The Preferred Alternative would affect approximately 23.2 acres of existing 100-year floodplains, as quantified in Table 4-36. These quantities were determined by the estimated footprints of cut and fill required by project construction. Longitudinal crossings of floodplains, which create longer crossings along the length of the floodplain, have been avoided because they would result in more floodplain fill and a reduction in water conveyance and floodplain storage capacity.

Groundwater and Hydrogeology

The majority of the Preferred Alternative, including the yard, maintenance facility, and substations, would be

constructed at-grade, and only minor changes to the movements of the shallow groundwater table likely would occur during site grading and construction. Any surface runoff would be directed to suitable outfalls through approved stormwater management facilities or treated through infiltration into the local groundwater through the use of approved environmental site design (ESD) stormwater techniques.

The proposed tunnel would intercept groundwater within the underlying aquifer. With an expected maximum depth of 50 feet below existing grade, the tunnel could cause permanent, but localized, changes to groundwater flow patterns. The proposed tunnel likely would affect only local water movements and not the quantity or quality of groundwater. Impacts to recharge are not anticipated as recharge is highly variable within the aquifer because it is determined by local precipitation and runoff.

Avoidance and Minimization

Waters of the U.S. and Wetlands

MTA has strived to avoid impacts to WUS and wetlands wherever possible through design solutions, including shifting the transitway alignment, adjusting construction work areas, and using retaining walls and ballast curbs to minimize the area of disturbance. The following measures currently are included in the design:

- Retaining walls along Veterans Parkway to minimize impacts to wetlands located north and south of the roadway, and along the proposed Rock Creek trail connection to avoid direct impacts to Wetland GB-8
- Shifting the transitway alignment to the south side of Veterans Parkway to avoid the extensive tributary and wetland system associated with Brier Ditch

Table 4-36. 100-Year Floodplain Impacts per Stream System (Acres)

Project Elements	Rock Creek	Sligo Creek	Northwest Branch	Paint Branch	Northeast Branch	Total
Transitway and Stations	0.8	1.4	6.4	4.5	10.0	23.1
TPSS	0	0	0	0	0.1	0.1
Project Total	0.8	1.4	6.4	4.5	10.1	23.2

- Use of ballast curb, effectively creating a retaining wall condition, where the proposed transitway and the widened existing roadways would parallel stream and ditch edges to reduce horizontal encroachment into existing streams or ditches and minimize the overall LOD.

Floodplains

Several measures designed to minimize, restore, and preserve natural and beneficial floodplain values will be considered as the project design advances, including minimizing fill within the floodplain, returning disturbed areas to natural contours, using minimum grading requirements, reducing compaction, and minimizing vegetation removal.

Groundwater and Hydrogeology

Impacts to groundwater have been minimized, as much of the Preferred Alternative would occupy existing transportation rights-of-way and other paved surfaces. Stormwater runoff from these surfaces will be managed in accordance with MDE guidelines.

Mitigation

MTA will mitigate project impacts to WUS, including wetlands, by complying with the Federal Compensatory Mitigation Rule (33 CFR Part 332), as well as stipulations from federal and state resource agencies.

MTA will coordinate with the regulatory agencies to develop a project-wide compensatory mitigation strategy to offset impacts to wetlands and aquatic resources.

Short-term Construction Effects

Chapter 5.0 provides a summary of the anticipated construction activities for the Preferred Alternative. The following sections describe short-term construction effects to various water resources.

Waters of the U.S. and Wetlands

The following short-term effects have been preliminarily identified:

- An intermittent stream (WUS GB-2) located within the Columbia Country Club would be crossed during construction of the transitway.
- Approximately 101 linear feet of in-stream construction would occur within Rock Creek

(WUS GB-6) to deconstruct, remove, and replace the existing bridge and bridge pier.

- Approximately 370 linear feet of stream diversions would result within the larger perennial streams, such as Northwest Branch (WUS 006) and Northeast Branch (WUS 018), to replace in-stream piers to widen existing bridges.
- Reconstruction of a vegetated stormwater management basin east of the intersection of East West Highway and Veterans Parkway would affect 0.26 acres of a palustrine emergent wetland (W081) and 83 linear feet of an intermittent stream (WUS 082).
- Reconstruction of a vegetated stormwater management basin north of East West Highway and west of Baltimore Washington Parkway would affect 0.09 acre of palustrine emergent wetland (W024) and 0.13 acre of palustrine forested wetland (W024), as well as 83 linear feet of an intermittent stream (WUS023).
- An impact of approximately 109 linear feet of an intermittent stream (WUS 038) would result north of Ellin Road to facilitate cleaning of existing culverts under Ellin Road and facilitate positive flow through the triple box culvert under the transitway south of Ellin Road.

Surface Water — Water Quality and Total Maximum Daily Loads

Short-term effects to surface waters would include physical disturbances or alterations to the ground surface over which water flows, accidental spills of construction materials, and sediment releases into the surface water that could affect aquatic life.

Scenic and Wild Rivers

Short-term effects on designated scenic or wild streams would occur during construction when equipment is placed near stream banks or in-stream diversions are implemented during pier removal.

Floodplains

Short-term effects to the 100-year floodplains would occur during culvert and bridge construction, especially during the deconstruction, removal, and replacement of the existing Rock Creek Bridge.

Groundwater and Hydrogeology

Construction of the Plymouth Street tunnel would have a short-term impact to localized groundwater resources as de-watering activities would be required to maintain a dry work zone.

Avoidance and Minimization

MTA will minimize the area of disturbance to Maryland-designated wild and scenic rivers by clearly marking and fencing the work area and prohibiting activity outside the work area. During construction, runoff will be directed to surface waters through stormwater management or treated as it is being infiltrated into the local groundwater through ESD stormwater facilities.

Mitigation

MTA will restore Sligo Creek approximately 180 feet upstream and 180 feet downstream of the project bridge to provide long-term benefits and enhance its inherent characteristics.

MTA will submit project plans to the MDNR for evaluation in compliance with the Maryland Scenic and Wild Rivers Act. MTA would provide mitigation if MDNR determines that the project would jeopardize the scenic value of the designated rivers.

MTA will perform hydraulic and hydrologic studies. If these studies find that the flood elevation would change, floodplain storage mitigation will be implemented, if required.

MTA will submit project plans to MDE for approval of structural evaluations, fill volumes, proposed grading elevations, structural flood-proofing, and flood protection measures in compliance with FEMA requirements, USDOT Order 5650.2, "Floodplain Management and Protection," and Executive Order 11988.

MTA will obtain applicable environmental permits for water resources.

MTA will develop an Erosion and Sediment Control Plan, in accordance with the Stormwater Management Act of 2007, which will specify proper slope and soil stabilization techniques, erosion and sediment controls, and stormwater management facilities.

4.15 Topography, Geology, and Soils

This section presents an inventory of topography, geology, and soils in the study area and identifies the extent of impacts that would result from the Preferred Alternative. This section also describes the measures taken to avoid or minimize these impacts and the mitigation measures MTA would undertake to offset impacts to these resources.

4.15.1 Regulatory Context and Methodology

Topography, geology, and soils have been identified to support the design and construction of the Preferred Alternative, which would depend upon factors such as depth to bedrock, slope, and soil types. Specifically, MDE's *Maryland Stormwater Design Manual, Volumes I & II* (2009) and the *Maryland Standards and Specifications for Soil Erosion and Sediment Control* (2011) specify that slope and stabilization techniques may be necessary in certain areas, contingent upon the extent of changes required to the topography, geology, and soils.

The only regulation of these resources is the preservation of farmland soils, under the Farmland Protection Policy Act, which requires that federal agencies consider the extent to which their programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses (7 CFR Part 658). Since the U.S. Census Bureau has designated the study area as urbanized, consideration of farmland soils is not required.

Hydric soils and highly erodible soils (HES) also have been identified to ensure that they are considered for design and construction, in accordance with MDE guidance. Implementation of appropriate sediment and erosion control techniques and stormwater management facilities would minimize impact to these soils during construction.

The study area considered for the topography, geology, and soils analysis is the LOD for the Preferred Alternative, as described in Section 4.1.

Information regarding the existing topography and geologic structure was obtained from USGS maps,

Maryland Geological Survey, and contour line data from M-NCPPC. Soil composition data, including the identification of hydric soils, HES, and farmland soils, were obtained from the NRCS. These data were compared to preliminary engineering drawings, grading plans, and tunnel studies to determine the impacts.

4.15.2 Affected Environment

Topography and Geology

The study area spans a broadly undulating landscape that defines the transitional zone between the Piedmont Plateau Physiographic Province in the western part of the corridor and the Atlantic Coastal Plain Physiographic Province in the east.

The Piedmont Plateau comprises gentle slopes cut by steep stream valleys, reaching elevations of approximately 335 feet above mean sea level near Bethesda. The underlying geology, which includes the Pelitic Schist, Kensington Diorite, and Boulder

Gneiss formations, consists of primarily hard crystalline igneous and metamorphic rocks with a soil and decomposed rock residuum overlying the bedrock.

The Atlantic Coastal Plain is characterized by level to moderately rolling upland, bounded by flat lowlands and estuaries such as the Northwest Branch and adjacent tributaries of the Anacostia River. The geologic structure is made up of unconsolidated gravel, clay, sand, and silt sediments definitive of the Potomac Group and Lowland Deposits.

Soils

Soils vary by type throughout the corridor. Most of the soils within the LOD have been previously altered by excavation, covered by fill material, or paved with asphalt and other impervious surfaces. Table 4-37 lists the naturally occurring soil types (not converted to urban land) and the characteristics of each.

Table 4-37. Characteristics of the Naturally Occurring Soils within the Study Area

Soil Name (Symbol)	Depth to Bedrock (feet bgs)	Depth to Water Table (inches bgs)	Slope (%)	Soil Drainage	Shrink Swell Potential
<i>Piedmont Plateau Province</i>					
Gailla silt loam (1B, 1C)*†	5+	Seasonal	0 to 55	Good	N/A
Glenelg silt loam (2B, 2C)*†	6 to 10+	Seasonal	0 to 55	Good	N/A
Brinklow silt loam (16D)*†	2.5 to 5	Seasonal	0 to 45	Good	N/A
Blocktown silt loam (16D)*†	1 to 3	Seasonal	0 to 60	Good	N/A
Codorus silt loam (53A)*	6+	Seasonal	0 to 3	Moderate	N/A
<i>Atlantic Coastal Plain Province</i>					
Codorus silt loam (CF)*	6+	Seasonal	0 to 3	Moderate	N/A
Hatboro silt loam (CF)*	5 to 10+	Seasonal	0 to 3	Poor	N/A
Christiana (CcD, CcE, CcF)*†	5+	20 to 40	0 to 40	Moderate	Moderate
Downer (CcD, CcE, CcF)*†	6+	72+	0 to 30	Good	Low
Elsinboro sandy loam (EsA, EsB)	6 to 20+	Seasonal	0 to 15	Good	N/A

*Hydric Soil or contains hydric inclusions: Undrained hydric soil, in combination with hydrophytic vegetation and hydrology, is one of three attributes of wetlands, which are federally recognized environmentally sensitive areas and are further discussed in Section 4.14 (33 USC 1344).

†Highly erodible soil: Severely susceptible to the erosive forces of wind and water, possessing the potential to result in channel destabilization, increased flooding, and loss of aquatic habitat.

bgs = Below Ground Surface

N/A = information not available from NRCS Official Soil Series Descriptions database

Source: Natural Resource Conservation Service, United States Department of Agriculture.

4.15.3 Preferred Alternative

Long-term Operational Effects

Topography and Geology

Construction of the Preferred Alternative would affect the existing topography and geology, as the study area is characterized by sloping terrain with a range of steepness that would require alterations to accommodate the proposed transitway, tunnel, and associated facilities. Elements requiring excavation and earth movement would include the Connecticut Avenue overpass, the track section underneath Jones Mill Road, the Rock Creek Bridge, installation of the piers leading to the Silver Spring Transit Center, the Plymouth Street tunnel, the approach to Adelphi Road, and the construction of the Lyttonsville Yard and the Glenridge Maintenance Facility. In the context of the urbanized corridor, these changes are anticipated to be relatively minor, as the study area has historically been heavily manipulated for the construction of streets and buildings.

Impacts to geology would be limited primarily to the tunnel below the steep grades at Plymouth Street. The amount of rock likely to be encountered during the construction could vary from almost a full face (entire tunnel height) of rock to very little, confined to the tunnel invert (bottom part of the tunnel), or possibly no bedrock at all in some locations. No long-term changes would be expected to the geologic structures underlying the remainder of the project corridor, as the only expected changes would result from the excavation and disturbance of surface and near-surface rock associated with the construction of the Preferred Alternative.

Soils

As a result of previous development, most of the soils in the study area already have been disturbed or covered. Given the relatively shallow excavation required along most of the transitway and the previous disturbance of most of the underlying soils, changes to naturally occurring soils and substantial alterations of existing soil conditions are not expected.

Avoidance and Minimization

The Preferred Alternative has been designed to follow existing roadways in order to avoid to the extent possible any additional disturbance to naturally occurring soils within the study corridor. Retaining walls, slope stabilization, and other best management practices have been incorporated into the project design to avoid soil erosion and minimize effects to topography, geology, and soils.

Mitigation

No mitigation is warranted.

Short-term Construction Effects

As discussed in Chapter 5.0, effects from construction of the Preferred Alternative would include excavation of slopes, resulting in short-term redirecting of runoff and small drainage patterns; soil erosion and instability; drilling and blasting of very thick boulder and rock substrate; dust hazards; vibrations from the excavation process; and noise impacts. Noise, vibration, water, and air quality impacts are discussed in other sections of this FEIS.

Work within areas known to contain hydric soils and HES would be addressed by conventional engineering practices and would not likely result in any technical construction challenges.

Avoidance and Minimization

Where excavation and earth movement is required, retaining walls, supports, and slopes will be built in accordance with applicable local, state, and federal design codes and construction standards. MTA will develop an Erosion and Sediment Control Plan, in accordance with state requirements, which will specify proper slope and soil stabilization techniques, erosion and sediment controls, and stormwater management facilities such as diversion dikes, mulching, and netting. Following construction, much of the removed earthen material will be carefully backfilled and the existing grades re-established.

Recent advances in technology related to rock removal will be assessed and implemented as reasonably feasible to minimize short-term effects, such as excessive vibration, flyrock, and damage to remaining rock.

MTA also will prepare a blasting plan to minimize the effects of blasting on the surrounding communities and environment. The specific volume of bedrock and residual soils that would be removed during the tunneling process will be determined as the project design advances.

Mitigation

No mitigation is warranted.

4.16 Hazardous Materials

This section describes recognized environmental conditions (REC) identified in the study area and summarizes recommendations for additional assessment and testing when hazardous or contaminated materials are encountered during construction or through real-estate transactions. It also discusses minimization strategies MTA has taken to eliminate or reduce impacts associated with contaminated materials and mitigation measures MTA will undertake to offset adverse effects. For additional information regarding data collection, site reconnaissance, and specific property information see *Purple Line Hazardous Materials Technical Report (2013)*.

4.16.1 Regulatory Context and Methodology

The following regulations apply to storage and handling of hazardous materials and wastes, inactive water wells, and underground storage tanks (UST):

- **Resource Conservation and Recovery Act (RCRA)**—regulation of hazardous waste from “cradle-to-grave.” Applies to the safe generation, transportation, treatment, storage, and disposal of hazardous wastes.
- **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)**—provides a Federal “Superfund” to clean up uncontrolled or abandoned hazardous waste sites, as well as accidents, spills, and emergency releases of pollutants and contaminants into the environment.
- **Federal Occupational Safety and Health Act (OSHA)**—provides workers with a place of employment free from recognized hazards to safety and health.
- **Toxic Substances Control Act (TSCA)**—includes restrictions relating to chemical substances and mixtures, as well as requirements for reporting, record keeping, and testing.
- **COMAR 26.04.04.11: Regulation of Water Supply, Sewage Disposal, and Solid Waste**—applies to inactive water wells so that they do not provide a conduit for possible contamination of groundwater.
- **COMAR 26.10—Oil Pollution and Tank Management**—requires confirmatory soil sampling of abandoned UST to be conducted, as warranted, to determine if petroleum has been released.

An assessment of the Purple Line corridor was conducted to identify, to the extent reasonably feasible, areas of hazardous waste concern or known RECs on properties that would be impacted or encroached upon by the Preferred Alternative. RECs are defined as “the presence or likely presence of any hazardous substance or petroleum product on a property with conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property” (ASTM 2005).

The Environmental Site Assessment (ESA) study area is the Preferred Alternative’s LOD including all parcels within, or overlapping it. The ESA study area was identified through a search of Maryland State Department of Assessments and Taxation (SDAT) records.

Non-intrusive inspections were performed at 573 sites identified within the ESA study area. Each site was classified for its potential for concern based upon the land uses¹¹ and observed site conditions. Properties assigned a ranking of 1 were deemed to have a relatively high potential for RECs, contamination, hazardous waste, or materials that could affect human health. Some properties that are

¹¹ Land uses that might indicate a higher potential for concern include businesses that manufacture, use, transport, or store petroleum products, solvents, paints, or electrical equipment that may have used PCBs, explosives, and glues.

listed on environmental regulatory databases, but could not be otherwise classified due to insufficient data, were given a ranking of 2 and are conservatively presumed to warrant further inquiry and investigation. Properties ranked 3 or 4 are considered to have a moderate potential for concern, and properties ranked 5 or 6 are considered to have a relatively low potential for concern.

There are two steps in the assessment methodology: the Phase I ESA that has been completed, and the Phase II ESA activities that would be performed as the project design advances.

- Phase I ESA was performed on sites within the study area to identify RECs in accordance with the American Society for Testing and Materials (ASTM) *Standard Practice for Environmental Site Assessments: Phase 1 Environmental Site Assessment Process, Designation: E 1527-05*. Phase I ESA data collection included a review of regulatory agency records and historical source information, as well as site reconnaissance. Site reconnaissance observed previously documented properties and identified observable evidence of contamination. General characteristics of each site were identified through an analysis of the existing topography, surface water, geology, soils, wetlands, and floodplains, and the site's potential for storage and migration of contaminants. The Phase I ESA recommends sampling and data collection activities at 153 sites.
- Phase II ESA would be performed on properties with a high potential for concern (rank 1 or 2), in accordance with ASTM *Standard Practice for Environmental Site Assessments: Phase II Environmental Site Assessment Process, Designation: E 1903-11* and MDE guidance, unless the property could be accurately classified by other means or methods. A Phase II ESA would include laboratory analysis of soil, groundwater, surface water, and sediment samples collected at, or in the vicinity of, a potentially contaminated site. Geophysical studies also potentially would be required.

4.16.2 Affected Environment

Residual contaminants potentially exist along portions of the study area in the underlying soils resulting from former industrial sites, existing and former gasoline service stations, and railroad yards.

Of the 573 sites identified, 71 were ranked 1 or 2 with a relatively high potential for concern, and 158 sites were ranked 3 or 4 with a medium potential for concern. Most of the parcels (344) were ranked 6, indicating that the sites are of low concern.

Table 4-38 summarizes site features that typically would be associated with each ranking and the number of sites within the study area assigned each ranking. Figure 4-29 shows the sites with high to medium/high potential (ranking of 1 to 3); these sites are shown because they are of the most concern. For property information for sites ranked 4 to 6, see *Purple Line Hazardous Materials Technical Report (2013)*.

4.16.3 Preferred Alternative

Long-term Operational Effects

Although there are several contaminants of concern within various environmental media, the installation of new pavement, new ballast, and new cast-in-place structures during the construction of the Purple Line would help to prevent exposures to the potentially contaminated soils and groundwater along the alignment following construction.

Numerous stormwater management facilities have been proposed. Typical stormwater facilities would be constructed to depths of three to six feet where significant interaction with potentially contaminated groundwater is not anticipated. Any stormwater facilities requiring more extensive excavation and grading potentially would be affected by both surface and sub-surface residual contamination (defined as remaining after the conclusion of regulatory actions).

In addition to impacts resulting from pre-existing contamination in the study area, the operation and maintenance of the Purple Line could be associated with petroleum releases from the equipment and materials stored at the Lyttonsville Yard and Glenridge Maintenance Facility.

Table 4-38. Potential for Concern—Ranking Criteria and Number of Sites within Study Area

Potential for Concern/Ranking	Typical Site Observations or Conditions	Number of Sites
High (1)	<ul style="list-style-type: none"> Industrial facilities Gasoline stations Automobile repair and vehicle fleet maintenance facilities Paint manufacturing facilities Aboveground storage tanks (AST) with a large amount of staining USTs containing gasoline, jet fuel, kerosene fuel, waste oil, or solvents Landfills Remediation systems in place Pits and lagoons Dry cleaners PCB transformers with major stains Surface dumps with drums or other hazardous materials 	49
Listed Sites (2)	Regulatory database listed sites that could not be otherwise classified, due to insufficient data or MDE regulatory information	22
Medium/High (3)	<ul style="list-style-type: none"> USTs containing materials other than listed above Surface dump with empty drums or other materials of concern Mounds ASTs with several medium stains Suspected PCB containing transformers with minor stains 	25
Medium (4)	<ul style="list-style-type: none"> Small amounts of surface staining Slightly discolored surface water Suspected PCB-containing transformers with no staining Distressed vegetation Unmarked transformers Large surface dumps containing household waste ASTs with a few small stains or no staining, but questionable integrity Hazardous material storage sites 	133
Medium/Low (5)	Regulatory database identified facilities outside the ESA study area that are not expected to result in impacts to the study area	0
Low (6)	<ul style="list-style-type: none"> Small surface dumps containing household wastes ASTs (relatively new) with no staining or evidence of poor structural integrity Septic systems Automobile repair/vehicle maintenance facilities on non-adjacent sites that are not expected to result in impacts to the ESA study area 	344
Total		573

Source: Coordination between Chesapeake Environmental Management, Inc. and Maryland State Highway Administration, 2003, and site inspections by Chesapeake Environmental Management, Inc., 2011-2012.

Avoidance and Minimization

As noted above, although there are several contaminants of concern within various environmental media along the transitway, the installation of new pavement, new ballast, and new cast-in-place structures would minimize exposure.

Mitigation

MTA will establish procedures and staff training for proper storage and maintenance of equipment and hazardous materials.

If groundwater contamination is encountered that results in contaminated groundwater inflow after the completion of construction, MTA will obtain a National Pollutant Discharge Elimination System (NPDES) permit for discharges from project sump and underdrain systems, if required.

Short-term Effects

General Construction Activities

Construction through contaminated areas would be subject to regulatory requirements for the management and disposal of contaminated materials to protect workers and the public.

The greatest potential effects are expected in areas of deep excavation, such as the tunnel section, where dewatering¹² would be required, and greater volumes of contaminated soil may be encountered. Deep excavations may also be involved in utility relocation work, including construction of stormwater management structures.

Construction-related effects, as discussed in Chapter 5.0, also are expected during shallow utility excavation and surface construction dewatering. These activities would not encounter contamination similar to deep excavation activities since the soils would not be in direct contact with groundwater. However, near-surface construction potentially would encounter residual petroleum, metal, and solvent contamination, which are expected to occur within five feet of ground surface in some areas.

Excavated materials that contain contaminant concentrations exceeding the applicable MDE regulatory level would be considered as regulated waste materials for the purpose of disposal.

Tunneling

Tunneling activities potentially would encounter contamination within the excavated soils or tunnel muck¹³ because of the presence of residual soil contamination and contaminated groundwater. During the excavation, the muck would be stock-piled for loading and disposal. Dewatering of the muck would be performed as part of the separation process, and affected water generated would be handled in the same manner as described below. Depending on the contaminant levels present in the muck, disposal may include re-use as borrow material or disposal at an approved landfill.

Groundwater/Dewatering

Dewatering activities near contaminated zones may result in the collection and discharge of contaminated groundwater. Where this occurs, treatment of the dewatering effluent may be necessary before discharge. In most cases, the contamination would

likely consist of petroleum hydrocarbons, and treatment with an oil/water separator and carbon filtration system would reduce the petroleum concentrations sufficient for discharge to the stormwater system. Dewatering treatment would be performed under MDE's General NPDES permit for the discharge of treated groundwater from oil-contaminated groundwater sources.

Structures

Where existing buildings would be acquired for right-of-way purposes, pre-demolition surveys, including laboratory analysis of a sample of the waste, would be required to determine the appropriate demolition and debris disposal methods.

Avoidance and Minimization

To assist with construction plans and preparations, additional testing and research will be conducted to provide information on hazardous materials that may be encountered during construction.

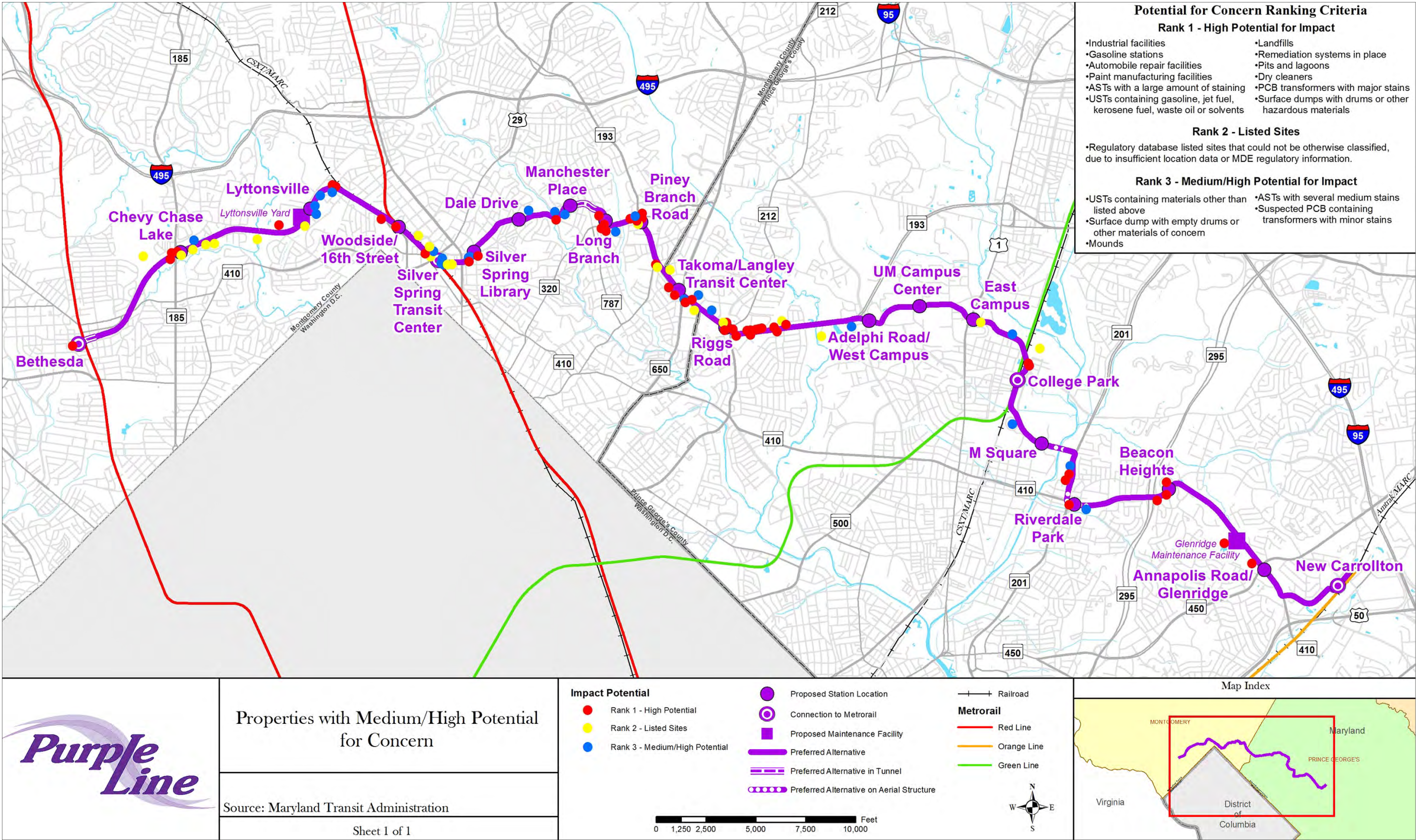
Recommendation for Phase II ESA

MTA will perform a Phase II ESA prior to acquisition of any property with a high potential for concern (sites ranked 1 or 2 in the Phase I ESA) unless the property can be classified accurately by other means or methods. MTA also will perform further records research on sites with a ranking of 4 to determine the potential presence of PCBs.

¹² Dewatering lowers the water table so that subsurface work can proceed.

¹³ Muck is described as a combination of excavated soil, rock, groundwater, and any conditioning additives that were required for the excavation and/or muck removal process.

Figure 4-29. Properties with Medium/High Potential for Concern



The Phase I ESA rankings of the 64 properties proposed for full or partial acquisition are shown in Table 4-39.

Table 4-39. Summary of Potential Concerns Associated with Property Acquisition

Ranking	Number of Sites	
1	Sites with a High Potential for Concern	11
2	Listed Sites	1
3	Sites with a Medium/High Potential for Concern	1
4	Sites with a Medium Potential for Concern	17
5	Sites with a Medium/Low Potential for Concern	0
6	Sites with a Low Potential for Concern	34
Total		64

Based on the Phase I ESA findings, sampling and data collection activities are recommended at 153 sites, including the 64 that would be either fully or partially acquired. Depending on the type of concerns identified and the type of suspected contamination present, the sampling and data collection activities would differ at each site. Table 4-40 summarizes the number of sites requiring each sampling activity or data collection.

Table 4-40. Summary of Additional Sampling and Data Collection Activities

Type of Additional Sampling or Data Collection Required	Number of Sites
Surficial Soil Sampling	40
Subsurface Soil Sampling	61
Groundwater Sampling	39
Confirmatory Soil Sampling	6
Confirmatory Groundwater Sampling	7
Ground Penetrating Radar Survey	3
Additional Site Inspection	8
Additional Regulatory Research	27
Additional Utility Research (PCBs)	58
Note: Numbers are not additive; some sites would require more than one sampling or data collection activity.	

The properties will undergo the Phase II ESA as the project design advances to account for cleanup activities, contamination removal, or remediation including the following:

- Closure of inactive water wells
- Soil sampling of abandoned USTs to determine if petroleum had been released. The UST would either be removed or an oil/water separator would be installed, as required
- Pre-construction surveys of buildings identified for demolition or renovation to address site specific concerns, such as asbestos and lead-based paint
- Construction specifications to address soil and/or groundwater contamination
- Construction of a ventilation plant to be used in the event of an unexpected encounter with a volatile material

Construction Procedures

MTA will identify remediation actions to be implemented as needed if unexpected soil or groundwater contamination is encountered.

MTA will develop a site-specific health and safety plan that will include the following:

- Equipment and procedures to protect the workers and general public
- Procedures for monitoring of contaminant exposures
- Identification of the contractor’s chain of command for health and safety.

Mitigation

If contaminated soils are identified or encountered during construction, MTA will evaluate off-site remediation, chemical stabilization, or other treatments and disposal options, in cooperation with MDE.

MTA will coordinate with MDE to determine the mitigation response and reporting required should a release of hazardous materials occur during operations.

4.17 Utilities

This section describes the existing utilities within the study area and identifies the potential impacts to utilities resulting from the construction of the Preferred Alternative. It also discusses the strategies that MTA will employ to avoid, minimize or mitigate these impacts.

4.17.1 Regulatory Context and Methodology

As a federal transit project, the Purple Line would require integration with existing utility infrastructure subject to FTA's *Project and Construction Management Guidelines*—Appendix C: Utility Agreements (2003). Policies and procedures addressing utility adjustment or relocation are based on 23 CFR Part 645, Subparts A and B. As defined in 23 CFR Part 645.207, utilities are considered to furnish essential public and private services, which include electricity, gas, water, steam, and other similar commodities. Utility services are distributed overhead and underground, through electrical transmission lines, high pressure gas lines, treated water and sanitary sewer mains, steam tunnels, buried fiber optic cables, underground and overhead telephone lines, and communication systems.

The study area for utilities is the LOD for the Preferred Alternative, as described in Section 4.1. Existing utilities were identified through a review of utility record drawings, base maps obtained from a variety of utility service providers, and subsequent field surveys and verifications.

MTA has facilitated extensive coordination through a variety of meetings with respective utility service providers to determine and verify the location of existing facilities within the study area.

4.17.2 Affected Environment

The study area traverses a complex utility infrastructure that connects residences and businesses to essential services. Service providers include Potomac Electric Power Company (PEPCO), Washington Gas (WGL), Washington Suburban Sanitary Commission (WSSC), the University of Maryland (MEDCO), Verizon, MCI Network Services, AT&T, Fiberlight, Zayo Group, Century

Link, Level 3 Communications, RCN Communications, Time Warner Communications, Cable TV Montgomery, XO Communications, and Comcast.

Although common throughout the study area, utility facilities are highly concentrated above or beneath the roadway rights-of-way, especially Wayne Avenue, University Boulevard, and Paint Branch Parkway.

Major utilities within the project study area have been identified based on their size and complexity to relocate. Such utilities include high voltage electric transmission lines, 12-inch or greater gas mains, water mains of 16 inches or more, sanitary sewer lines of 15 inches or more, steam mains, and fiber optic lines.

4.17.3 Preferred Alternative

Long-term Operational Effects

Due to the complex utility infrastructure supporting the urban environment in which the Preferred Alternative would be constructed, the relocation, reinforcement, protection, maintaining-in-place, or removal of several utilities would be required. Utilities in direct conflict with the proposed transitway, structural supporting elements, or grading and filling required during construction would be relocated in accordance with the utility owner's specifications and those set forth in MTA's *Red/Purple Light Rail Design Criteria and Standards* (April 2012).

Reinforcement and protection would involve fortifying the utility in place by adding a concrete encasement or other covering capable of withstanding loads imposed by the transitway. Case-ments would be required for pipelines carrying oil, gas, petroleum or other flammables, steam, water, and all other pressurized lines. Utilities that are maintained-in-place would be avoided during the construction process and allowed to remain in their existing condition. Although rare in occurrence, removal also could take place where utilities are outdated or no longer needed. Older vulnerable utilities may need to be updated with more modern materials or replaced in a safer location. The specific treatment of each utility conflict would be addressed on an individual basis, dependent upon

the underground or overhead clearance and type of each utility.

Major utility relocations could include gas, fiber-optic, telephone, electric, water, and steam facilities. Due to the complexity of the utility infrastructure throughout the study area, the identification of utility conflicts is ongoing, and coordination with utility service providers continues. Additional impacts may be discovered during further design development, following completion of the NEPA process. Although changes to the existing utility facilities may result from the implementation of the Preferred Alternative, the ability and capacity of the utility infrastructure to deliver service would not be impacted.

Avoidance and Minimization

To minimize costs and limit impacts, utilities would be protected and reinforced wherever possible rather than relocated.

Mitigation

Utility-related effects will be addressed in advance of, or in conjunction with, the construction of the proposed Preferred Alternative. Mitigation is not anticipated to be required.

Short-term Construction Effects

Impacts to existing utilities resulting from the construction of the Preferred Alternative could include temporary service interruptions when an existing utility must be disconnected and a temporary or replacement service is installed. The duration of down time would depend on the utility type and complexity of construction. Chapter 5.0 provides more information on the anticipated construction activities.

Avoidance and Minimization

Ongoing meetings and discussions with the respective utility service providers would continue as the project design progresses to identify additional impacts and minimize service interruptions. MTA would plan and schedule construction activities well in advance of temporary utility service disruptions, in coordination with respective utility service providers and appropriate local agencies. Affected utility customers would be notified in advance of any planned outages.

To the extent possible, utilities affected by construction would be reinforced and protected in place, in accordance with the utility company's standards, rather than relocated. Supporting and protecting utilities helps reduce outages and construction delays.

Relocation, reinforcement, and protection would be constructed based on design criteria established in MTA's *Red/Purple Line Light Rail Design Criteria and Standards* and in accordance with the specifications set forth by each respective utility owner. Some private utility owners would handle the design and construction of their required utility relocations. MTA would maintain continued correspondence with each utility owner to coordinate the design and construction of utility relocation work to avoid conflicts with other proposed utility relocation construction and the Purple Line construction schedule.

Mitigation

Mitigation is not warranted.

4.18 Energy Use

This section describes the current trend in energy consumption and assesses the potential long-term operating and short-term effects of the Preferred Alternative on energy consumption, including discussion of the minimization strategies MTA will use to reduce energy usage within the corridor.

4.18.1 Regulatory Context and Methodology

Under the regulations for implementing NEPA, the Council on Environmental Quality (CEQ) requires that the energy requirements for each alternative be analyzed and the energy conservation and mitigation measures be identified (40 CFR 1502.16(e)).

Energy consumption was calculated based on projected travel forecasts for the Washington DC metropolitan area found in Section 3.2. Estimates for direct (during operations) and indirect¹⁴ (during construction) energy consumption for the Preferred

¹⁴ Indirect, in relation to the energy analysis, refers to the energy used during construction. This term is used differently in this analysis than it is in the Indirect and Cumulative Effects analysis in Chapter 7.0 of the FEIS.

Alternative were based on the analysis in the *Energy and Transportation Systems* manual (Hatano et al. 1983) and the methodologies described in *Urban Transportation and Energy: The Potential Savings of Different Modes* (Congressional Budget Office, 1977). Updated consumption calculation factors for project construction and operation were obtained from the DOE *Transportation Energy Data Book, 30th Edition* (Davis et al. 2011), *National Household Travel Survey* (Santos et al. 2011), *Assessment of the Energy Impacts of Improving Highway-Infrastructure Materials* (Stammer and Stodolsky, 1995), the USDOT's *National Transportation Statistics* (Duych, R. et al. 2012), and the American Public Transportation Association's (APTA) *Public Transportation Fact Book* (Neff and Dickens, 2012).

Calculating indirect energy consumption during construction considered the number of proposed track miles, including shared and exclusive lanes as well as surface, tunnel, and elevated track. These

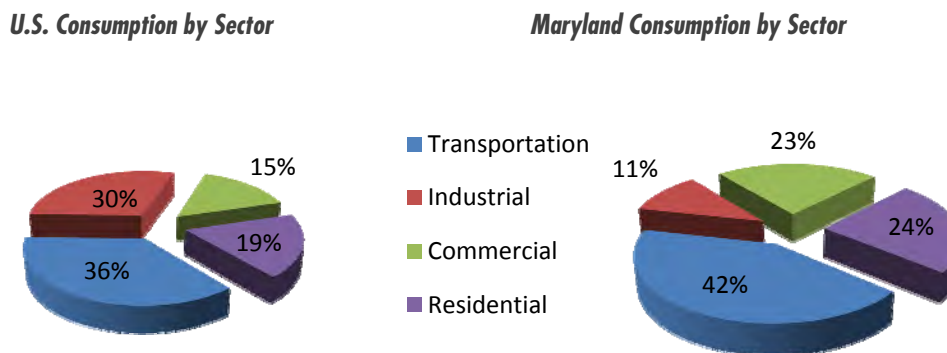
figures were multiplied by construction energy factors, which estimate the amount of energy necessary to extract raw materials, manufacture and fabricate construction materials, transport materials to the work site, and complete construction.

Calculating transportation energy consumption during operation considered the imputation of daily VMT for automobiles, diesel trucks, bus transit, and light rail transit throughout the study area.

4.18.2 Affected Environment

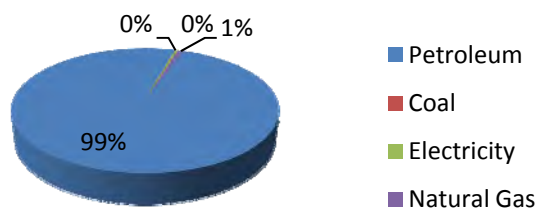
Figure 4-30 shows consumption of energy by sector, for the United States and the State of Maryland. The transportation sector is the largest consumer of energy, accounting for over one third of the consumption, and petroleum is the predominant source of transportation energy consumption in Maryland, as shown in Figure 4-31.

Figure 4-30. Consumption of Total Energy by Sector, 2009, U.S. and Maryland



Source: U.S. Energy Information Administration, June 2011

Figure 4-31. Maryland Transportation Energy Consumption Estimates, 2009



Source: U.S. Energy Information Administration, June 2011

4.18.3 Preferred Alternative

Long-term Operational Effects

As shown in Table 4-41, implementation of the Preferred Alternative would reduce total energy consumption in the corridor by 0.043 percent, compared to the No Build Alternative in 2040. As a result of the anticipated reduction in roadway VMT by only 0.064 percent (36 million miles annually based on the FTA annualization factor), the overall change in energy consumption from Preferred Alternative to the No Build Alternative is expected to be very small but beneficial. Energy consumption quantities are given in British thermal units (Btu), the measure of the amount of heat required to raise the temperature of one pound of water by one degree Fahrenheit.

Although the overall change in total direct transportation energy consumption would be minor, the per passenger transportation energy use would be considerably less for the Preferred Alternative when compared to the petroleum consumption of transit buses and private automobiles. Assuming average vehicle occupancies derived from FHWA and APTA data, Table 4-42 demonstrates the single person energy benefits of light rail transit (FHWA 2011; Dickens and Neff 2012). Light rail would require approximately 1,885 Btu less energy per passenger mile than automobiles and 2,474 Btu less than buses.

Short-term Construction Effects

In addition to the direct propulsion requirements, one-time, non-recoverable indirect energy expenditures would result from construction. Table 4-42 summarizes the energy consumed by type of track and reveals that 684,498 million Btu would be consumed during the construction of the Preferred Alternative. Chapter 5.0 provides a summary of the anticipated construction activities.

Table 4-41. Direct Transportation Energy Consumption, 2040

	No Build Alternative	Preferred Alternative
Roadway		
Daily Project Study Area VMT	195,866,009	195,761,256
Annual Roadway Fuel Consumed (million gallons) ¹	2,612	2,611
Annual Roadway Energy Consumption (million Btu)	327,651,524	327,483,438
Light Rail Transit (LRT)		
Daily Vehicle Miles Traveled	Not Applicable	4,775
Annual LRT Electricity Use (kWh) ³	Not Applicable	8,402,952
Annual LRT Energy Consumption (million Btu)	Not Applicable	28,671
Totals		
Total Energy Consumption (million Btu)	327,651,524	327,512,109
Percent Change from No Build Alternative	—	-0.043%

Note: Transportation includes automobile, diesel, bus transit, and LRT modes. Assumed 4,576 Btu/vehicle mile for automobiles; 16,333 Btu/vehicle mile for diesel trucks (with 1 operator); 22,779 Btu/vehicle mile for bus (Davis et al. 2012); and 20,217 Btu/vehicle mile for LRT (Dickens and Neff 2012).

¹Davis, S.C., Diegel, S.W., and Boundy, R.G. 2012. *Transportation energy data book: Edition 31*. Oak Ridge National Laboratory, Oak Ridge, TN.

²Assumes 5.93 kWh/vehicle-mile in 2040. Projected from Table A. 15: Transit Rail Fuel Use (Davis et al. 2012) and light rail vehicle mile data obtained from Table 80 (Dickens and Neff 2012).

Table 4-42. Indirect Energy Consumption

	Length (miles)	Energy Consumed (millions Btu)
Track		
At-grade Track ¹	36.8	230,197
Above-grade Track	1.6	28,572
Below-grade Track ²	1.4	230,158
Track Work Subtotal	39.8	488,927
Miscellaneous Materials ³		48,893
Placement Energy ³		146,678
Total Indirect Energy Consumption		684,498

¹Assumed energy consumption for excavation and grading of green track to be similar to roadway resurfacing (Stammer and Stodolsky 1995).

²Assumed energy for construction to be similar to that of major bridge rehabilitation (Stammer and Stodolsky 1995).

³Miscellaneous and placement energy 10% and 30% of subtotal, respectively (Hatano et al. 1983).

Avoidance and Minimization

No avoidance or minimization is anticipated.

Mitigation

There is no mitigation required.

4.19 Environmental Justice

This section documents coordination efforts with Environmental Justice (EJ) communities and presents the EJ effects that would result from implementing the Preferred Alternative. Also discussed are avoidance and minimization strategies MTA has taken to eliminate or reduce impacts, and mitigation measures MTA will undertake to offset adverse effects.

4.19.1 Introduction and Regulatory Overview

Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was signed by President Clinton on April 11, 1994. This Executive Order directs federal agencies to take appropriate and necessary steps to identify and address disproportionately high and adverse environmental effects of federal agency actions (including transportation projects) on minority and low-income populations. Following is a summary of other guidance and procedures that are used in the EJ analysis:

- **Environmental Justice Guidance under the National Environmental Policy Act (CEQ 1997)**—established guidance to assist federal agencies in effectively integrating the issue of EJ into their project development procedures.
- **Updated Final Order on Environmental Justice, 5610.2(a) (USDOT May 2012)**—provides detailed procedures for identifying EJ populations and for determining disproportionately high and adverse effects to the targeted populations. It sets forth steps to prevent disproportionately high and adverse effects to minority or low-income populations through Title VI analyses and environmental justice analyses conducted as part of federal transportation planning and NEPA provisions. It also describes the specific measures to be taken to address instances of disproportionately high and adverse effects.
- **FTA Circular 4703.1 Environmental Justice Policy Guidance for Federal Transit Administration Recipients (FTA August 2012)**—provides guidance for incorporating EJ

principles into plans, projects, and activities receiving funding from FTA.

4.19.2 Methodology

The strategies developed under **FTA Circular 4703.1** are intended to ensure that communities are provided the opportunity to provide input on the planning and design of a federal action, as well as effects and mitigation measures; and that disproportionately high and adverse effects on minority or low-income populations are appropriately addressed. The general methodology for addressing EO 12898 involves:

- Identifying the EJ populations within the study area
- Providing information on the efforts that MTA has made to involve minority, low-income, and limited English proficient populations in the study area
- Assessing whether the project alternatives would result in disproportionately high and adverse effects on EJ populations, taking into consideration mitigation and enhancement measures and project benefits, as appropriate.

Study Area

The study area for the EJ analysis includes the census tracts that fall within 500 feet of the alignment or within a half-mile radius of a proposed station.

The assessment of the potential for disproportionate high and adverse effects is based upon the environmental impact information developed for the FEIS. Using the results of the technical studies conducted for this project, the physical locations of adverse impacts were identified, and a map analysis was conducted to determine whether patterns or concentrations of adverse effects occurred in areas with EJ populations.

Data Sources

The data sources used for the identification of low income populations was the American Community Survey five-year average data for 2006-2010 and for minority populations, the U.S. Census of 2010.

Other data sources that were used to confirm the location of minority and low-income populations

included information and data from the National Center for Educational Statistics, government assisted housing programs, historical references, City and County officials, field visits, community meetings and interviews and a review of revitalization efforts within the project study corridor.

Identifying Minority and Low-Income Populations

The USDOT Order on Environmental Justice (5610.2a) provides definitions of the minority populations addressed by EO 12898. These populations are as follows:

- **Minority Populations**—Any readily identifiable groups of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who would be similarly affected by a proposed FTA program, policy, or activity. Minority includes persons who are American Indian or Alaskan Native, Asian American, Native Hawaiian or Other Pacific Islander, Black (not of Hispanic Origin), and Hispanic or Latino.
- **Low-Income Population**—Any readily identifiable group of low-income persons whose household income is at or below the US Department of Health and Human Services poverty guidelines, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who would be similarly affected by a proposed DOT program, policy, or activity.

As established by the U.S. Department of Health and Human Services (DHHS), the poverty guidelines in 2010 are shown in Table 4-43.

In addition to the use of census data, MTA spoke with city and county agency staff, local elected officials, and community leaders to identify the location of EJ populations that might not be reflected in census data.

The use of thresholds for identifying EJ areas was based on the CEQ guidance document, Environmental Justice Guidance under the National Environmental Policy Act (NEPA) (CEQ 1997). This approach was used in the AA/DEIS, which identified EJ and non-EJ areas based on the criteria described above. On August 15, 2012, FTA issued Circular 4703.1, which does not adopt the CEQ's approach and instead calls for EJ analyses to include "reasonable efforts to identify the presence of distinct minority and/or low-income communities residing both within, and in close proximity to, the proposed project, or activity."

For consistency with the approach used in the AA/DEIS, this FEIS continues to identify EJ areas based on a threshold approach. In accordance with Circular 4703.1, this FEIS also considers the potential for EJ populations outside areas identified as EJ areas. Some low income EJ communities were found in Bethesda, north of the station area, and in Silver Spring, a population of Ethiopian immigrants. MTA was able to team with Impact Silver Spring for Amharic language outreach to the Ethiopian community. This group also helped organize community meetings in some low-income apartment complexes in Silver Spring.

4.19.3 Environmental Justice Populations in the Study Area

As a tool for evaluating the proportionality of impacts and benefits, this analysis identifies "EJ areas" and "non-EJ areas" within the project study corridor. An "EJ area" was defined to include any census tract in which the minority or low-income population meets either of the following thresholds:

- a) the minority or low-income population in the census tract exceeds 50 percent
- b) the percentage of a minority population in the affected area is meaningfully greater than the lowest percentage in the either county, the state or study area

Table 4-43. DHHS Poverty Guidelines

Persons in Family/Household	Income Threshold
1	\$10,830
2	\$14,570
3	\$18,310
4	\$22,050
5	\$25,790
6	\$29,530
7	\$33,270
8	\$37,010

Source: U.S. Department of Health and Human Services

c) the percentage of a low-income population in the affected area is meaningfully greater than the lowest percentage in the either county, the state or study area.

As noted above, the CEQ guidance recommends identifying areas that are “meaningfully greater” than the average in the surrounding jurisdiction. The CEQ guidance does not define the specific percentage that should be used for determining if the minority or low-income population is “meaningfully greater” than the average in the surrounding jurisdiction. However, it is consistent with the CEQ guidance to set a threshold that is higher than (not the same as) the average of the low-income or minority population in the surrounding jurisdictions. For this FEIS, FTA has determined that the minority or low-income population is “meaningfully greater” than the average in the surrounding jurisdictions if it is 10 percentage points higher than the jurisdiction with the lowest percentage of that EJ population.

Minority and low-income population data at the state, county, and study area levels were compiled to provide a basis for identifying areas with high levels of EJ populations. Geographic information system (GIS) maps were developed to illustrate the minority and income characteristics of the population in the study area.

The lowest percentage of minority population is 42 percent of the total population in Montgomery County (Table 4-44). The addition of 10 percentage points creates a higher threshold than 50 percent, so any census tract block group over 50 percent minority is identified as an EJ area.

The lowest percentage of low income population is 6 percent of the total population in Montgomery County (Table 4-45). The addition of 10 percentage points creates a threshold of 16 percent, so any census tract block group over 16 percent low income is identified as an EJ area.

The study area includes 155 census block groups, which were analyzed to identify affected populations and EJ-related issues that would not be apparent at a larger geographic scale. Based on the minority and low-income criteria, 93 block groups of the 155 block groups within the study area are identified as representing EJ populations (see Table 4-46). The population in the 93 block groups totals 158,261, or about 68 percent of the total study area population. Of the 93 EJ block groups, 22 block groups exceed both the minority and low-income EJ criteria. Figure 4-32 presents the results of the demographic and income analysis for the corridor.

For more information on the EJ analysis see the *Purple Line Social Effects and Land Use Planning Technical Report* (2013).

Table 4-44. Race and Ethnicity in Region

Geographic Area	White only	African-American or Black only	American Indian/ Native Alaskan only	Asian only	Native Hawaiian/ Pacific Islander only	Other Race	Two or More Races	Hispanic Ethnicity	Minority
Maryland	58%	29%	0%	6%	0%	4%	3%	8%	42%
DC	38%	51%		4%	0%	4%	3%	9%	62%
Montgomery County	57%	17%	0%	14%	0%	7%	4%	17%	43%
Prince George's County	19%	65%	1%	4%	0%	9%	3%	15%	81%
Study Area	45%	28%	1%	6%	0%	16%	4%	27%	55%

¹ The U.S. Census records Hispanic ethnicity as distinguished from race, and therefore, the percentages given for Hispanic population include those who are White, Black, or other races.

Source: U.S. Census Bureau 2010

Table 4-45: Low Income Percentages in the Region

Geographic Area	Households Below the Poverty Level
Maryland	8%
DC	16%
Montgomery County	6%
Prince George's County	7%
Study Area	10%

Source: U.S. Census Bureau 2006-2010 American Community Survey 5-Year Average

Table 4-46: Minority and Poverty Characteristics by Census Tract and Block Group

Geographic Area	Census Tract	Block Group	Percent of population considered minority	Percent of households below poverty level	EJ Block Group
Bethesda	704700	1	8.4%	0.0	N
		2	13.7	0.0	N
		3	7.6	4.2	N
		4	6.4	0.0	N
	704803	1	20.7	2.1	N
		2	22.5	6.6	N
		3	32.2	0.0	N
	704804	1	16.7	2.0	N
	704805	1	27.5	16.7	Y
		2	30.2	27.5	Y
	704806	1	22.8	6.4	N
		2	23.9	7.6	N
	705502	1	11.1	4.6	N
		2	5.5	0.0	N
3		11.5	1.6	N	
Bethesda Totals			17.4	6.1	N
Chevy Chase	705000	1	11.4	3.8	N
		2	8.5	7.3	N
		3	13.5	4.5	N
		4	18.8	2.9	N
	705100	1	19.8	0.4	N
		2	14.5	2.8	N
		3	6.8	0.0	N
		4	7.4	3.7	N
	705200	1	17.2	0.0	N
		2	7.2	0.0	N
		3	8.7	0.0	N
	705400	1	9.5	0.0	N
		2	6.6	2.4	N
Chevy Chase Totals			12.1	2.1	N
Rock Creek/ Lyttonsville/ Rosemary Hills	7052700	1	61.5	2.0	Y
		2	40.7	11.5	N
		3	13.6	3.8	N
		4	57.3	13.2	Y
Rock Creek/Lyttonsville/Rosemary Hills Total			49.8	7.4	N

Table 4-46: Minority and Poverty Characteristics by Census Tract and Block Group (continued)

Geographic Area	Census Tract	Block Group	Percent of population considered minority	Percent of households below poverty level	EJ Block Group
Woodside	702800	1	33.1	8.0	N
		2	58.0	9.1	Y
		3	24.2	4.9	N
		4	30.7	0.0	N
Woodside Totals			37.3	6.5	N
Silver Spring	001600	1	77.4	0.0	Y
		2	71.4	11.0	Y
		3	76.2	5.6	Y
		4	73.7	1.3	Y
	702402	1	56.6	25.0	Y
		2	45.1	7.5	N
		3	58.7	11.0	Y
	702500	1	69.1	7.0	Y
		2	52.5	4.6	Y
		3	63.7	23.5	Y
		4	55.9	6.1	Y
	702601	1	61.1	10.5	Y
		2	46.2	10.8	N
		3	49.5	5.4	N
		4	46.2	12.3	N
	702602	1	32.8	13.9	N
		2	58.7	18.7	Y
	702900	1	15.2	7.0	N
		2	25.5	2.4	N
		3	31.1	0.0	N
		4	40.5	0.0	N
		5	15.0	0.0	N
Silver Spring Totals			52.0	9.4	Y
East Silver Spring	702101	1	76.9	20.7	Y
		2	76.9	10.3	Y
		3	66.9	4.1	Y
		4	77.5	6.5	Y
	702200	1	53.0	3.6	Y
		2	16.5	14.5	N
		3	23.1	3.0	N
		4	21.6	0.0	N
	702302	1	61.1	8.2	Y
		2	18.4	0.0	N
3		55.8	4.9	Y	
East Silver Spring Totals			54.7	7.4	Y
Long Branch	702301	1	62.3	8.6	Y
		2	70.6	6.5	Y
	702401	1	26.2	6.5	N
		2	36.8	2.6	N
Long Branch Totals			52.7	6.3	Y

Table 4-46: Minority and Poverty Characteristics by Census Tract and Block Group (continued)

Geographic Area	Census Tract	Block Group	Percent of population considered minority	Percent of households below poverty level	EJ Block Group
Takoma Park	701702	1	67.6	15.0	Y
	701703	1	68.3	0.0	Y
		2	30.7	2.6	N
		3	79.0	4.7	Y
	701800	1	69.8	25.9	Y
		2	79.2	15.5	Y
		3	23.0	2.8	N
		4	14.0	0.0	N
	701900	1	64.4	17.6	Y
		2	41.7	0.3	N
		3	41.8	14.2	N
	702000	1	74.0	17.7	Y
		2	77.8	31.9	Y
		3	65.2	13.3	Y
	805500	1	74.8	8.4	Y
		2	77.3	5.6	Y
Takoma Park Totals			63.6	11.9	Y
Langley Park	805601	1	74.5	19.3	Y
		2	77.5	17.5	Y
		3	73.9	35.0	Y
	805602	1	68.5	24.7	Y
		2	79.8	23.4	Y
	805700	1	80.2	6.9	Y
		2	75.3	2.4	Y
		3	71.3	22.1	Y
Langley Park Totals			74.1	19.7	Y
Lewisdale	805801	1	80.1	6.5	Y
		2	86.4	18.5	Y
	805802	1	79.7	14.4	Y
		2	77.7	13.5	Y
Lewisdale Totals			80.8	12.8	Y
Adelphi	805904	1	66.1	12.1	Y
		2	76.1	29.1	Y
	805909	1	55.1	17.6	Y
		2	88.1	9.7	Y
Adelphi Totals			73.1	15.2	Y

Table 4-46: Minority and Poverty Characteristics by Census Tract and Block Group (continued)

Geographic Area	Census Tract	Block Group	Percent of population considered minority	Percent of households below poverty level	EJ Block Group
College Park	806400	1	28.5	0.0	N
		2	21.4	7.9	N
		3	23.0	3.0	N
	806800	1	46.1	3.7	N
		2	41.8	3.2	N
		3	37.3	0.0	N
	807000	1	37.9	2.3	N
		2	40.7	13.9	N
		3	45.6	33.5	Y
		4	42.3	41.4	Y
	807200	1	17.0	59.5	Y
		2	32.2	0.0	N
		3	32.1	89.2	Y
		4	38.9	30.1	Y
College Park Totals			33.0	23.6	Y
Riverdale	803900	1	77.4	0.0	Y
		2	76.1	15.9	Y
		3	77.0	7.8	Y
	803401	1	95.1	22.8	Y
		2	92.2	10.0	Y
		3	93.1	8.9	Y
	806501	1	51.0	0.0	Y
		2	62.3	0.0	Y
		3	77.8	7.9	Y
	806601	1	71.9	4.2	Y
		2	87.7	13.2	Y
		3	68.6	15.4	Y
	806602	1	82.7	17.7	Y
		2	69.6	0.0	Y
		3	67.6	1.4	Y
	807102	1	18.6	7.0	N
		2	57.1	7.4	Y
	Riverdale Totals			74.5	9.3
Glenridge/Beacon Heights	803613	1	83.5	3.1	Y
		2	90.6	6.3	Y
		3	94.8	0.0	Y
	803801	1	73.2	9.9	Y
	803803	1	83.5	6.0	Y
		2	82.7	14.3	Y
		3	83.5	3.7	Y
Glenridge/Beacon Heights Totals			83.7	6.5	Y
New Carrollton	803605	1	74.8	30.5	Y
		2	79.3	3.6	Y
		3	78.9	9.8	Y
		4	80.1	1.8	Y
	803610	1	81.5	1.2	Y
		2	88.1	16.8	Y
New Carrollton Totals			80.4	7.9	Y

Table 4-46: Minority and Poverty Characteristics by Census Tract and Block Group (continued)

Geographic Area	Census Tract	Block Group	Percent of population considered minority	Percent of households below poverty level	EJ Block Group
West Lanham Hills	803602	1	95.3	10.0	Y
		2	96.6	8.1	Y
	803612	1	83.1	30.5	Y
		2	95.9	3.6	Y
	803700	1	75.0	14.4	Y
		2	75.9	6.0	Y
West Lanham Hills Totals			86.4	11.0	Y

Source: U.S. Census Bureau 2006-2010 American Community Survey 5-Year Average and U.S. Census Bureau, Census 2010.

Minority Populations

In 2010, 55 percent of the population in the study area block groups was minority, and 86 block groups exceed the 50 percent minority criteria (see Table 4-46).

Low Income Populations

According to data from the U.S. Census Bureau American Community Survey 2006-2010 Five-Year Average, 10 percent of the study area households are below the poverty level. Twenty-nine census block groups meet or exceed the 16 percent low-income criteria.

4.19.4 Public Involvement

MTA has implemented a robust outreach program, with an emphasis on meaningful exchange with minority and low-income populations. The engagement of local residents, business owners, and other stakeholders began with scoping in 2003 and continues to this day.

Table 4-47 presents the range of outreach activities that has occurred. MTA developed a public outreach strategy that created meaningful opportunities for public engagement for all members of the community, including members of the EJ population. MTA also monitored its public outreach effectiveness in EJ communities and made additional efforts in EJ communities when it was not achieving comparable engagement of EJ populations. Participation of low income and minority populations in the Purple Line decision-making process began as early as 2005 and has been advanced through:

- Expanded outreach to environmental justice communities to encourage attendance at, and participation in project meetings and open houses.
- Translation of outreach materials into Spanish
- Flyers hand delivered to homes in EJ neighborhoods for community meetings with low attendance.
- Direct mailing inviting residents in EJ neighborhoods to Community Focus Groups where neighborhoods were not being represented (Community Focus groups were typically composed of representatives of community associations, but where there was low participation, MTA reached out to invite local residents directly).
- Invitations to Community Focus Groups sent to leaders of local houses of worship in EJ neighborhoods.
- Meetings with city and county agency staff, local elected officials, and community leaders to identify leaders of local communities, particularly those traditionally under-represented in the civic process. The groups identified included Action Langley Park, Impact Silver Spring, Puente Inc., and CASA de Maryland.
- Other community representatives identified and invited to participate in the Community Focus Group meetings were:
 - Prince George's County Latino Affairs Liaison
 - Montgomery County Department of Housing & Community Affairs
 - Montgomery County Business Development Specialist

Figure 4.22 Environmental Justice Populations within Study Area by Block Group

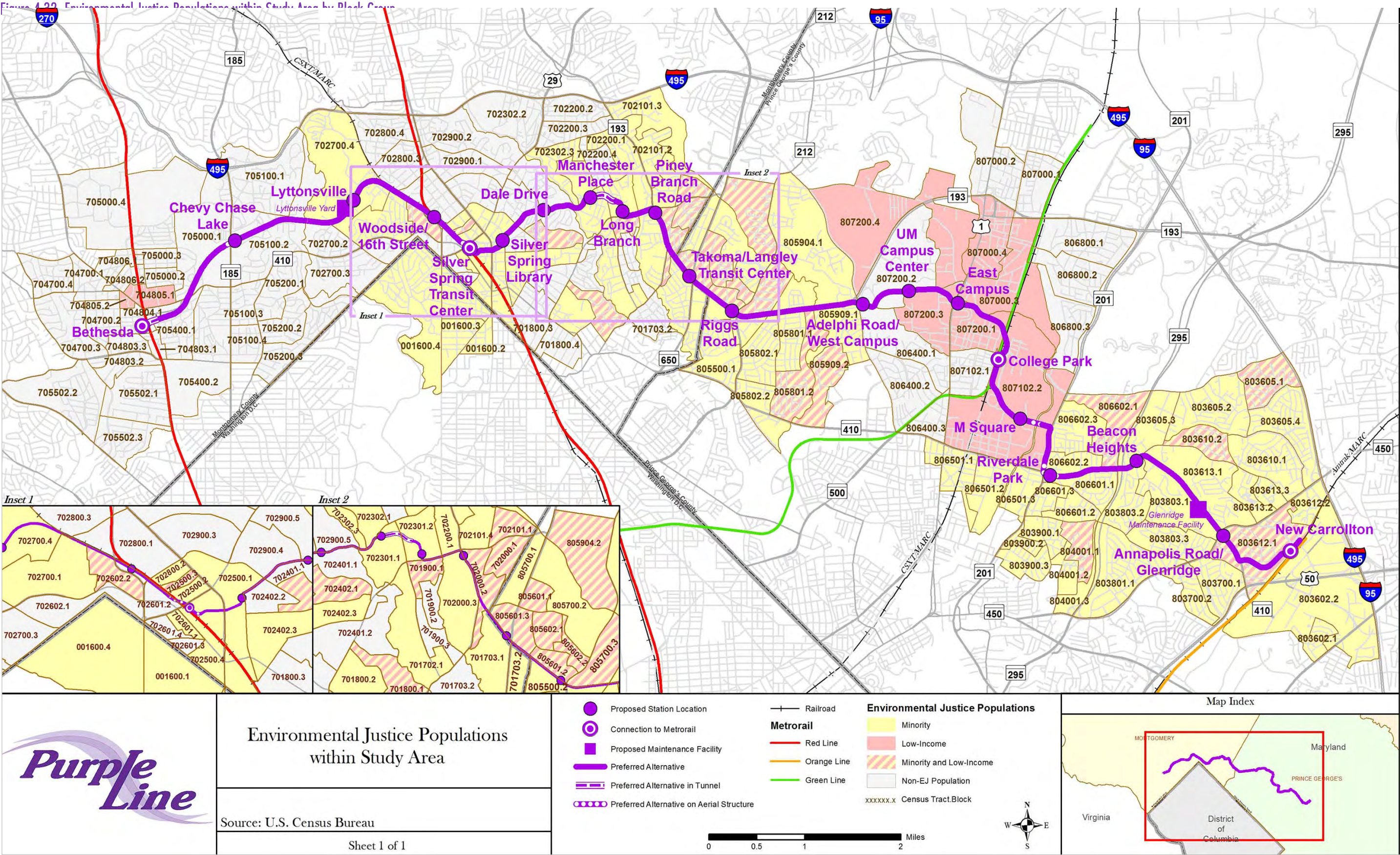


Table 4-47: Community Outreach Techniques and Objectives

Outreach Techniques	Time Frame	Objectives
MTA held 7 rounds of corridor-wide open houses for a total of 32. The format of these was a self-paced review of project information, with project staff available to discuss the plans and answer questions.	2003-2013	These meetings covered the entire project corridor and provided the public the opportunity to discuss proposed plans and provide input on issue they cared about. Comments were collected. The early meetings were general discussions about the purpose and need for the project, and supported the identification of appropriate project definition and markets.
Community Focus Groups — these meetings covered areas about 2 miles long and were generally focused on a comparison of the alternatives. Thirty-five of these meetings were held.	2005-2008	The goal of these meetings was to meet with representatives of local communities to learn about local conditions, transportation needs, community concerns and thoughts about the alternatives, and comparison of the alternatives under consideration. This was during the alternatives development phase of the project and these meetings were influential in shaping the development of the alternatives, and occasionally resulted in the proposal of new alternatives.
Neighborhood Work Groups — MTA held 32 of these meetings with local communities. These meeting were focused on station areas and issues of local concern.	2011-2013	These small group meetings were held after the identification of the Locally Preferred Alternative and were used for finer grained discussion of neighborhood level issues. Community members met with project planners and engineers to discuss what was proposed or what they desired in their neighborhood. Station access was the focus of many of these meetings.
MTA attended over 113 meetings with local community and civic associations.	2003-2013	These meetings were generally at the invitation of the local community, although on occasion MTA initiated the meetings. They were generally discussions of topics of local concern. In some cases these meetings precipitated design modifications to address community concerns. In Lyttonsville the relocation of the Yard and the reprogramming of the two yard and maintenance facilities was the result of community meetings where local residents expressed dissatisfaction with the proposed plans. Some of these meetings were with community advocacy groups to expand project outreach to traditionally underrepresented groups such as recent immigrants and renters.
MTA has met with local business groups, chambers of commerce, CDCs and other business advocacy groups in the corridor 51 times.	2003-2013	These meetings will support the future Business Impact Mitigation Plan by developing relationships with local business groups, engaging them in the project, and listening to business concerns.
MTA has met with special interest and project advocacy groups 64 times since 2003.	2003-2013	MTA provided project briefings, and updates.
In 2010 MTA began a General Information program, hosting a booth at events such as community fairs and farmers markets, etc.). Over 80 events have been attended.	2010-2013	The goal of this effort was to provide general information about the project, invite people to sign up for the mailing list, and solicit comments on the project. One of the challenges of a transportation project is reaching people who have not been engaged. These events, which have been focused in EJ communities, are part of MTA's on-going efforts to engage EJ communities.
In 2012 MTA began focused door-to-door outreach to local businesses. Over 1050 businesses have been spoken to about the project.	2012-2013	This effort is the first formal step in the business impact mitigation effort. MTA has begun a discussion with the local businesses about potential impacts and benefits for the project. These contacts will be further developed as MTA prepares the Business Impact Mitigation Plan.
MTA has met with principals and PTSA representatives of local public schools in the corridor 10 times.	2003-2013	The proposed Purple Line would operate near a number of schools in the corridor. MTA has worked closely with the schools in proximity to the alignment to discuss the plans and issues of concern such as safety. In a number of locations plans have been modified in response to input from the local schools.
After publication of the AA/DEIS in 2008 MTA held public hearings and a 90-day public comment period.	2008-2009	Stakeholders submitted over 3,300 comments to MTA on the project. For a summary of the comments, and MTA's responses see Appendix A. Decision-makers and MTA gained an understanding of the issues important to stakeholders.
Throughout project planning and engineering MTA has communicated project information though number of channels <ul style="list-style-type: none">Twelve issues of the project newsletter have been published and sent to a mailing list of 66,000 people and businesses.Project websiteMTA has launched both Facebook and Twitter to further broaden the outreach efforts of the project.Project literature — brochures and fact sheets (translated into Spanish)MTA has two dedicated phone numbers for the public, one in English and another in Spanish.	2003-2013	The project newsletter (also in Spanish) is intended to educate the public about the project and upcoming public involvement opportunities. MTA has used to project website (fully translated into Spanish) to engage and inform stakeholders. Members of the public regularly submit questions and comments to the website which are all answered personally. The project phone lines are generally used by the public to ask questions about the project.
Correspondence with the public	2003-2013	MTA has responded to over 500 letters about the project with personalized letters.

The Purple Line corridor contains a large Spanish-speaking population. MTA was concerned that this community of non-English speakers would not be engaged in the public participation process, and early outreach efforts validated this concern. For that reason, MTA engaged two full-time Spanish-speaking outreach staff and collaborated with advocacy groups in the area such as CASA de Maryland and Impact Silver Spring. The project website, newsletters, and flyers are fully translated into Spanish, and MTA maintains a dedicated telephone line for Spanish-language calls.

To engage those who reside in apartments, MTA has worked with Impact Silver Spring to participate in targeted meetings with residents of large apartment complexes. Impact Silver Spring had also helped with outreach to other, smaller groups, such as Ethiopian and Vietnamese immigrants, for example, Impact Silver Spring hosted community meetings on the Purple Line and provided translation services. Many of the general outreach efforts, such as attendance at community fairs and festivals, have been aimed at engaging these communities.

Another major outreach initiative to engage and solicit information and concerns of the minority community is the multi-phase Purple Line business outreach program. Throughout the project's development, Purple Line project team members have met with over 1000 business owners in the project corridor, including independent, minority-owned businesses in EJ areas. The Purple Line's business outreach staff includes Spanish-speaking individuals to establish effective communications with those business owners, managers, and workers who do not speak English or have limited English proficiency.

This first phase of the business outreach program was aimed at educating the owners of businesses located within the Purple Line corridor about the project, with the intent to engage the owners in the project's planning and design process. In addition, a database has been created of contact information of

the business owners and managers for use in future outreach efforts. The businesses were asked to fill out a short questionnaire. A report on this effort is included in the *Purple Line Social Effects and Land Use Planning Technical Report (2013)*. Subsequent phases of the program will focus on small business group meetings to address potential construction stage effects; development of a forum to promote available local, state, and federal business assistance programs; and the creation of a mitigation plan to address local business disruptions during construction.

Many community members and business owners have expressed concern that existing businesses would be disrupted during construction of the Purple Line, particularly small, independent, minority-owned businesses, and that the project would lead to redevelopment and rising land values. The Purple Line team will continue to work collaboratively with business owners to address their concerns. Concerns and issues raised by community members throughout this outreach program have been considered carefully in the development of the Preferred Alternative and potential mitigation strategies. Public outreach activities are described in detail in Chapter 8.0.

Table 4-48 summarizes some of the major concerns in the EJ communities and the actions that MTA has taken to address them and documents the coordination with local communities.

4.19.5 Preferred Alternative

The Preferred Alternative is expected to be constructed and in service by 2020. This section identifies long-term operational effects of the Preferred Alternative.

The Preferred Alternative was developed over a long period of time in conjunction with an extensive public involvement program. From the earliest conceptual design phase of the project, the alignments under study were shaped by MTA discussions with the public and incorporated efforts to avoid or minimize impacts.

Table 4-48: EJ Community Concerns and MTA Actions and Responses

EJ Community	Major Issues/Concerns	MTA Actions and Responses
Lyttonsville	<ul style="list-style-type: none"> Proximity of residential community to maintenance facility Expansion of facility Commercial displacements Concerns about potential adverse impacts of maintenance facility (noise, visual) 	<ul style="list-style-type: none"> Multiple community meetings including a community “walk-through” MTA’s proposed resolution accepted by the community in March 2012 Relocation of yard west of Lyttonsville Place (maintains most of the commercial properties, and is moved farther from residential areas) Reduction in size of facility Reprogramming of yard sites to make Lyttonsville a storage and light maintenance facility, and Glenridge a heavy maintenance facility. This action reduced the size of the facility so that it could fit west of the Lyttonsville Bridge as the community desired. Community members preferred the storage facility to the heavy maintenance facility.
Bonifant Street	<ul style="list-style-type: none"> Impacts to small businesses <ul style="list-style-type: none"> construction loss of on-street parking loss of loading zones conversion of two-lane roadway to one-lane 	<ul style="list-style-type: none"> Multiple community meetings with local businesses and county, ongoing Community input on which way to make the street one-way Coordination with county to identify opportunities for additional local short-term parking Added loading zones
Woodside Station area	<ul style="list-style-type: none"> Displacement of shopping center — owner is not minority, but some business owners (the center’s tenants) are minority 	<ul style="list-style-type: none"> Multiple community meetings Coordination with property owner Outreach to commercial tenants to explain relocation process Located station to maximize redevelopment potential of site
University Boulevard—Takoma/Langley	<ul style="list-style-type: none"> Business—construction impacts Business displacements Property value increases (rents) Potential reduction in availability of affordable housing 	<ul style="list-style-type: none"> Multiple community meetings with local residents, business groups (Langley Park Businesses, CASA de Maryland’s Fair Development Coalition, Takoma Langley Crossroads Development Authority) Targeted outreach to business and Hispanic community Business Impact (construction) Mitigation Plan Engagement with local elected officials and agencies to encourage development of affordable housing policies Coordinated with SHA and the County to reduce the width of University Boulevard to minimize impacts and reduce displacements
Kenilworth Avenue—Town of Riverdale Park	<ul style="list-style-type: none"> Business displacements due to proposed widening of Kenilworth Avenue Residential and commercial access changes due to alignment location Design of aerial structure Residential displacements 	<ul style="list-style-type: none"> Multiple community meetings in 2011 (CKAR — Central Kenilworth Avenue Revitalization and the Riverdale Park Business Association) Targeted outreach to impacted residents and businesses Coordination with the Town of Riverdale Park Coordination with SHA and Prince George’s County to minimize future roadway widening and shift alignment to median. These changes reduce displacements and minimized access changes. New plans addressing community concerns accepted by the community in April 2012

An example of this is the decision to operate the Preferred Alternative in mixed traffic lanes on Wayne Avenue. The neighborhoods on the south side of Wayne Avenue are EJ areas. Earlier plans for dedicated lanes would have required extensive widening of the roadway into the front yards of local residents. After hearing community opposition to the roadway widening, MTA considered how best to minimize impacts to the community. MTA conducted a traffic analysis that demonstrated that the delays on Wayne Avenue are caused by vehicles waiting to make left turns. By adding left turn lanes at the signalized intersections, the traffic conditions on Wayne Avenue in 2040 would actually improve, even with the mixed-use Purple Line operations. MTA met with local residents many times as these plans were being developed, in 2008 alone, MTA met with local community members more than 20 times.

These types of design decisions have been made by MTA throughout the project, so that often the avoidance and minimization of impacts is integrated into the Preferred Alternative. Most of these design decisions occurred in EJ communities.

On University Boulevard the proposed addition of two transit lanes to the existing six-lane roadway would have resulted in a number of impacts to the adjacent EJ community; including business impacts from displacements and loss of parking, as well as degradation of the pedestrian environment from the standpoints of safety, walkability, and aesthetics. In response to community concerns, MTA worked with the counties and the State Highway Administration to agree on replacing two of the traffic lanes with the transitway, reducing the required widening, allowing room for pedestrian and streetscape enhancements and minimizing business displacements, access issues, and parking loss.

The shift in the alignment on Kenilworth Avenue, described in detail in Section 2.2.2, from the side to the center of the roadway, and the modification of the alignment on Kenilworth Avenue was the direct result of outreach with this EJ community and a commitment by MTA to minimize impacts in the community.

Long-term Effects

The Preferred Alternative would bring benefits to the communities it serves, most of which are EJ areas. EJ populations within the study area would also experience some adverse effects from implementation of the Preferred Alternative. However, if the Preferred Alternative were moved outside of the EJ areas to avoid the adverse impacts, those communities would be deprived of the benefits. The extent of the adverse impacts must therefore be weighed against the benefits. MTA has endeavored to avoid and minimize adverse impacts wherever possible. When further avoidance and minimization are not reasonably feasible, MTA is committed to applying mitigation measures equally through the corridor. The sections below discuss impacts by resource type. Also in each section is a discussion of avoidance, minimization and mitigation measures that have been included in the project.

Both the Lyttonsville Yard and the Glenridge Maintenance Facility would be located in EJ areas. Multiple sites were evaluated during the alternatives analysis process to determine the most suitable locations. These sites were analyzed based on size, availability, existing land use, lack of constraints to development, and distance from existing residences. All potential yard and maintenance facility sites were located in EJ neighborhoods because the only non-EJ neighborhood in the corridor did not contain large, contiguous parcels of suitable land adjacent to the transitway. The cost of the necessary infrastructure (rails, overhead wires, traction power substations) dictates that the maintenance facility be built adjacent to the alignment.

Sites in the Lyttonsville and Beacon Heights/Glenridge neighborhoods were selected for yard and maintenance facilities as these alternatives met the site criteria described above, without substantial impacts on residential communities or environmental resources. Other potential yard and maintenance facility sites were eliminated from consideration due to parcel size; challenging terrain such as steep grades, forested lands, streams and wetlands; and proximity to historic properties (See *Supporting Documentation for Alternatives Development 2013* for the Lyttonsville Yard sites

analysis and Chapter 6.0 for a discussion of the Prince George's county sites considered). Both the Lyttonsville Yard and the Glenridge Maintenance Facility have been planned and designed in close coordination with neighborhood stakeholders and county officials to address community concerns and minimize adverse effects on residents. See Section 2.2.2 and Section 6.4.1 Glenridge Community Park for further discussion of coordination with local stakeholders.

Public Transportation

Residents in the corridor are heavily reliant on transit; the Preferred Alternative would provide a new east-west LRT service between Bethesda and New Carrollton, with more reliable, more frequent, and higher capacity service for transit riders. It would travel in dedicated or exclusive transit lanes for 13.9 miles of its 16.2-mile length, allowing the Purple Line to operate more reliably than the No Build Alternative bus services. In 2040, the end-to-end travel time for the Preferred Alternative would be 63 minutes, while the bus travel time for No Build Alternative would be 108 minutes, demonstrating that the Preferred Alternative would provide faster transit service.

In addition to the travel time-savings, improved transit service in the corridor would provide improved access to employment, educational, recreational, shopping, and cultural opportunities; and, due to improved access, a larger customer market for businesses near station areas. The Preferred Alternative would connect communities to the Red, Green, and Orange lines of the Metrorail system, all three MARC commuter rail lines and Amtrak's Northeast Corridor at the New Carrollton

Station. These connections would improve transit access between corridor neighborhoods and other parts of the region.

While all populations within the project's service area would realize these benefits to the same extent, they would accrue to a higher degree to minority and low-income populations due to their higher reliance on transit. Having a station in one's neighborhood provides access and mobility improvements; and 18 of the 21 proposed Purple Line stations are in EJ areas. Ridership analysis of the Preferred Alternative (Table 4-49) indicates that the largest percentage increase in transit ridership would come from EJ areas (e.g., Takoma/Langley, College Park, Riverdale, and New Carrollton); the proposed transit services would thus accommodate minority and low-income populations, and those populations that are reliant on transit. For a more detailed discussion of the transit effects of the Preferred Alternative, see Chapter 3.0.

Roadways

The Preferred Alternative is expected to divert some traffic from the arterial roadways on which the Preferred Alternative would operate onto local streets, and alter property access and circulation. Access to some properties and from some sides streets would be converted to right in, right out only where the Preferred Alternative is operating in dedicated lanes in the median of the roadway, in EJ areas this occurs on Piney Branch Road, University Boulevard, and Kenilworth Avenue. On Piney Branch Road provision for U-turns will be made at appropriate locations for traffic needing to make left turns. On Kenilworth Avenue, Quesada Road will be realigned to connect to a full signalized

Table 4-49. Ridership Projections

Measure	Area						
	Bethesda	Connecticut Ave/ Lyttonsville	Silver Spring	Takoma/ Langley	College Park	Riverdale	New Carrollton
Produced Transit Trips (percent increase under the Preferred Alternative compared to the No-Build in 2040)	16%	33%	35%	48%	51%	93%	69%

Note: The seven areas indicated above are based on MWCOC Traffic Analysis Zones. They do not correspond exactly to the Purple Line neighborhoods as defined in this FEIS, but rather to larger segments of the Purple Line corridor.

Source: *Purple Line Travel Forecasts Results Report (2013)*.

intersection at Rittenhouse Street for traffic coming to or from the neighborhoods on the west side of Kenilworth Avenue. Where the Preferred Alternative is on the side of a roadway, access to some parcels in EJ areas will be eliminated from that roadways (Riverdale Road, Arliss Street) and new entrances will be provided by MTA. On Kenilworth Avenue and Riverdale Road impacts to the roadway network will be minimized by a number of traffic improvements consisting of the addition of some new left turn lanes and traffic signals, as well as the adjustment of traffic signal phases and timing. Roadway and intersection improvements would be made throughout the corridor as part of the Preferred Alternative. These include re-aligning intersections, and adding or lengthening turn lanes. The roadway changes would result in localized improvements to vehicular traffic operations. Improvements in EJ areas include the following:

- The addition of left turn lanes along Wayne Avenue at Cedar Street, and Manchester Road. The addition of dedicated left turn lanes at these key intersections and a left turn phase as part of the signal would improve traffic operations and further promote safety along the corridor.
- The re-alignment of Mustang Drive to connect to Riverdale Road directly across from 62nd Place. Eliminating the current “split” signal would improve traffic operations and facilitate safer pedestrian crossings.
- The addition of a dedicated left turn lane on westbound Riverdale Road at 67th Avenue. This would provide full-time, protected access to the Beacon Heights community.

Level of Service

Where a new transit system runs on or intersects at grade with existing roads, traffic impacts can occur. The positive effects of the Preferred Alternative on roadway and intersection traffic level of service would be the result of adding through and turning lanes, possibly adding traffic signals to control traffic flow, and adjusting traffic signal phases and timing to optimize intersection operations. (See Chapter 3.0 for a more detailed discussion of the level of service effects of the Preferred Alternative.)

Analysis of the long-term traffic effects on intersections where traffic would interact with the Purple Line for the year 2040 Preferred Alternative forecasted that the number of failing intersections would be reduced from 18 under the No Build to 15 under the Preferred Alternative. Conditions would be improved at thirteen intersections in, or bordering, EJ communities. The roadways with the greatest improvements over the No Build conditions are seen in the following EJ areas:

- University Boulevard
- Paint Branch Parkway
- River Road

Pedestrian and Bicycle Facilities

Light rail transit is typically compatible with pedestrian environments and is often used in areas of heavy pedestrian activity. This is due to the fact that light rail is powered by an overhead wire system rather than an electrified third rail and that the tracks can be embedded in a street or paving so that they can be easily crossed. Where light rail operates in roadways it adheres to existing traffic signals and speed limits.

Overall, there would be an improvement in pedestrian and bicycle connections and access. Throughout the corridor the Preferred Alternative includes the following:

- Additional sidewalks or crosswalks in station areas, where needed to support safe station access
- Sidewalks along both sides of new and reconstructed roadways
- Bicycle racks at stations, where space allows

The Preferred Alternative includes the following location-specific changes to bicycle and pedestrian facilities in EJ areas:

- Accommodates extension of the Montgomery County Green Trail along Wayne Avenue. The Green Trail is not part of the Purple Line and would be funded separately by Montgomery County, but likely would be built with the Purple Line.
- New signalized pedestrian crosswalks across 16th Street, Wayne Avenue, Arliss Street, Piney Branch Road, University Boulevard, Campus Drive, and River Road

- Wider outside roadway travel lanes to accommodate bicycles on Piney Branch Road, University Boulevard, and Kenilworth Avenue, and a 5-foot wide bicycle lane on the eastbound side of Veterans Parkway, separated from the traffic lane by striping
- Wider sidewalks and crosswalks, pedestrian plazas, and refuges along University Boulevard where needed and where reasonably feasible,
- Construction of a new bikeway across the UMD campus
- Portions of the Capital Crescent Trail are in EJ communities. The eastern 4.3 miles of the Capital Crescent Trail from Bethesda to Silver Spring would be constructed and paved, replacing the existing Georgetown Branch Interim Trail between Bethesda and Stewart Avenue, providing a permanent trail, separate from the roadways, from Stewart Avenue into downtown Silver Spring.¹⁵ See Section 2.3.2 for more detail.

Parking Facilities

The effects of the Preferred Alternative on parking are described below. See Chapter 3.0 for a more detailed discussion of the effects of the Preferred Alternative on parking.

- **On-Street Parking**—On-street parking impacts would primarily be in EJ areas. Most impacts would occur on University Boulevard in the Takoma/Langley area and in Lewisdale. Other areas experiencing on-street parking impacts would be Bonifant Street in Silver Spring, Arliss Street in Long Branch, and on the University of Maryland campus.
- **Non-Residential Parking Lots**—The majority of permanent impacts to non-residential parking lots in the Purple Line corridor would occur on the University of Maryland campus and in EJ areas at shopping centers with

parking lots adjacent to the roadways planned for widening as part of the Preferred Alternative. Apart from the university campus, most impacts to non-residential parking would occur to businesses located along University Boulevard in Langley Park and Takoma Park. In Langley Park, 124 spaces would be removed, and in Takoma Park, approximately 107 spaces would be removed.

- **Residential Parking Lots**—All residential parking lot impacts of the Preferred Alternative would occur in EJ areas. The most spaces would be removed at the Falkland Chase apartments in Silver Spring (43 spaces). Other residential parking impacts would involve minor impacts to apartment complex parking areas.

The loss of parking is largely the result of the location of the transitway in existing roadways. The loss of parking has been accepted as a tradeoff because replacing the parking would have required further widening of the roadways and would have resulted in greater impacts to private property, including residential and commercial displacements.

MTA continues to work with specific communities and business areas to address parking impact concerns. While it is anticipated that most ridership will be “walk-up” or by transfer from bus or Metrorail, if parking problems result from a specific station location, MTA will work with the community and county to identify the appropriate measure to address the issue. Both counties include provisions to implement residential parking permit programs. Potential measures can include time restrictions, which would allow local parking for businesses but eliminate all-day commuter parking. Mitigation of permanent parking loss is not proposed in lots where the current parking is underutilized and remaining parking capacity exceeds parking utilization. See Section 3.4 for a detailed description of the parking impacts.

Neighborhood Quality and Cohesion

As discussed in Section 4.3, community cohesion refers to the quantity and quality of interactions among people in a community. Linear transportation facilities can sometimes act as barriers, affecting the ease with which neighbors socialize,

¹⁵ The Preferred Alternative assumes that the permanent Capital Crescent Trail between Talbot Avenue and Silver Spring would be located in CSXT right-of-way in accordance with the County’s land use plan. The completion of the trail in the CSXT corridor is contingent on agreement between the County and CSXT on the use of its property on the north side of the CSXT tracks for the trail. If agreement is not reached by the time the Purple Line construction occurs, MTA would construct the trail from Bethesda to Talbot Avenue. From Talbot Avenue to Silver Spring, an interim signed bike route on local streets would be used.

recreate, and shop. However, light rail is very compatible with pedestrian environments, precisely because it does not act as a barrier. Where roadways currently create a barrier, if they are wide or traffic operates at high speeds the addition of light rail will not cause a change. University Boulevard is such a road, being both wide and heavily used, often at high speeds, while at the same time being an area of high pedestrian activity. Original plans for the Preferred Alternative required widening of the roadway to preserve the existing six lanes for road traffic, while also providing two lanes for the transitway; this design would have exacerbated the barrier effect of this roadway. MTA worked with the counties and the State Highway Administration to agree on replacing two of the traffic lanes with the transitway. As a result MTA will reduce the proposed roadway to four lanes and transitway and provide room for pedestrian enhancements and landscaping. This has minimized the impact of the project, and provided enhancement to the neighborhoods on either side of University Boulevard.

The Preferred Alternative would not have an adverse impact on neighborhood or community cohesion. The Preferred Alternative would not result in a major change in community cohesion or neighborhood quality as it would operate in or adjacent to existing roadways along most of its alignment. As today, pedestrians would cross at pedestrian cross walks. It would improve transit accessibility and mobility, which would in turn encourage more pedestrian and bicycle travel. The Preferred Alternative would further encourage pedestrian and bicycle connectivity with its improvements to intersections, crosswalks, and other bicycle and pedestrian facilities.

As part of the Preferred Alternative, stations have been planned to encourage redevelopment around station areas in an effort to create a sense of place in local neighborhoods. No effects to EJ areas are anticipated. For a more detailed discussion of the effects of the Preferred Alternative on neighborhoods, see Section 4.3.

Neighborhoods and Community Facilities

Human Health

The Preferred Alternative would provide the opportunity to improve the overall health of the users of the Purple Line corridor in the following ways:

- Improvements and extensions of the trail system, leading to increased physical activity and the use of active transportation modes for some trips.
- The safety (crash reduction) improvements resulting from the general upgrade of pedestrian and bicycle facilities that would be implemented in conjunction with the Purple Line.

While these benefits are not easily measureable on an individual level, expanded opportunities for recreation and alternate modes for users of the Purple Line, and upgraded safety measures all provide the opportunity for a healthier lifestyle. Considered in the context of the proposed higher-density, pedestrian-oriented development planned for several station areas and the improved transit system, the opportunities for additional pedestrian and bicycle trips, as well as better access to employment, healthcare, and community facilities, all point to an overall improvement in human health. These benefits would accrue to communities throughout the corridor, including EJ areas.

Community Facilities

As discussed in Section 4.3, modifications to existing access to community facilities would be necessary, which would result in minimal increases in travel time for patrons of the facilities. The addition of the transitway would affect nine facilities. One facility would be displaced, one would have its driveway rebuilt, and partial acquisitions of property would be required at seven facilities. Six of the nine, or 67 percent of the permanent effects to community facilities and services would occur in EJ areas (see Table 4-50). This is commensurate with the percentage of block groups identified as EJ areas (69 percent). The effects are expected to be minimal and would be

mitigated (see Section 4.3 for details of the minimization and mitigation).

Mitigation measures determined for specific community facilities in EJ areas are listed below:

- **Chillum-Adelphi Fire Company #34**—The Purple Line Fire Life/Safety & Security Committee would continue to meet to identify and resolve issues arising from construction and operation.
- **First Korean Presbyterian Church**—MTA will work to negotiate just compensation or mitigation for property impacts.
- **Rosemary Hills Elementary School, and Silver Spring International Middle School**—Coordination to minimize disruptions by phasing construction in summer when school is not in session, to the extent reasonably feasible.

Property Acquisition and Displacements

As shown in Table 4-51, there would be 53 residential displacements as a result of the Preferred Alternative. Forty-one of these displacements (77 percent) would be in EJ areas. The residents along Riverdale Road associated with 22 of the displacements supported the shift in the alignment which resulted in full rather than partial property acquisition. See Sections 2.2.2 and 4.4.3 for documentation of the coordination conducted in neighborhoods along Riverdale Road.

There would be 60 commercial business displacements as a result of the Preferred Alternative, 35 of which (58 percent) would occur in EJ areas. This is not disproportionate as 69 percent of the block groups in the Purple Line corridor are EJ areas. As described in Section 4.4, all activities related to property acquisition and displacements will be conducted in conformance to the Uniform Relocation and Real Property Acquisitions Policies Act of 1970 and the Real Property Article of the Annotated Code of Maryland.

MTA has initiated relocation interviews with potentially displaced residents and businesses.

Displaced persons and businesses within the area needed for the project may be eligible for benefits under MTA's Relocation Assistance Program. Benefits could include advisory services, moving and reestablishment costs, and other payments and services as provided by law.

Economic Activity

The Preferred Alternative would be expected to have long-term positive effects to the economy within the station areas by creating area jobs, increasing available area housing, and improving mobility and accessibility for commuters. These benefits would apply to all area residents, including environmental justice populations.

Surrounding communities would likely see an increase in employment opportunities due to a greater number of commercial and residential businesses that are planned along the corridor. This should result in positive economic gains in the form of increased wages and spending (see Section 4.5). The additional transportation capacity would create competitive advantages for both existing and future businesses located in the corridor (see Chapter 7.0).

Prince George's County is currently completing the Purple Line TOD Study which identifies development concepts and implementation strategies to maximize the TOD potential and accessibility of five planned Purple Line stations:

- Beacon Heights (Riverdale Road)
- Riverdale Park
- M Square (River Road)
- College Park-UMD
- Adelphi Road/West Campus (University Hills)

These five stations are all in EJ areas.

Many of the commercial areas of the corridor are in EJ areas, and these areas will benefit from the Preferred Alternative.

The Preferred Alternative would improve access for study area residents to jobs and educational opportunities. This benefit is particularly important for the transit-dependent populations.

Table 4-50. Distribution of Community Facility Impacts

Neighborhood	Census Tract	Block Group	Community Facility	Long-term Effects (2040)	EJ Block Group
Silver Spring	702601	2	Silver Spring Post Office	The facility would be displaced.	No
	702900	5	Silver Spring International Middle School	Partial acquisition of property would be required due to the widening of Wayne Avenue. The driveway would be shifted approximately 400 feet east on Wayne Avenue to accommodate the Dale Drive station, and the parking lot would be reconfigured.	No
Long Branch	702301	2	Long Branch Library	Partial acquisition of property would be required in order to reconfigure the roadway in front of this library. Additionally, since a dedicated left-turn lane is not feasible, the driveway would be converted to right-in/right-out only. The pedestrian entrance on Walden Avenue would also be modified.	Yes
College Park	806400	1	University Baptist Church	The driveway entrance to the church would be moved to a new signal at Presidential Drive.	No
Riverdale	807102	2	Niels Bohr Library	Partial acquisition of property would be required. Sidewalk access directly to River Road would be removed. Access from River Road to Physics Ellipse Drive would be shifted approximately 1,000 feet west.	Yes
			First Korean Presbyterian Church	Partial acquisition of property would be required, removing approximately 10 parking spaces and the building's vestibule.	Yes
	806601	1	St. Bernard School	Partial acquisition of property would be required. Due to changes in grade, the secondary access to the school would require permanent modifications. Pedestrian access would also be affected.	Yes
			St. Bernard Church	Partial acquisition of property would be required. Due to changes in grade, pedestrian access would be affected.	Yes
			Refreshing Spring Church of God in Christ	Partial acquisition of undeveloped property (no impact on existing religious facility) would be required.	Yes

Sources: M-NCPPC Montgomery County Planning Department, Montgomery County GIS, and M-NCPPC Prince George's County Planning Department Information Management Division.

Table 4-51. Distribution of Residential and Commercial Displacements

Neighborhood	Census Tract	Block Group	Number of Residential Unit Displacements	Number of Commercial Business Displacements	EJ Block Group
Bethesda	704804	1	0	3	No
Rock Creek/Lyttonsville/Rosemary Hills	702700	1	1	0	Yes
		4	0	1	Yes
Silver Spring	702500	4	0	17	Yes
	702601	2	12	22	No
Long Branch	702301	1	12	0	Yes
		2	1	1	Yes
Takoma Park	702000	2	0	5	Yes
		3	4	0	Yes
Langley Park	805700	3	0	3	Yes
Riverdale	806601	1	22	2	Yes
	807102	2	0	3	Yes
Glenridge/Beacon Heights	803803	1	1	0	Yes
		2	0	2	Yes
West Lanham Hills	803612	1	0	1	Yes

Visual Resources

Section 4.9 identified 10 VAUs within the corridor, based on cohesiveness of land use and development patterns. The visual effects to these units were evaluated. Three of the VAUs were identified as experiencing high visual effects. Of these, two include EJ populations:

- **VAU 4: Wayne Avenue to Western Plymouth Street Tunnel portal**—This VAU was identified as having moderate to high visual effects.
- **VAU 9: Kenilworth Avenue and Riverdale Park**—This area would have a range of low to high effects.

The only VAU with a uniform high effect was not in an EJ community. See Section 4.9 for a more detailed discussion of the visual effects of the Preferred Alternative.

For visual impacts, continued coordination with EJ populations and assessment of design and aesthetic treatments, including the aerial structure at Kenilworth Avenue/East West Highway, will be performed during further design development to address adverse visual impacts throughout the corridor. In addition, MTA is committed to providing design treatments to reduce visual impacts at affected locations, where possible, including those in areas with EJ populations. Those treatments would be analyzed further during further design development.

MTA will use the Art-In-Transit program to enhance key elements of the project as appropriate.

Air Quality

The air quality analysis was completed to conform to the requirements of the Clean Air Act of 1990 and the Federal Transportation Conformity Rule, along with various MDE standards. VOC and NO_x were evaluated at the regional level; CO, O₃, PM₁₀ and PM_{2.5}, and MSATs were analyzed at the regional and local level. Implementation of the Preferred Alternative would slightly decrease emission of criteria pollutants for which the region is designated as non-attainment or maintenance. No long-term effects to air quality in EJ areas are anticipated. The project would comply with the conformity requirements.

Noise

The operational impacts of the Preferred Alternative were evaluated using the guidelines set forth by FTA's *Transit Noise and Vibration Assessment* and the Federal Highway Administration's (FHWA) *Noise Abatement Criteria*.

Noise impacts from the Preferred Alternative were predicted for six locations in the Purple Line corridor. Five of these are in EJ areas. As shown in Table 4-52, moderate noise impacts were predicted for seven single-family residences at three locations and four apartment buildings, including a total of approximately 140 units, at four locations. The impacts would be associated with LRT vehicles sounding their horns as they approach stations and grade crossings; for safety reasons, use of these horns could not be eliminated.

Vibration

As shown in Table 4-53, four single-family residences and one apartment building, including approximately six units, would experience vibration effects as a result of the Preferred Alternative. One of the five identified locations is in an EJ area at the Barrington apartments.

MTA will mitigate operational vibration impacts associated with the Preferred Alternative by evaluating and implementing specific materials and construction methods in the construction of the transitway, including using resilient fasteners, ballast mats, resiliently supported ties, or other vibration damping measures as deemed necessary.

Short-term Construction Effects

Construction of the Preferred Alternative would generate a variety of temporary environmental, transportation, and community impacts within the study area. Construction activities typically generate discernible levels of dust, noise, vibration, and vehicle emissions. Associated effects include temporary adjustments to vehicular and pedestrian traffic patterns and access, temporary loss or relocation of parking, temporary interruptions in utility services, and temporary visual impacts related to construction activities and stockpiling of materials and equipment. Proposed construction staging areas would be required at specific points

Table 4-52. Potential Noise Impacts of the Preferred Alternative

Neighborhood	Census Tract	Block Group	General Location	Type/Number of properties affected	EJ Block Group
Silver Spring	702500	1	Wayne Avenue at Silver Spring Library Station	Apartment building	Yes
Long Branch	702401	1	Wayne Avenue at Dale Drive Station	Single family residences	No
	702301	1	Wayne Avenue at Manchester Place Station	95 East Wayne Avenue, Apartment complex and single family residence	Yes
	702301	2	Arliss Street at Long Branch Station	Flower Branch apartment complex	Yes
Glenridge/Beacon Heights	803803	2	67th Place at Beacon Heights Station	East Pines apartment complex	Yes
West Lanham Hills	803612	1	Hanson Oaks Drive	Single family residences	Yes

Source: Purple Line Noise and Vibration Technical Reports (2013)

Table 4-53. Potential Vibration Impacts of the Preferred Alternative

Neighborhood	Census Tract	Block Group	Location	Type/Number of properties affected	EJ Block Group
Bethesda	704804	1	4230 East West Highway	2 single-family residences	No
Chevy Chase	705000	1	4110 Edgevale Court	2 single-family residences	No
Silver Spring	702602	2	1946 Rosemary Hills Drive	The Barrington apartments	Yes

Source: Purple Line Noise and Vibration Technical Reports (2013)

along the corridor, and access points would be designated for construction access.

Construction stage mitigation will include a host of best management practices to reduce socio-economic, natural resource, air, noise, and vibration effects. A special focus of construction stage mitigation measures will be to limit disruption to businesses along the corridor. Business outreach coordinators familiar with the unique needs of the EJ communities will continue to work with neighborhood businesses to establish an effective communication program. Pre-construction planning with local communities and businesses will be completed in the form of a mitigation plan to address and reduce impacts associated with temporary road closures, detours, access restrictions, and other operational issues affecting businesses during construction. Special signing, including foreign language signs where appropriate, will be implemented throughout construction to alert citizens to upcoming activities and to inform and promote access to businesses during construction. The implementation of typical construction-stage mitigation measures would reduce the overall impact of construction on local

communities. See Chapter 5.0 for a detailed description of construction activities and short-term impacts.

Additionally, non-EJ areas would experience similar short-term construction stage impacts as EJ areas, such as travel and access restrictions, dust, noise and vibration, emissions, and increased truck traffic along access and haul routes.

Public Transportation

During construction, existing bus transit routes and stop locations would be temporarily affected due to roadway lane closures, designation of alternative access routes, and other construction-related restrictions to transit operations. A Transportation Management Plan (TMP) will be developed, in concert with transit and emergency service providers, to minimize interruptions in transit service and ensure adequate emergency response during project construction. The TMP will include defined operational changes to ensure reliable transit service and a public outreach plan to inform and educate transit riders of both project progress and proposed activities that would affect access and transit operations. Impacts on transit service would be experienced throughout the corridor.

Roadways

Construction of the Preferred Alternative would result in temporary short-term impacts to local and regional transportation operations including lane closures, temporary lane and shoulder closures, detours, and disruption of traffic during peak and nonpeak times. These impacts would result throughout the study area. See Chapters 3.0 and 5.0 for a detailed description of construction activities and potential short-term impacts.

Parking Facilities

Some parking in EJ areas would be temporarily unavailable during construction of the Preferred Alternative. Several residential and non-residential parking lots would be temporarily affected during construction. Most of the temporary parking loss would be due to the need for construction staging areas. Below are the larger parking lots in EJ areas where spaces would be removed temporarily during construction. For a detailed description of the parking impacts of the Preferred Alternative, see Section 3.4.

- **Lyttonsville Yard**—This area would include the parking at the County Maintenance Lot during construction of the Lyttonsville Yard. MTA will coordinate with Montgomery County to find a temporary site during construction.
- **Silver Spring International Middle School**—The parking lot would be reconfigured resulting in temporary loss of parking during construction.
- **Wayne Manchester Towers and Kenwood House Condominiums**—Parking lots would be temporarily removed during the construction of the Plymouth Tunnel.

Neighborhoods and Community Facilities

Construction of the Preferred Alternative would temporarily affect neighborhood quality for a period of up to five years. The time to construct each project element would differ based on the type of element, site characteristics, weather, and structural design. The construction of a few elements, such as the Silver Spring Transit Center, would require the entire 5-year duration; however, other areas would require a substantially shorter time to complete. Impacts from construction would be experienced in all neighborhoods.

Property Acquisition and Displacements

Properties affected through a temporary easement would be restored to an acceptable pre-construction condition following construction activities, dependent upon individual easement agreements. If access to a facility is temporarily removed, alternate access would be provided.

Economic Activity

As described in Section 4.5 and Chapter 5.0, in selected areas of the corridor, temporary construction easements, lanes or road closures, or other property restrictions would have negative impacts to some businesses located in EJ areas, which would affect the economy within the study area. Losses of parking and difficulty accessing businesses during construction would deter customers and disrupt deliveries. Small businesses in particular would have difficulty withstanding the resulting loss of commerce.

MTA will provide appropriate mitigation to all businesses affected by the project, including businesses located in EJ communities. MTA has begun door-to-door outreach to businesses which would be affected by construction and will provide appropriate mitigation. MTA understands small, local and EJ businesses in the Purple Line corridor will require some unique efforts. To address access restrictions or detours to businesses, MTA is committed to identifying and working with local business liaisons and groups like CASA de Maryland and others to understand the characteristics of local EJ businesses (customer origins, peak business times, etc.) and to establish construction stage plans to minimize business disruptions. MTA would continue communication with local businesses including Spanish-speaking liaisons and translated written material during construction to monitor effects and modify construction plans, if possible, to further reduce impacts.

MTA will implement a Business Impact Minimization Plan. MTA will develop this plan after evaluation of best practices and lessons learned from other light rail construction projects (see Sections 8.2.2). These practices could include:

- Maintaining Spanish-speaking outreach staff
- Constructing the project in segments, to keep disruption to a small area at a time
- Maintaining access to business during construction for customers and deliveries
- Maintaining or relocating bus stops
- Maintaining parking lot access
- Providing directional signage
- Developing “Open for Business” marketing and advertising tools for use during construction, translated where appropriate
- Promotion of local businesses
- Providing a construction hotline open 24/7
- Maintaining open communication between the project outreach team and local businesses
- Maintaining communication with local support and advocacy groups

Most importantly, MTA will maintain open communication between the Purple Line public outreach team and local businesses, so businesses have no surprises and know who to call when they have questions or issues. As noted above, MTA coordination with affected commercial property owners has already started and will continue through project construction and implementation.

MTA is committed to addressing language barriers and promoting engagement of EJ communities.

MTA has reached out to the Montgomery and Prince George’s County Economic Development offices as well as the Maryland Small Business & Technology Development Center and CASA de Maryland to identify support services and resources available for small businesses. MTA will continue to coordinate with the counties on how to facilitate use of these services and resources by Purple Line corridor businesses.

The National Center for Smart Growth has recently created the Purple Line Corridor Coalition. The mission of the coalition is to engage organizations active in the Purple Line corridor, stimulate collaborative projects, and provide valuable

information to assure that investments in the Purple Line will achieve the maximum possible economic, social, and environmental benefits to the residents and businesses of the corridor. MTA is partnering with the National Center for Smart Growth in this effort.

Specifically, the Purple Line Corridor Coalition aims to:

- Stimulate economic development
- Strengthen neighborhoods
- Engage historically under-represented communities
- Support distinctive places to live, work and play
- Provide people of all backgrounds with better access to opportunities
- Establish the Purple Line corridor as a world class, multi-ethnic corridor of major research and development institutions, small business incubator, and affordable place to live

Since January 2006 MTA has met with business groups in the corridor 47 times, including the

- CASA de Maryland Fair Development Coalition
- Takoma Langley Crossroads Development Authority
- Long Branch Business League
- Silver Spring Chamber of Commerce
- Bethesda-Chevy Chase Chamber of Commerce
- Maryland Hispanic Chamber of Commerce
- Riverdale Park Business
- Central Kenilworth Avenue Revitalization
- Purple Business Alliance (now Purple Rail Alliance)
- Langley Park businesses
- Takoma Park businesses

MTA will work with Montgomery and Prince George’s counties to create opportunities for project-related local economic benefits including workforce development programs. MTA has partnered with the Maryland Department of Labor, Licensing and Regulation in the creation of a workforce development plan to identify training and certification needs in the local labor pool for the Purple Line, and to help create a local workforce ready and equipped to build and operate the Purple Line.

Air Quality

Impacts to air quality from construction would be felt by all neighborhoods.

Noise and Vibration

Noise and vibration impacts from construction would be felt by all neighborhoods.

Mitigation and Enhancement Measures

MTA will mitigate adverse effects on EJ and non-EJ populations from the Purple Line. Mitigation measures for each topic area are discussed in detail in Chapters 3.0 and 4.0.

Indirect and Cumulative Effects

The potential effects, both adverse and beneficial, that have been discussed above are all direct effects of the implementation and operation of the Purple Line. There are however, potential indirect effects that could be caused by the Purple Line, later in time or farther removed in distance, but still reasonably foreseeable. Likewise, there are cumulative effects which would be the result of incremental impacts added to other past, present, or reasonably foreseeable future actions.

In general, indirect impacts would be limited to the station areas; the spacing of stations is generally consistent along the corridor. Opportunities for redevelopment exist throughout the corridor in both EJ and Non-EJ areas, and are dependent largely on land availability, land use and the presence of supportive zoning. The Preferred Alternative would provide new economic competitiveness advantages to the EJ areas through increased transit service that would not be available under the No Build Alternative. However, potential indirect effects to EJ populations could include increased business expenses (e.g., rents) from increased property values, business migration and displacement, changes in the availability and affordability of housing stock, and changes in neighborhood character in the indirect effects study area.

Over time, additional economic and employment opportunities would be expected to capitalize on the improved accessibility and the effects of increased expenses would be offset to varying degrees through increased customer markets for local businesses.

Studies of the effect of transit on property value using sales data typically have indicated increases in residential real estate values in close proximity to stations, with a reduced influence beyond a one-half mile radius.¹⁶ This premium depends on several factors, including the design of the station, the level of ridership, local real estate market conditions, neighborhood characteristics, and adjacent land uses. These economic effects can be both a benefit and a burden. While implementation of the Purple Line may help communities effect positive economic growth, the diversity and the economic needs of the entire community must be considered.

Affordable Housing

A potential indirect effect of the Purple Line to EJ populations would be a reduction in affordable housing as a result of redevelopment of existing housing and increased commercial rents and property values. A goal of the project is to serve transit-dependent communities, many of which are low income. Land use and zoning decisions by the counties and cities in the corridor affect the stock and affordability of local housing. MTA has discussed concerns regarding the preservation of affordable and low-income housing with both Montgomery and Prince George's Counties; however, MTA has no authority over affordable housing, or any policies and programs that implement or maintain affordable housing.

The Montgomery County Moderately Priced Housing Law, in effect since 1974, has facilitated the private development of over 13,000 affordable housing units between 1976 and 2010. Montgomery County also recently enacted legislation requiring the county to include an assessment of the potential for incorporating affordable housing into county capital projects such as libraries, fire stations, recreation centers, and parking structures.

In Prince George's County a number of public assistance programs, including home and business improvement subsidies and public infrastructure

¹⁶ "Public Transportation Boosts Property Values" in *Transportation: A Toolkit for Realtors* 2nd Edition, National Association of Realtors, 2012 <http://www.realtor.org/sites/default/files/transportation-toolkit-2012-05-29.pdf>

funding, are in place in Prince George's County to address priority needs related to affordable housing, economic revitalization, and public services.

MTA will continue working with the counties and advocacy groups to support engagement of local elected officials regarding affordable housing and increased commercial rents resulting from increased property values as the project moves forward.

Cumulative effects to neighborhoods and community facilities and services would result from additional residential and commercial/employment development in the cumulative effects study area. The Preferred Alternative would play a supporting role with incremental effects compared to the larger state and county-driven planning actions. Yet, at some Purple Line station locations, such as Chevy Chase Lake, Lyttonsville, Woodside/16th Street, Long Branch, Piney Branch Road, Takoma/Langley Transit Center, Riggs Road, Adelphi/West Campus, East Campus, M Square, Riverdale Park, Beacon Heights and Annapolis Road/Glenridge, the Preferred Alternative would have a more prominent role in shaping neighborhood character. With the exception of Chevy Chase Lake, these stations are in EJ neighborhoods.

The Takoma/Langley Transit Center and the Riggs Road station would serve the Takoma Langley Crossroads area, which straddles the Montgomery County and Prince George's County boundary. The planned Takoma/Langley Transit Center and adjacent Purple Line station at the intersection of University Boulevard and New Hampshire Avenue are envisioned as the catalysts for redevelopment of the existing suburban style commercial retail uses corridor.

The planned redevelopment of the neighborhood could increase pedestrian activity and increase property values. Visually, the neighborhood would become more urban, with buildings constructed on the front property line and parking in structures or mid-block lots.

As the catalyst for implementation of these plans, the Preferred Alternative is expected to have long-term positive effects to the economy. Future development would create more jobs for local

residents and improve mobility and accessibility for commuters. Potential indirect effects to environmental justice populations include increased business expenses (e.g., rents) from increased commercial property values. These effects may be offset to varying degrees through increased customer markets for local businesses. For example, implementation of Montgomery County's Takoma Langley Crossroads Sector Plan calls for broadening local commercial and housing opportunities, thereby potentially increasing the customer markets for local businesses.

For further discussion of Indirect and Cumulative Effects, see Chapter 7.0.

4.19.6 Assessment of Potential for "Disproportionately High and Adverse Effects" on Minority and Low-Income Populations

Standards for Evaluating Effects

Disproportionately High and Adverse Effect on Minority and Low-income Populations means an adverse effect that:

- Is predominantly borne by a minority population and/or a low-income population, or
- Will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non-low-income population

Determinations of whether a project will have disproportionately high and adverse effects must take into consideration "mitigation and enhancements measures that will be taken and all offsetting benefits to the affected minority and low-income populations..." (USDOT Order, Section 8.b). The FTA Circular explains how benefits are considered in making this determination:

"...your analysis also should include consideration of offsetting benefits to the affected minority and low-income populations. This is particularly important for public transit projects because they often involve both adverse effects (such as short-term construction impacts, increases in bus traffic, etc.) and positive benefits (such as increased transpor-

tation options, improved connectivity, or overall improvement in air quality). The NEPA EJ analysis will include a review of the totality of the circumstances before determining whether there will be disproportionately high and adverse effects on EJ populations.” (see FTA Circular 4703.1, p. 46.)

Evaluation of Effects and Benefits

Adverse Effects

Sixty-nine percent of the block groups in the corridor are EJ areas, so it is to be expected that adverse effects will be experienced by EJ populations. The adverse effects of the project are distributed proportionately between EJ and non-EJ areas.

The potential direct and indirect adverse effects on EJ populations in the study corridor described in the preceding pages are listed below. Some of these are long term and others are short-term effects.

- Parking impacts
- Business property acquisitions, including some business relocations
- Residential property acquisitions
- Displacements and partial acquisitions of some community facilities
- Moderate to high visual effects
- Noise and vibration impacts during construction and operation
- Business disruption during construction
- Increasing rents for businesses
- Loss of affordable housing

Minimization and mitigation for both the direct and indirect effects have been described.

Offsetting Benefits

While these adverse effects would occur on EJ populations, the EJ populations in the corridor also benefit from the project. The following is a list of the benefits to EJ communities in the corridor:

- More reliable, more frequent, and higher capacity service for transit riders
- Improved connectivity and access to transit
- Improved mobility through the project vicinity
- Improved pedestrian and bicycle connections and access
- Faster transit service

- Improved access to employment, educational, recreational, shopping, and cultural opportunities
- Improved overall health of the users of the Purple Line with improvements and extensions of the trail system and safety improvements
- Increased employment opportunities due to a greater number of commercial and residential businesses that are planned along the corridor, which would result in positive economic gains in the form of increased wages and spending.

The key benefits of the Purple Line are improved mobility and travel time to locations along the corridor and the provision of connectivity to other transit services and systems.

Additionally, pedestrian enhancements to sidewalks, paths, and crosswalks would be constructed at various locations as part of the overall project. These enhancements would provide safer street crossings and improve access to several trails located within the corridor for pedestrians and bicyclists. Most of these proposed enhancements would be in areas that have environmental justice populations residing in those block groups.

These improvements would benefit low-income and minority areas throughout the project corridor, including transit-dependent residents of those areas. Some of the EJ areas that would be most directly affected, such as Langley Park and Long Branch would be among the principal beneficiaries of the project as these neighborhoods are not served by the Metro system, and many of the residents of these areas are transit dependent.

The Preferred Alternative is located largely within EJ communities, and thus both adverse and beneficial effects will be experienced by EJ communities. Where there are adverse impacts, MTA has committed to apply the mitigation measures equally through the project corridor.

Potential for Denial of Benefits

In an effort to assess the potential for the possible denial of benefits to environmental justice populations by the construction and operation of the proposed transit system, an analysis was completed to address location and access.

The Purple Line would provide accessibility to locations throughout the project corridor and to the Metrorail, MARC and Amtrak systems. The Purple Line station locations were selected based upon the density of residential development, activity centers, and creation of transfer points to other transit services. These locations are evenly distributed along the corridor and serve all populations, including environmental justice populations equally. Therefore, EJ populations will not be denied the benefits of the proposed Purple Line.

Full and Fair Participation

Full and fair access to meaningful involvement by low-income and minority populations in project planning and development is an important aspect of environmental justice. Ensuring full and fair access means actively seeking the input and participation from those typically under-represented groups throughout all the project stages. Residents can provide important information on community concerns, special sites, and unusual traffic, pedestrian or employment patterns in the corridor. This information can be used in the design and evaluation of alternatives, to avoid negative impacts to valued sites, and to support the development of safe, practical, and attractive transportation options that are responsive to the concerns of environmental justice communities.

Findings

Taking all of these factors into account, MTA and FTA have concluded that the Preferred Alternative as a whole would not have “disproportionately high and adverse effects” on EJ populations. Nonetheless, MTA and FTA recognize that some of the specific impacts of the Preferred Alternative may adversely affect EJ populations. Therefore, where possible, the alignment options have been refined through the NEPA process to minimize impacts to both the human and natural environment. Environmental commitments and mitigation measures identified throughout Chapters 3.0, and 4.0 of this FEIS will address impacts from LRT operations and construction activities that may affect EJ populations. MTA will mitigate adverse impacts throughout both EJ and non-EJ communities. MTA, however, will provide enhanced outreach to EJ communities, particularly Spanish-speaking communities with

limited English proficiency, to implement mitigation strategies effectively in those communities.

4.20 Commitments

This section summarizes MTA’s commitments to minimize and mitigate impacts on the natural and built environment described in Sections 4.2 through 4.19 during the design, construction, and operation of the Preferred Alternative. MTA is considering a range of procurement methods including a Public Private Partnership. MTA is responsible for implementing the commitments in this FEIS regardless of the procurement method used.

Land Use, Zoning, and Public Policy (Section 4.2)

- MTA will provide alternative access for properties that would be subject to changes in access or closures of portions of their property during construction, as necessary.

Neighborhoods and Community Facilities (Section 4.3)

- The Purple Line Fire Life/Safety & Security Committee will continue to meet prior to and during construction with emergency responders to identify and resolve issues arising from construction and operation.
- MTA will work to negotiate just compensation or mitigation to the First Korean Presbyterian Church on Kenilworth Avenue.
- MTA will construct the Glenridge Maintenance Facility at a lower grade than the existing park maintenance facility and provide a landscape buffer, as appropriate, to the adjacent park and school; MTA will install retaining walls to minimize the area of grading needed.
- MTA will coordinate with the counties to identify alternative access or temporary off-site parking for community facilities and businesses where access or parking may be temporarily removed, as appropriate.
- MTA will coordinate with UMD, Rosemary Hills Elementary School, Sligo Creek Elementary School, and Silver Spring International Middle School to minimize disruptions to the extent reasonably feasible.

- MTA will provide alternative access to community facilities if access is temporarily removed, where practical.
- MTA will build traction power substations with landscaping or appropriate architectural treatments to be compatible with adjacent land uses in areas of moderate or high visual sensitivity.

Property Acquisition and Displacements (Section 4.4)

- MTA will perform property acquisition and relocation activities in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act) as amended and FTA Circular 5010.1D, Grants Management Requirements and all applicable Maryland State laws that establish the process through which MTA may acquire real property through a negotiated purchase or through condemnation.
- For areas that would be subject to construction easements for staging or access areas, MTA will compensate owners based on fair market appraisal.
- MTA will use vacant or publicly-owned property, rather than privately-owned, developed property, for temporary construction activities to the greatest extent possible.
- MTA will restore properties affected through a temporary easement to an acceptable pre-construction condition following construction activities, in accordance with the individual easement agreements.
- MTA will provide a parking facility for both County and MTA employees in Lyttonsville.

Economics (Section 4.5)

- MTA will continue to coordinate with affected commercial property owners to identify strategies to minimize the effects of temporary construction easements, lane or road closures, and other property restrictions on existing corridor businesses.
- MTA will implement a Business Impact Minimization Plan as described in the Environmental Justice section.

Parks, Recreational Facilities, and Open Space (Section 4.6)

- MTA will include drainage improvements and water quality facilities in four stream valley parks (Sligo Creek, Long Branch, Northwest Branch, and Anacostia River), Long Branch Local Park, and New Hampshire Estates Neighborhood Park.
- MTA, through coordination with M-NCPPC, the NCPC, the NPS, and the public, will implement the following measures:
 - Expand and upgrade facilities and plant trees in Glenridge Community Park, as well as convert approximately 2 acres of land currently used for the Prince George's County Parks' Northern Area Maintenance—Glenridge Service Center either to parkland within Glenridge Community Park or to upgrade and expand athletic fields at the Glenridge Elementary School
 - Restore park properties that are disturbed as a result of construction activities to acceptable conditions through coordination with the park owners
 - Provide replacement parkland for all park impacts; the amount and location of replacement parkland will be determined by MTA in consultation with park owners
 - Coordinate selective tree clearing and identification of significant or champion trees with agencies having jurisdiction.
- MTA will continue to coordinate with the public and agencies to develop appropriate minimization strategies during construction. Efforts will include the following:
 - Roadway or sidewalk closures will be staged to maintain pedestrian and vehicular access.
 - Trail detours needed during construction will be coordinated with the agency having jurisdiction over the trail to identify and develop a plan for a temporary detour route, and the trail routes would be restored at the end of construction.
 - MTA will continue to coordinate during further design development with the agencies having jurisdiction over the

affected parks to develop additional appropriate long-term minimization and mitigation.

Built Historic Properties (Section 4.7)

- In accordance with Section 106 of the National Historic Preservation Act, MTA and the Maryland Historical Trust are preparing a Programmatic Agreement that outlines commitments and mitigations concerning historic and archeological resources under Section 106. MTA will implement the project in accordance with the Section 106 Programmatic Agreement.
- MTA will continue to plan and implement the project design elements negotiated with the Columbia Country Club and the MHT minimize impacts to the Club.
- MTA, in coordination with the M-NCPPC, will provide transitway and pedestrian structures through the Rock Creek Park that include design elements to minimize the effects of the project.
- MTA will continue to coordinate with UMD regarding the aesthetic design of the transitway.
- Minimization measures for the Baltimore-Washington Parkway, in addition to what is listed above for Parks, Recreational Facilities and Open Space (4.6), are as follows:
 - The permanent replacement bridges of the Baltimore-Washington Parkway over Riverdale Road will have a similar arch design as the existing bridge structures and would include horizontal arched shields above the transitway overhead wires.
 - The stone façade from the existing bridge abutments will be re-used on the new bridge abutments. If additional stone is required, it will come from the same source or would be selected in consultation with the NPS to match the existing stone.
 - The catenary wires will be attached to the bridges to minimize the number of poles throughout the Parkway.
 - Landscape plans for the Baltimore-Washington Parkway will be developed in accordance with the Baltimore-Washington Parkway Design

Elements-Section 2: Parkway Landscape-Recommendations, and submitted to NPS for review and approval.

- Protected resources will be identified and marked for protection in field prior to construction activities (i.e., trees, archeological sites).

Archeological Resources (Section 4.8)

- As discussed above in Parks, Recreational Facilities and Open Space (4.6), the proposed temporary bridges to carry Baltimore-Washington Parkway over Riverdale Road will be constructed between the existing ramps and the existing bridges to completely avoid the archeological site identified in the median.
- Protected resources will be identified and marked for protection in field prior to construction activities.

Visual Resources (Section 4.9)

- MTA and Montgomery County will continue to coordinate and consult on the design of the future Capital Crescent Trail to provide an aesthetically pleasing facility while meeting safety requirements and ADA requirements.
- MTA will continue to coordinate with the Columbia Country Club on the visual and aesthetic elements of the transitway.
- MTA will continue to coordinate and consult with Montgomery County and the local community regarding the aesthetic treatment of the bridge structures over Connecticut Avenue.
- MTA will continue to coordinate with M-NCPPC and the NCPC regarding the design and construction of the Rock Creek Bridges.
- MTA will continue to coordinate and consult with affected communities regarding the aesthetic treatments of the transitway elements.
- MTA will require that the construction contractor utilize best management practices to maintain an orderly appearance of active work zones and staging areas.
- MTA will use the Art-In-Transit program to enhance key elements of the project as appropriate.
- MTA will require that the construction contractors utilize best management practices

to maintain an orderly appearance of active work zones and staging areas

Air Quality (Section 4.10)

- MTA will require the construction contractor to implement dust control measures in accordance with MDE requirements and require that construction equipment complies with EPA's Tier 2 engine emission standards. Possible dust and emission control measures include the following:
 - Minimizing land disturbance
 - Constructing stabilized construction site entrances per construction standard specifications
 - Covering trucks when hauling soil, stone, and debris
 - Using water trucks or calcium chloride to minimize dust
 - Stabilizing or covering stockpiles
 - Minimization of dirt tracking by washing or cleaning trucks before leaving the construction site
 - Using ultra-low sulfur diesel fuel for diesel equipment
 - Equipping some construction equipment with emission control devices such as diesel particulate filters
 - Permanently stabilizing and seeding any remaining disturbed areas

Noise (Section 4.11)

- MTA will minimize noise resulting from Purple Line operations as follows:
 - Between Bethesda and Rock Creek Stream Valley Park, there will be a minimum four-foot noise wall or retaining wall adjacent to residential areas.
 - LRT vehicles will include vehicle skirt panels to reduce the noise caused by the vehicles on the track.
 - Public address systems at stations will have volume adjustment controls designed to maintain announcement volume at the specified noise levels, as appropriate.
 - The traction power substations will be designed in accordance with MTA design

criteria intended to minimize the noise from transformer hum.

- Possible noise minimization measures during construction will include to the extent reasonably feasible the following:
 - Conducting the majority of construction activities during the daytime, as reasonably feasible.
 - Routing construction equipment and other vehicles carrying spoil, concrete, or other materials over designated truck routes that will minimize disturbance to residents.
 - Locating stationary equipment away from residential areas within the site/staging area
 - Employing control technologies to limit excessive noise when working near residences
 - Adequately notifying the public of construction operations and schedules.

Vibration (Section 4.12)

- MTA will perform site-specific assessments of those areas identified in the FEIS as having potential vibration impacts. MTA will develop appropriate mitigation measures.
- MTA will analyze extremely vibration-sensitive buildings located within the UMD campus, as agreed upon by MTA and UMD. The study will establish criteria, and measure regarding mitigation for vibration will be specified in the MTA UMD agreement. MTA will develop appropriate mitigation measures.
- MTA will identify control measures be implemented by the contractor during construction activities to minimize the potential for vibration impacts.

Habitat and Wildlife (Section 4.13)

- MTA will prepare a Forest Conservation Plan, or similar, and will detail additional impact avoidance and minimization techniques to be applied during construction.
- MTA will comply with MDNR requirements for the final forest planting obligation.
- MTA will coordinate with the NMFS and other regulatory agencies during further design development to avoid or minimize:

- Creation of in-stream barriers that block migratory fish from upstream spawning grounds
- Alterations of stream configuration, characteristics, and hydrology
- Incremental changes to in-stream water quality from deforestation of the riparian zone
- MTA will provide a spill management plan and water quality and quantity controls for work area containment, use and storage of fuels and other potential contaminants based on current regulations and project permit conditions.
- MTA will design culverts and bridges to MDE standards to avoid or minimize secondary and cumulative impacts to migratory fish and the alteration of habitat.
- MTA will restore and stabilize temporarily disturbed aquatic habitat at the end of construction according to a location-specific restoration plan developed in coordination with the USACE and MDE permits.
- MTA will not undertake in-stream construction during state-mandated stream closure periods.
- MTA will coordinate with the MDNR during further design development to ensure that its concerns are addressed relative to the heron colony located within Coquelin Run.

Water Resources (Section 4.14)

- MTA will mitigate project impacts to Waters of the U.S., including wetlands, by complying with the Federal Compensatory Mitigation Rule (33 CFR Part 332), as well as stipulations from federal and state resource agencies.
- MTA will coordinate with the regulatory agencies to develop a project-wide compensatory mitigation strategy to offset impacts to wetlands and aquatic resources. MTA will minimize the area of disturbance to Maryland-designated wild and scenic rivers by clearly marking and fencing the work area and prohibiting activity outside the work area.
- MTA will obtain applicable environmental permits for water resources.
- MTA will submit project plans to the MDNR during further design development for evaluation in compliance with the Maryland

Scenic and Wild Rivers Act to assure that the project will not jeopardize the scenic value of the designated rivers.

- MTA will restore Sligo Creek approximately 180 feet upstream and 180 feet downstream of the project bridge to provide long-term benefits.
- MTA will perform hydraulic and hydrologic studies during further design development. If these studies find that flood elevation would change, floodplain storage mitigation may be required.
- MTA will submit project plans to MDE for approval of structural evaluations, fill volumes, proposed grading elevations, structural flood-proofing, and flood protection measures in compliance with FEMA requirements, USDOT Order 5650.2 “Floodplain Management and Protection,” and Executive Order 11988.
- MTA will obtain applicable environmental permits for water resources.

Topography, Geology, and Soils (Section 4.15)

- MTA will develop an Erosion and Sediment Control Plan, in accordance with the Stormwater Management Act of 2007, which will specify proper slope and soil stabilization techniques, erosion and sediment controls, and stormwater management facilities.

Hazardous Materials (Section 4.16)

- MTA will establish procedures and staff training for proper storage and maintenance of equipment and hazardous materials.
- MTA will develop a site-specific health and safety plan. The plan will include the following:
 - Equipment and procedures to protect the workers and general public
 - Procedures for monitoring of contaminant exposures
 - Identification of the contractor’s chain of command for health and safety
- If groundwater contamination is encountered that results in contaminated groundwater inflow after the completion of construction, MTA will obtain an NPDES permit for discharges from project sump and underdrain systems, if required.

- MTA will perform a Phase II ESA prior to acquisition of any property with a high potential for concern (sites ranked 1 or 2 in the Phase I ESA) unless the property can be classified accurately by other means or methods. MTA also will perform further records research on sites with a ranking of 4 to determine potential presence of PCBs.
- MTA will identify remediation actions to be implemented as needed if unexpected soil or groundwater contamination is encountered.
- If contaminated soils are identified or encountered during construction, MTA will evaluate off-site remediation, chemical stabilization, or other treatments and disposal options, in cooperation with MDE.
- MTA will coordinate with MDE to determine the mitigation response and reporting required should a release of hazardous materials occur during operations.

Environmental Justice (Section 4.19)

In addition to the commitments described above for Sections 4.2 through 4.18, MTA will work with Montgomery and Prince George's Counties on business improvement initiatives, including:

- To address access restrictions or detours to businesses, MTA will work with local business liaisons to understand the characteristics of local businesses (customer origins, peak business times, etc.) and to establish construction stage plans to minimize business disruptions.
- MTA will implement a Business Impact Minimization Plan. MTA will develop this plan after evaluation of best practices and lessons learned from other light rail construction projects (see Sections 8.2.2 and 4.5.3). These practices could include:
 - Maintaining Spanish-speaking outreach staff
 - Constructing the project in segments, to keep disruption to a small area at a time
 - Maintaining access to business during construction for customers and deliveries
 - Maintaining or relocating bus stops
 - Providing directional signage

- Developing "open for business" marketing and advertising tools for use during construction, translated where appropriate
- Promotion of local businesses
- Providing a construction hotline open 24/7
- Maintaining open communication between the project outreach team and local businesses
- Maintaining communication with local support and advocacy groups
- MTA will continue communication with local businesses during construction to monitor effects and modify construction plans, if possible, to further reduce impacts.
- MTA will work with the counties and other stakeholders to leverage existing resources to support and strengthen small businesses in the corridor.
- MTA will work with Montgomery and Prince George's counties to create opportunities for project-related local economic benefits including workforce development programs.
- MTA will continue working with the counties and advocacy groups to support engagement of local elected officials regarding affordable housing and increased commercial rents resulting from increased property values as the project moves forward.

4.21 Irreversible and Irretrievable Commitment of Resources

Pursuant to NEPA regulations (40 CFR 1502.16), an analysis of a proposed project's environmental consequences is required to address the irreversible and irretrievable commitment of resources associated with the project's implementation. An irreversible and irretrievable commitment of resources results in the permanent loss of a resource for future uses (or alternative purposes) as the resources cannot be replaced or recovered.

The No Build Alternative would not require an irreversible and irretrievable commitment of resources.

Construction of the Preferred Alternative would require the commitment of natural, human, and monetary resources. While some resources could be

recovered within a relatively short period of time, other resources would be committed irreversibly and irretrievably. As the Preferred Alternative would be largely constructed within existing roadway and transportation rights-of-way, potential effects on natural resources have been minimized, as described in Chapter 4.0 of this FEIS. Construction materials such as steel, fossil fuels, energy, concrete, and aggregate would be irretrievably expended during grading, tunneling, and construction of track and related facilities.

Construction of the Preferred Alternative would require a one-time financial expense of federal, state, and local funds as well as contributions from private sources. Although the initial capital cost for the Preferred Alternative would be irretrievably committed and unavailable for other projects, the Preferred Alternative would benefit local and regional economies with positive employment, earnings, and output effects. In addition, Purple Line operations and maintenance expenditures (\$38.3 million annually) would result in approximately 425 permanent jobs for the regional economy. This new employment would result in a \$9.165 million annual increase in household earnings for the region, which would equate to a \$50.33 million increase in regional output, as explained in Section 4.5.

As noted in previous sections of Chapter 4.0, MTA has worked during the planning and design stages to avoid or minimize impacts to resources. MTA is continuing these efforts by integrating public involvement with design development.

4.21.1 Short-term Effects/Long-term Benefits

NEPA requires that the environmental analysis include identification of “.. the relationship between local short-term uses of man’s environment and the maintenance and enhancement of long-term productivity” (42 USC 4332). This section compares the short-term uses of the environment (that is, effects during construction) with long-term benefits over the operational lifetime of the No Build and Preferred Alternatives.

As the No Build Alternative would not involve construction activity, neither short-term nor

long-term effects of the No Build Alternative would occur.

In some locations within the study area, short-term construction-related effects of Preferred Alternative, as discussed in Chapter 5.0, would include temporary parking loss, easements for staging areas and construction access, temporary lane or road closures, and temporary property access restrictions. Additionally, short-term visual effects, localized airborne dust and emissions, elevated noise and vibration levels, utility interruptions, and temporary disturbances to parks, habitat, wetlands, and soils also are anticipated in some locations during the construction of the Preferred Alternative. However, the short-term use of human, socioeconomic, cultural, and natural resources would contribute to the long-term benefits that the Preferred Alternative is intended to provide, as described in this FEIS.

4.22 Anticipated Permits and Approvals

Construction of the Purple Line is expected to require a number of permits and approvals. Table 4-54 lists these anticipated permits, along with the federal or state agency with authority over each one.

Agency coordination has been ongoing through all planning phases, as summarized within the AA/DEIS, and also in Chapter 8.0. Coordination with the regulatory and resource agencies will continue throughout the later stages of design and during construction. In interagency review meetings held throughout the project planning phase, MTA has coordinated with the following resource/regulatory agencies:

- U.S. Army Corps of Engineers (USACE)
- U.S. Fish and Wildlife Service (USFWS)
- U.S. Environmental Protection Agency (EPA)
- Maryland Department of the Environment (MDE): Water Management Administration—Nontidal Wetlands and Waterways Division; Compliance Program; and Sediment, Stormwater & Dam Safety Program
- Maryland Department of Natural Resources (MDNR): Environmental Review Unit (ERU) and Program Open Space (POS)

Table 4-54. Anticipated Permits and Approvals Required for the Preferred Alternative

Resources/Impacts	Agencies	Permit Type/Additional Information
Natural Resources		
Nontidal Wetlands, 25-foot Wetland Buffer, Streams, and 100-year Floodplain	USACE MDE Water Management Administration—Nontidal Wetlands and Waterways Division	Section 404 Individual Permit Nontidal Wetlands and Waterways Permit, and Water Quality Certification, Construction within a 100-year floodplain
Dewatering and groundwater withdrawal for contractor dewatering operations associated with deep excavations	MDE	MDE Water Appropriations Permit and, if contaminated water is encountered, an NPDES permit
Forest	MDNR	Forest Conservation Act compliance
Maryland Scenic and Wild Rivers	MDNR	No permit required, just coordination with MDNR during the design process
Rare, Threatened or Endangered Species (RTE)	USFWS, MDNR ERU, and NMFS	Endangered Species Act Compliance- Based on the resource agency responses, no RTEs have been identified within the project area.
Water Resources		
Stormwater Management	MDE Water Management Administration—Sediment, Stormwater & Dam Safety Program	Stormwater Management Approval, COMAR 26.17.01 and 26.17.02
Erosion & Sediment Control	<ul style="list-style-type: none"> MDE Water Management Administration—Sediment, Stormwater & Dam Safety Program, and Montgomery and Prince George's County Soil Conservation Districts (SCD) 	Erosion & Sediment Control Approval, COMAR 26.17.01 and 26.17.02
Ponds	MDE Water Management Administration—Sediment, Stormwater & Dam Safety Program	Waterway construction permits for new ponds or alterations to existing impoundments, COMAR 26.17.04
Point Source Water Pollution	EPA and MDE Water Management Administration—Compliance Division	National Pollutant Discharge Elimination System (NPDES) General or Individual Permit to Discharge Stormwater Associated with Construction Activities, Notice of Intent (NOI)
Historic Resources		
Built and archeological resources	FTA and MHT	Section 106 compliance and Section 4(f) compliance
Parks, Recreational Areas, and Open Space		
Parks, recreational areas, and open space	FTA, USDOJ/NPS, and NCPC	Section 4(f) compliance
Baltimore-Washington Parkway	DOI/NPS	<ul style="list-style-type: none"> Special Use Permit (valid for five years) for non-invasive activities such as survey geotechnical borings, etc. Construction/Access Permit for temporary use of parkland Right-of-way Permit for the permanent use of parkland
Construction Permits		
Sediment Control	MDE	Sediment control permit—stipulates how and where major sediment control devices would be located and maintained
Groundwater	MDE	Groundwater Appropriation Permit—required for tunnel construction
Maintenance of Traffic (MOT)	Maryland State Highway Administration, Montgomery County Department of Transportation, Prince George's County Department of Public Works and Transportation, and FHWA—Eastern Federal Lands	MOT plan—phasing to be submitted for approval
Construction on or adjacent to railroads	CSX, Amtrak	Railroad access permits—stipulate insurance requirements, and provide mechanism for contractor to request railroad flaggers, as well as other coordination
Adjacent construction	WMATA Metrorail—Metro Office of Joint Development and Adjacent Construction	Adjacent construction permit—for construction adjacent to the Metrorail

- Maryland Historical Trust (MHT)
- National Capital Planning Commission (NCPC)
- M-NCPPC—Montgomery County Department of Parks and Prince George’s County Department of Parks and Recreation
- U.S. Department of Interior, National Park Service (DOI/NPS)
- Federal Highway Administration (FHWA)
- Maryland State Highway Administration (MDSHA)
- Federal Railroad Administration (FRA)
- National Marine Fisheries Service (NMFS)

The interagency review meetings serve to inform the resource agencies of the project and to resolve any resource issues or concerns of the agencies early in the process and prior to the permitting phase. This collaboration assists MTA in addressing agency comments and input early and throughout the design and permitting phases.

In addition to the interagency review meetings, other agency coordination meetings, specifically related to obtaining permits and approvals, were held during the preparation of this FEIS. These meetings include the following:

- Jurisdictional Delineation (JD) Field Reviews, required for wetland permits, attended by USACE, MDE, and NMFS: May 8 and May 9, 2012.
- Coordination meeting to discuss wetland and stream mitigation opportunities within Prince

George’s County M-NCPPC owned properties, attended by PG M-NCPPC: November 2, 2012.

- Wetland/Waterway Mitigation Meetings/Field Reviews, attended by MDE, USACE, and MTA: October 25 and November 28, 2012.
- Coordination meeting to discuss forest impacts and mitigation with MDNR-Forestry Division: May 18, 2012.
- Coordination meetings with NCPC to discuss impacts to parks partially purchased using Capper-Cramton Act funding as well as the Baltimore-Washington Parkway: June 9, 2011, April 22, 2012, and July 12, 2012.
- Coordination meetings to discuss park impacts with M-NCPPC—Montgomery County Department of Parks: January 25, 2012, May 16, 2012, and November 21, 2012.
- Coordination meetings to discuss park impacts with M-NCPPC—Prince George’s County Department of Parks and Recreation: January 6, 2012, June 7, 2012, and October 8, 2012.
- Monthly coordination meetings with USDOJ/NPS-National Capital Parks-East to discuss the proposed Purple Line and the impacts it would have on the Baltimore-Washington Parkway, and potential minimization and mitigation measures: began January 2012.
- Coordination meeting with MDNR’s POS staff to provide a detailed overview of the Preferred Alternative and discuss impacts to parks that were purchased or developed using POS funds: July 9, 2012.

