



Chapter 2.0

Alternatives Considered

This chapter summarizes the alternatives analysis and evaluation process that defined the Preferred Alternative. It presents the two alternatives that are the subject of this Final Environmental Impact Statement (FEIS): the No Build Alternative and the Preferred Alternative.

Changes to this Chapter since the AA/DEIS

This chapter includes an updated analysis of alternatives, which is organized into the following sections:

Section 2.1 describes the development and evaluation of the alternatives that were documented in the AA/DEIS. It summarized the previous phases of the study: the initiation of the AA/DEIS, scoping and alternatives development, the screening of alternatives, and the evaluation of the alternatives in the AA/DEIS.

Section 2.2 describes the Locally Preferred Alternative (LPA) identified in August 2009. It then describes the refinement made to the LPA as well as some refinements evaluated but not incorporated. The revised LPA is referred to in this FEIS as the “Preferred Alternative.”

Section 2.3 describes the No Build Alternative and the Preferred Alternative, including its proposed alignment, stations, track types, storage and maintenance facilities, and ancillary facilities; and the Capital Crescent Trail. It describes the service and operating characteristics, costs, and implementation schedule.

This chapter also includes a section that updates the information presented in the Alternatives Analysis/Draft Environmental Impact Statement (AA/DEIS) Chapter 5.0 Costs and Funding with an operating plan and refined estimates of capital and operating and maintenance costs for the Preferred Alternative.

2.1 Alternatives Development and Evaluation

This section provides a summary of the previous phases of the study.

For additional information refer to the following technical reports: *Supporting Documentation on Alternatives Development (2013)* and the *Definition of Alternatives Report (2008)*. The 2012 document summarizes the alternatives and includes memoranda prepared on specific alignments since the publication of the AA/DEIS, while the 2008 report describes the alternatives analyses that led to the publication of the AA/DEIS.

As discussed in Chapter 1.0, the need for improved east-west transit within the corridor, particularly between Bethesda and Silver Spring, has been identified for more than 20 years, and has been the subject of many studies. Most of the ridership of the Purple Line would be short trips, and the area of heaviest ridership is between Bethesda and Silver Spring. These studies ranged from general feasibility studies of corridors and modes to a major investment study of a transitway between Bethesda and Silver Spring. In 2003, FTA and MTA initiated this study of a transitway between Bethesda and New Carrollton.

2.1.1 Initiation of AA/DEIS

FTA and MTA initiated the NEPA process for the Purple Line on September 3, 2003 with the publication of a Notice of Intent (NOI) to prepare an Environmental Impact Statement for the Bi-County Transitway project¹ in Montgomery and Prince George's Counties extending from the Bethesda Metrorail station on the western branch of the Metrorail Red Line to the New Carrollton Metrorail station on the Metrorail Orange Line. The NOI stated that the project would provide high-capacity transit in the corridor addressing "the need to improve travel access, reduce travel times and improve connectivity in response to regional growth, traffic congestion and land use plans for the area." The NOI further stated that the project included the alignment on the Georgetown Branch Transitway/Trail (Bethesda to Silver Spring); but it did not preclude other alignments between Bethesda and Silver Spring. The modal alternatives identified for evaluation were a No Build Alternative, a Transportation System Management (TSM) Alternative, and light rail transit (LRT) and bus rapid transit (BRT) alternatives. The NOI identified twelve potential stations for the Build Alternatives.

2.1.2 Scoping and Alternatives Development

Upon publication of the NOI, MTA initiated the scoping process by inviting interested individuals, organizations, and agencies to provide their ideas, comments and concerns regarding possible modes, alignments, and station locations in the Purple Line corridor. Four public scoping meetings and an agency scoping meeting were held, and a corridor tour was provided for regulatory agencies. The following five project goals were presented during scoping meetings based on both the transportation needs and community concerns:

- Optimize public investment
- Improve regional mobility
- Improve system connectivity
- Support economic development
- Support regional air quality goals

As described in Chapter 1.0, these goals were developed to support a decision on the Alternatives Analysis and so covered a broader range of issues than those directly arising from the purpose and need.

Public and agency scoping meetings and early public participation activities (a newsletter and a project website) yielded discussion and assessment of concepts from previous studies, as well as new concepts. See *Bi-County Transitway Scoping Report, May 2004* for a description of the scoping process, the alternatives presented, and comments received.

Beginning at scoping and continuing to this day, MTA and FTA have conducted an extensive public outreach program throughout the project that has resulted in the development and refinement of the alternatives. For a description of the public involvement process see Chapter 8.0.

Build Alternatives Presented at Scoping Meetings

The Build Alternatives presented at scoping included a number of alignments for BRT and LRT, which were proposed at-grade, underground, elevated, or a combination of these. They were as follows:

- **BRT: Option A**—Mixed-use bus lanes, where BRT shares lanes with regular traffic
- **BRT: Option B**—BRT operated on existing roadways with a combination of mixed-use lanes and dedicated bus lanes and exclusive right-of-way
- **BRT: Option C**—BRT operated in dedicated and exclusive bus lanes, including some aerial structures or tunnels
- **LRT: Option A**—LRT operated primarily at-grade
- **LRT: Option B**—LRT operated primarily in exclusive lanes, often grade-separated (tunnel and aerial structures)

All alignments began in Bethesda with a connection to the Metrorail station, served the future Silver Spring Transit Center (SSTC), and continued to the New Carrollton Metro station. A BRT alignment on Jones Bridge Road was included at scoping as a low cost BRT alternative because of its use of existing roadways, opposed to the Georgetown Branch right-of-way.

¹ The name "Bi-County Transitway" was selected by the governor for the full Bethesda-to-New Carrollton project. Four years later in 2007 the project returned to the name "Purple Line".

Alternatives Analysis (AA) Requirements under FTA's New Starts Program

MTA is pursuing federal funding for this project under FTA's New Starts program for major capital investment grants. As part of the application process for New Starts funding, MTA was required to prepare an AA under 49 USC § 5309.1 at the time this study was initiated. The requirement to prepare an AA was eliminated by the Moving Ahead for Progress in the 21st Century Act (MAP-21), which was enacted on July 6, 2012 and took effect on October 1, 2012.

The requirement to prepare an AA was separate from the requirement to prepare an EIS under NEPA. Like an EIS, an AA involved a comparison of alternatives that are intended to address a transportation problem; however, the purpose of an AA was to assist FTA in determining whether a project meets the financial justification requirements that must be satisfied before a project can be advanced into the preliminary engineering stage of FTA's project development process. As a result, an AA included a more detailed assessment of cost and cost-effectiveness issues than would be required under NEPA alone.

Because an AA addressed many of the same issues that are covered in an EIS, FTA allowed AAs, including the Purple Line project, to be combined with NEPA documents in certain instances, satisfying both New Starts and NEPA requirements.

LRT on Jones Bridge Road was considered in scoping but was not carried forward for detailed study in the AA/DEIS. An LRT alignment on Jones Bridge Road would require the transitway to be aligned on one-way routes through the Bethesda CBD on Wisconsin and Woodmont Avenues. These two roads are very congested and have narrow rights-of-way. There are six signalized intersections on Wisconsin Avenue and nine on Woodmont Avenue. Given the physical constraints of this route, the possibility of aligning LRT in dedicated or exclusive lanes would not be likely; as a result, LRT travel times would be greatly increased

compared to the BRT Alternative. On such narrow congested roadways, reliable LRT operations would be very difficult to achieve. One of the benefits of BRT over LRT is the vehicles' ability to maneuver or pass obstacles. An LRT alternative operating in mixed-use travel lanes would be less reliable and would add considerable travel time for riders going to and from Bethesda. The Bethesda CBD is one of the largest travel markets of the project and it would not make sense to penalize such a large number of riders, for the benefit of a far smaller number of riders. See Section 2.1.4 *Variations on Medium Investment BRT Alternatives* for further discussion of these travel markets.

The availability of the Georgetown Branch right-of-way, owned by Montgomery County and designated for use as a transitway and trail, provides the potential to build a transitway within a nearly exclusive operating environment with few, if any, grade crossings. This, in turn, provides the opportunity for a transit service unimpeded by traffic conflicts resulting in reliable service and faster speeds between Bethesda and Silver Spring. However, the capital cost of constructing a transitway and trail along this alignment is relatively high, so a lower cost alternative using Jones Bridge Road was considered between Bethesda and Rock Creek.

This lower cost alternative consisted of in-street running BRT along Jones Bridge Road and Jones Mill Road and along Woodmont Avenue west of Jones Bridge Road connecting to downtown Bethesda. For BRT this would have a lower cost, since the buses would be operating on the existing roadways. However, LRT along Jones Bridge Road would require the reconstruction of the street for the installation of the rails and catenary, and therefore would not offer the same savings over the use of the Georgetown Branch right-of-way.

For these reasons, and the constrained right-of-way between Jones Bridge Road and the Bethesda station described above, LRT was not considered on Jones Bridge Road. However, MTA continued to study the use of Jones Bridge Road for BRT.

Some alignments were considered for both BRT and LRT, while others were considered for only one mode because of environmental, operational, or engineering constraints.

Based on the public and agency comments received during scoping, a range of alternatives was developed for consideration in the evaluation process. These alternatives included most of the alignments presented at scoping, as well as others identified during scoping.

Exclusive Lanes—A right-of-way that is solely for use of transit vehicles and is not occupied by any other type of vehicle or by pedestrians. Exclusive lanes may be either grade-separated or protected by a fence or substantial permanent barrier. All crossings are grade-separated.

Dedicated Lanes—Lanes used solely for transit vehicles, separated and protected from parallel traffic, but which crosses roads, driveways, and pedestrian pathways at-grade. Separation may be achieved by mountable or un-mountable curbs, barriers, or fences. If the transit is light rail, protection at grade-crossings would be provided at some locations by railroad-style flashers and gates if required, or traffic signals at others.

Mixed-use Lanes—Lanes in which the transit vehicles operate in mixed traffic, sharing the same space with other types of road users. Transit vehicles in mixed-use lanes would be controlled by the existing traffic signals and signs.

Consideration of Other Transit Modes

During scoping, two modes were proposed by MTA: LRT and BRT. Monorail and heavy rail were not included in the alternatives initially presented during scoping. These modes had been eliminated in previous studies based on prohibitive capital costs, environmental impacts, and other factors. Based on the *Capital Beltway Purple Line Study* (2002), FTA and MTA concluded that monorail and heavy rail would not be reasonable.²

During the scoping process, a few commenters suggested additional consideration of heavy rail alternatives. FTA and MTA considered these comments and determined that heavy rail was not a

reasonable alternative for meeting the purpose and need of this project, as concluded earlier in the *Capital Beltway Purple Line Study*. After scoping was completed, the County Executive of Montgomery County recommended consideration of a heavy rail alternative referred to as the Red Line or Metrorail Loop which would connect the Metrorail Red Line from Bethesda to Silver Spring along the Capital Beltway. MTA and FTA conducted additional analysis of this heavy rail alternative, and concluded that it should not be carried forward for detailed study because it did not meet the purpose and need of this project, and because it had other drawbacks, including environmental impacts and cost (see *Definition of Alternatives* (2008), pages 1-8, and *Supporting Documentation on Alternatives Development* (2013)).

2.1.3 Screening of Alternatives

Screening Methodology

Between 2004 and 2008, FTA and MTA examined a number of alternatives and design concepts. The screening process evaluated the alternatives based on a number of factors, including ability to meet the project's Purpose and Need, engineering feasibility, natural and social environmental impacts, preliminary cost estimates, and input from the public and agencies. Alternatives that did not meet these criteria were not considered reasonable.³ Alternatives that were not considered reasonable were eliminated from further consideration and not included in the AA/DEIS (see *Definition of Alternatives* (2008) pages 1-7).

Many alternatives met the reasonableness standard. In order to reduce the number of reasonable alternatives for study in the AA/DEIS, the screening process focused on weighing the relative merits or disadvantages of the various alignments or options within the definition of low, medium and high investment. For example, where two low investment surface options for a particular mode were under consideration, if one had appreciably greater impacts to the environment or the local

² *Capital Beltway/Purple Line Study*, SHA/MTA, 2002

³ *Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations*, 46 Fed. Reg. 18026 (1981), Response to Question 2a.

community, it was eliminated from further consideration. This approach followed the Council on Environmental Quality's (CEQ) guidance for determining the range of alternatives in an EIS, which states "When there are potentially a very large number of alternatives, only a reasonable number of examples, covering the full spectrum of alternatives, must be analyzed and compared in the EIS."⁴

Involvement of the Public, Elected Officials, and Agencies

During the screening process, MTA created eight geographically-organized Community Focus Groups to foster dialogue with the local communities about their concerns and to compare alignment options at a local level. These groups met multiple times during the screening process, which supported the refinement of alternatives including station locations and more detailed information about potential impacts.

MTA created a Project Team that included local planners, state and county agencies, and elected officials. MTA has had regular meetings with the Project Team throughout the Purple Line study; and these meetings were used extensively during the alternative analysis process as a forum to evaluate and review proposed alternatives.

Once the Project Team agreed on the alternatives to be carried forward for further study, the alternatives were presented to the public in a series of open houses held in the corridor in November 2004, June 2006, and December 2007, in the ongoing Community Focus Group meetings, and in presentations to both the Montgomery and Prince George's County Councils.

2.1.4 Alternatives Evaluated in the AA/DEIS

The AA/DEIS advanced eight alternatives and several design options for further study. These included the No Build Alternative, the TSM Alternative, and six Build Alternatives: three BRT alternatives and three LRT alternatives, differentiated by levels of investment. The AA/DEIS also presented several design options (alignment

variations). Chapter 2 of the AA/DEIS described these alternatives in detail and this FEIS summarizes the analysis conducted.

No Build Alternative

The No Build Alternative assumed no new improvements to the transportation system in the corridor, other than those in the 2007 Financially Constrained Long-Range Transportation Plan (CLRP) of the National Capital Region Transportation Planning Board. As defined in the AA/DEIS, the No Build Alternative consisted of transit service levels, highway networks, traffic volumes, and forecasted demographics for the horizon year of 2030.

TSM Alternative

The TSM Alternative included improvements to transit service that would enhance mobility, without constructing a new transit guideway. The TSM Alternative included improved bus service in the Purple Line corridor and a new through-route from Bethesda to New Carrollton replacing the existing J4 route and overlaying service on portions of the F4 and F6 routes between College Park and New Carrollton. A combination of less frequent stops and queue jump lanes (allowing the buses to bypass long lines of vehicles at intersections) and signal priority (special treatment given to transit vehicles at traffic signals) comprised the core of service improvements. This alternative assumed the use of 60-foot articulated buses.

Build Alternatives — BRT and LRT

The alignments for the BRT and LRT alternatives extended the full length of the corridor between the Bethesda Metro station and the New Carrollton Metro station. For each mode, the alternatives were differentiated from one another mainly by the level of investment that would be required for construction: low, medium, or high. The six distinct Build Alternatives are listed in Table 2-1.

Table 2-1. BRT and LRT Alternatives Evaluated in the AA/DEIS, 2008

Bus Rapid Transit	Light Rail Transit
Low Investment BRT	Low Investment LRT
Medium Investment BRT	Medium Investment LRT
High Investment BRT	High Investment LRT

⁴ Ibid, Response to Question 1b. See also FTA, Office of Planning and Environment, *Procedures and Technical Methods for Transit Project Planning*, Chapter 3, Framework for Alternative Analysis, October 2005, Page 3-3.

Because the alternatives generally followed the same alignment, the varying levels of investment facilitated a comparison of the benefits and costs of different elements of the alternatives. As explained below, the variation in the levels of investment depended on the extent to which each alternative incorporated design features such as tunnels and aerial structures, which improve travel times but increase costs.

Low Investment

The Low Investment Alternatives primarily operated in shared traffic lanes on existing streets to avoid the cost of grade separation, right-of-way acquisition, and roadway reconstruction. They incorporated signal, signage, and lane improvements such as queue jump lanes wherever these would provide benefits. Aerial structures and tunnels were proposed only where existing roadway grades were outside the Purple Line design criteria.

Medium Investment

The Medium Investment Alternatives operated in dedicated or exclusive lanes (see Section 3.1.3) where possible or most beneficial, with some key grade-separations. These alternatives were developed to include those elements deemed most beneficial while remaining within moderate cost constraints.

High Investment

The High Investment Alternatives were intended to provide the most rapid travel times. They operated almost entirely in exclusive or dedicated lanes and were grade-separated, either on aerial structures or in tunnels in areas of high congestion such as crossings of the major radial roadways.

The other distinguishing factor among the AA/DEIS alternatives was the alignment of the Low Investment BRT alternative between Bethesda and Jones Mill Road, which followed Woodmont Avenue and Jones Bridge Road from Bethesda to Jones Mill Road, avoiding using the Georgetown Branch right-of-way west of Jones Mill Road. There was public support for studying an alternative that would not impact the Georgetown Branch Interim Trail. The Medium and High Investment BRT Alternatives and the LRT Alternatives used the Georgetown Branch right-of-way.

The AA/DEIS explained that, while it analyzed six end-to-end BRT and LRT alternatives, an alternative could include a combination of segments from different Build Alternatives. See AA/DEIS, Section 2.4.3.

Stations for BRT and LRT Alternatives

The scoping process considered twelve potential stations. Nine additional stations were added between the scoping process in 2003 and completion of the screening of the alternatives in 2007. The following is a complete list of the 21 proposed stations; the stations shown in italics were added to the Build Alternatives after the scoping process began.

- Bethesda
- Connecticut Avenue/Chevy Chase Lake
- Lyttonsville
- Woodside/16th Street
- Silver Spring Transit Center
- *Silver Spring Library/Fenton Street*
- *Dale Drive*
- *Manchester Place*
- *Long Branch/Arliss Street*
- Piney Branch/University Blvd
- Takoma/Langley Transit Center
- *Riggs Road*
- Adelphi Road/West Campus
- UM Campus Center
- *East Campus*
- College Park Metro
- *M Square/River Road*
- Riverdale Park
- *Beacon Heights/Riverdale Road*
- *Annapolis Road*
- New Carrollton

Many of the nine additional stations were proposed by local stakeholders or members of the public and were supported by a better understanding of the corridor and the existing markets, gained during the study. An early assumption about the corridor was that many riders would travel longer distances east-west and that travel time would be at a premium. As the study progressed, however, it became apparent that most of the riders would be using the Purple Line for short trips to destinations within the corridor or as part of longer trips transferring to or from north-south transit services. These travel

patterns supported the addition of more stations to better serve local residents or activity centers.

Permanent Capital Crescent Trail

As described in Section 2.1.1, a multi-use trail currently exists in the Georgetown Branch right-of-way. This unpaved trail was built as an interim trail until the construction of the Capital Crescent Trail; it is referred to in this document as the Georgetown Branch Interim Trail. In addition to providing a transitway, all of the BRT and LRT alternatives included the construction of the Capital Crescent Trail in those sections of the alternative that used the Georgetown Branch right-of-way (see AA/DEIS Section 2.4.3). The Low Investment BRT Alternative would not have included the construction of the Capital Crescent Trail between Bethesda and Jones Mill Road.

Variations on Medium Investment BRT Alternatives

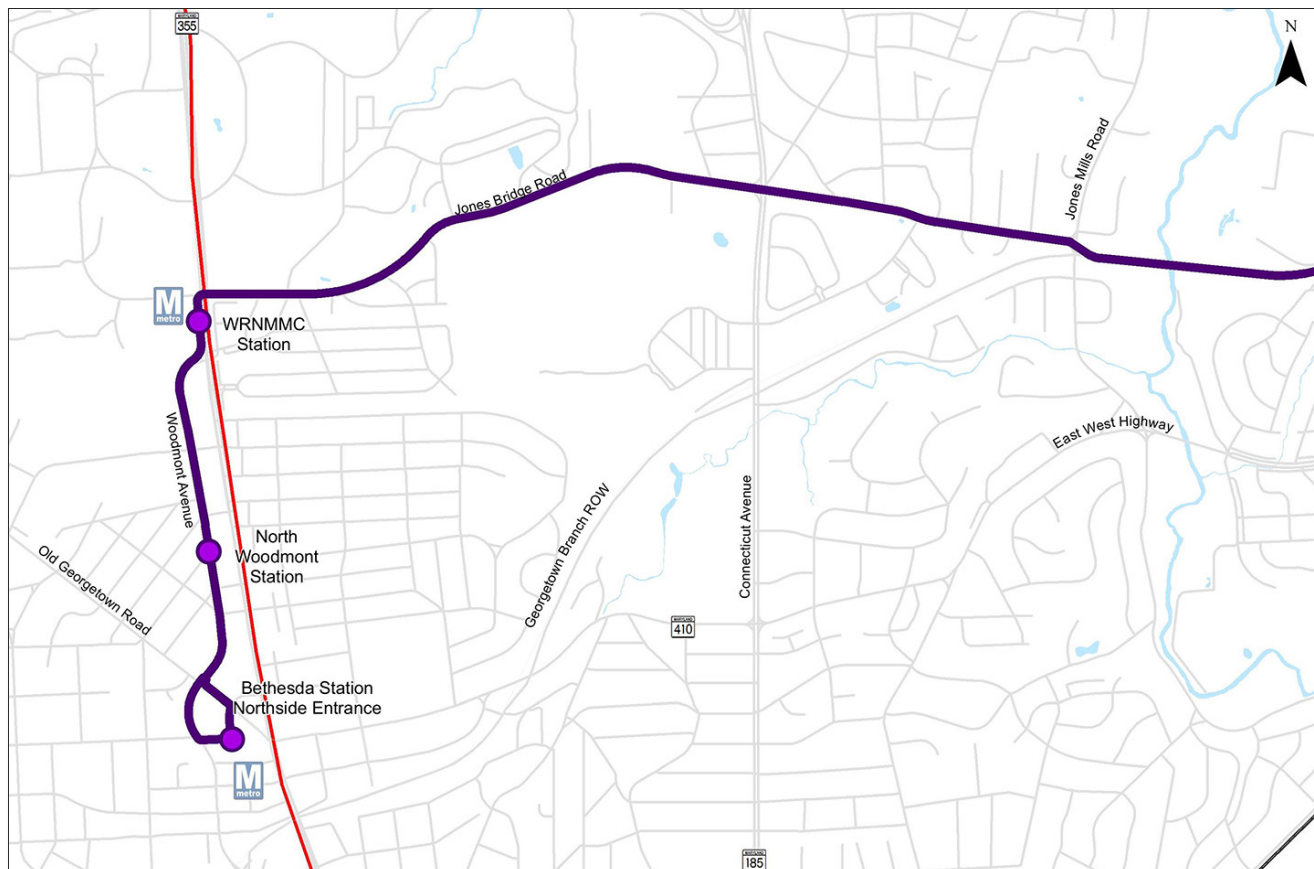
In response to comments from stakeholders, MTA conducted additional studies of some variations of

the BRT and LRT alternatives. This additional analysis included two options (described below) that would have provided service to the Walter Reed National Military Medical Center (WRNMMC) as well as downtown Bethesda. The WRNMMC is the former National Naval Medical Center. As a result of the Base Realignment and Closure (BRAC) process, the WRNMMC now includes the functions that were formerly provided at the Walter Reed Army Medical Center.

Medium Investment BRT Option 1

The Town of Chevy Chase asked MTA to evaluate a Medium Investment BRT option (Figure 2-1) that would use the alignment of the Low Investment BRT Alternative on Jones Bridge Road between Bethesda and Jones Mill Road, in combination with the Medium Investment BRT alignment in the rest of the corridor. This request reflected a concern that the Jones Bridge Road alignment was not being evaluated fairly since it was included only in a low

Figure 2-1. Medium Investment BRT Option 1



investment alternative. In response, MTA and FTA developed a medium investment option aligned on Jones Bridge Road that served the WRNMMC directly. From WRNMMC, the BRT would have followed Woodmont Avenue to the bus loop at the current entrance to the Bethesda Metro station.

Medium Investment BRT Option 2

MTA also evaluated a BRT option (Figure 2-2) that would have routed the Medium Investment BRT service to downtown Bethesda on the Georgetown Branch right-of-way and then north along Woodmont and Wisconsin Avenues to WRNMMC, avoiding Jones Bridge Road, while still providing a “one seat” ride to the WRNMMC. This option was not requested by the Town of Chevy Chase, but was developed by MTA and FTA as a basis for evaluating options for serving the WRNMMC.

MTA analyzed both options; the full analysis is presented in Medium Investment BRT Variations

Serving the Medical Center, included in the *Supporting Documentation on Alternatives Development (2013)*.

Because of the indirect route of Option 1, the travel time between downtown Silver Spring and downtown Bethesda would have been 24 minutes, whereas the original Medium Investment BRT Alternative along the Georgetown Branch right-of-way would have completed this trip in 10 minutes. The longer travel time would result in a loss of more than 2,000 daily riders. While Option 1 would have provided more direct service to WRNMMC than the Medium Investment BRT Alternative, the travel market (defined as the number of residents and jobs near a proposed station) of downtown Bethesda is almost twice the size of the WRNMMC travel market (Figure 2-3). For these reasons this option was not carried forward.

Figure 2-2. Medium Investment BRT Option 2

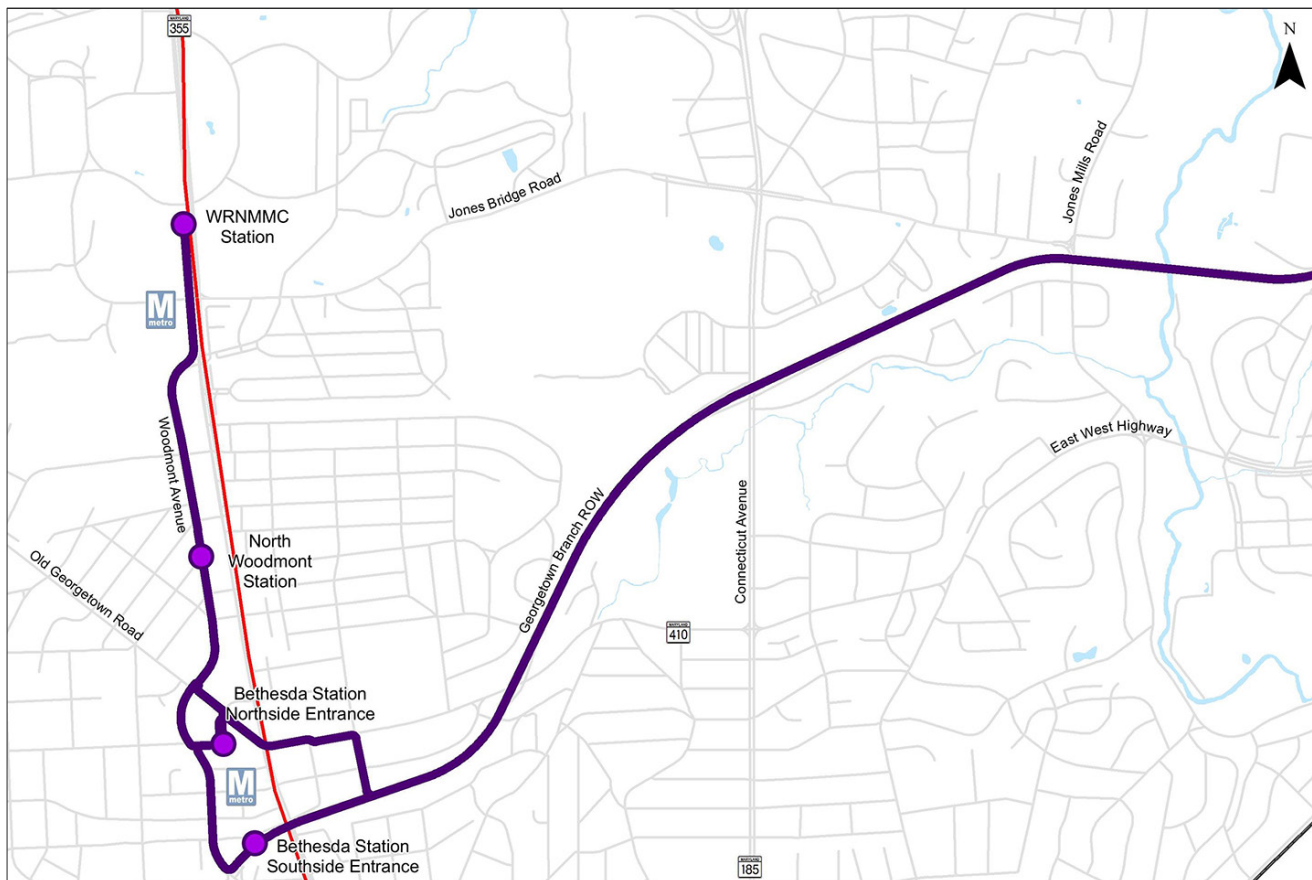
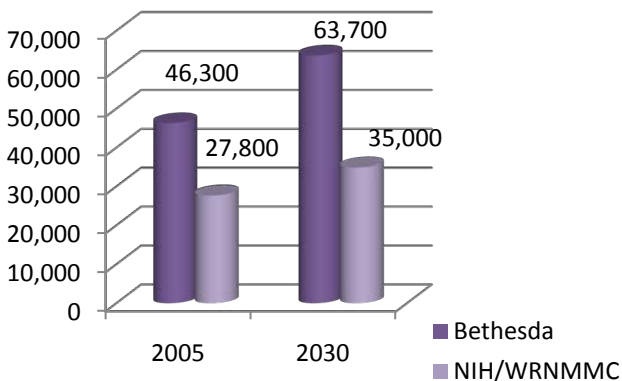


Figure 2-3. Comparison of Bethesda Central Business District and WRNMMC Travel Markets



Note: Data presented was developed at the time of the AA/DEIS, and for this reason uses the horizon year of 2030. This data includes the changes resulting from BRAC. NIH = National Institutes of Health, located near WRNMMC. Bethesda refers to the Bethesda central business district.

Source: Metropolitan Washington Council of Governments Travel Forecasting Model

Option 2 was developed by MTA as another possible approach to providing BRT service to the WRNMMC travel market. This option would have provided a fast ride via the Georgetown Branch right-of-way to downtown Bethesda, and it also would have provided a one-seat ride to WRNMMC. However, despite the benefit of a one-seat ride, transferring to the Metrorail Red Line would still provide a faster ride. There was no public support for this option as the advocates for serving WRNMMC did not support using the Georgetown Branch right-of-way.

Evaluation of AA/DEIS Alternatives

Chapter 6 of the AA/DEIS considered the environmental impacts of the No Build Alternative, TSM Alternative, and the six Build Alternatives, as well as several design options. In addition, a comprehensive evaluation of each alternative was conducted, based on the following framework used by FTA in the New Starts process:

- **Effectiveness**—the extent to which an alternative achieves the purposes that the transportation improvements are intended to address.

- **Impacts**—the extent to which an alternative supports economic development, environmental or local policy goals.
- **Cost-Effectiveness**—the extent to which an alternative provides a level of benefits that is commensurate with its costs relative to other alternatives.
- **Financial Feasibility**—the extent to which sufficient funding is available or can be developed to support the construction, operation, and maintenance of an alternative.
- **Equity**—the extent to which an alternative provides fair distribution of costs and benefits across various communities in the corridor.

In determining effectiveness, the evaluation examined each alternative's ability to achieve the following goals of the project that had been identified in Chapter 1 of the AA/DEIS:

- Increase mobility and improve accessibility
- Improve transit operations efficiencies
- Enhance environmental quality
- Optimize public investment
- Support local plans for economic and community development
- Support attainment of regional air quality standards

For each of the six goals listed above, the AA/DEIS identified a series of objectives, as well as evaluation measures associated with each of the objectives (see AA/DEIS, Section 1.6).

Chapter 6 of the AA/DEIS included a table that summarized each alternative's ability to meet each of the project's goals and objectives (see AA/DEIS, Section 6.2, Attainment of Goals and Objectives). It then discussed each alternative's effectiveness, cost-effectiveness, financial feasibility, and equity. Lastly, it discussed the trade-offs among the alternatives.

The AA/DEIS acknowledged that the High Investment LRT Alternative would maximize achievement of the project's goals, but would have a much higher capital cost and require a higher annual operating subsidy. It found that "a substantial amount of the benefits [of High Investment LRT] could be achieved at a lower cost by Medium Investment LRT." Chapter 6 also found that "BRT alternatives would require lower capital and annual

⁵ Federal Transit Administration, Office of Planning and Environment, *Procedures and Technical Methods for Transit Project Planning*, Chapter 9, Evaluation of the Alternatives. Undated.

operating subsidy investments and commitment of financial resources, but would provide lower achievements of mobility and other objectives.”

While it discussed the trade-offs among the alternatives, the AA/DEIS did not identify a Preferred Alternative. Instead, MTA and FTA used the comments received on the AA/DEIS to gather input from agencies, elected officials, and the public, to inform the decision-making process, which led to the Preferred Alternative.

Public Comments on Alternatives Considered in AA/DEIS

Upon publication of the AA/DEIS in September 2008, MTA provided a 90-day public comment period from October 17, 2008 through January 14, 2009, and conducted four public hearings. Over 750 people attended the hearings, with 290 providing oral testimony. In total MTA received over 3,000 comments on the Purple Line, including several petitions. There were comments both supporting and opposing the project. Overall, the public hearings and comment process revealed widespread, strong support for the Purple Line. There were almost 1600 comments and over 3,300 signatures on twelve separate petitions supporting the project. Approximately 150 comments expressed opposition to the project as a whole, and 1090 people expressed opposition to the use of the Georgetown Branch right-of-way for transit. See Chapter 8.5 for more information on the Public Hearings. Specific public comments and a more detailed summary of issues presented during this process are provided in *Appendix A: AA/DEIS Comments and Responses*.

Montgomery and Prince George's Counties' Recommendations on Alternatives Considered in AA/DEIS

The Montgomery County Planning Board held public hearings on the project in January 2009 and recommended the adoption of the Medium Investment LRT Alternative with several modifications, by a vote of 5 to 1. The Montgomery County Council voted unanimously to concur with their recommendation. Subsequently, the County Council and the County Executive issued a joint letter on February 2, 2009, endorsing the Medium Investment LRT Alternative with the inclusion of the Capital Crescent Trail through the underpass

under Wisconsin Avenue and the adjacent Apex and Air Rights buildings, which was part of the High Investment LRT Alternative. The joint letter also recommended postponing the construction of the Dale Drive station with the recommendation that the project be designed so the station easily could be added in the future. Light rail was identified as the “more viable long-term option” because of its consistency with the Georgetown Branch Master Plan, its higher projected ridership, its shorter travel times, and because the County Council believed it would better support transit-oriented development (TOD).

On January 27, 2009 the Montgomery County Council asked MTA to conduct additional analysis of the feasibility of the following prior to the selection of the LPA by the governor:

- Diesel-electric rail vehicles to avoid the need for an overhead wire propulsion system
- A single track segment along the Georgetown Branch right-of-way in Chevy Chase to minimize the removal of trees
- A longer tunnel under Wayne Avenue from the SSTC to Mansfield Road

These studies were completed, presented to the County Council, and made available to the public on the website (see *Supporting Documentation on Alternatives Development (2013)*).

Consideration of the use of diesel-electric vehicles was not carried forward due to community impacts. The longer tunnel under Wayne Avenue was not carried forward due to cost, and community and environmental impacts. The single track segment was not carried forward because it would not have minimized the removal of trees and it would have resulted in substantial operation impacts to the Purple Line.

A November 18, 2008 statement from Prince George's County Council Chairman Samuel Dean and the County Council endorsed LRT as the preferred mode, but did not indicate a preferred alternative. The Council emphasized its desire for a future extension of the Purple Line beyond New Carrollton. In a January 13, 2009 letter, the Prince George's County Department of Public Works and Transportation supported High Investment LRT in Prince George's County. The Prince George's

County Planning Department agreed in a January 28, 2009 letter that the High Investment LRT Alternative would provide the most benefit, but acknowledged that the Medium Investment LRT Alternative would be an acceptable option. The Planning Department supported LRT based on its future capacity and because of the economic and TOD benefits. They specifically endorsed location of the alignment on Campus Drive through the University of Maryland (UMD) campus.

2.2 The Locally Preferred Alternative

Based on consideration of the information in the AA/DEIS, as well as input from the public, local jurisdictions, and elected officials, Governor Martin O'Malley identified an LPA on August 4, 2009. The phrase "Locally Preferred" reflects its selection by the local jurisdiction, in this case, the State of Maryland.

The LPA was largely the Medium Investment LRT Alternative as defined in the AA/DEIS, but included the following elements from the High Investment LRT Alternative:

- Maintaining the Capital Crescent Trail in the Bethesda underpass
- Lengthening the bridges of the Baltimore–Washington Parkway over Riverdale Road to accommodate the transitway in dedicated lanes
- Crossing under Annapolis Road

One element of the LPA that was not evaluated in the AA/DEIS was an aerial crossing of the intersection of Kenilworth Avenue and East West Highway. This intersection is very congested and would have resulted in substantial delays for the Purple Line. An elevated alignment was considered briefly, but MTA had been concerned about the potential visual impacts of an elevated alignment along Kenilworth Avenue. However the Town of Riverdale Park was interested in the redevelopment of this area, and in comments submitted on the AA/DEIS, suggested the evaluation of an elevated alignment. This was supported by Prince George's County. An elevated alignment was developed and added to the LPA.

The elevated alignment on Kenilworth Avenue, the dedicated lanes under the Baltimore-Washington

Parkway, and the grade-separated crossing of Annapolis Road would all improve the travel time of the Purple Line.

The LPA also included a commitment to study postponing the construction of the Dale Drive station. The FEIS assumes the Dale Drive station since the issue is one of construction timing, when the station would be built, not whether.

The LPA's range of impacts and costs fell between the Medium Investment and High Investment LRT Alternatives and all of the elements of the LPA except the elevated Kenilworth alignment were studied as part of either of these two alternatives in the AA/DEIS. The LPA included those elements that provided improved travel times while balancing potential community and environmental impacts at an acceptable and affordable cost. The LPA had a high passenger capacity and the ability to accommodate projected future growth in ridership.

The selection of the LPA by the Governor was based on the following factors:

- The Medium Investment LRT Alternative had the second highest ridership, new transit trips and improved travel times of all the alternatives. The High Investment LRT Alternative was designed to be even faster and, therefore, had a 9-percent higher ridership but a 34-percent increase in cost. As discussed above, the LPA included three elements from the High Investment LRT Alternative that improved the travel times measurably, but at an affordable cost.
- The High Investment BRT Alternative was less expensive than the Medium Investment LRT Alternative, but had lower ridership. By attracting more riders and new transit trips compared with the BRT alternatives, the LRT alternatives would generate more user benefits and reduce more automobile trips from roadways albeit at higher initial construction costs.
- Another concern regarding the BRT alternatives was their limited capacity to handle increased ridership in the future. The carrying capacity of a BRT vehicle (140 people) is much less than a two-car train (280 people). The AA/DEIS did assume the addition of "trippers"

between Bethesda and Silver Spring during peak hours. “Trippers” are extra buses placed in operation for only the period of time needed to accommodate the demand. If ridership grows even higher in the future, adding even more BRT vehicles to the service and therefore further reducing headways would have caused operational problems including platooning of buses at major intersections.

- The LRT alternatives have the potential to provide a higher passenger-carrying capacity to meet long term ridership demand beyond what was projected for 2030. The higher capacity allows for reduced headways. An investment of this scale in public infrastructure must look beyond a 25-year time frame. Light rail transit also offers economic development and community revitalization benefits by providing improved and more permanent mobility and accessibility to the station areas, thus encouraging community investment. Because of these benefits, there was strong support from the public, both counties, and most of the local

jurisdictions in the Purple Line corridor for the LRT alternatives, and particularly for the Medium Investment LRT Alternative.

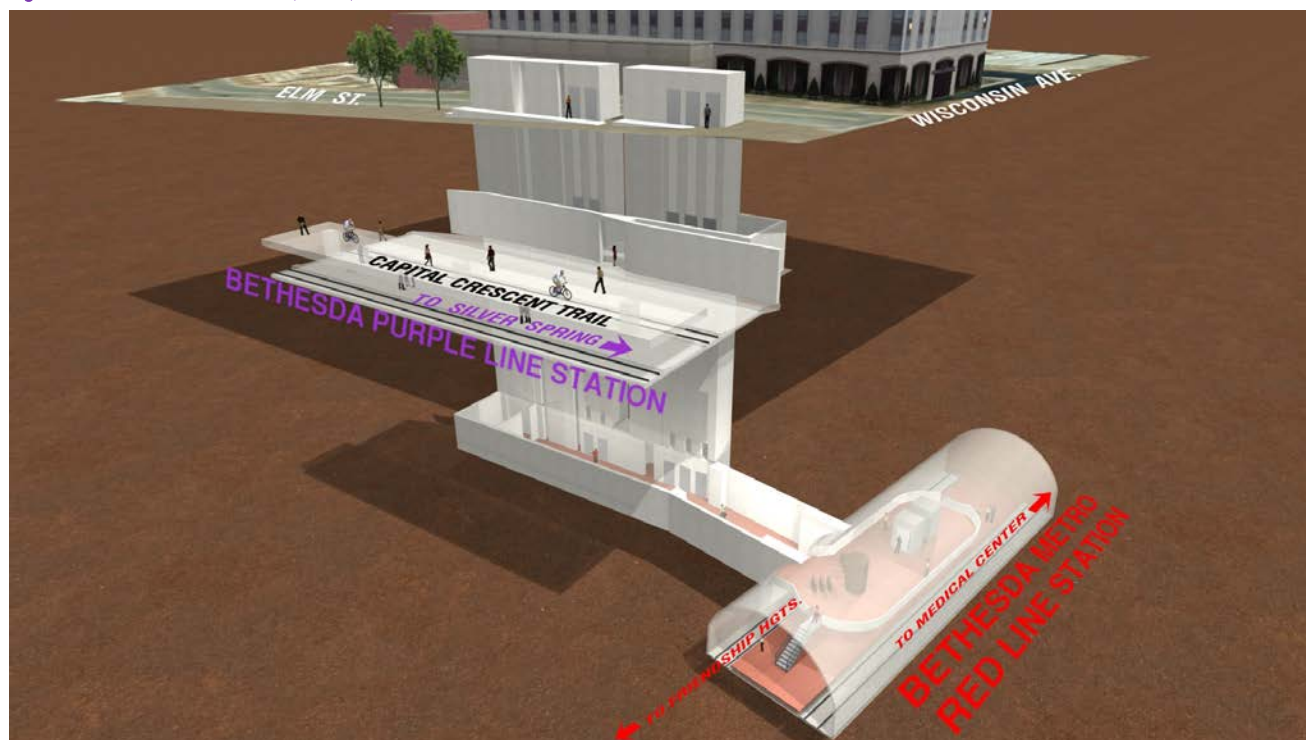
2.2.1 Description of the Locally Preferred Alternative (2009)

The following is a description of the Locally Preferred Alternative identified by Governor O’Malley in August 2009.

Downtown Bethesda

The LPA alignment began in the underpass of Wisconsin Avenue and the Apex and Air Rights buildings. The Bethesda station was located under the Apex building. At this location, the LPA connected to the elevators for the new south entrance to the Bethesda Metro station (Figure 2-4), a separate project funded by Montgomery County. The Capital Crescent Trail was placed on an aerial structure directly above the transitway, and would transition to grade into Woodmont Plaza.

Figure 2-4. Bethesda Station, Trail, and Connections to Metrorail Station under the LPA



Bethesda to Silver Spring

Heading east from Bethesda, the LPA followed an at-grade alignment along the Georgetown Branch right-of-way, crossing over Connecticut Avenue and under Jones Mill Road. The Capital Crescent Trail was completed (paved and landscaped) to provide a continuous trail between Bethesda and Silver Spring, replacing the existing Georgetown Branch Interim Trail between Bethesda and Stewart Avenue. A maintenance and storage facility was located along Brookville Road in Lyttonsville. At the CSXT right-of-way the trail crossed to the north side on a separate bridge near Talbot Avenue.

The LPA stayed on the south side of the CSXT corridor until just before Colesville Road, where it crossed over the CSXT and WMATA tracks to enter the SSTC on an aerial structure above the existing tracks.

Silver Spring to College Park

The LPA left the SSTC along Bonifant Street at grade to a station integrated into the new Silver Spring Library. It continued at grade on Wayne Avenue, in mixed-use lanes. Just past Manchester Road it entered a 1/4-mile-long tunnel under Plymouth Street and returned to the surface on Arliss Street in dedicated lanes, before turning left onto Piney Branch Road and then right onto University Boulevard.

The LPA continued at grade on University Boulevard, until west of Adelphi Road where University Boulevard rises steeply. At this point the LPA crossed under Adelphi Road, returning to grade just east of Adelphi Road, and continuing directly through the center of the UMD campus, crossing US 1 on Rossborough Lane to enter the new East Campus development.

It continued on Paint Branch Parkway in a short section of mixed-use lanes, passing under the CSXT/Metrorail tracks, and entering the College Park UMD Metro Station. It then followed the south side of River Road in dedicated lanes before it turned east onto Kenilworth Avenue.

College Park to New Carrollton

On Kenilworth Avenue, the LPA was located on the west side of the roadway transitioning to an aerial

structure. It crossed over the intersection of East West Highway and Kenilworth Avenue, and turned left into an aerial station located in the small triangle formed by East West Highway, Kenilworth Avenue and Riverdale Road.

The LPA continued in dedicated lanes on Riverdale Road and then along the south side of Veterans Parkway, passing under Annapolis Road, before turning left onto Ellin Road to arrive at the New Carrollton Metro station. A second maintenance and storage facility was located along Veterans Parkway on the site of a Prince George's County park maintenance facility.

The LPA included the construction of the Capital Crescent Trail for the full 4.3 miles between downtown Bethesda and downtown Silver Spring.

2.2.2 Refinements to the Locally Preferred Alternative (2009–2012)

The LPA described above was a step toward the definition of the Preferred Alternative evaluated in this FEIS. After the LPA was selected, MTA continued with conceptual engineering until FTA approved the project's entry into preliminary engineering in October 2011. MTA also continued to engage in public involvement, soliciting input from the public about all aspects of the LPA. Through this process, many refinements were made that resulted in the Preferred Alternative.

In accordance with 23 CFR 771.129, MTA prepared a Re-evaluation because more than three years had passed since publication of the AA/DEIS for this project. MTA submitted the Re-evaluation to FTA on August 8, 2012. The Re-evaluation compared the current Preferred Alternative as examined in the FEIS to the build alternatives considered in the AA/DEIS, and concluded that a Supplemental Environmental Impact Statement (EIS) of the AA/DEIS is not required because there are no new significant environmental impacts beyond those evaluated in the AA/DEIS. In correspondence dated October 2, 2012, FTA concurred with the findings in the Re-evaluation but indicated that the FEIS should include the information on the changes in the project so that these changes could be subject to public review.

Refinements to the LPA largely consisted of minor shifts in alignment. For example, the transitway was originally located along the same roadway but was shifted from the middle of the road to the side of the road, or from the side of a road to the middle. Other refinements resulted in minor shifts to station locations and in the plans for the maintenance and storage facility sites. Many refinements were the result of input received from the public and stakeholders. Some were proposed to resolve outstanding design issues or to avoid or minimize environmental or community impacts, improve traffic or transit operations, improve safety, or reduce project costs. The refinements and the accompanying public involvement activities are described in greater detail in the *Purple Line DEIS Re-evaluation (2012)* included in *Supporting Documentation on Alternatives Development (2013)*.

The following sections provide a summary of these refinements which have been incorporated into the alternative, now referred to as the Preferred Alternative.

Alignment along Kenilworth Avenue (From River Road to East West Highway)

After the selection of the LPA, the Maryland State Highway Administration (SHA) informed MTA that its Highway Needs Inventory identified a need for the future widening of Kenilworth Avenue between River Road and East West Highway based on projected traffic generated by M Square Research Park. The additional lanes near River Road would affect the design of the Purple Line. In response, MTA modified its plans to accommodate the widening, resulting in the potential displacement of nine businesses and in substantial changes in access to businesses and residences on the west side of Kenilworth Avenue. After MTA presented these modifications to project stakeholders and the public, members of the public and representatives from Prince George's County and the Town of Riverdale Park expressed concern over the additional displacements and requested that MTA and SHA re-assess the need for the widening, and consider options to minimize impacts. MTA, SHA, and Prince George's County collaborated in a re-assessment of the future travel demand along

Kenilworth Avenue in light of the changing nature of the area and other ongoing projects.

Dale Drive Station

The LPA included a commitment to further study of a Dale Drive station at the request of Montgomery County. Based on further study and community input, MTA has decided to include the Dale Drive station in the Preferred Alternative primarily to provide improved transit access for the East Silver Spring communities. Without the station, the communities would lack convenient access to the Purple Line. Therefore, the FEIS includes analysis of the benefits and impacts of the Dale Drive station.

MTA continues to assess community input regarding the timing of building the Dale Drive station. The design provides the space for the station platform. If construction of this station is deferred, the initial construction would include right-of-way acquisition, track layout and subsurface infrastructure to accommodate the station; the elements that would be deferred are the station platform, canopy and fare equipment.

The portion of Kenilworth Avenue to the south of the proposed Purple Line alignment had been narrowed from six to four lanes, and a current project was converting the existing wide shoulders to bike lanes and wider sidewalks in response to high transit use and increasing pedestrian activity in the area. The introduction of Purple Line stations at M Square Research Park and Riverdale Park is expected to further increase the need for better bicycle and pedestrian access.

MTA also re-assessed future travel demands, which confirmed the need for the proposed improvements at the intersection of River Road and Kenilworth Avenue in order to accommodate future development at M Square Research Park. However, further traffic analysis demonstrated that a future six-lane roadway section on Kenilworth Avenue was not warranted, nor were all of the existing three south-bound lanes for the entire length of Kenilworth Avenue within the project corridor.

As a result of this new information, much of the proposed widening of Kenilworth Avenue was eliminated, which in turn enabled MTA to move the transitway to the median of Kenilworth Avenue, and to include new sidewalks on both sides of the roadway and bicycle-compatible outside lanes. This refinement would reduce the potential business displacements to three, and would maintain access to businesses and local roads. Because the construction of the Purple Line would require realignment of the road, the roadway improvements would be constructed concurrently.

Alignment along East West Highway/Riverdale Road (Kenilworth Avenue to Veterans Parkway)

Both shared and dedicated lanes in the median of East West Highway/Riverdale Road between Kenilworth Avenue and Veterans Parkway were evaluated in the AA/DEIS. These alignments would have restricted access to homes and businesses along Riverdale Road to right-in/right-out, resulted in strip acquisitions of properties to widen the road, and required the re-grading of front yards and driveways. As the residential parcels closest to the Baltimore-Washington Parkway are very small with short, often steep, driveways, there was concern that the strip acquisitions could result in impacts unacceptable to the property owners. Prince George's County asked MTA to study a shift in the transitway to the south side of the roadway, displacing the residents on that side. MTA conducted an extensive public outreach effort with the affected residents and homeowners, which revealed that the majority of affected property owners preferred the shifted south side alignment to the median alignment, despite the resulting displacements. Therefore, MTA and Prince George's County have jointly endorsed the south side refinement along Riverdale Road.

Alignment along Veterans Parkway

Once the site for the Glenridge Maintenance Facility on Veterans Parkway was identified, the transitway alignment in the area was reconsidered to provide safe and efficient access to the facility. The median alignment in the LPA would have required transit vehicles entering and exiting the yard to cross southbound traffic on Veterans Parkway. Also, it was difficult to accommodate the

required lead tracks and switches in the median. An alignment on the southwest side of the roadway would not require the transit vehicles to cross vehicular traffic and would accommodate the lead tracks and switches. Therefore, the alignment was shifted to the southwest side of Veterans Parkway but was still primarily within the state-owned right-of-way of Veterans Parkway.

Annapolis Road At-Grade Crossing

During project-wide value planning exercises, options were considered to address the following challenges presented by the transitway underpass at Annapolis Road proposed in the LPA:

- The Annapolis Road station would have been located under Annapolis Road. While this would have provided good access to both sides of Annapolis Road, it presented safety concerns because passengers would wait in an area of poor visibility, away from the pedestrian activity occurring at street level.
- This station location also would require stairs and elevators to provide access to the station.
- The grade-separated alignment would have resulted in a direct conflict with a 66-inch underground water main, which would require the relocation of a portion of the water line.
- Maintenance of traffic on Annapolis Road would have been difficult during construction of a new bridge carrying Annapolis Road over the Purple Line, since no reasonable detour routes exist.
- Large retaining walls would have been required to accommodate the grade separation.

In addition to the safety and construction difficulties, the cost of meeting these requirements would be considerable. Therefore, MTA determined that an at-grade crossing of Annapolis Road would be an appropriate refinement. Also, an at-grade station east of Annapolis Road would be in line with CPTED⁶ principles for safety and reduced crime by improving visibility and integrating the station with

⁶ Crime Prevention through Environmental Design (CPTED) is an approach to deterring criminal behavior through the design of the built environment. Often referred to as Defensible Space, several of the main principles are maximizing visibility, differentiating between public and private space, and controlling access with fencing, lighting and landscaping.

the pedestrian activity at street level, and it would support the county's plan for TOD in this location.

Lyttonsville and Glenridge Maintenance and Storage Facility Sites

Both of these maintenance and storage facility sites were identified in the AA/DEIS and LPA, but the site plans and work programs were not prepared at that stage of the project. The size and designs are dependent on the number of vehicles required, which, in turn, is dependent on the projected ridership.

As plans for the Purple Line were more fully developed and the number of trains increased in response to a larger projected ridership, the site in Lyttonsville expanded. Local residents expressed concerns about the proposed location and increased size because the facility would be close to homes and would have displaced a number of commercial and light industrial businesses along Brookville Road. MTA agreed to reexamine the plans for the facility to address the community's concerns.

MTA developed an option that would address both the community concerns and meet MTA's operational requirements. Working with owners of two large parcels of land in the area, Montgomery County and the Washington Suburban Sanitary Commission, MTA was able to shift most of the facility west of Lyttonsville Place and south of Brookville Road, away from the local residents and the commercial area.

In a continued effort to reduce both the capital and operating costs of the project and the community impacts, MTA programmed the activities at the two sites to serve separate purposes. The Lyttonsville site would be the primary vehicle storage area and would house the operations and control center while the Glenridge site would be the primary maintenance and repair shop. As a result, the Lyttonsville Yard design was consolidated to displace fewer adjacent businesses, and the Glenridge Maintenance Facility was shifted farther from an elementary school and from the active recreation facilities of Glenridge Park.

Adelphi Road At-grade Crossing

The grade of University Boulevard as it approaches Adelphi Road was outside the Purple Line LRT design criteria used during the conceptual planning for the AA/DEIS.⁷ Consequently, the LRT alternatives in the AA/DEIS included an underpass at Adelphi Road. In 2012, after the project entered Preliminary Engineering, UMD requested that an at-grade crossing of Adelphi Road be considered to improve the visibility of the station, its connection to UMD University College and the main campus, safety for station users, and pedestrian access. MTA conducted additional survey work to obtain more information on the grades, developed more detailed designs, and obtained more detailed information on the capabilities of the LRT vehicles under consideration.

These studies determined that an adjustment in the vertical profile of the transitway in the median of University Boulevard to meet the elevation of Campus Drive would permit an at-grade crossing of Adelphi Road, which would achieve the goals cited by UMD and would simplify the maintenance of traffic during construction. This refinement also relocated the proposed station to street level on the south side of Campus Drive.

The Prince George's County Park and Planning Commission supported the change, noting that TOD opportunities would be enhanced by the at-grade option. The Prince George's County Purple Line TOD study assumes an at-grade station.⁸

2.2.3 Additional Refinements to the Alignments (post-August 2012)

After the completion of the Re-evaluation in August 2012 the MTA continued design refinement in response to additional community and stakeholder input, and further understanding of local conditions

⁷ For the initial planning stage of the project MTA developed a set of design criteria including LRT vehicle capabilities (*Purple Line Corridor Transit Study General Vehicle Guidelines*, 2006). These early design criteria for vehicles were based on conservative assumptions for size, type, and other characteristics of potential light rail vehicles. Typical of these assumptions was the grade that the vehicles could handle.

⁸ *Purple Line TOD Study*, M-NCPPC, draft, November 2012.

and constraints. The following are the refinements made.

Alignment along Ellin Road (Veterans Parkway to New Carrollton Metro Station)

Initial plans for the alignment on Ellin Road located both tracks of the transitway on the south side of Ellin Road from Veterans Parkway (MD 410) to the New Carrollton Metro Station. The alignment passed a substantial PEPCO electrical substation. During coordination with PEPCO, the MTA was advised that the alignment would need to be relocated due its proximity to an underground grid and several underground electrical vaults. The MTA evaluated several options and ultimately selected an option that located the tracks in the outside lanes of the existing roadway. The light rail would operate in mixed traffic conditions in these lanes along a portion of Ellin Road.

Alignment along Arliss Street (Flower Avenue to Piney Branch Road)

At the time of the AA/DEIS, the tunnel portal was planned in the center of the roadway and tracks remained in the center. In the context of the development of a new local sector plan MTA worked with the Montgomery County planners and DOT as well as local property owners to address concerns about changes in property access and property acquisition requirements. In response and through close coordination with the county, the MTA has shifted the portal to the south side of the roadway and realigned the tracks and station platform to that side of Arliss Street. Coordination with the property owner is ongoing regarding construction easements and short term impact minimization.

Reduction of University Boulevard from Six to Four General Traffic Lanes (Piney Branch Road to West Park Drive)

At the time of the AA/DEIS, University Boulevard between Piney Branch Road (MD 320) and West Park Drive would remain a six-lane roadway with three travel lanes in each direction. The addition of a dedicated transitway for the Purple Line in the center would have resulted in roadway widening of approximately 40 feet.

Community members and stakeholders proposed that MTA study the possibility of reducing the width of the transportation corridor right-of-way along University Boulevard in order to make the area safer and more pedestrian-friendly, facilitate transit-oriented development, and provide space for streetscape elements such as landscaping, cycle tracks and wider sidewalks. University Boulevard in this area is already notable for high levels of pedestrian activity, as well as a high number of pedestrian accidents.

After extensive coordination and study with SHA and both counties, it was agreed that University Boulevard would be reduced to a four-lane section between Piney Branch Road and West Park Drive with specific additional intersection improvements. The intersection improvements in conjunction with the minor estimated diversions would result in a four-lane configuration that would operate similar to the six-lane configuration included in the Locally Preferred Alternative. Benefits from this change include:

- Narrower transportation corridor
 - 22 feet narrower compared to LPA
 - Improves pedestrian facilities/safety
 - Provides opportunities for wider sidewalks and green buffers in some areas
 - Significantly reduces right-of-way impacts
 - Reduces displacements from 11 to 6 (down to 8 businesses)
 - Less impact on adjacent properties
 - Maintains a portion of several service drives and residential and commercial parking lots (120 fewer residential spaces lost)
- Reduces storm water management needs
- Balances needs of all users (pedestrians, motorists, transit)
- Provides more space for future sector plan improvements such as cycle tracks and/or wider sidewalks

This refinement has been coordinated with the local jurisdictions and supported by the community and local stakeholders.

2.2.4 Refinement Options Evaluated but Not Selected

Since the identification of the LPA in 2009, several design options were evaluated but not selected for inclusion in the Preferred Alternative (see *Supporting Documentation on Alternatives Development* (2013)).

North Side of Ellin Road

The residents of the Hanson Oaks neighborhood on the south side of Ellin Road in Prince George's County asked MTA to evaluate an option locating the transitway on the north side of Ellin Road, instead of the south to minimize impacts to their neighborhood. This option was evaluated, but rejected because it would have impacts to West Lanham Neighborhood Park. It also would have required acquisition of residential property, while the south side option did not take any private residential property. The north side option, although farther from the Hanson Oaks neighborhood, would have been closer to the West Lanham Hills neighborhood.

Single Track under the Baltimore-Washington Parkway

At the request of the National Park Service (NPS), MTA evaluated the option of single track operation on Riverdale Road as the Purple Line crosses under the Baltimore-Washington Parkway. This would have reduced the required widening of Riverdale Road, and thus reduced the impacts to the NPS property. The single-track segment would be approximately 1,600 feet long, and would be located in the eastbound left turn lane of Riverdale Road. As the transit vehicles and the motor vehicles could not use the lane at the same time, the shared use would require that the eastbound traffic be held at a signal when the light rail vehicle was in the lane. The resulting delay, both the time for the traffic to clear the lane and the time for the transit vehicle to traverse the single track, would cause queues of eastbound traffic over 4,000 feet long, extending to and beyond Kenilworth Avenue compared to queues of approximately 1,100 feet under the LPA. In addition, the projected traffic delay in the eastbound direction from west of Kenilworth Avenue to east of Veterans Parkway would increase from 5 minutes under the LPA, to 45 minutes.

These traffic impacts would be so severe that this would not be a reasonable option.

Tunnel Option at Baltimore-Washington Parkway

Also at the request of the NPS, MTA evaluated the option of a putting the LRT in a tunnel where the alignment would cross the Baltimore-Washington Parkway, to avoid potential impacts to that facility. This option would have left the parkway bridges untouched and would not have impacted traffic at the signals at the parkway entrance and exit ramps and the nearby intersections on Riverdale Road. However, the tunnel would have been over 3,300 feet long, would have required ventilation and pumping, and would have resulted in additional residential displacements. It also would have required an underground station at Beacon Heights. The combined cost of the tunnel and the station was estimated at over \$300 million dollars, which would have made the project financially infeasible.

2.3 Alternatives Evaluated in the FEIS

2.3.1 No Build Alternative

The No Build Alternative represents the future conditions of transportation facilities and services in 2040 in the corridor if the Purple Line were not built. The No Build Alternative has been updated since the publication of the AA/DEIS in 2008 and includes the existing highway network and transit service, plus those transportation projects listed in Table 2-2 for which funding sources have been identified, and have been included in the CLRP for implementation by 2040. The CLRP also includes some unfunded "illustrative projects," which could be built if additional funding is obtained, but are not included in the No Build Alternative. Maintenance projects, such as roadway resurfacing, cleaning or painting and the current Montgomery County consideration of a BRT network⁹ also are not included. The Montgomery County BRT study involves a proposal for a countywide BRT network of multiple routes. The final draft of this proposed amendment to the Master Plan of Highways is scheduled for transmittal to the County Council

⁹ *Master Plan of Highways Bus Rapid Transit Amendment*, Montgomery County Planning Department, M-NCPPC, September 2011

July 22, 2013. Because the Montgomery County BRT is still in development, and is not adopted or funded, it is not included in the No Build Alternative.

The following three projects are not part of the Preferred Alternative and are planned to be built absent the Purple Line project. While these three projects all have independent utility, each would be constructed in a manner that will accommodate the Purple Line.

Bethesda Metro Station South Entrance

This new entrance to the Bethesda Metro Station mezzanine at the south end of the Red Line Metro-rail platform would provide a direct connection between the Purple Line and the Red Line. Montgomery County has committed \$81 million for construction.

Montgomery County intended to initiate construction of the Metro Station South Bethesda Station Entrance as a separate project prior to the start of

the Purple Line construction. However, based on recent discussions with the county, the building of this project is now likely to occur at the same time as the Purple Line, providing some construction interface and cost savings benefits. During the construction of the shaft containing the elevators and egress stairs providing the connection between the Metrorail station and the surface, Elm Street between Wisconsin Avenue and Woodmont Avenue would be closed to through traffic.

Silver Spring Transit Center

This is an integrated transit center at the Silver Spring Metro Station that includes bus bays for Metrobus and Ride On, an intercity bus facility, a taxi queue area, a kiss-and-ride facility, and a MARC ticketing office. Provision is also made for the Purple Line and the Capital Crescent Trail. This project is under construction.

Table 2-2. Transportation Projects in the CLRP

Jurisdiction	Agency	Project Name	Facility	Limits
Montgomery County	Montgomery County	Silver Spring Green Trail	Silver Spring Green Trail	Silver Spring Metro Station to Sligo Creek Trail
Montgomery County	Montgomery County	Silver Spring Transit Center	Silver Spring Transit Center	Silver Spring Metro Station
Montgomery County	Montgomery County	Bethesda Bikeway and Pedestrian Facilities	Bethesda Bikeway and Pedestrian Facilities	Bethesda CBD
Montgomery County	Montgomery County	Bethesda Metro South Entrance	Bethesda Metro Station	Bethesda Metro Station
Montgomery County	Montgomery County	Dale Drive Sidewalk	Dale Drive Sidewalk	Mansfield Road to Hartford Avenue
Montgomery County	Montgomery County	Silver Spring Traffic Improvements	Dale Drive	Dale Drive to US 29 Colesville Road
Montgomery County	Montgomery County	Bethesda Lot 31 Parking Garage	Bethesda Lot 31 Parking Garage	Bethesda Avenue at Woodmont Avenue
Montgomery County — Prince George's County	MTA	Takoma/Langley Park Transit Center	Takoma/Langley Park Transit Center	University Boulevard at New Hampshire Avenue
Prince George's County	MDOT/State Highway Administration	US 1, Baltimore Avenue	US 1 Baltimore Avenue	College Avenue to Sunnyside Avenue
Prince George's County	Prince George's County	US Route 1 Bus Enhancements	US Route 1	District Line to MD 198
Prince George's County	Prince George's County	Greenbelt Road MD 193 Bus Enhancement	MD 193 Greenbelt Road/University Blvd	MD 650 New Hampshire Avenue to MD 564 Lanham-Severn Road
Prince George's County	MDOT/State Highway Administration	MD 201, Kenilworth Avenue	MD 201	Rittenhouse Road to Pontiac Street

Takoma/Langley Park Transit Center

This transit center is a joint project of MTA and SHA with financial contributions by Prince George's and Montgomery Counties that includes pedestrian safety, roadway and intersection improvements including new sidewalks and crosswalks; and a shelter for patrons awaiting buses. It will be on the northwest corner of the University Boulevard and New Hampshire Avenue intersection in Langley Park. This transit center would be adjacent to the Purple Line station in the median of University Boulevard. This project received a U.S. Department of Transportation TIGER¹⁰ grant award in February 2010. Notice to Proceed is anticipated in 2013.

2.3.2 Preferred Alternative

The term "Preferred Alternative" as used in this FEIS refers to MTA's current proposal, which is a refined version of the LPA. The Preferred Alternative is a 16.2-mile east-west LRT line that would extend from the Bethesda Metro station in Montgomery County to the New Carrollton Metro station in Prince George's County.

The Preferred Alternative would be at grade except for one short tunnel section and three sections elevated on structures. The Preferred Alternative would operate mainly in dedicated or exclusive lanes, providing fast, reliable transit operations. The alignment, stations, system elements, yard, maintenance facility and operating plan are summarized in Table 2-3, shown in Figure 2-5, and described below.

For plans and mapping of the Preferred Alternative see *Volume 2 – Conceptual Engineering Plans and Environmental Resource Mapping*.

Alignment

Bethesda to Silver Spring Transit Center — 4.3 miles

For mapping of this area see the conceptual engineering plans CV-1 through CV-20, and environmental resource maps 1 through 9.

The transitway would begin on the Georgetown Branch right-of-way in Bethesda. The Georgetown Branch right-of-way crosses under Wisconsin Avenue. On either side of the Wisconsin Avenue bridge, buildings have been built above the right-of-way; the Apex building west of Wisconsin Avenue, and the Air Rights building to the east. The western terminus would include a short section of track extending west outside the Apex building for approximately 100 feet. The Bethesda station would be under the Apex building.

For mapping of this area see the conceptual engineering plans CV-1 through CV-6, and environmental resource maps 1 through 3.

Table 2-3. Summary of Preferred Alternative

Measure	Preferred Alternative
Length	16.2 miles
Stations	21
Storage and maintenance facilities	2
Ancillary facilities	20 traction power substations — 18 along the alignment and 2 in yards Approximately 14 signal bungalows
Length in tunnel	0.3 miles
Travel time (Bethesda–New Carrollton)	63 minutes during peak hours 60 minutes during off peak hours

The station would connect to elevators serving a new south entrance to the Bethesda Metrorail station. The elevators would continue up to Elm Street. Access also would be provided from Woodmont Plaza to the west, and via a sidewalk from the Capital Crescent Trail. This sidewalk from the elevator lobby area adjacent to the Purple Line station and under the Air Rights building would provide access to the station from the east. The transitway would continue east under both Wisconsin Avenue and the Air Rights building. After emerging from under the Air Rights building, the transitway would continue in the Georgetown Branch right-of-way, crossing under East West Highway and passing through the Columbia Country Club (see Figure 2-6 for an illustration of a typical section in the Georgetown Branch right-of-way).

¹⁰ Transportation Investment Generating Economic Recovery, a supplementary discretionary grant program included in the American Recovery and Reinvestment Act of 2009.

Figure 2-5. Purple Line Preferred Alternative

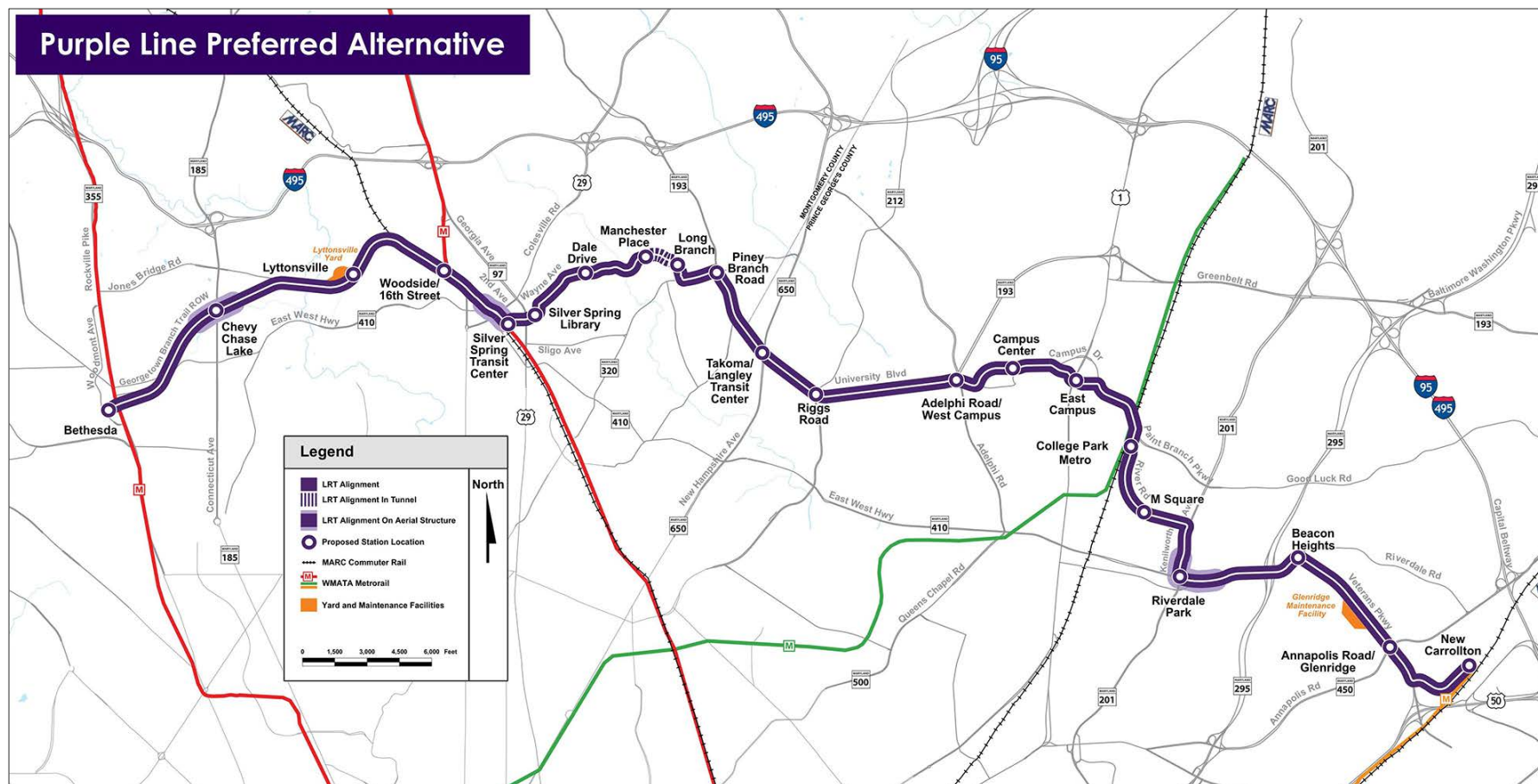
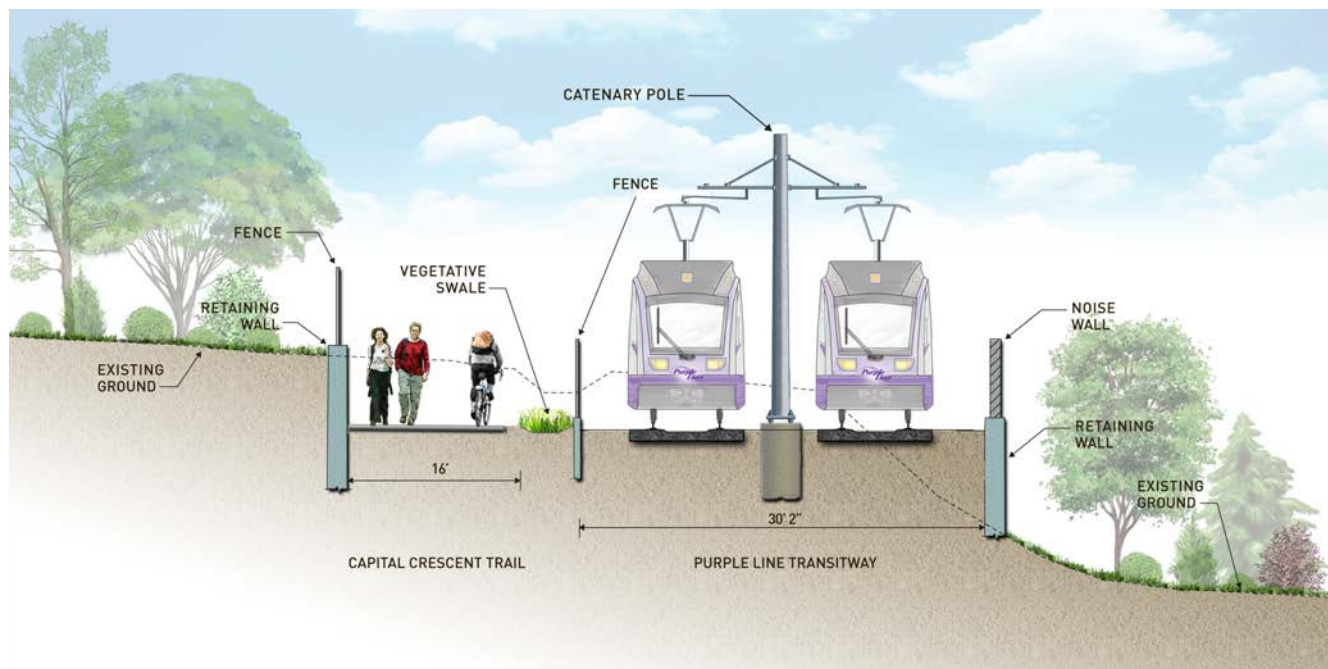


Figure 2-6. Typical Section in Georgetown Branch Right-of-way



Continuing along the Georgetown Branch right-of-way, the transitway would cross Connecticut Avenue on a bridge. The Chevy Chase Lake station would be on the east side of Connecticut Avenue, elevated at the level of the bridge with connections to street level provided by stairs and elevators. The transitway would continue east, returning to grade, and then pass under Jones Mill Road. A new bridge, approximately 10 to 15 feet lower than the existing pedestrian bridge, would carry the transitway across Rock Creek. The Lyttonsville Yard would be located on the north side of the transitway, mostly west of the Lyttonsville Place bridge. The Lyttonsville station would be located east of the bridge. Continuing east in the Georgetown Branch right-of-way to the CSXT right-of-way, the transitway would continue parallel to the CSXT right-of-way on the south side (see Figure 2-7 for an illustration of a typical section along the CSXT right-of-way).

It would pass under the bridges at Talbot Avenue, 16th Street, and Spring Street within or adjacent to the CSXT right-of-way, at approximately the same elevation as the CSXT tracks. The Woodside station would be just east of the 16th Street Bridge. East of the Falkland Chase Apartments, the transitway would cross over the CSXT tracks to the north on

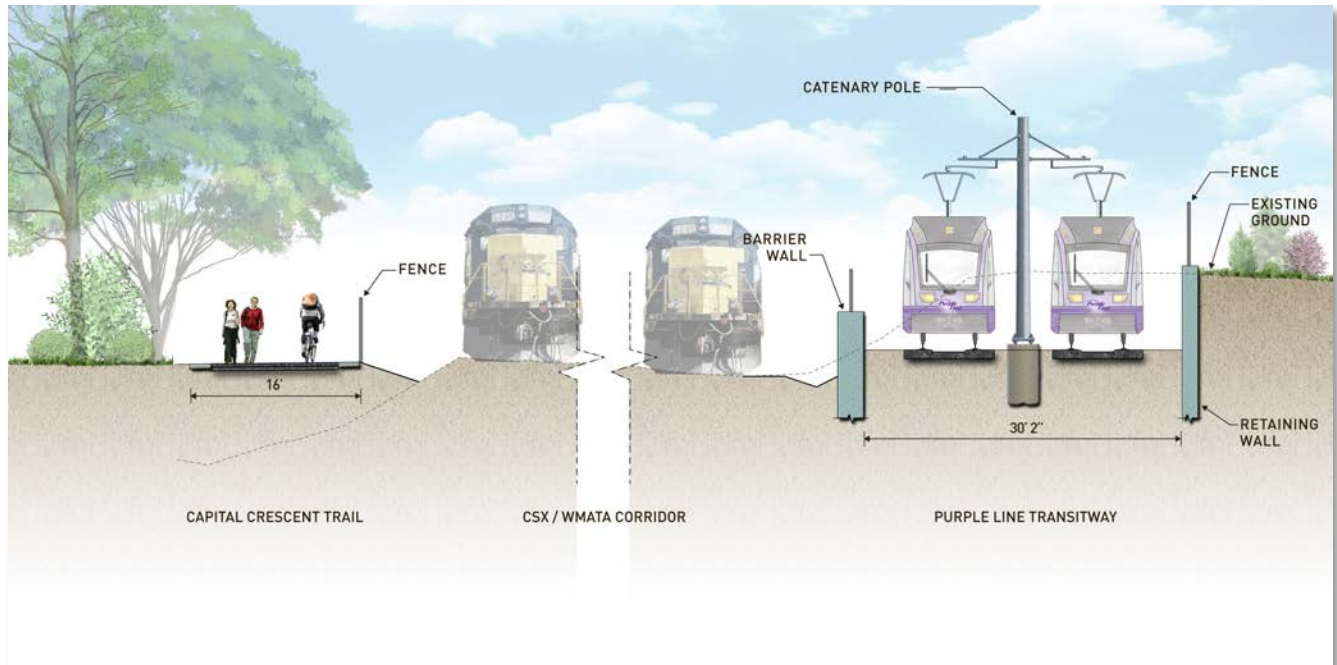
an aerial structure and enter the SSTC parallel to, but higher than, the existing Metrorail tracks. The SSTC station platform would be located between the SSTC and the existing railroad tracks.

Silver Spring Transit Center to Takoma/Langley Park Transit Center — 3.2 miles

For mapping of this area see the conceptual engineering plans CV-20 through CV-37, and environmental resource maps 9 through 15.

East of the SSTC, the transitway would turn away from the CSXT right-of-way and descend to grade on the south side of Bonifant Street in dedicated lanes. The transitway would cross Georgia Avenue at grade, shifting to the north side of Bonifant Street. Just before reaching Fenton Street, the transitway would turn north to pass through the future Silver Spring Library building, the location of a station, and enter the intersection of Fenton Street and Wayne Avenue. The transitway would continue on Wayne Avenue in mixed-use lanes in the center of the roadway. The Preferred Alternative would have a station in the center of Wayne Avenue east of Dale Drive.

Figure 2-7. CSXT Right-of-Way Typical Section, Looking Southeast



Note: While this figure shows completing the Capital Crescent Trail in CSXT right-of-way, the completion of the trail along the CSXT corridor is contingent on agreement with CSXT on the use of their 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.

The transitway would continue along Wayne Avenue (Figure 2-8). After crossing the intersection of Sligo Creek Parkway, it would enter a tunnel from Wayne Avenue east of Manchester Road to avoid the steep grade of Wayne Avenue. The Manchester Place station in the portal of the tunnel would be accessed both at grade from Wayne Avenue or by stairs or elevators from Plymouth Street above. The transitway would emerge from the tunnel on the south side of Arliss Street in dedicated lanes and would continue to the intersection of Piney Branch Road. The Long Branch station would be on the west side of Arliss Street at this intersection.

The transitway would run in the median of Piney Branch Road to the intersection with University Boulevard. Piney Branch Road would be widened to accommodate the two new transit lanes.

The Piney Branch station would be in the median of University Boulevard at this intersection. The transitway would continue south in dedicated lanes in the median of University Boulevard to a station at the intersection with New Hampshire Avenue,

adjacent to the Takoma/Langley Park Transit Center. On University Boulevard the Preferred Alternative would replace the two center traffic lanes with the transitway. As described in Section 2.2.2, this change would reduce University Boulevard from six lanes to four lanes. See Figure 2-9 for a typical section of the transitway in the median of University Boulevard.

Takoma/Langley Park Transit Center to College Park Metrorail station — 4.0 miles

For mapping of this area see the conceptual engineering plans CV-37 through CV-57, and environmental resource maps 15 through 22.

Continuing along University Boulevard, the Riggs Road station would be in the median of University Boulevard on the west side of the Riggs Road intersection. The transitway would continue on University Boulevard, crossing Adelphi Road at grade to enter the UMD campus. The Adelphi Road/West Campus station would be located here directly across from UMD University College.

Figure 2-8. Wayne Avenue Typical Section, Looking East

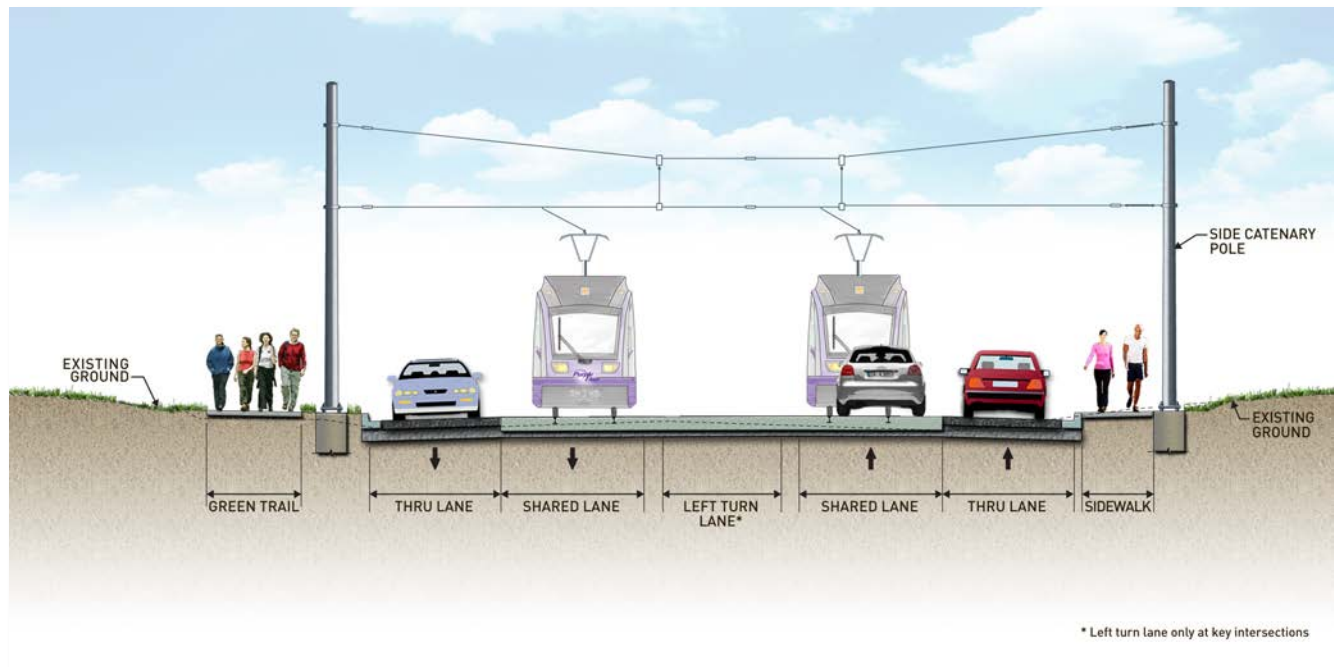
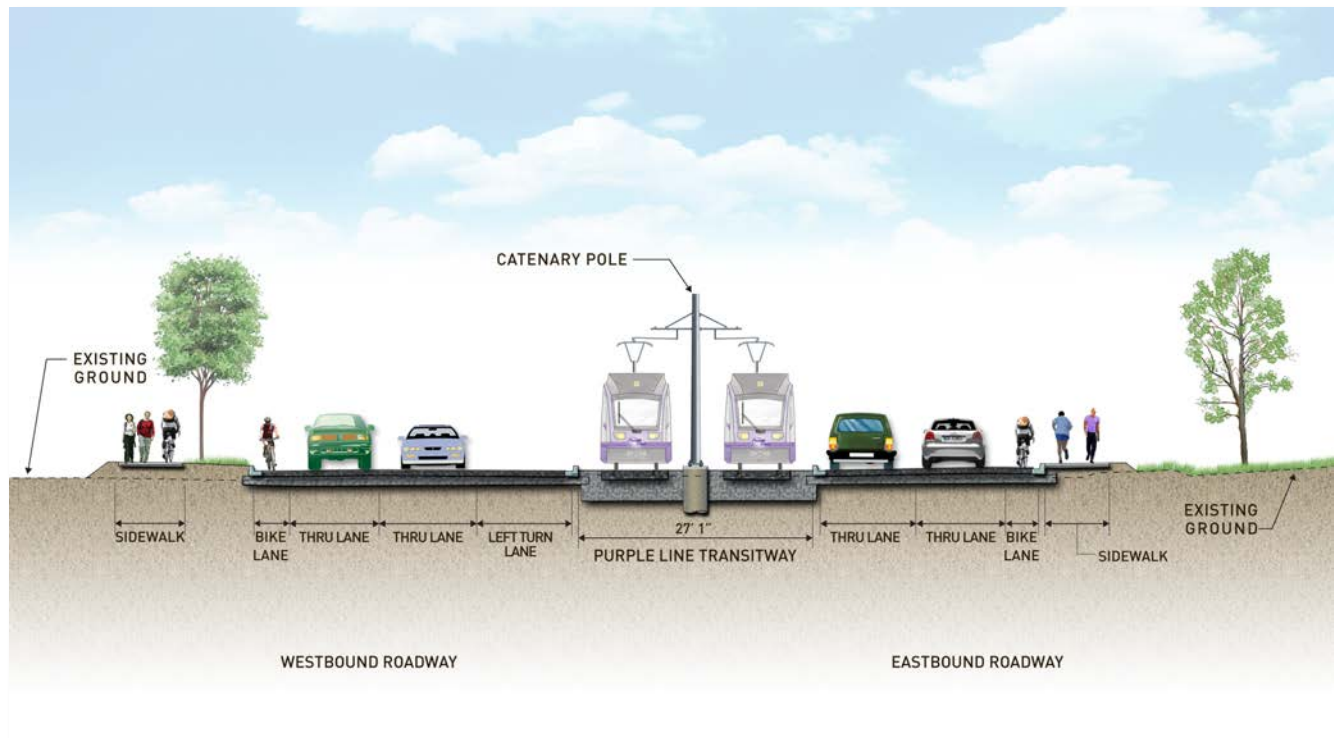


Figure 2-9. University Boulevard Typical Section, Looking East



The transitway would turn left at Presidential Drive and follow a future extension of Union Drive as shown in the UMD *2011-2030 Facilities Master Plan* in an area that currently contains parking lots to connect to the existing Union Drive and continue to Campus Drive. The Campus Center station would be located near Cole Student Activities Building. The transitway would continue on Campus Drive to Regents Drive. Campus Drive would be rebuilt as a three-lane roadway, with the outside lanes shared by Purple Line vehicles and buses and the center lane as a one-way lane for general traffic. The Preferred Alternative would continue at grade in a new exclusive transitway from Regents Drive, along the parking lots adjacent to the Armory, behind the Visitors Center to Rossborough Lane.

The transitway would cross US 1 at grade on Rossborough Lane, to enter the East Campus development. The East Campus station would be on Rossborough Lane just east of US 1. The transitway would continue east to Paint Branch Parkway in dedicated lanes along the curb and would continue on Paint Branch Parkway in mixed-use lanes. Immediately east of the existing station parking garage, it would turn and enter the College Park—UMD Metro station area and would run adjacent to the Metrorail tracks. The Purple Line College Park Metro station would be located here. After passing behind the proposed parking garage for the currently planned future residential development, the transitway would turn towards River Road.

College Park Metrorail Station to New Carrollton Metrorail Station—4.7 miles

For mapping of this area see the conceptual engineering plans CV-57 through CV-82, and environmental resource maps 22 through 32.

The Preferred Alternative would parallel the south side of River Road from River Tech Court to Haig Drive. The M Square station would be just west of Haig Drive. The transitway would continue along the side of River Road, cross over the Northeast Branch, and turn right into the median of Kenilworth Avenue. It would rise on an aerial structure that begins near Quesada Street and

would continue over the intersection of Kenilworth Avenue and East West Highway where it would then turn left onto the south side of Riverdale Road. The Riverdale Park station would be on the elevated structure just after the intersection. The transitway would return to grade in dedicated lanes adjacent to Riverdale Road on the south side and would then pass under the Baltimore—Washington Parkway. The existing bridges of the Baltimore—Washington Parkway over Riverdale Road would be lengthened to accommodate the Preferred Alternative. The Beacon Heights station would be just west of the intersection with Veterans Parkway.

The transitway would turn at Veterans Parkway and continue on the south side of the parkway, as shown in Figure 2-10. Along Veterans Parkway, the Glenridge Maintenance Facility would be located at the current site of the Maryland-National Capital Park and Planning Commission (M-NCPPC) Northern Area Maintenance—Glenridge Service Center. The transitway would cross Annapolis Road at grade to arrive at the Annapolis Road station. It would continue along Veterans Parkway and turn left at Ellin Road and travel in the outside lanes of Ellin Road in mixed-traffic operations to arrive at the transitway terminus at the New Carrollton Metro station.

Capital Crescent Trail

As part of 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. 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 (Figure 2-11). At the junction with the CSXT Metropolitan Subdivision, the County's current plan calls for the permanent Capital Crescent Trail to continue on the north side of the CSXT corridor to the SSTC. The Preferred Alternative as shown in the FEIS includes completing the Capital Crescent Trail in CSXT right-of-way in accordance with the County's plan. The completion of the trail along the CSXT corridor, however, is contingent on agreement

Figure 2-10. Veterans Parkway Typical Section, Looking East

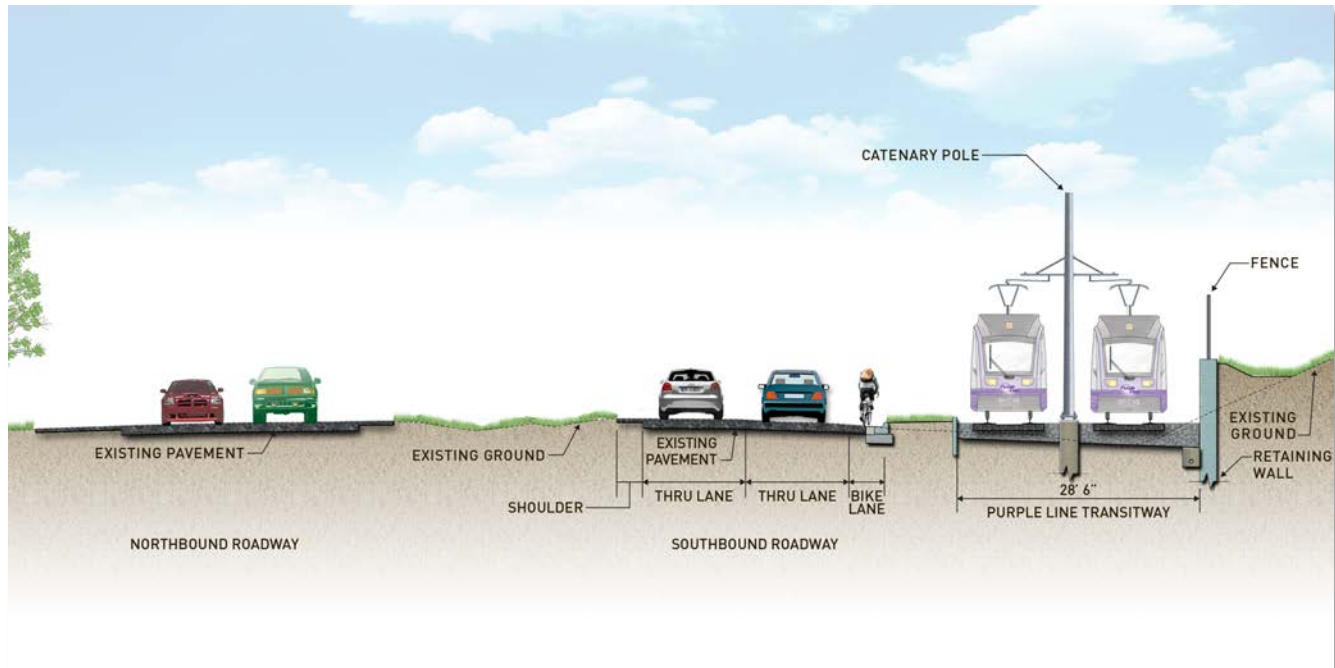
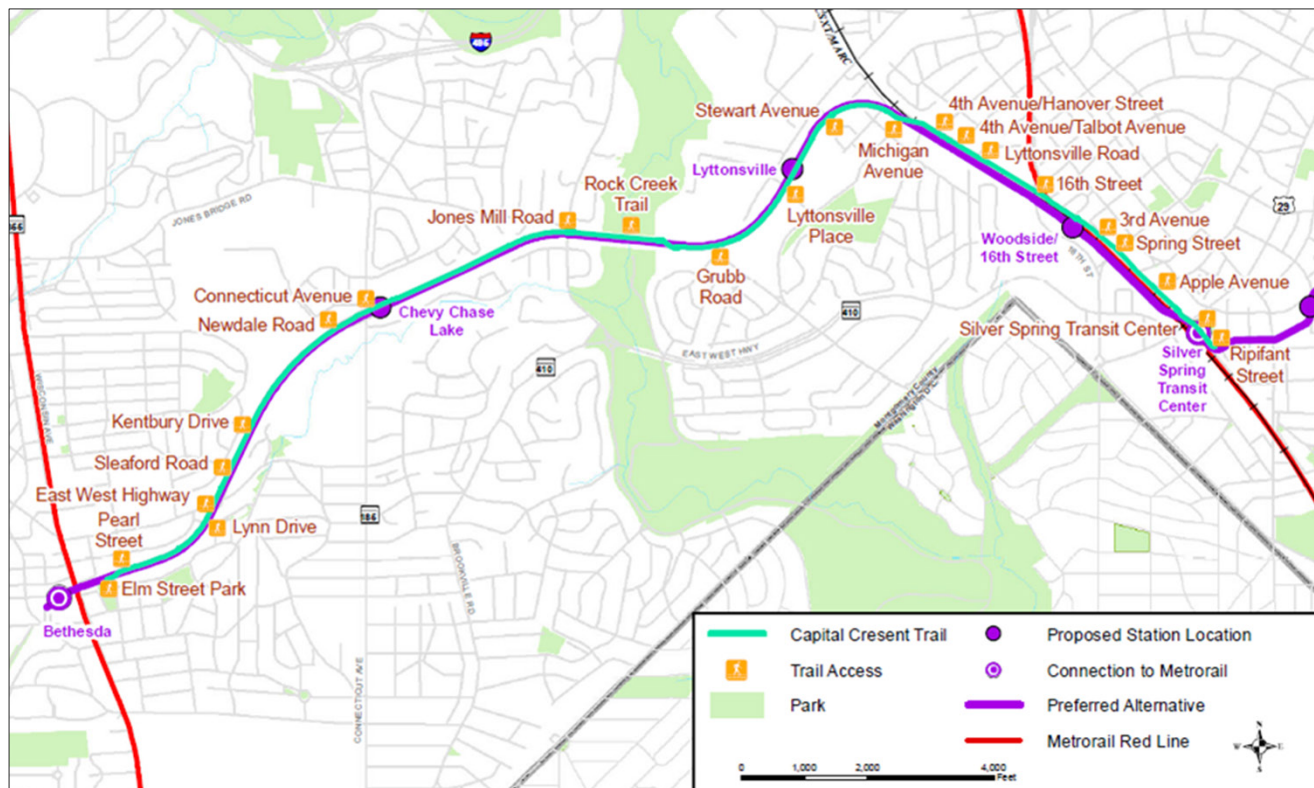


Figure 2-11. Capital Crescent Trail with Access Points



between Montgomery County and CSXT on the use of their 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. MTA will plan, design, and construct the permanent Capital Crescent Trail between Bethesda and Talbot Avenue concurrently with the Purple Line. The Capital Crescent Trail will be owned and operated by Montgomery County, which will be responsible for providing the funds to construct it. Funding for the trail is in the county's Capital Improvements Program.¹¹ Because the Capital Crescent Trail will be a county facility, Montgomery County has determined design elements such as the trail width, the type of surface, and inclusion of additional amenities such as lighting.

This FEIS for the Purple Line describes the potential environmental impacts of the trail and the proposed mitigation. Once completed, the Capital Crescent Trail would be a paved trail, generally 12 feet wide with 2-foot unpaved shoulders, except that it may be narrower in locations where the width is constrained. Where there is sufficient width, the trail would be located approximately 10 feet from the transitway to provide a landscaped buffer between the two. Between Bethesda and Talbot Avenue, the trail would include 16 access locations, listed below, and shown in Figure 2-11:

- Elm Street Park
- Pearl Street
- Lynn Drive
- East West Highway
- Sleaford Road
- Kentbury Drive
- Newdale Road
- Connecticut Avenue
- Jones Mill Road
- Rock Creek Trail
- Grubb Road
- Lyttonsville Place
- Stewart Avenue
- Michigan Avenue

- 4th Avenue/Hanover Street
- 4th Avenue/Talbot Avenue

Between Talbot Avenue and downtown Silver Spring, the proposed trail access points are:

- Lyttonsville Road
- 16th Street
- 3rd Avenue
- Spring Street
- Apple Avenue
- Silver Spring Transit Center
- Ripifant Street

Due to the physical constraints under Wisconsin Avenue and the Air Rights and Apex buildings, the construction of a full-width trail above the LRT tracks in the underpass would incur high costs and a very high risk due to the need to lower the transitway and reinforce the piers that support the buildings above. In March 2012 the Montgomery County Council decided that it would defer the construction of a full width trail in this built-over section because of the high cost and associated risks.

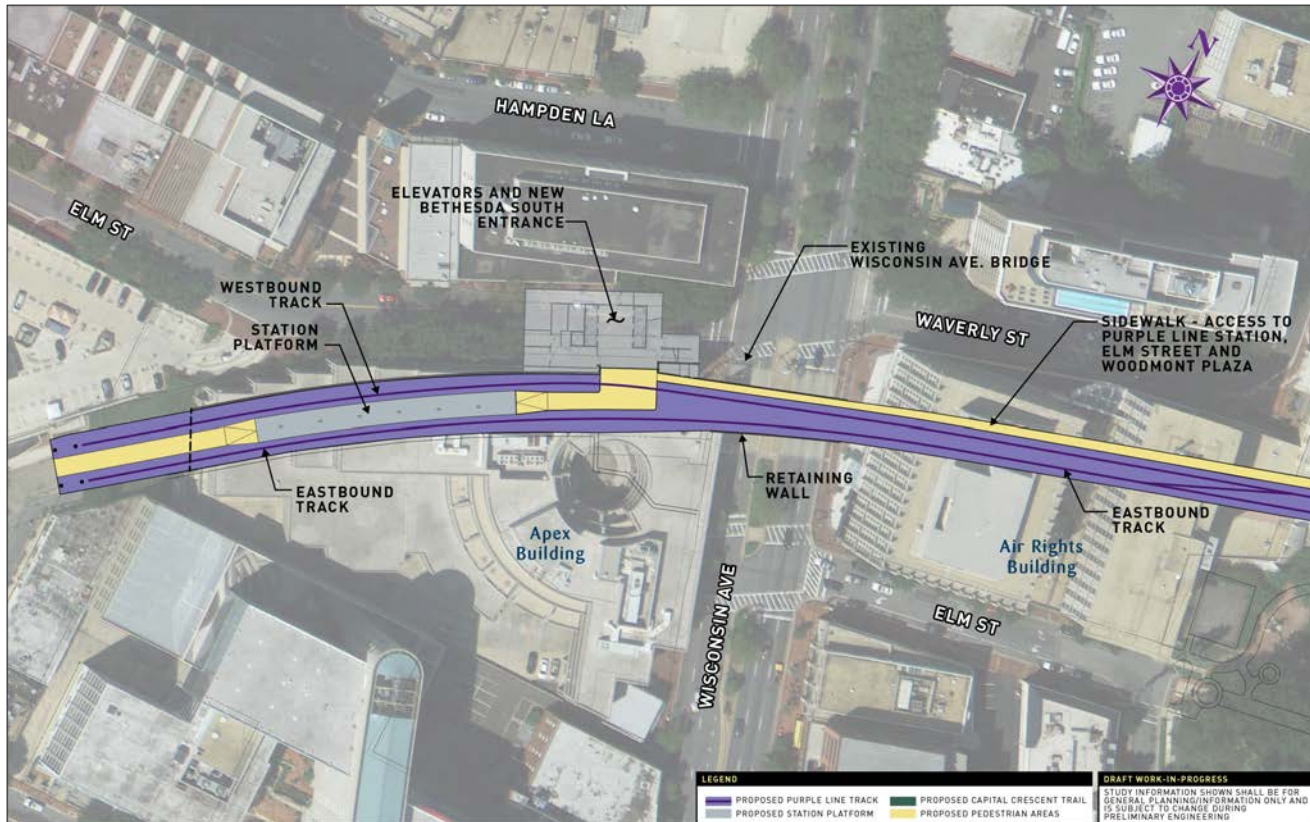
In fall 2012 MTA developed a new option that would provide a sidewalk connection from the trail to the Bethesda station platform (Figure 2-12). While not a full-width trail, this 5- to 7-foot sidewalk would allow pedestrians to access the Purple Line station, the elevators to the Red Line station and Elm Street, and continue to Woodmont Plaza. This option was presented to and endorsed by the Montgomery County Council in September 2012.

As a separate project, Montgomery County is constructing an at-grade connection between the existing Capital Crescent Trail in Bethesda and Elm Street Park. This connection includes bike lanes and signage on existing streets. The connection is part of the Montgomery County *Countywide Bikeways Functional Master Plan* (2005).

From Elm Street Park on the south side of the right-of-way, the Capital Crescent Trail would cross over the transitway on an elevated structure. Once on the north side of the transitway the trail would descend to ground level. Between approximately Pearl Street and Rock Creek, the trail would be on the north side of the transitway.

¹¹ FY13-18 Capital Improvements Program, Project 501316

Figure 2-12. Bethesda Station



The trail would cross Connecticut Avenue on a separate bridge adjacent to the transitway and would provide pedestrian and bicycle access to the Chevy Chase Lake station. The trail would continue east, passing under Jones Mill Road and crossing Rock Creek on a separate bridge that would be lower than the transitway bridge. After crossing Rock Creek, the trail would pass under the transitway to the south side.

Between Bethesda and Stewart Avenue in Lyttonsville, the trail would parallel the transitway in a similar location as the existing trail. The trail would follow the transitway until crossing to the northeast side of the CSXT right-of-way via a new structure, west of the Talbot Avenue Bridge. The trail would be built parallel to, and on the northeast side of, the CSXT right-of-way. The trail would then parallel the CSXT corridor, passing under the Talbot Avenue, 16th Street, and Spring Street bridges, continuing directly into the SSTC over Colesville Road on an aerial structure that would be below the level of the transitway, but above the top level of the SSTC.

Stations

Twenty-one stations are planned for the Preferred Alternative. The station locations were selected based on connections with existing transit services and urban design principles including access and safety, public space availability, local plans, ridership catchment areas, and engineering feasibility. Potential station locations were presented to community members, local jurisdictions, and other stakeholders for input. In some cases, stations were moved or shifted in response to comments. Seventeen of the stations would be at street level, three would be on aerial structures, and one would be in a tunnel portal. Most riders would walk to the stations or transfer from other transit services. Access plans for each station have been developed to enhance pedestrian and transit access for nearby communities. Ramps, stairs, elevators, and escalators in compliance with the Americans with Disabilities Act of 1990, as amended, would be provided where needed.

As illustrated in Figure 2-13 and Figure 2-14, the stations would have either side or center platforms depending on the site characteristics and space availability. The characteristics of each station are summarized in Table 2-4. The platforms would be approximately 200 feet long to serve two-car trains. Stations would include ticket vending machines, weather shelters for passengers, lighting, wayfinding and informational signage, trash receptacles, seating, and security equipment such as emergency telephones and closed circuit television cameras. The Purple Line would use off board fare collection, compatible with the SmarTrip system, and a barrier-free proof-of-payment system. Landscaping and bike storage would be included where space allows. The size of station shelters and the number of bike storage facilities would be relative to the projected ridership at each station.

Track Types

Four types of track (ballasted, embedded, direct fixation, and green track) are being considered for the project. They are described below:

- Ballasted track would be used where the transitway would not be used by other vehicles, such as along Veterans Parkway. Ballast is made up of stones of granite or a similar material. Ballasted track is formed by packing ballast between, below, and around the railroad ties. The ballast provides support, load transfer, and drainage to the track.
- Embedded track would be used where the Purple Line operates in mixed-use lanes on Wayne Avenue and Paint Branch Parkway and where vehicles would cross or drive on the tracks. Embedded track is track structure that is completely covered, except for the top of the rails, with pavement. Embedded track can typically be found where light rail transit routes are constructed within public streets, pedestrian or transit malls, or any area where rubber-tired vehicles must operate.
- Direct fixation track would be used where the Purple Line is on bridges or in a tunnel. Direct fixation track is similar to embedded track in that the rails are fastened directly to the track support.
- Green track (Figure 2-15) is trackway where plant material is grown between the rails. Green track is commonly used in Europe and is being evaluated for portions of the Purple Line. Green track can be an aesthetic treatment and under certain conditions may be used to address stormwater management requirements.

In some locations there is no choice of track type. For example, the tracks must be embedded where other vehicles would operate on or cross the tracks. In other areas the track type is being evaluated based on operations, maintenance, cost, and aesthetics.

Storage and Maintenance Facilities

Two storage and maintenance facilities are proposed: one at Lyttonsville in Montgomery County and the other at Glenridge in Prince George's County. The AA/DEIS envisioned that approximately half the fleet would be stored in each location, and the maintenance and operations activities would be split. However, this resulted in some redundant activities as certain functions would be performed at both sites, and maintenance buildings would be required at each site with associated materials storage, locker rooms, training/break rooms, and other employee services. As discussed in Section 2.2.2, the sites have been reprogrammed to reduce redundant activities, reduce costs, and minimize impacts.

Lyttonsville Yard

As described earlier, the plans for the Lyttonsville site were modified in response to community concerns. Under the modified plans, the yard would be parallel to the transitway and provide tracks to store vehicles not in use or waiting for repair.

The yard would be used to store vehicles, and would include a train wash, a traction power substation, fuel pumps, office facilities, operations center, and an employee parking facility. The parking facility would provide 200 spaces for MTA employees and 200 spaces for employees of the county's maintenance facility. The parking for county employees would be provided because the yard would displace their existing parking facility. A stormwater

Figure 2-13. Typical Center Platform Station



Figure 2-14. Typical Side Platform Station



Table 2-4. Station Summary

Station	Location	Markets Served	Vertical Location	Platform Type	Connecting Transit Services
Bethesda	Georgetown Branch right-of-way and Elm Street, west of Wisconsin Avenue, under Apex Building	Central business and residential district, and transfers	Under Building	Center	Metro rail Red Line; Metrobus: J2, J3, J7, J9; Ride On: 29, 30, 32, 33, 34, 36, 42, 47, 70, 92
Chevy Chase Lake / Connecticut Avenue	Georgetown Branch ROW at Connecticut Avenue	Local business and residential	Aerial	Side	Metrobus: L7, L8
Lyttonsville	Georgetown Branch ROW at Lyttonsville Place	Local business and residential	At Grade	Center	Ride On: 2
Woodside/16th Street	South of CSXT ROW at 16th Street	Local business and residential, and transfers	At Grade	Side	Metrobus: J5, Q2, Y5, Y7, Y8, Y9; Ride On: 3, 4, 5, 127
Silver Spring Transit Center	Silver Spring Metro rail Station	Central business and residential district, entertainment, and transfers	Aerial	Center	Metro rail Red Line; MARC Brunswick Line; Metrobus: F4, F6, J1, J2, J3, J5, Q2, S2, S4, Y5, Y7, Y8, Y9, Z2, Z6, Z8, Z9, Z11, Z13, Z29, 70, 71, 79; Ride On: 1, 2, 3, 4, 5, 8, 9, 11, 12, 13, 14, 16, 17, 18, 19, 20, 22, 28, 127
Silver Spring Library	Wayne Avenue and Fenton Street	Central business and residential district, and transfers	At Grade	Side	Metrobus: F4, F6; Ride On: 12, 16, 17, 19, 20, 28
Dale Drive	Wayne Avenue at Dale Drive	Local residential	At Grade	Center	Ride On: 3, 12, 19
Manchester Place	Wayne Avenue between Manchester Road and Manchester Place	Local residential	Tunnel Portal	Side	Ride On: 12, 13, 19
Long Branch	Arless Street at Piney Branch Road	Local business and residential	At Grade	Center	Ride On: 14, 16, 20, 24
Piney Branch Road	University Boulevard and Piney Branch Road	Local business and residential, and transfers	At Grade	Center	Metrobus: C2, C4; Ride On: 14, 15, 16, 20, 24
Takoma/Langley Transit Center	University Boulevard and New Hampshire Avenue	Local business and residential, and transfers	At Grade	Center	Metrobus: C2, C4, F8, K6; Ride On: 16, 17, 18; TheBus: 17, 18
Riggs Road	University Boulevard and Riggs Road	Local business and residential, and transfers	At Grade	Center	Metrobus: C2, C4, F8, R5, R1, R2; TheBus: 17, 18
Adelphi Road/West Campus	Campus Drive and Adelphi Road	Residential, UMD, and transfers	At Grade	Center	Metrobus: C2, C8, F6, F8, R3; TheBus: 17
Campus Center	Campus Drive at Cole Student Activities Building	UMD	At Grade	Side	Metrobus: C2, C8, F6; UM Shuttles; TheBus: 17,
East Campus	Rossborough Lane at US 1	Commercial, hotel, residential, UM, and transfers	At Grade	Side	Metrobus: C2, C8, F6, 81, 83, 86; TheBus: 17
College Park Metro	River Road at College Park — UMD Metro station	Residential, future mixed-use development, and transfers	At Grade	Center	Metro rail Green Line; MARC Camden Line; Metrobus: C2, C8, F6, R12, 83, 86; TheBus: 14, 17 CAR: G, H
M Square	River Road at Haig Drive/ University Research Court	M Square Research Park and residential	At Grade	Side	Metrobus : F6, R12; TheBus: 14
Riverdale Park	Kenilworth Avenue and MD 410	Local business, and residential	Aerial	Side	Metrobus: F4, R12, 84, 85; TheBus: 14
Beacon Heights	Riverdale Road at Veterans Parkway	Local business and residential	At Grade	Side	Metrobus: F4, 84, 85; TheBus: 14
Annapolis Road/Glenridge	Veterans Parkway at Annapolis Road	Local business	At Grade	Side	Metrobus: F13, T18,
New Carrollton	Ellin Road at New Carrollton Metro station	Business, residential, and transfers	At Grade	Center	Metro rail Orange Line; MARC Penn Line; Amtrak; Metrobus: B21, B22, B24, B25, B27, B29, B31, C28, F4, F6, F12, F13, F14, R12, T16, T17, T18, 84, 85, 88; TheBus: 15, 16, 21, 21X

Notes: Bus Operators: WMATA Metrobus = WMATA, Ride On = Montgomery County, TheBus = Prince George's County, CAR = Connect a Ride. WMATA J4, Ride On 15, and Shuttle-UM 111 would likely be replaced by the Purple Line

Figure 2-15. Green Tracks with Grass

management facility would be constructed underground. Figure 2-16 shows the proposed Lyttonsville Yard site plan.

Glenridge Maintenance Facility

The Glenridge Maintenance Facility would be located at the current site of the M-NCPPC Northern Area Maintenance—Glenridge Service Center. This facility would provide the repair and maintenance needs. To increase the separation from, and reduce impacts to, Glenridge Park and Glenridge Elementary School, a more linear configuration is proposed for the Glenridge site rather than the loop configuration proposed in the AA/DEIS. Most activities would occur in the maintenance building. Approximately 225 parking spaces would be provided for MTA employees. A traction power substation would also be located at this facility. Figure 2-17 shows the proposed Glenridge Maintenance Facility site plan.

Ancillary Facilities

Traction Power Substations

Traction power substations convert electric power to appropriate voltage and type to power the light rail vehicles. The Preferred Alternative would require substations approximately every mile. Twenty substations are proposed, including 18 along the transitway and one each at the Lyttonsville and Glenridge facilities. The substation

structures would range in size from approximately 15 by 52 feet to 22 by 60 feet. The substations would be sited at easily accessible locations with approximately 10 feet of space around the substation building for access and for underground electrical facilities.

Signal Bungalows

Signal bungalows contain elements of the signaling control system, circuits and equipment required for train operation. Fourteen signal bungalows would be located along the transitway at track crossover locations and would be approximately 10 feet by 20 feet in size. Depending on the visual sensitivity of each site, landscaping or other screening could be used.

Overhead Contact System

The overhead contact system (OCS) provides a continuous supply of electrical power to the LRT vehicles. This is achieved by the use of overhead wires centered over the tracks, supported by poles. The vehicles have rooftop pantographs which run along the wires supplying the vehicle with power. Depending on the location, the poles supporting the overhead contact system would be positioned in between the tracks, or on either side, outside of the tracks. In some cases, poles also would be used for street lights or signs. MTA will work with the local utility companies and jurisdictions to investigate the opportunities for this shared use during the design phase of this project.

Two types of wire systems are proposed for the Purple Line: an auto-tensioned simple catenary and a fixed-termination single contact wire.

An auto-tensioned simple catenary system typically consists of a messenger wire supporting a contact wire by means of hangers (Figure 2-18). The distance between the messenger wire and the contact wire is typically four feet. In straight (tangent) sections of the transitway the support poles can be up to 240 feet apart, but would need to be more closely spaced in curves

Figure 2-16. Lyttonville Yard

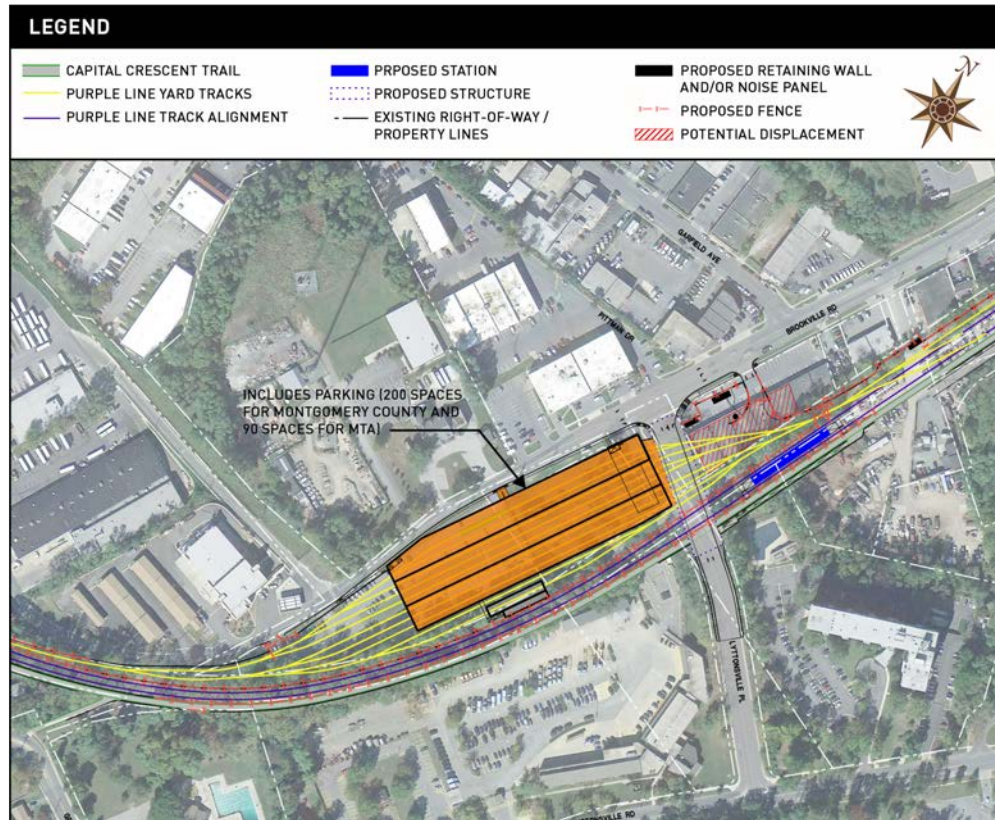


Figure 2-17. Glenridge Maintenance Facility



Figure 2-18. Auto Tensioned Catenary System

A fixed-termination single contact wire uses a single trolley wire (Figure 2-19), however, because of the electrical load requirements, a parallel supplementary feeder needs to tap into the trolley wire approximately every 200 feet.

The auto-tensioned simple catenary is proposed for the majority of the transitway, while the fixed-termination single contact wire is proposed for the Plymouth Street tunnel and the portion of the transitway from the Adelphi Road/West Campus station to the College Park Metro station. A double feeder system would be installed through the center of the UMD campus to minimize the potential for electromagnetic interference (EMI) impacts to university research activities. (See the memos regarding EMI mitigation and minimization in *Supporting Documentation on Alternatives Development* (2013)).

Gates

An automatic gate protects road users and pedestrians, and informs them of the approach or presence of rail traffic at grade crossings. Automatic gates are typically installed in conjunction with flashing light signals, and they are designed to extend across the approaching roadway to block roadway vehicles or pedestrians from crossing the tracks when a train is approaching. On the Purple Line, the decision to install automatic gates at grade crossings will be based on engineering studies of each crossing. In general, automatic gates would be

installed at grade crossings of dedicated alignments where LRT speeds would exceed 35 mph.

Crossovers

A crossover is a location where a rail vehicle can move from one set of tracks to another. Twelve crossovers are proposed, one at each of the two terminal stations at Bethesda and New Carrollton, and 10 intermediate crossovers. The crossovers at the terminal stations would be used for normal operations to provide access to both platform tracks. The intermediate crossovers would be used during special operations or during maintenance. These have been located to provide approximately 12-minute headways in both directions when single-track operations are required.

Figure 2-19. Fixed-Termination Single Contact Wire Sharing a Pole with Street Lights

Additionally, two pocket tracks would be located on either side of UMD to facilitate the addition of supplementary trains during special events at the University. Pocket tracks are short sections of track located off the mainline transitway to provide a place to stage supplementary trains. The pocket tracks would be located in the median of University Boulevard near Riggs Road and just east of the

College Park Metro station, behind the proposed joint development residential building on River Road.

Preferred Alternative Service Characteristics

The operations plan for the Preferred Alternative is based on a number of assumptions that were developed from the ridership estimates. Headways for the line were planned to provide sufficient capacity for that passenger volume. The Preferred Alternative would take approximately 63 minutes to travel the corridor from Bethesda to New Carrollton during peak hours, and 60 minutes during off peak hours. When operating in or adjacent to roadways, the Preferred Alternative would operate at, or below, the posted speed limit.

Hours of Service and Headways

The Preferred Alternative would operate seven days a week. The hours of operation would be scheduled to meet the first and last Metrorail train at each of the four stations where the Preferred Alternative connects with Metrorail (Table 2-5). Peak hour headways would be 6 minutes, and off-peak headways would be 10 minutes.

Table 2-5. Approximate Span of Service

Day of Week	Hours of Operation
Monday–Thursday	5:00 AM–12:00 AM
Friday	5:00 AM–3:00 AM
Saturday	7:00 AM–3:00 AM
Sunday	7:00 AM–12:00 AM

Fares

Purple Line fares are assumed to be a flat fare following the regular Metrobus fares and policies. As described earlier, passengers would purchase tickets from ticket vending machines at stations and board the trains through multiple doors to expedite boarding. A proof-of-payment method is assumed, with roving, on-board fare inspectors. SmarTrip cards and other multi-trip passes would be available for purchase at Metro sales offices, retail outlets, or Commuter Stores. Passengers would swipe their cards to record the trip before boarding the Purple Line. Purple Line transfers to Metrobus would be free. Transfers from the Purple Line to Metrorail and from Metrorail to the Purple Line would be

reduced. Transfers to other local services are proposed to be equal to existing bus-to-bus transfer policies.

Preferred Alternative Operating Characteristics

The specific vehicles for the Purple Line have not been identified, but a set of general design criteria have been established calling for articulated vehicles approximately 95 feet long operating in two-car trains. Each vehicle would accommodate 140 passengers for a total train capacity of 280. The vehicles would be 70 percent low-floor vehicles for easy boarding.

Preferred Alternative Costs

Capital Cost

The estimated capital cost for the Purple Line is \$2.2 billion in year of expenditure dollars. This cost includes the transitway construction, vehicles, support facilities, right-of-way, and the engineering and other professional services required to design and implement the project. These costs are presented in detail in the *Purple Line Capital Cost Technical Report (2013)*.

Project capital funding is expected to come from federal and State/local sources with up to 50 percent of funding planned to come from the federal FTA New Starts program. MTA is intending to seek Capital Investment Grant Program (CIG) funding from FTA for the Preferred Alternative examined in this NEPA document. The CIG program, more commonly known as the New Starts, Small Starts, and Core Capacity program, involves a multi-year, multi-step process that project sponsors must complete before a project is eligible for funding. The steps in the process and the basic requirements of the program can be found on FTA's website at www.fta.dot.gov.

FTA must evaluate and rate proposed projects seeking funding from the Capital Investment Grant Program on a set of project justification and local financial commitment criteria specified in law. The criteria evaluate the merits of the project and the projects sponsor's ability to build and operate it as well as the existing transit system. FTA assigns ratings from low to high based on information that project sponsors submit on the project cost,

benefits, requested amount of Capital Investment Grant Program funds, and overall financial plan. Projects must receive a medium or better overall rating to advance through the steps in the process and be eligible for funding from the program. As projects proceed through the steps in the process, information concerning costs, benefits, and impacts is refined and the ratings are updated to reflect new information.

The Purple Line would compete for New Starts funding grants with projects from across the country. On October 7, 2011, the Purple Line was approved for FTA's New Starts Preliminary Engineering Phase, as it was called at the time of approval, based on the previously submitted Request to Enter Preliminary Engineering. The State of Maryland is identifying funding options from state and local sources for its share of the funding with the primary state source being the Transportation Trust Fund.

As the SSTC and the Takoma/Langley Transit Center are funded separately and scheduled to be constructed independently and in advance of the Purple Line, no costs are assumed here except for possible modifications of the projects to accommodate the Purple Line. The new south entrance to the Bethesda Metro station also is an independent project, but it would be built at the same time as the Purple Line. Constructing both the new entrance and the Purple Line simultaneously would not generate any additional environmental impacts.

The expenditure for the Georgetown Branch right-of-way between Bethesda and the CSXT Metropolitan Branch, purchased previously by Montgomery County for the specific purposes of providing both a transitway and trail, is assumed to be already contributed by the county to the project.

The Capital Crescent Trail between Bethesda and Silver Spring would be constructed by MTA concurrently with the construction of the Purple Line. Along the Georgetown Branch right-of-way, MTA would include sufficient right-of-way for the trail as part of the design of the project, and would design the transitway to be compatible with the trail. Construction of the trail itself would be funded by Montgomery County. The cost of construction

of the trail is not included as part of the \$2.2 billion cost estimate of the project in this FEIS. Funding for the trail is in Montgomery County's approved Capital Improvements Program.¹² The Green Trail along Wayne Avenue is not part of the Purple Line and also would be funded separately by Montgomery County, but likely would be built with the Purple Line.

It is assumed that the use of roadway rights-of-way controlled by the state, counties, and local jurisdictions, including those on the UMD campus and at Metrorail stations, would be granted to the project at no cost, except for construction of new facilities and replacement or repair of existing facilities and utilities.

Operations and Maintenance Costs

MTA is assumed to be responsible for operation and maintenance of the Purple Line services and associated costs. This annual cost is estimated to be \$38 million (2012 dollars). MTA, WMATA, Montgomery County, Prince George's County, UMD, and other transit operators in the corridor and the region would continue to be responsible for operations and maintenance of their bus and rail transit services and facilities, recognizing that some adjustments to service levels and routing bus services may result from implementation of the project.

The cost of operating and maintaining the Capital Crescent Trail would be the responsibility of Montgomery County.

Preferred Alternative Implementation Schedule

The schedule for the Purple Line anticipates major construction beginning in July 2015 and revenue service beginning in December 2020.

¹² Montgomery County Council, FY 2013-2018 Capital Improvements Program for Montgomery County Government, May 2012