T&E COMMITTEE #1
January 22, 2009

MEMORANDUM

January 20, 2009

TO: Transportation, Infrastructure, Energy and Environment (T&E) Committee

FROM: Glenn Orlin, Deputy Council Staff Director

SUBJECT: Purple Line Alternatives Analysis/Draft Environmental Impact Statement (AA/DEIS)—recommendation on Locally Preferred Alternative

The Purple Line is a planned 16-mile transitway between Bethesda and New Carrollton, connecting four branches of the Metrorail System, three MARC commuter rail routes, and several inside-the-Beltway activity centers, including Bethesda, Silver Spring, Langley Park, the University of Maryland, College Park, Riverdale, and New Carrollton. According to the DEIS:

> The purpose of the proposed project is to provide faster, more direct and more reliable east-west transit service in the Purple Line corridor, which would connect the four major activity centers, including the Metrorail services located there, to each other, and with the communities located between them. The existing and expected future roadway congestion in the corridor will have an increasingly detrimental effect on the travel times and reliability of east-west bus transit services in the corridor. The Purple Line BRT and LRT transit service improvement alternatives are intended to improve travel times and reliability through more direct services using dedicated and exclusive lanes and guideways for operations where most beneficial. (page 1-1)

Note that the purpose does not include reducing congestion for auto drivers, although both the BRT and LRT alternatives would draw some traffic off of east-west arterials in the corridor that provide benefits to drivers.

The Maryland Transit Administration (MTA) published the DEIS on October 17, held four public hearings in November, and accepted correspondence and further testimony through January 14. Maryland Department of Transportation Secretary John Porcari is expected to select a Locally Preferred Alternative (LPA) to submit to the Federal Transit Administration by late winter or early spring. During this worksession the T&E Committee will craft its recommended LPA; that recommendation will go before the full Council on January 27. Once the full Council determines its recommendations they will be transmitted by letter to Secretary Porcari.

On January 8 and 15 the Planning Board held a public forum and worksessions on this matter; its detailed recommendations are attached on ©A-C. At this writing the County Executive has not issued his recommendations, but our understanding is that they will be released prior to the Committee meeting.

The Council is not holding its own public hearing on the DEIS, just as it has not for the Intercounty Connector and other State projects for which the State is the decision-maker. However, over the past several weeks Councilmembers have received and had the opportunity to review the transcripts of the four MTA public hearings, the written testimony submitted at the Planning Board's January 8 public forum, and substantial written testimony and correspondence from civic associations, business organizations, advocacy groups, and individuals (if the individual conveyed more than just a few general remarks). In addition, the Council has received directly more than two thousand pieces of correspondence on this matter during the past few months.

Agenda for this worksession. The worksession, which is scheduled for three hours, will proceed as follows:

1. Planning staff will begin with a 20-30 minute Powerpoint briefing on the DEIS, highlighting the Planning Board's recommendations and the rationale for them.
2. Department of Transportation staff will then summarize the County Executive's recommendations.
3. Council staff will follow with its recommendations (see below).
4. Finally, MTA staff will present in significant detail the two design issues which have received the most public comment: (1) the design of the trail parallel to the light rail line between Bethesda and Silver Spring; and (2) the at-grade and tunnel options for the light rail line between the Silver Spring Transit Center and Sligo Creek Parkway, including the relationship with the planned Silver Spring Green Trail.

Councilmembers are encouraged to engage with the presenters at any point, but with the knowledge that the trail and Wayne Avenue issues will be covered in most detail during MTA's portion of the presentation. The Committee has scheduled a subsequent meeting on Friday, January 23 at 10:00 am (also in the 7th Floor Hearing Room) if it needs more time to deliberate.

Council staff recommendations: **Concur substantially with the Planning Board (and Planning staff) recommendations on mode, alignment, design, and further analysis to be included in the Final Environmental Impact Statement, as described as Recommendations #1-10 on ©A-C, attached. Mainly, the State should select the Medium Investment Light Rail Alternative with the following revisions:**

- **Incorporate the High Investment Light Rail design for the Capital Crescent Trail in a tunnel beneath Wisconsin Avenue and the Air Rights and Apex Buildings in Bethesda.** *Council staff further recommends that the tail tracks be curtailed no further than 100' west of the tunnel's western portal (approximately even with the steps just east of the Landmark Theaters), and further east than that, if possible.*

- *Council staff further recommends identifying more access points to the Capital Crescent Trail than those currently appearing in the DEIS. Examples include: a trail in the Coquelin Run right-of-way between Manor Road and Chevy Chase Lake Drive with an access to the Capital Crescent Trail, and a connection from the intersection of Grubb Road and Terrace Drive.*
- **Expand the width of the Capital Crescent Trail from 10' to 12' (with 2' shoulders on each side) where the additional width can be accommodated without additional right-of-way acquisition or a significant increase in cost.** *Council staff further recommends that the trail be wider than 12' and that the landscaped buffer be wider than the typical 10' where the right-of-way permits it (i.e., between the western end of the Columbia Country Club to the east end of Rock Creek Park) and if there is not a significant increase in cost.*
- **Continue to study both the Medium Investment Light Rail surface alignment and tunnel option from the Silver Spring Transit Center (SSTC) to west of Sligo Creek Park.** *Council staff believes the at-grade alignment is a sufficient and appropriate application of light rail. However, should the tunnel option result in a substantial increase in ridership and improved utility for the Purple Line as a whole, and if it can be affordable, then it should be selected.*
- **If the surface alignment between the SSTC and Sligo Creek Park is selected, then eliminate the Dale Drive stop from the LPA.** *Council staff further recommends that the line should be laid out to facilitate the addition of a Dale Drive stop at some future time should the community ultimately favor a stop there.*

In response to concerns from trail advocates that somehow the trail portion of the joint light rail/trail project might be dropped, Council staff recommends that the Council approve an amendment to the FY09-14 Capital Improvements Program to fund it. The cost of the trail has, since the 1980s, always been assumed as a County responsibility, even though the County might seek Federal "Enhancement Program" funds for much of its cost. (During the 1990s the Enhancement Program provided much of the funding for the Capital Crescent Trail between Bethesda and the District of Columbia boundary.) The total cost of the trail is yet to be determined, since the State and the County have yet to negotiate over the how the "shared" costs of the project will be split between the light rail and trail. Nevertheless, the funding should be programmed in the latter years of the CIP (FYs12-14), which is the earliest that the joint light rail/trail project would be built. Another trail to be built concurrently with the light rail line, the Silver Spring Green Trail, is already programmed in the CIP.

Council staff does not recommend initiating a Purple Line Corridor Land Use Master Plan in the FY10 budget (Recommendation #11). The study is premature until at least there is a signed Full Funding Grant Agreement between the State and Federal Government, or some other similar funding means of guaranteeing the Purple Line's construction. This will likely not occur for another 1½-2 years, at the earliest. Until the light rail project is a "given" the County should not begin to consider re-zonings or other land use changes.

Council staff also believes it is premature to establish a transit infrastructure financing committee to identify and secure local funding for expansion and maintenance for transit system improvements (Recommendation #12). Until the new Federal funding program for transit is

clearly identified, and until the State addresses how it will restore funding for the Consolidated Transportation Program, the County should not be leaping to fund such large projects which traditionally would be funded primarily by the Federal and State governments.

Council staff concurs with Recommendation #13: that the Planning Board reserve rights-of-way needed through the development approval process for all options identified in the AA/DEIS until a Locally Preferred Alternative is approved by the Federal Transit Administration.

The Planning staff report on ©1-85 is an excellent analysis of the DEIS and Councilmembers are encouraged to review it again, as it will provide the foundation for much of the presentations during the worksession. (It is the same report distributed to Councilmembers shortly before the winter holidays.) Its conclusions regarding mode, alignment, and design are well reasoned:

- The advantage of light rail over bus rapid transit stems primarily to its capacity to handle the anticipated demand in 2030 and beyond. It is also the most consistent with County master plans which call for light rail in the corridor: first with the Georgetown Branch Master Plan Amendment in 1990, and subsequently with the Bethesda CBD Sector Plan (1994) and the Silver Spring CBD, North & West Silver Spring, East Silver Spring, and Takoma Park Master and Sector Plans (2000).
- The advantage of the Georgetown Branch alignment over Jones Bridge Road derives from its superior travel time savings due to its operating more on dedicated guideways and its orientation to the primary travel market at the west end, which is the Bethesda Central Business District, not the Medical Center complex (even assuming BRAC).
- The widening of the trail to at least 12', where possible, is more important to the quality and utility of the trail than maintaining a 10' buffer between it and the closest light rail track. An 8'-wide buffer is sufficient.
- The surface alignment through East Silver Spring will have minimal negative impacts and several positive aspects, including better access to the future Silver Spring Library, the Town Center, and Fenton Village. It will also have a traffic calming effect on Wayne Avenue, an arterial (A-76), just as was achieved by the reconstruction of Piney Branch Road more than a decade ago. However, the 3½-minute travel time savings that could be achieved by the tunnel option may be worth the additional (estimated) $175 million cost, so it should be evaluated more carefully prior to the development of the FEIS.
- If the surface option is selected, the elimination of the Dale Drive stop makes sense given the low-density residential development in the vicinity. Most of the ridership forecasted by MTA at this stop is not from walk-ons, but from transfers from intersecting bus routes. These transfers might be more efficiently facilitated by re-working the bus routes, rather than introducing a stop. However, the line should be built to allow the stop to be readily introduced should the community consensus warrants it in the longer-term future.

MONTGOMERY COUNTY PLANNING BOARD
THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

OFFICE OF THE CHAIRMAN

January 16, 2009

Councilmember Nancy Floreen, Chair
Transportation, Infrastructure,
Energy and Environment Committee
Montgomery County Council
100 Maryland Avenue
Rockville, Maryland 20850

Dear Ms. Floreen:

The Montgomery County Planning Board yesterday voted to recommend that the County Council endorse the Medium Investment Light Rail Alternative as the Locally Preferred Alternative for the Purple Line. The Planning Board is also recommending that the Georgetown Branch/Capital Crescent Trail alignment through the tunnel under Wisconsin Avenue also be included as part of the Locally Preferred Alternative and that the station planned for Dale Drive along Wayne Avenue be dropped from further consideration. Inherent in the Medium Investment Light Rail Alternative is the feature of a surface alignment along Wayne Avenue and a station at the planned library site at the intersection of Wayne Avenue and Fenton Street. A summary of all of the Planning Board recommendations on the Purple Line is attached.

The Planning Board's decision on the Purple Line was a difficult one. The vote was 4-1. Those voting in favor recognized that the construction of the Purple Line along the Georgetown Branch alignment will represent a traumatic change for some residents and will ultimately result in a different trail experience. Over time, however, we believe the trail will remain a valuable and valued resource. Also, the Board members have concerns about how the Purple Line and other critical transportation projects will be funded.

The larger and longer-range view, however, clearly calls for this project. The Georgetown Branch right-of-way was purchased and the Purple Line included in our Master Plans because it is critical that we preserve our ability to travel east-west in our close-in suburbs, connect with our Metrorail system, reduce our carbon footprint, and continue to grow in a more sustainable way–less dependent on the auto.

Our staff will be present at the Committee's deliberations on January 22, should you or other Committee members have any questions. Should you have any questions in advance, please do not hesitate to contact Tom Autrey (301-495-4533) of our Transportation Planning Division.

Sincerely,

Royce Hanson
Chairman

(A)

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Planning Board Recommendations on Purple Line
Adopted January 15, 2009

Mode

1. Select Light Rail Transit (LRT) for the Purple Line.

Alignment and Design Options

2. Select the Medium Investment LRT that uses the master planned Georgetown Branch right of way and features a surface alignment on Wayne Avenue, with two modifications as noted below:

   a. Incorporate the High Investment LRT design for the Capital Crescent Trail through the tunnel under Wisconsin Avenue.
   b. Eliminate the Dale Drive station.

3. Defer decision on the Preinkert/Chapel Drive Design Option to Prince George's County.

4. Expand the Capital Crescent/Georgetown Branch trail width from 10' to 12' in locations where the additional width can be accommodated without additional right-of-way acquisition or significant cost increases.

Further Analysis to be Included in the Final Environmental Impact Statement

5. Conduct detailed study of the portion of the Medium Investment LRT alternative between the Silver Spring Transit Center and Dale Drive to address:

   a. Pedestrian safety and station accessibility
   b. Forecast ridership at the Silver Spring Transit Center and Fenton Street stations
   c. Transit, vehicle queuing, and parking operations in shared lanes, including options to minimize adverse economic effects on retail businesses along Bonifant Street
   d. Cost effectiveness and feasibility of the at-grade and tunnel options
   e. Wayne Avenue Green Trail design

6. Develop design details for the Capital Crescent/Georgetown Branch Trail that include:

   a. detailed plans for all access points, including the connection to the Rock Creek Trail
   b. retaining walls and security or privacy fencing,
   c. landscaping (including shade trees),
   d. aesthetic treatments for the bridges crossing Rock Creek (including coordination with the National Park Service)
   e. signing and marking, and
   f. bicycle facilities at Purple Line stations.
   g. a public plaza at the Woodmont East terminus

7. Prepare a phasing plan for the Purple Line along University Boulevard in Takoma Langley Crossroads area that identifies how LRT implementation will be coordinated with establishment of the wider master planned typical section.

8. Provide continuous sidewalks and/or shared use paths on both sides of roadways that carry the Purple Line alignment.

9. Include mitigation strategies for the following impacts:
   a. Wetlands and Waters of the US, with impacts and mitigation identified by watershed.
   b. obtains Parks Department approval for proposed mitigation sites in parkland.
   c. noise impacts at wheel squeal locations.
   d. historic resources – including mitigation for the impact for Falkland Apartments.
   e. Parks Department property impacts, including the Brookeville Maintenance site.

10. Provide additional details on alternative LRT vehicle technology and operations appropriate for the alignment to facilitate development and review of mitigation, funding and operations/maintenance strategies. Provide additional analysis of energy and emissions characteristics of alternative LRT vehicle types.

Other Recommended County Council Actions

11. Include station area planning in the Purple Line Corridor Land Use Master Plan proposed in the Department's FY 10 budget.

12. Establish a transit infrastructure financing committee to identify and secure local funding for expansion and maintenance for system improvements; including Metrorail, MARC, the Purple Line, and the Corridor Cities Transitway.

Planning Board Actions

13. Reserve rights-of-way as needed through the development approval process for all options identified in the AA/DEIS until a Locally Preferred Alternative is approved by the Federal Transit Administration.

MONTGOMERY COUNTY PLANNING DEPARTMENT
THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

MCPB
Item #
January 8, 2009

December 22, 2008

MEMORANDUM

TO: Montgomery County Planning Board

VIA: Rollin Stanley, Director, Planning Department RS
Glenn Kreger, Acting Chief, Vision/Community Based Planning Division
John Carter, Chief, Design Division JAC
Mary Dolan, Master Plan Supervisor, Green/Environmental Planning Division MD
Dan Hardy, Chief, Move/Transportation Planning Division DCH

FROM: Tom Autrey (301-495-4533), Supervisor, Move/Transportation Planning TA
Katherine Holt (301-495-4549), Senior Planner, Move/Transportation Planning

SUBJECT: Purple Line Alternatives Analysis/Draft Environmental Impact Statement (AA/DEIS) - Study Review and Recommendation On Locally Preferred Alternative

STAFF RECOMMENDATION: Transmit Comments to the Montgomery County Council

This memorandum is prepared for the Planning Board's January 8, 2009 public hearing and worksession on the Maryland Transit Administration (MTA) Alternatives Analysis/Draft Environmental Impact Statement (AA/DEIS) for the Purple Line. Staff proposes to make a short presentation on our recommendations before taking two hours of public testimony. Thereafter, we will ask the Planning Board for recommendations. Our staff and MTA staff will be available to answer questions as you proceed through the decision-making process.

Staff requests the Planning Board to vote on four categories, in the following order:

- mode
- alignment and design options
- further analysis for MTA to include in the Final Environmental Impact Statement (FEIS)
- recommended further actions for Montgomery County government

Planning Board recommendations will be sent to the County Council for their consideration; the Transportation, Infrastructure, Energy, and Environment Committee is scheduled to discuss this matter on January 22. We also intend to send a copy of your recommendations to the MTA.

8787 Georgia Avenue, Silver Spring, Maryland 20910 Director's Office: 301.495.4500 · Fax: 301.495.1310
www.MontgomeryPlanning.org

Below is a summary of staff recommendations, intended as a guide for your decision making. The attached staff report provides study background and highlights the issues and rationale for the staff recommendations.

Staff recommends Planning Board support for the following elements of the Purple Line:

Mode

1. Select Light Rail Transit (LRT) for the Purple Line.

Alignment and Design Options

2. Select the Medium Investment LRT Alternative that uses the master planned Georgetown Branch right-of-way and features a surface alignment on Wayne Avenue, with two modifications as noted below:
    a. Incorporate the High Investment LRT design for the Capital Crescent Trail through the tunnel under Wisconsin Avenue.
    b. Eliminate the Dale Drive station.

3. Defer decision on the Preinkert/Chapel Drive Design Option to Prince George's County.

4. Expand the Capital Crescent/Georgetown Branch trail width from 10' to 12' in locations where the additional width can be accommodated without additional right-of-way acquisition or significant cost increases.

Further Analysis to be Included in the Final Environmental Impact Statement

5. Conduct detailed study of the portion of the Medium Investment LRT Alternative between the Silver Spring Transit Center and Sligo Creek to address:
    a. pedestrian safety and station accessibility
    b. forecast ridership at the Silver Spring Transit Center and Fenton Street stations
    c. transit, vehicle queueing, and parking operations in shared lanes, including options to minimize adverse economic effects on retail businesses along Bonifant Street
    d. cost effectiveness and feasibility of the at-grade and tunnel options
    e. Wayne Avenue Green Trail design

6. Develop design details for the Capital Crescent/Georgetown Branch Trail that include:
    a. detailed plans for all access points, including the connection to the Rock Creek Trail
    b. retaining walls and security or privacy fencing,
    c. loss of trees screening residential neighborhoods and landscaping (including shade trees)
    d. aesthetic treatments for the bridges crossing Rock Creek (including coordination with the National Park Service)
    e. signing and marking
    f. bicycle facilities at Purple Line stations, and
    g. a public plaza at the Woodmont East terminus

7. Prepare a phasing plan for the Purple Line along University Boulevard in the Takoma/Langley Crossroads area that identifies how LRT implementation will be coordinated with establishment of the wider master planned typical section.

8. Provide continuous sidewalks and/or shared use paths on both sides of roadways that carry the Purple Line alignment.

9. Include mitigation strategies for the following impacts:
    a. Wetlands and Waters of the US, with impacts and mitigation identified by watershed
    b. obtain Parks Department approval for proposed mitigation sites in parkland
    c. noise impacts at wheel squeal locations
    d. historic resources – including mitigation for the impact for Falkland Apartments
    e. Parks Department property impacts, including the Brookeville Maintenance site

10. Provide additional details on alternative LRT vehicle technology and operations appropriate for the alignment to facilitate development and review of mitigation, funding and operations/maintenance strategies. Provide additional analysis of energy and emissions characteristics of alternative LRT vehicle types.

County Governmental Actions

11. Include station area planning in the Purple Line Corridor Land Use Master Plan proposed in the Department's FY 10 budget.

12. Establish a transit infrastructure financing committee to identify and secure local funding for expansion and maintenance for system improvements, including Metrorail, MARC, the Purple Line, and the Corridor Cities Transitway.

13. Reserve rights-of-way as needed through the development approval process for all options identified in the AA/DEIS until a Locally Preferred Alternative is approved by the Federal Transit Administration.

Table of Contents

STAFF RECOMMENDATION 1

EXECUTIVE SUMMARY 7

1. BACKGROUND 9

Purpose and Need 9
Project History 10
Master Planning and Development Review Context 11
General Description of The Purple Line 11
Alternatives Not Retained For Detailed Study 13
Existing Transit Service in the Purple Line Corridor 16
Profile of the Service Area 19
Forecasted Growth 20
Definition of Alternatives 23
Service Profile of the Build Alternatives 32
Estimates of Ridership, Costs, and Cost Effectiveness 33
Master Plan Advisory Group (MPAG) 34

2. PREFERRED PURPLE LINE MODE 36

Vehicle Capacity 36
Vehicle Emissions and Greenhouse Gas Impacts 38
Vehicle Noise and Vibration 38
Master Plan Conformance and Urban Design 40
Georgetown Branch Master Plan Amendment, January 1990 40
Bethesda - Chevy Chase Master Plan, April 1990 41
Silver Spring Central Business District Sector Plan, March 2000 41
East Silver Spring Master Plan, December 2000 and *Takoma Park Master Plan,* December 2000 ... 41
Urban Design and Economic Development 42
Cost, Cost Effectiveness, and Ridership 50
Public Testimony 54
Summary of Analysis of the Preferred Mode For The Purple Line 54

3. PREFERRED PURPLE LINE ALIGNMENT 56

Station Area Issues 56
Estimated Ridership 56
Walk Access 58
Urban Design and Economic Development 61
Jones Bridge Road Alignment 61
Wayne Avenue 62
Silver Spring / Thayer Design Option 66
Master Plan Conformance 67
Georgetown Branch Trail 68
Silver Spring Green Trail (Wayne Avenue) 70

Parks Impacts and Mitigation 71
Historic Preservation 72
Environmental Planning 73
Traffic and Parking Impacts 73
Community Impacts 77
Preinkert/Chapel Drive Design Option 80
Summary of Analysis of Factors In Recommending a Preferred Alignment 80

4. ADDITIONAL ITEMS FOR FURTHER STUDY 83

Historic Preservation 83
Station Area Planning 83
Funding Transit 84
The Purple Line Functional Plan 85
Development Review 85

APPENDICES (under separate cover)

A. GLOSSARY OF TERMS
B. SUMMARY OF PUBLIC TESTIMONY
C. SUPPORTING STAFF MEMORANDA

LIST OF EXHIBITS

FIGURE 1 – Metrorail System and the Purple Line 12
FIGURE 2 – Purple Line Corridor Bus Service 17
FIGURE 3 – Population Density 19
FIGURE 4 – How We Get To Work 19
FIGURE 5 – Average Commute Time By Mode 19
FIGURE 6 – Transportation Analysis Zones 19
FIGURE 7 – Capital Costs 51
FIGURE 8 – Annual Operating Costs 51
FIGURE 9 – Estimated Weekday Ridership (2030) 52
FIGURE 10 – Cost Effectiveness 52
FIGURE 11 – 20 Year Projection of Transit System Costs 53

TABLE 1 – Capital Cost Comparison 13
TABLE 2 – Existing Bus Service 18
TABLE 3 – Existing Metrorail Service 18
TABLE 4 – Forecasted Household Density 21
TABLE 5 – Forecasted Job Density 22
TABLE 6 – Cost and Ridership 33
TABLE 7 – Peak Load Point, Ridership, and Capacity 36
TABLE 8 – Summary of Woodmont East Urban Design Issues 45
TABLE 9 – Representative BRT Benefits 49
TABLE 10 – Representative LRT Benefits 49
TABLE 11 – Ridership Overall 56
TABLE 12 – Ridership By Station 57
TABLE 13 – Preliminary Estimates of Property Takings for Surface Alignment 65
TABLE 14 – Impacts On Intersection Level of Service – AM Peak Hour 74
TABLE 15 – Impacts On Intersection Level of Service – PM Peak Hour 75
TABLE 16 – Impact on On-Street Parking 76

EXECUTIVE SUMMARY

This report presents the Montgomery County Planning Department staff recommendations on a Locally Preferred Alternative (LPA) for the Purple Line, a proposed transitway connecting Bethesda to New Carrollton in Montgomery and Prince George's Counties. The report also describes the relevant findings of the Purple Line Alternatives Analysis / Draft Environmental Impact Statement (AA/DEIS), completed by the Maryland Transit Administration (MTA) in September 2008. The staff recommendations are for the portions of the Purple Line within Montgomery County.

Staff finds that the Purple Line is an infrastructure investment needed to fulfill the objectives of the Montgomery County General Plan. Staff recommends that the study proceed to the next phase of Preliminary Engineering/Final Environmental Impact Statement (PE/FEIS) using the guidance in the report and summarized below.

Staff recommends that the Purple Line be implemented as a Light Rail Transit (LRT) mode, based primarily on the need to provide East-West transit capacity higher than that which can reliably be expected from a Bus Rapid Transit (BRT) system. The mode selection process also recognizes that Prince George's County officials have also expressed a preference for LRT.

Staff recommends that the LPA conform generally to the AA/DEIS Medium Investment LRT Alternative, based primarily on the design features of the alternative and the fact that it is the most cost effective of the LRT alternatives studied. Staff recommends that the LPA include two modifications to the Medium Investment LRT Alternative:

- Inclusion of the Capital Crescent/Georgetown Branch Trail through the Air Rights Tunnel under Wisconsin Avenue in Bethesda. This connection is integral to the regional trail system and should be incorporated into the LRT facility design and constructed concurrent with the transit facility. A separate funding source should be pursued to retain the LRT cost-effectiveness.
- Elimination of the Dale Drive station, based on the staff finding that the increased travel time and community impacts associated with a station at this location are not warranted by the travel demand generated from the surrounding low-density single-family residential neighborhood.

The portion of the Purple Line between Bethesda and Silver Spring has been in the County's master plan since 1986 and has been the subject of several prior studies by state and county agencies. The portion east of Silver Spring has not been the subject of prior detailed study, and further investigation is needed to assess the best way to minimize or mitigate several potential impacts in the communities along the Medium Investment LRT Alternative, particularly between the Silver Spring Transit Center and Sligo Creek Parkway. In these areas, the AA/DEIS provides sufficient information to select an alternative, and staff recommends the surface alignment in the AA/DEIS. However, more refined travel demand forecasts, preliminary engineering, and operational analysis are needed to assess site specific concerns along Bonifant Street and Wayne Avenue, ranging from the preliminary cost effectiveness of a tunnel option to the removal of on-street parking in certain areas.

The staff recommends the development of further design studies and mitigation strategies to address concerns identified in the AA/DEIS, most notably the mitigation of community impacts associated with master planned changes to the Capital Crescent/Georgetown Branch Interim Trail. The 1986 Georgetown Branch Master Plan envisioned a transitway and trail in the Georgetown Branch right-of-way and the trail subsequently constructed was designated an Interim Trail with the recognition that the master plan vision included trail reconstruction. Nevertheless, the construction of the Medium Investment LRT Alternative will change the character of the trail and the ultimate trail design must be carefully considered to balance transportation, recreation, and community compatibility objectives.

The staff recommends additional local government agency actions to continue Purple Line station area plans, establish procedures to identify and fulfill local agency funding requirements, and reserve rights-of-way through the development approval process.

1. BACKGROUND

There is a considerable amount of available information on the history of and issues surrounding the Purple Line. As a result, this staff memo provides only a brief overview of the project background. References are provided for readers interested in learning more about how the Purple Line project planning has evolved.

Purpose and Need

The description of the Purpose and Need for the Purple Line is presented in Chapter 1 of the AA/DEIS and states in part:

"The purpose of the proposed project is to provide faster, more direct, and more reliable East-West transit service in the Purple Line corridor, which would connect the four major activity centers, including the Metrorail services located there, to each other, and with the communities located between them.[1] The existing and expected future roadway congestion in the corridor will have an increasingly detrimental effect on the travel times and reliability of East-West bus transit services in the corridor. The proposed Purple Line corridor and transit improvements are intended to improve travel times and reliability by providing more direct services that will operate on dedicated and exclusive lanes and guideways."

The need to improve East-West travel in general is also specifically noted in the County's General Plan.[2] There are other transportation related goals, objectives, and strategies in the General Plan that are consistent with the Purple Line project purpose. Examples include:

- Give priority to establishing exclusive travelways for transit and high occupancy vehicles serving the Urban Ring and Corridor.
- Make transit use more price and time-competitive with auto use.
- Encourage regional, state, and federal agencies to implement transportation system improvements consistent with County goals, including accessibility to other jurisdictions.

The Purple Line is about more than transportation—the project helps us carry out other important County strategies as outlined in the General Plan. Examples include:

- Integrate housing with employment and transportation centers and include appropriate community services and facilities, especially in transit stop locations.
- Encourage development of affordable, higher density housing in the vicinity of transit stations.
- Concentrate employment activities where there is adequate infrastructure, with an emphasis on sufficient public transportation.

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[1] The four major activities as noted in the AA/DEIS include Bethesda, Silver Spring, University of Maryland – College Park, and New Carrollton.

[2] See *General Plan Refinement of the Goals and Objectives for Montgomery County, December 1993*, page 63.

- Designate the highest density and the most flexible zoning in transit station locales to attract development.

Finally, it important to note the role of the Purple Line in meeting General Plan objectives related to the County's Urban Ring. Selected narrative taken from the Plan's vision for the Urban Ring includes the following (emphasis added):

"The General Plan Refinement foresees continued growth and intensification where appropriate in centers in the Urban Ring. ***The Refinement does not recommend uniform high density throughout the Urban Ring. Suburban densities will be found within many areas of the Urban Ring outside centers.*** *Since growth will include both infill and redevelopment, the Refinement stresses the need for compatibility with existing communities. The Refinement also expects Montgomery County to avoid creation or perpetuation of abandoned or blighted areas, through appropriate zoning, designation of transition areas, and public investment.* ***It designates the Urban Ring as a high priority for location for new infrastructure to accommodate new growth and redevelopment and to support existing development."***

"While encouraging continued growth in the Urban Ring, the General Plan Refinement seeks to preserve the flourishing neighborhoods already located there. The Refinement encourages the County to protect these areas from the encroachment of non-conforming land uses, through traffic, and excessive noise. ***It seeks to maintain and reinforce the many desirable features that are common to the Urban Ring."***

The Urban Ring

In summary, the Purple Line represents a significant re-investment in the infrastructure of the down-County area. It helps set the stage to continue growing smart while remaining economically competitive in the area where our communities and facilities are the most established and are closest to the region's core. In that regard, staff has found it useful when considering the project's technical aspects to pause and imagine how the General Plan goals and objectives for much of the Urban Ring might be met without a Purple Line. It would be difficult – maybe impossible.

Project History

The Purple Line project history is documented in Section 1.1 of the AA/DEIS. There is also additional historical background and context provided in the *Purple Line Functional Master Plan Purpose and Outreach Report*.[3] The most significant historical aspects of the project include the following.

[3] The Purpose and Outreach Report can be accessed through the following link: http://www.mcparkandplanning.org/planning/viewer.shtm#http://www.mcparkandplanning.org/Transportation/projects/documents/FINALPURPOSEANDOUTREACHREPORT010808.pdf

- Montgomery County adopted the Georgetown Branch Master Plan Amendment in November 1986. The plan included a trolley line that operated between Bethesda and Silver Spring along the Georgetown Branch right-of-way from Bethesda to the Metropolitan Branch right-of-way.
- In 1988, Montgomery County purchased the surface easement within the railroad right-of-way (the Georgetown Branch) for the segment of the Purple Line between Bethesda and Silver Spring.
- The Purple Line, in one form or another, has been the subject of a number of studies dating back to 1986.

Master Planning and Development Review Context

As noted above, the Purple Line between Bethesda and Silver Spring is the subject of one specific adopted Master Plan–the *Georgetown Branch Master Plan Amendment* (1986, amended 1990). It is also included in other master plans (1986 and later) that address areas along the corridor between Bethesda and Silver Spring.

The Purple Line east of the Silver Spring Transit Center (SSTC) is not included in any adopted master plan. One objective of including the development of a Purple Line Functional Master Plan in both our FY-09 and FY-10 work programs is to establish the alignment from Bethesda to the Takoma/Langley Crossroads area, thereby guiding subsequent master planning efforts.

Development activity between Bethesda and Silver Spring has continued to be reviewed in the context of the *Georgetown Branch Master Plan Amendment* and the alternatives under consideration in this current AA/DEIS, as have development applications for sites east of the SSTC.

Additional information on the Purple Line and related master plans is available in the *Purple Line Functional Master Plan Purpose and Outreach Report* noted above and in the supporting staff memorandum from the Vision Division that is included as an Appendix to this staff memo.[4]

General Description of The Purple Line

The Purple Line is envisioned as a Bus Rapid Transit (or BRT as depicted on the left in Los Angeles) or Light Rail Transit (or LRT as shown below in Houston) line that would operate between Bethesda and New Carrollton via Silver Spring, the Takoma/Langley Crossroads area, and the University of Maryland at College Park.

[4] See pages 7 and 8 of the Purpose and Outreach Report.

The service plan concept calls for six minute service during peak periods. The service would operate on weekdays and weekends on a schedule similar to Metrorail. There is a relatively detailed description of the service area's setting, the existing transit service, and other important aspects of the current conditions in Chapter 1 of the AA/DEIS.

Staff has identified the following factors as the most important to consider regarding the setting and purpose of the Purple Line:

- The Purple Line provides travel options by more efficiently connecting relatively dense mixed use places and by connecting other major transportation facilities—Metrorail, the Capital Crescent, Georgetown Branch, and Metropolitan Branch Trails, regional and local bus service, MARC commuter service, inter-city bus, and Amtrak—with one another.

FIGURE 1 – Metrorail System and the Purple Line

- The fact that the Purple Line connects various segments of the Metrorail system cannot be overemphasized. The ridership forecasts in the AA/DEIS indicate 40-45% of total weekday ridership (depending upon the alternative under consideration) will be from passengers transferring from Metrorail.

- The Purple Line's interface with Metrorail is frequent and the locations of shared stations have strategic implications. Bethesda and Silver Spring are within the turnback segments—where peak period frequencies are every two to three minutes. Silver Spring, Long Branch, and Takoma/Langley are the focus of redevelopment opportunities. The State's flagship university is in College Park. New Carrollton is an end of the line Metrorail station. The Purple Line's connections with Metrorail are more than that of a

feeder line--it is designed to function as part of the Metrorail system. This is an important consideration when staff examines the issue of capacity later in this memorandum.

Alternatives Not Retained For Detailed Study

The Purple Line AA/DEIS includes an evaluation of eight alternatives—six of which are "build alternatives" that represent capital improvements for a transitway, vehicles, and other support components. Several additional alternatives were identified in the early study stages but were not retained for detailed study in the AA/DEIS because they either did not meet the study Purpose and Need or because their costs or impacts were considered prohibitive.

Metrorail or Purple Line Loop

This heavy rail loop alignment would have begun at the Medical Center Metrorail Station and extended north under the Capital Beltway and then east on the north side of the Beltway where it would cross the Beltway and enter the CSX corridor and continue to the SSTC. This potential alignment was examined by the Planning Board in January 2003. The Planning Board voted at that time that the alternative not be included in subsequent studies examining alternative alignments based on its costs, environmental factors, and the adverse impact on Metrorail service frequencies north of the Medical Center and Silver Spring stations.

Some members of the Planning Board's Purple Line Functional Master Plan Advisory Group (MPAG) expressed concern that the Purple Line Loop needed to be reconsidered in light of the relocation of the Walter Reed Army Hospital to the National Naval Medical Center in Bethesda. The staff discussed this issue with the MPAG and we find the costs are simply prohibitive for a circumferential connector. Table 1 compares the capital costs on a per mile basis for selected applicable project segments[5]:

Table 1 – Capital Cost Comparison

Project	Segment	Mode	Cost Per Mile (Millions)	$ Year
WMATA Largo Extension	Addison Road to Largo Town Center	Heavy Rail	$140.0	2004
WMATA Dulles Extension	East Falls Church to Wiehle Avenue	Heavy Rail	$178.0	2008
Purple Line Loop	Silver Spring to Medical Center	Heavy Rail	$143.3	2002
Miami Metro Extension	MLK Station to Broward County Line	Heavy Rail	$144.4	2009

[5] The Miami project is included because it, along with the Dulles project, is one of the more recent heavy rail projects.

Project	Segment	Mode	Cost Per Mile (Millions)	$ Year
Inner Purple Line	Bethesda to Silver Spring	Light Rail	$84.3	2002
Purple Line	Bethesda to New Carrollton	Light Rail – Medium	$76.3	2007
Corridor Cities Transitway	Shady Grove to COMSAT	Light Rail	$57.0	2007

Source: FTA Annual New Starts Reports, Purple Line AA/DEIS and Corridor Cities Transitway Alternative Analysis/Environmental Assessment (AA/EA) Preliminary Estimates and staff reports.

LRT on Jones Bridge Road

LRT on Jones Bridge Road was dropped from consideration because of its high construction costs and its inability to achieve travel time savings, both relative to the Georgetown Branch right-of-way. Instead, Jones Bridge Road was examined as a potential alignment for the lower investment BRT alternative.[6]

BRT and LRT on Brookville Road

An alignment on Brookville Road for either mode was dropped from further consideration because of potential traffic conflicts and issues related to the layout of the planned maintenance and storage facility on Brookville Road.

16th Street to East West Highway to Colesville Road (BRT Only)

This Low Investment BRT option was dropped from further consideration because the travel times along 16th Street and Colesville Road were significantly worse than using Spring Street and 2nd Avenue to get to the SSTC.

[6] This alternative became the focus of an analysis carried out by Sam Schwartz Engineering, a consulting firm retained by the Town of Chevy Chase. A review of issues raised by this analysis is presented later in this memo.

BRT and LRT from CSX at Spring Street to 2nd Avenue to Wayne Avenue

An LRT option was considered that would have left the CSX right-of-way and used Wayne Avenue to access the SSTC—similar to the Low Investment BRT alternative that ultimately was evaluated. This LRT option required an aerial crossing of Colesville Road because the LRT could not use 2nd Avenue due to steep grades. There were other problems related to costs and traffic impacts and it was decided to drop this alternative from further consideration.

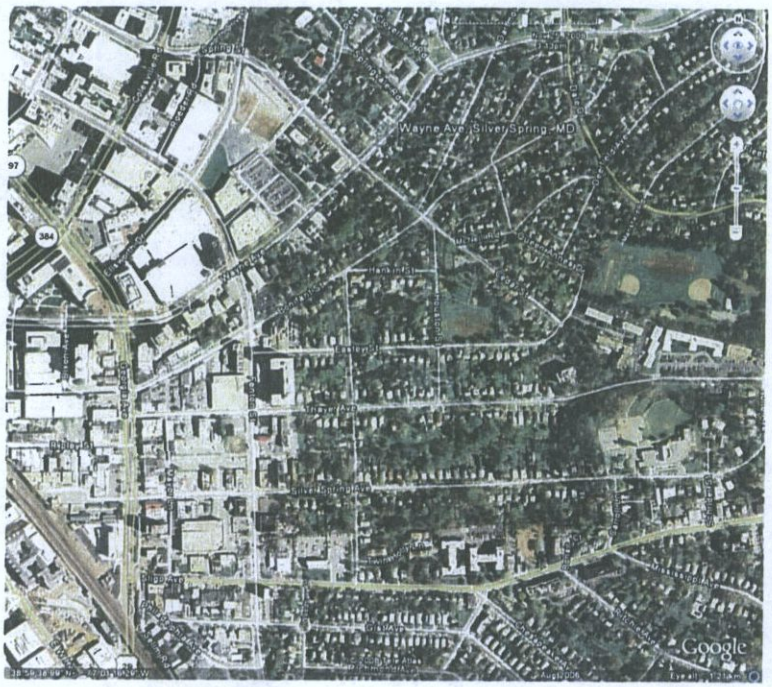
A BRT option that used an aerial crossing of Colesville Road was also dropped because of high costs and impacts to adjacent properties.

Tunnel from Sligo Avenue and Piney Branch Road Directly to Takoma/Langley Crossroads

This alignment would have gone down Sligo Avenue to Piney Branch Road, then entered a tunnel and surfaced near the intersection of University Boulevard and Anne Street. The alignment was dropped because it would have added a significant amount of capital cost to the project.

Sligo Avenue In East Silver Spring—Either At-Grade or in Tunnel

These alignments were dropped because of the potential impacts on traffic flow, small businesses, and residences. Wayne Avenue was thought to be a better alternative because it is wider for any at-grade application and in the case of a tunnel application, would result in shorter tunnels when compared to Sligo Avenue.



Colesville Road and University Boulevard —Via Four Corners

Colesville Road access to and from the SSTC, and as far north as the Four Corners junction with University Boulevard, was dropped from further consideration because of traffic flow impacts on this heavily traveled road, right-of-way limitations, and increased distance and therefore, travel times.

Longer Tunnels under Wayne Avenue

Because of community concerns related to an at-grade alignment on Wayne Avenue, the MTA examined two alternatives.

One alternative consisted of tunnel that would extend from the SSTC below Sligo Creek, eventually surfacing on Piney Branch Road near Barron Street. This alternative was viewed as too expensive, lacking any significant travel time advantage, and dependent on underground stations that would further increase costs.

The MTA also considered a shorter tunnel that would have extended from the SSTC to a point near Mansfield Road. This tunnel was rejected by the MTA as having adverse impacts on residences on the south side of Wayne Avenue, requiring property acquisitions from the front yards of residences near the tunnel portal, and generating additional cost and no travel time benefits. The MTA also notes in the AA/DEIS that "the high cost of the underground stations weighed against their inclusion, but if underground stations were not included in these alignments the communities would not benefit from the project and ridership would be lower."[7]

The MTA analyzed this tunnel extension without the results of a computer model that would forecast ridership. When a tunnel (i.e., to a point just east of Cedar Street) was later included in a model analysis and paired with a less capital intensive alternative, the results indicated ridership would actually increase even though there were fewer stations. The ridership increase was likely attributable to the shorter travel times resulting from the tunnel alignment and the absence of the station stops. The stations that were not included were located on Wayne Avenue—one at Dale Drive and one at the proposed library site at Fenton Street. Additional discussion of the issue of this longer tunnel on Wayne Avenue is presented in a later section of this memo.

Existing Transit Service in the Purple Line Corridor

There is currently a considerable amount of bus service in the corridor. While there is no single route that serves the entire length from Bethesda to New Carrollton, there are some routes that might compare with the objectives and scope of the Purple Line, especially the Montgomery County segment of the Purple Line.

Metrobus Routes J1, J2, and J3

This line provides frequent (with six to seven minute headways) peak hour service between Montgomery Mall and the Silver Spring Metrorail Station via either the Bethesda Metrorail Station or the Medical Center Metrorail Station.

Metrobus Route J4

This route comes closest to covering the entire segment of the Purple Line. It operates in peak periods only between the Bethesda and the College Park Metrorail Stations providing limited

[7] See page 2-4 and 2-5 of the AA/DEIS for a discussion of the longer tunnels under Wayne Avenue.

stop service on a 20-minute frequency. Improvements to this route form the basis for the Transportation Systems Management Alternative (TSM) discussed later in this memo.

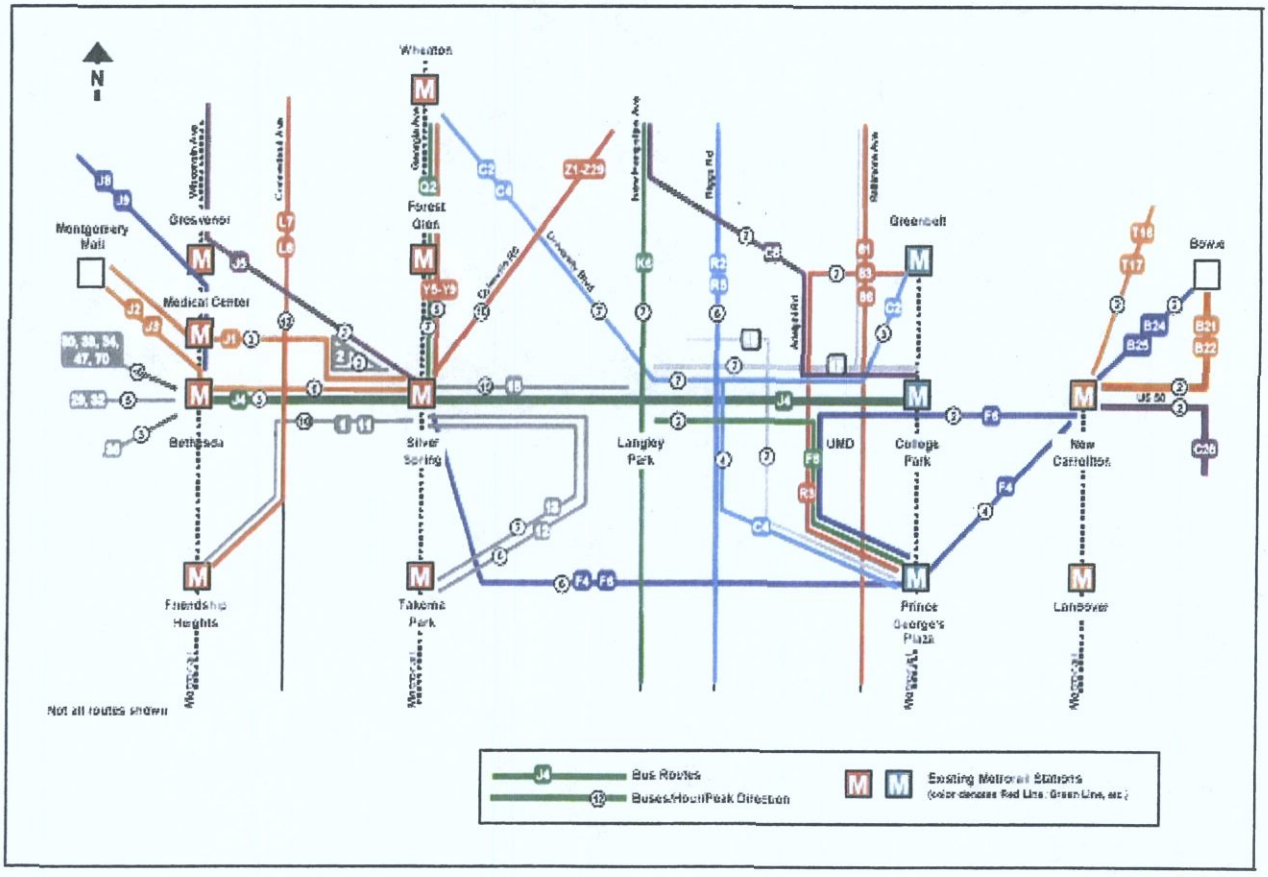
Metrobus Route F4 and F6

This line provides service primarily between Silver Spring and New Carrollton via Prince George's Plaza on a 15-minute frequency during peak periods.

Ride On Route 15

This route provides service between Silver Spring and the Takoma/Langley Crossroads area every four minutes during the peak period in the peak direction. The route alignment is essentially the same as one of the alternative alignments for the Purple Line.

FIGURE 2 – Purple Line Corridor Bus Service



The various bus routes and their respective connections with the Metrorail system is depicted in the diagram above that is taken from the AA/DEIS. The table below shows service frequencies and estimates of average weekday ridership.

TABLE 2 – Existing Bus Service

Route	Terminal and Intermediate Points	Early Morning	AM Peak	Midday	PM Peak	Evening	Saturday	Sunday	Average Daily Riders
WMATA J1	Montgomery Mall-Medical Center – Silver Spring Metro	--	20	--	20	---	--	--	6,600
WMATA J2	Montgomery Mall – Bethesda – Silver Spring Metro	20	17	20	24	15	20	25	
WMATA J3	Montgomery Mall – Bethesda – Silver Spring Metro	--	17	--	24	--	--	--	
WMATA J4	Bethesda Metro – Silver Spring – College Park Metro	--	20	--	20	--	--	--	1,000
WMATA C2	Wheaton Metro – Greenbelt Metro	--	22	30	16	--	30	--	5,200
WMATA C4	Twinbrook Metro – Prince George's Plaza Metro	10	22	30	16	30	30	16	7,800
WMATA F4	Silver Spring – New Carrollton	12	12	40	15	--	30	60	4,600
WMATA F6	Silver Spring – New Carrollton	--	20	40	30	--	--	--	3,100
Ride On 15	Silver Spring Metro – Langley Park	15	4	12	4	30	12	15	7,200
TheBus 17	Langley Park – UM-College Park Metro	45	45	45	45	--	--	--	40
UM Shuttle 111	UM – Silver Spring Metro	--	35	75	45	30	--	--	500
UM Shuttle 104	UM – College Park Metro	8	8	12	8	20	20	20	2,500

These bus routes provide connections to the Metrorail system. A profile of the Metrorail service frequencies and average weekday boardings at selected stations is provided below.

TABLE 3 – Existing Metrorail Service

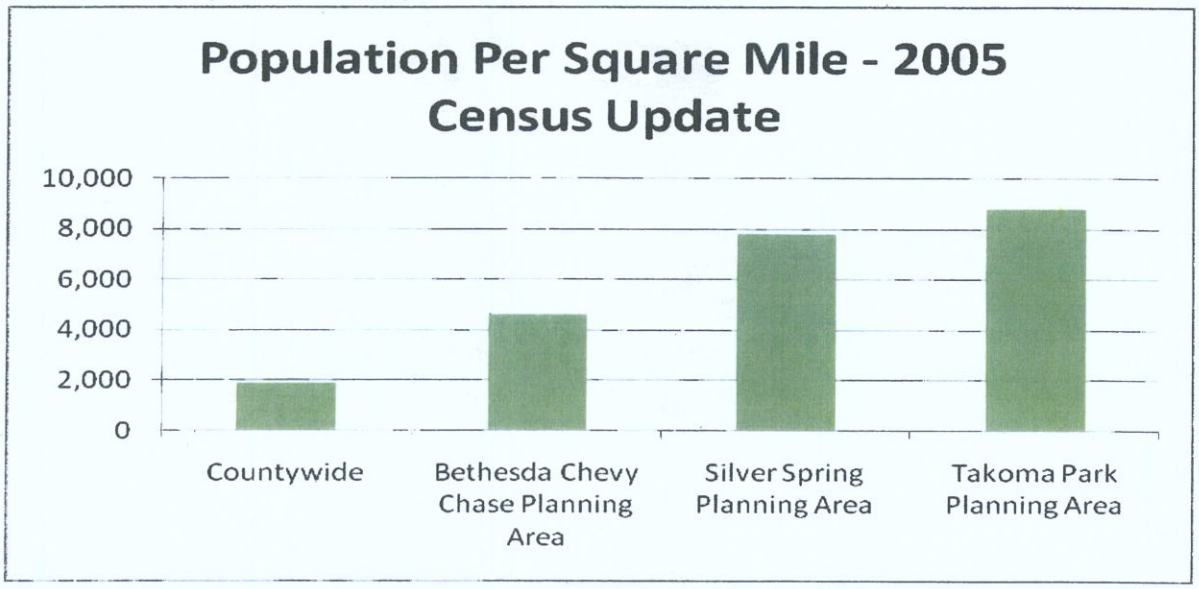
Metrorail Line	Shady Grove	Medical Center	Bethesda	Silver Spring	Glenmont	New Carrollton	UMD College Park
Weekday Peak Period Service Frequency (min.)							
Red Line	6	3	3	3	6		
Orange Line						6	
Green Line							6
Weekday Mid-Day Period Service Frequency (min.)							
Red Line	12	6	6	6	12		
Orange Line						12	
Green Line							12
Average Weekday Boardings At Metrorail Station							
FY 2008	14,182	5,174	10,511	14,476	6,004	10,444	4,727

Profile of the Service Area

The 2005 Census Update provides a quick overview of the planning areas served by the Purple Line and the planning areas compared with the County overall:

In general, the planning areas served by the Purple Line have a greater population density than the County overall.

FIGURE 3 – Population Density



A higher percentage of residents commute by transit and the travel times by transit are shorter when compared to the County overall.

FIGURE 4 How We Get To Work

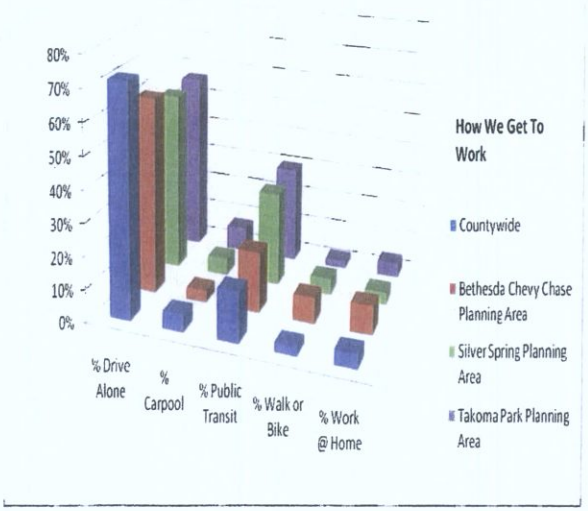
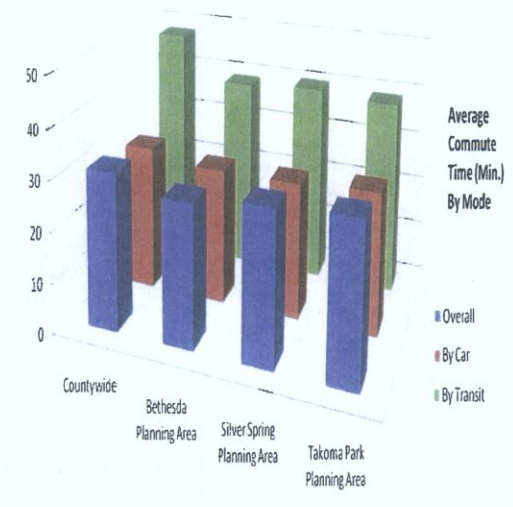


FIGURE 5 Average Commute Time By Mode



Forecasted Growth

As previously noted, one of the tenets of the General Plan is to direct growth toward existing and planned transit station areas so that the county can continue to slow the overall growth of single-occupant auto trips, particularly within the urban ring. It is also important to preserve existing neighborhoods. One way to measure the extent to which we are accomplishing these sometimes competing objectives is to examine forecast housing and job densities.

The most commonly used geographic area is the traffic analysis zone (TAZ). One of the first issues raised by the MPAG was the examination of the forecasted development along the Purple Line corridor. The densities, along with a reference map are charted below.

FIGURE 6 Transportation Analysis Zones

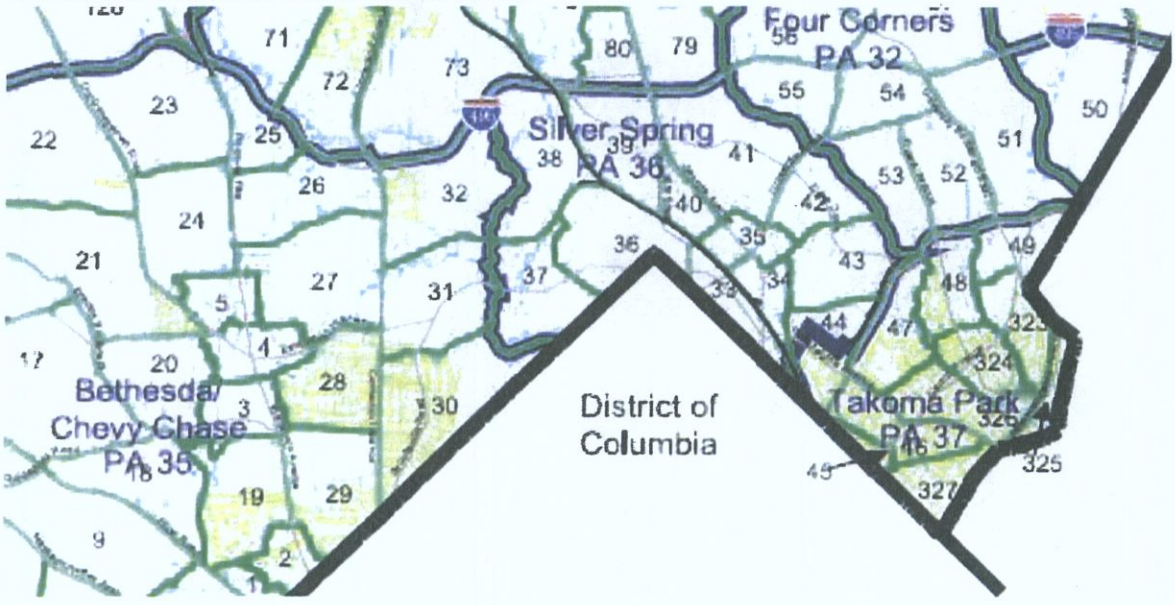


TABLE 4 – Forecasted Household Density

Description	TAZ	Households / Acre 2005	Households / Acre 2030	% Increase	% Annual Increase
NIH / Natonal Library of Medicine	24	1	1	1%	0.04%
Bethesda CBD	5	21	48	133%	5.33%
Bethesda CBD	4	16	30	89%	3.55%
Bethesda CBD	3	18	28	61%	2.44%
National Naval Medical / USUHS	26	0	0	34%	1.35%
West Chevy Chase Heights / Columbia CC	27	4	4	8%	0.33%
Tow n of Chevy Chase	28	3	4	15%	0.61%
North Chevy Chase / Audubon Society	32	2	2	2%	0.07%
Master Plan Alignmnet East of Conn Ave.	31	2	2	0%	0.00%
Walter Reed Annex Area	38	0	1	253%	10.11%
Lyttonsville Area	37	3	3	1%	0.03%
Woodside - North Side of CSX	30	3	3	1%	0.04%
Rosemary Hills - South Side of CSX	36	11	11	1%	0.03%
Woodside - Betw een 16th St & Georgia Avenue	40	3	3	10%	0.40%
Silver Spring CBD - Betw een Wayne Ave & Spring St.	35	18	37	100%	4.01%
Silver Spring CBD - Betw een E/W Highw ay and Fenton St.	34	4	39	784%	31.36%
Silver Spring CBD - Betw een DC Line and CSX	33	19	38	96%	3.84%
East Silver Spring - N of Wayne Ave - Woodside Park	42	5	5	0%	0.00%
East Silver Spring - Betw een Sligo Ave. & Wayne Ave.	43	6	7	17%	0.67%
East Silver Spring / Takoma Park - South of Sligo Ave & West of Piney Br	44	5	5	5%	0.18%
Highland View	53	9	10	9%	0.36%
Long Branch / Brookside Forest	52	5	5	0%	0.02%
Long Branch / Rolling Terrace	48	12	13	6%	0.22%
Takoma Park - Betw een Maple Ave and Piney Branch Rd.	47	5	7	45%	1.81%
New Hampshire Estates	49	8	8	0%	0.02%
Takoma Park - Betw een New Hampshire Ave and Carroll Avenue	323	3	3	0%	0.00%
Takoma Park - East of New Hampshire Avenue	325	6	6	5%	0.20%

TABLE 5 – Forecasted Job Density

Description	TAZ	Jobs / Acre 2005	Jobs / Acre 2030	% Increase	% Annual Increase
NIH / Natonal Library of Medicine	24	50	61	22%	0.89%
Bethesda CBD	5	62	68	10%	0.39%
Bethesda CBD	4	137	158	15%	0.61%
Bethesda CBD	3	76	87	15%	0.62%
National Naval Medical / USUHS	26	25	32	31%	1.23%
West Chevy Chase Heights / Columbia CC	27	3	3	22%	0.88%
Tow n of Chevy Chase	28	1	1	5%	0.21%
North Chevy Chase / Audubon Society	32	1	2	72%	2.89%
Master Plan Alignmnet East of Conn Ave.	31	2	3	5%	0.20%
Walter Reed Annex Area	38	9	11	17%	0.68%
Lyttonsville Area	37	1	1	0%	0.00%
Woodside - North Side of CSX	30	1	1	5%	0.18%
Rosemary Hills - South Side of CSX	36	2	2	15%	0.59%
Woodside - Betw een 16th St & Georgia Avenue	40	0	0	106%	4.24%
Silver Spring CBD - Betw een Wayne Ave & Spring St.	35	121	143	19%	0.75%
Silver Spring CBD - Betw een E/W Highw ay and Fenton St.	34	85	94	11%	0.43%
Silver Spring CBD - Betw een DC Line and CSX	33	47	56	21%	0.82%
East Silver Spring - N of Wayne Ave - Woodside Park	42	2	2	10%	0.41%
East Silver Spring - Betw een Sligo Ave. & Wayne Ave.	43	2	2	14%	0.57%
East Silver Spring / Takoma Park - South of Sligo Ave & West of Piney	44	2	2	12%	0.48%
Highland View	53	1	1	0%	0.00%
Long Branch / Brookside Forest	52	2	2	19%	0.78%
Long Branch / Rolling Terrace	48	2	3	27%	1.09%
Takoma Park - Betw een Maple Ave and Piney Branch Rd.	47	1	2	6%	0.23%
New Hampshire Estates	49	2	2	18%	0.70%
Takoma Park - Betw een New Hampshire Ave and Carroll Avenue	323	5	5	4%	0.18%
Takoma Park - East of New Hampshire Avenue	325	9	9	0%	0.02%

These population and job forecasts are from Round 7.1 of the Metropolitan Washington Council of Governments (COG) Cooperative Forecasts. The densities reported in the table have been rounded to the nearest whole number but the percentages reported are based on the values prior to rounding.

In general, the following observations can be made about the housing and job growth forecasted within the Purple Line corridor:

- The highest growth rate in household density is in the Bethesda and Silver Spring CBDs.
- The highest rate of growth in household density is in TAZ 34, in the Silver Spring CBD between East-West Highway and Fenton Street south of Wayne Avenue.
- The forecasted growth within established neighborhoods near the CBDs is minimal.
- The largest rate of increase in employment growth is forecasted to be at National Naval Medical Center (NNMC) in Bethesda.
- The greatest concentration of employment is forecast to remain in the Bethesda and Silver Spring CBDs. The Bethesda CBD will have both a greater net employment density and more total employment than the aggregation of the NIH/NNMC campuses.

Definition of Alternatives

This section of the memo includes a brief description of each alternative followed by summary information on the service profile (hours, frequency, and vehicle type), ridership, capital costs, and cost effectiveness.

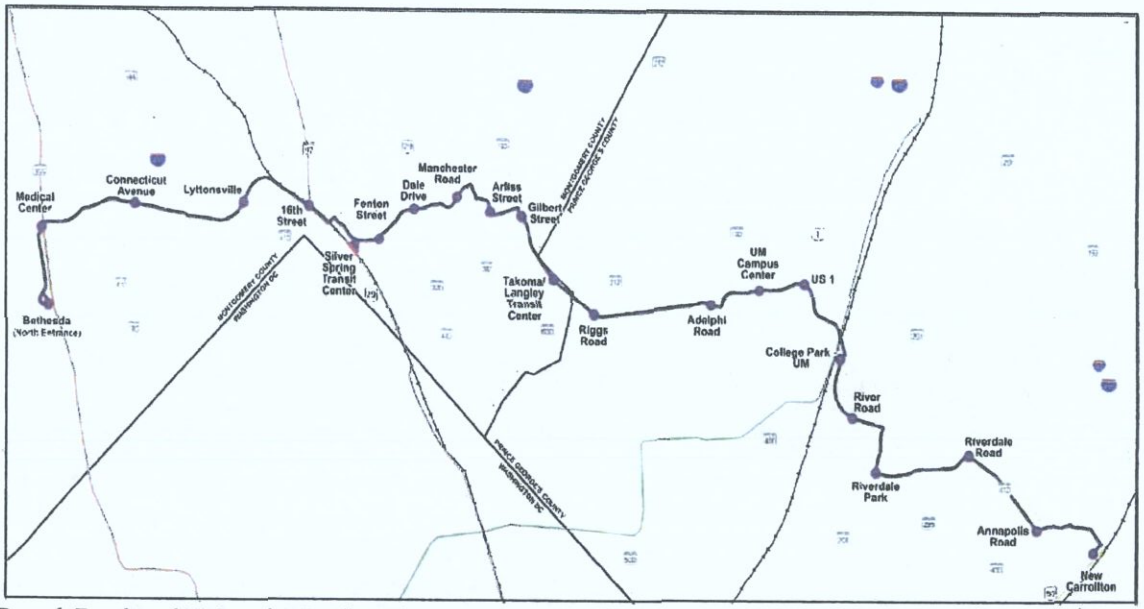
No Build Alternative

The No Build Alternative assumes that no new improvements would be made to the transportation system in the corridor, other than the planned transportation projects that are assumed in the Constrained Long Range Plan (CLRP) of the COG.

Transportation System Management Alternative (TSM)

The TSM alternative would include improved bus service in the corridor including a new through-route from Bethesda to New Carrollton replacing the existing WMATA J4 route, and overlaying service on portions of the WMATA F4/F6 routes between College Park and New Carrollton. A combination of limited stops and selected intersection and signal improvement strategies would be the core of service improvements. Standard buses would be used.

Alternative 3: Low Investment BRT



Key Features

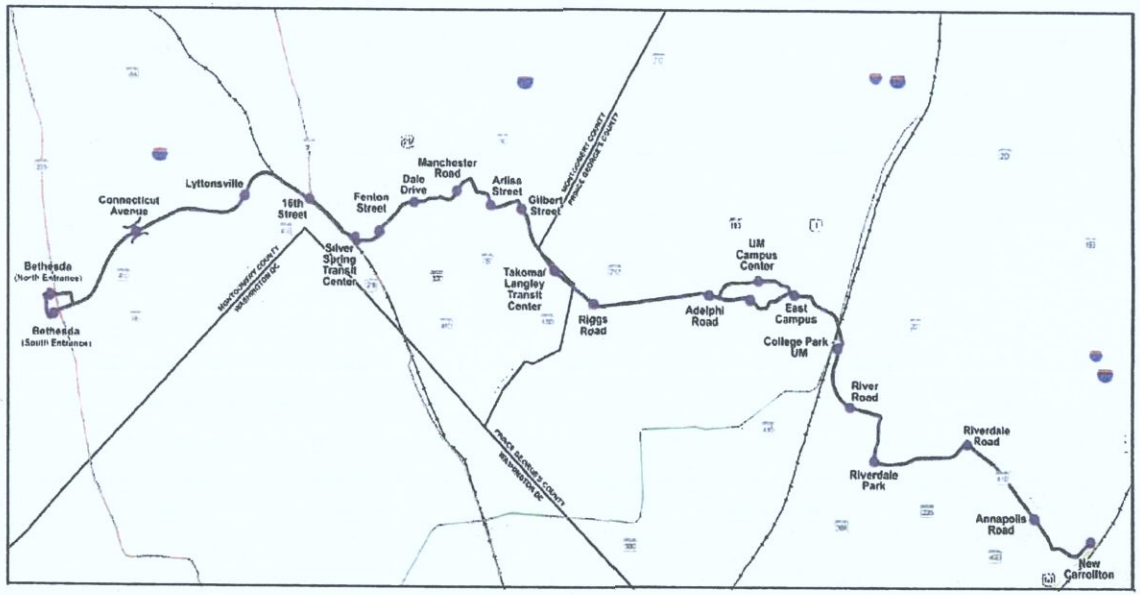
- Serves Bethesda CBD via Woodmont Avenue
- Does not serve Bethesda Metrorail south entrance
- Alignment is on Jones Bridge Road in shared lanes
- At-grade crossing of Connecticut Avenue
- Enters Georgetown Branch right-of-way at Jones Mill Road
- The Capital Crescent Trail (CCT) is constructed east of Jones Mill Road To Silver Spring—not west of Jones Mill Road
- Two bridges—one for the BRT and one for the CCT—over Rock Creek Park
- CCT connection to Rock Creek Trail is provided east of the CCT bridge over Rock Creek Park
- Transitway stays on south side of CSX, crosses 16th Street at-grade, and enters the Silver Spring CBD via 2nd Avenue and Wayne Avenue
- Operates in shared curbside lanes on Wayne Avenue, Piney Branch Road, and University Boulevard

Estimated 2030 Travel Times (doesn't include access or walk, wait, and transfer time)

From	To	Minutes (Model Estimate)	Cumulative Time (Min.)
Bethesda Metrorail North	Medical Center	4.7	-
Medical Center	Connecticut Avenue	6.0	10.7
Connecticut Avenue	Lyttonsville	5.2	15.9
Lyttonsville	Woodside / 16th Street	2.4	18.3
Woodside / 16th Street	Silver Spring Transit Center	6.2	24.5
Silver Spring Transit Center / Metrorail	Fenton Street	4.6	29.1
Fenton Street	Dale Drive	2.8	31.9
Dale Drive	Manchester Place	2.3	34.2
Manchester Place	Arliss Street	4.8	39.0
Arliss Street	Gilbert Street	6.6	45.6
Gilbert Street	Takoma/Langley Transit Center	4.8	50.4
Takoma/Langley Transit Center	UM Campus Center	15.0	65.4
UM Campus Center	College Park – UM Metrorail	10.8	76.2
College Park – UM Metrorail	New Carrollton Metrorail	19.6	95.8

(24)

Alternative 4: Medium Investment BRT



Key Features

- Uses Georgetown Branch right-of-way east of Pearl Street
- When westbound, leaves the Georgetown Branch right-of-way at Pearl Street and operates on counterclockwise loop serving both Bethesda Metrorail entrances before re-entering right-of-way at Bethesda Avenue and Woodmont Avenue.
- CCT remains in tunnel adjacent to transitway as only one (westbound) lane is required for bus
- CCT is constructed from Bethesda Metrorail south entrance to SSTC
- Transitway and CCT cross Connecticut Avenue on aerial structure
- Transitway and trail go under Jones Mill Road. Bridges are added for Rock Creek crossing and connection as described under Low Investment BRT alternative
- Transitway is on south side of CSX while trail crosses CSX on new bridge near Talbot Street bridge. The transitway crosses 16th Street and Spring Street at-grade and crosses over the CSX right-of-way east of the Falklands Apartments in order to enter the SSTC
- Leaves the SSTC in dedicated lanes on Bonifant Street and operates in shared curbside lanes with added left turn lanes on Wayne Avenue at Cedar Street, Dale Drive, and Sligo Creek Parkway
- Operates in dedicated curbside lanes on Piney Branch Road and University Boulevard. Intersections are crossed at-grade

Estimated 2030 Travel Times (doesn't include access or walk, wait, and transfer time)

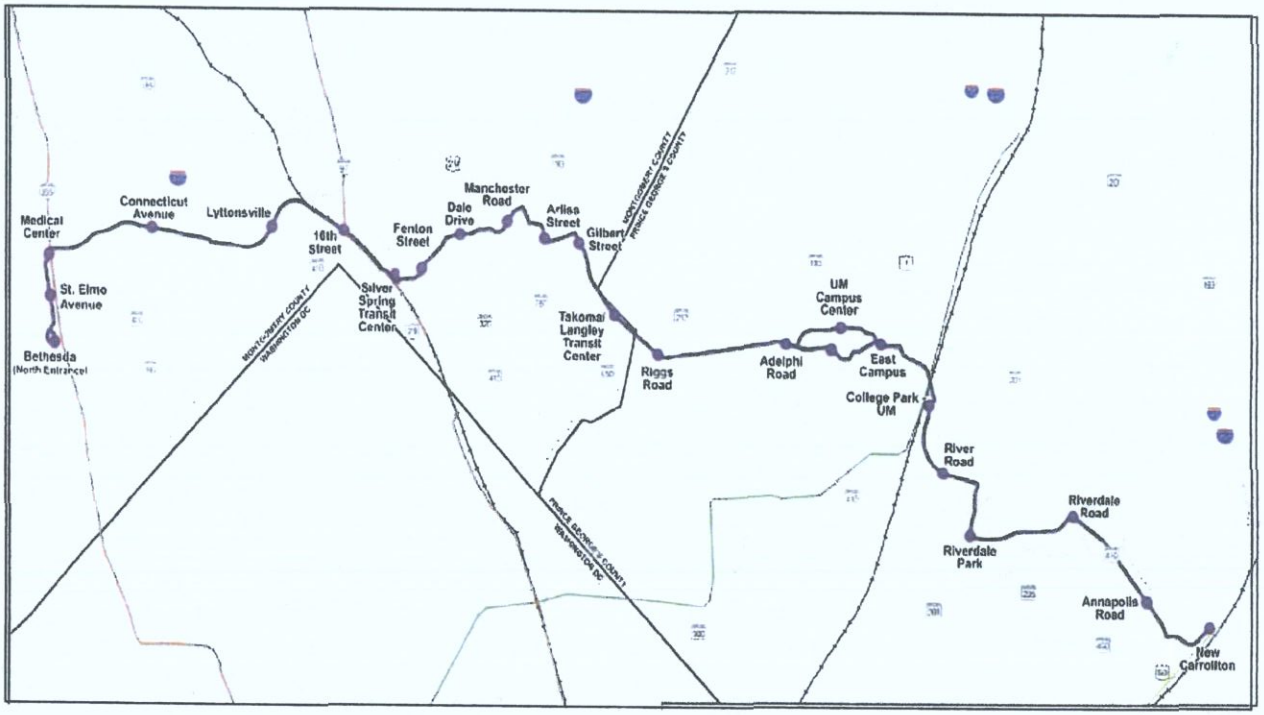
From	To	Minutes (Model Estimate)	Cumulative Time (Min.)
Bethesda Metrorail North	Bethesda Metrorail South	5.2	-
Bethesda Metrorail South	Connecticut Avenue	5.5	10.7
Connecticut Avenue	Lyttonsville	3.1	13.8
Lyttonsville	Woodside / 16th Street	2.4	16.2
Woodside / 16th Street	Silver Spring Transit Center	2.1	18.3
Silver Spring Transit Center / Metrorail	Fenton Street	3.1	21.4
Fenton Street	Dale Drive	3.0	24.4
Dale Drive	Manchester Place	2.3	26.7
Manchester Place	Arliss Street	4.7	31.4
Arliss Street	Gilbert Street	3.4	34.8
Gilbert Street	Takoma/Langley Transit Center	2.3	37.1
Takoma/Langley Transit Center	UM Campus Center	11.2	48.3
UM Campus Center	College Park – UM Metrorail	6.0	54.3
College Park – UM Metrorail	New Carrollton Metrorail	18.3	72.6

(25)

Alternative 4A: Medium Investment BRT via Jones Bridge Road

Key Features

- Combines features of Alternative 3 (in Bethesda and along Jones Bridge Road) with features of Alternative 4 (for balance of alignment)
- Adds a station near St. Elmo and Woodmont Avenues
- As in the case of Alternative 3, the CCT would not be constructed west of Jones Mill Road in this alternative



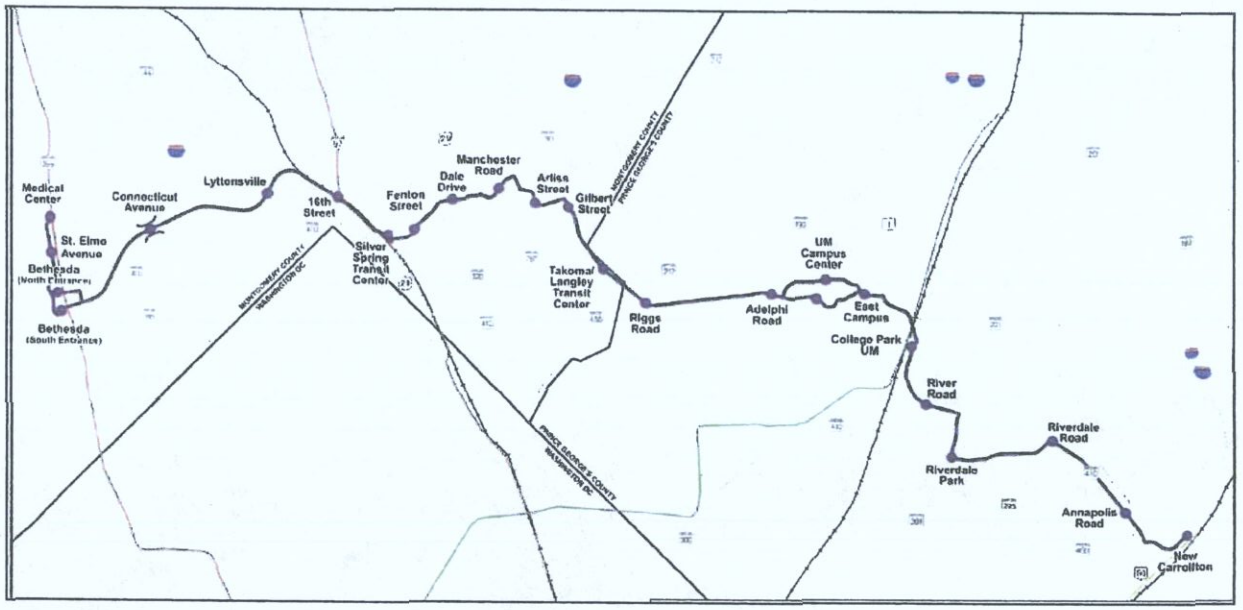
Estimated 2030 Travel Times (doesn't include access or walk, wait, and transfer time)

From	To	Minutes (Model Estimate)	Cumulative Time (Min.)
Bethesda Metrorail North	Saint Elmo Ave.	3.0	-
Saint Elmo Ave.	Medical Center	3.0	6.0
Medical Center	Connecticut Ave.	6.0	12.0
Connecticut Ave.	Lyttonsville	5.2	17.2
Lyttonsville	Woodside / 16th Street	2.4	19.6
Woodside / 16th Street	Silver Spring Transit Center	2.1	21.7
Silver Spring Transit Center / Metrorail	Fenton Street	3.1	24.8
Fenton Street	Dale Drive	3.0	27.8
Dale Drive	Manchester Place	2.3	30.1
Manchester Place	Arliss Street	4.7	34.8
Arliss Street	Gilbert Street	3.4	38.2
Gilbert Street	Takoma/Langley Transit Center	2.3	40.5
Takoma/Langley Transit Center	UM Campus Center	11.2	51.7
UM Campus Center	College Park – UM Metrorail	6.0	57.7
College Park – UM Metrorail	New Carrollton Metrorail	18.3	76.0

Alternative 4B – Medium Investment BRT via Georgetown Branch Extended To Medical Center

Key Features

- Similar to Alternative 4 but with extension to Medical Center Metrorail Station via station at St. Elmo Avenue.
- The Bethesda Metrorail south entrance would be served only on trips in the eastbound direction.



Estimated 2030 Travel Times (doesn't include access or walk, wait, and transfer time)

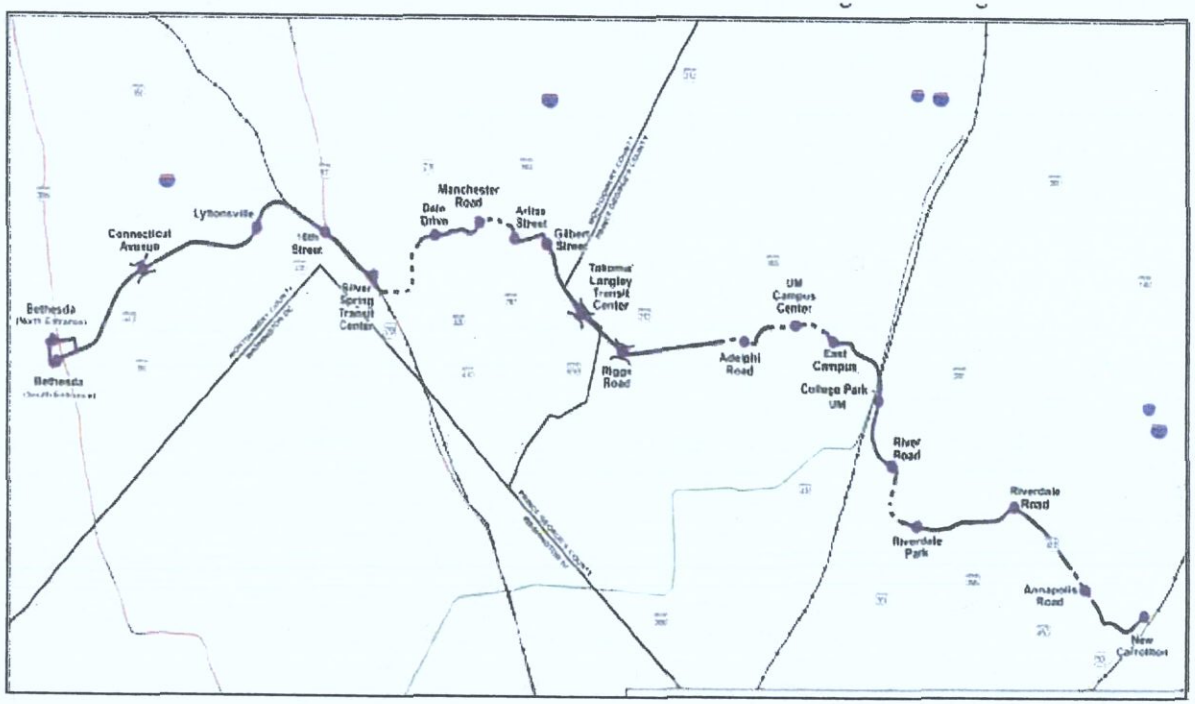
From	To	Minutes (Model Estimate)	Cumulative Time (Min.)
Medical Center	Saint Elmo Ave.	3.0	-
Saint Elmo Ave.	Bethesda Metrorail North	3.0	6.0
Bethesda Metrorail North	Bethesda Metrorail South	5.2	11.2
Bethesda Metrorail South	Connecticut Ave.	5.5	16.7
Connecticut Ave.	Lyttonsville	3.1	19.8
Lyttonsville	Woodside / 16th Street	2.4	22.2
Woodside / 16th Street	Silver Spring Transit Center	2.1	24.3
Silver Spring Transit Center / Metrorail	Fenton Street	3.1	27.4
Fenton Street	Dale Drive	3.0	30.4
Dale Drive	Manchester Place	2.3	32.7
Manchester Place	Arliss Street	4.7	37.4
Arliss Street	Gilbert Street	3.4	40.8
Gilbert Street	Takoma/Langley Transit Center	2.3	43.1
Takoma/Langley Transit Center	UM Campus Center	11.2	54.3
UM Campus Center	College Park – UM Metrorail	6.0	60.3
College Park – UM Metrorail	New Carrollton Metrorail	18.3	78.6

(27)

Alternative 5: High Investment BRT

Key Features

- Same routing as Alternative 4 west of SSTC except it crosses 16th Street and Spring Street below-grade—at about the level of the CSX tracks
- Enters a tunnel south of the SSTC to go under Georgia Avenue and Grove Street before surfacing on Wayne Avenue just east of Cedar Street
- Continues in dedicated lanes on Wayne Avenue until it enters tunnel under Plymouth Street to Arliss Street
- Includes grade separation at New Hampshire Avenue and Riggs Road in addition to Connecticut Avenue.



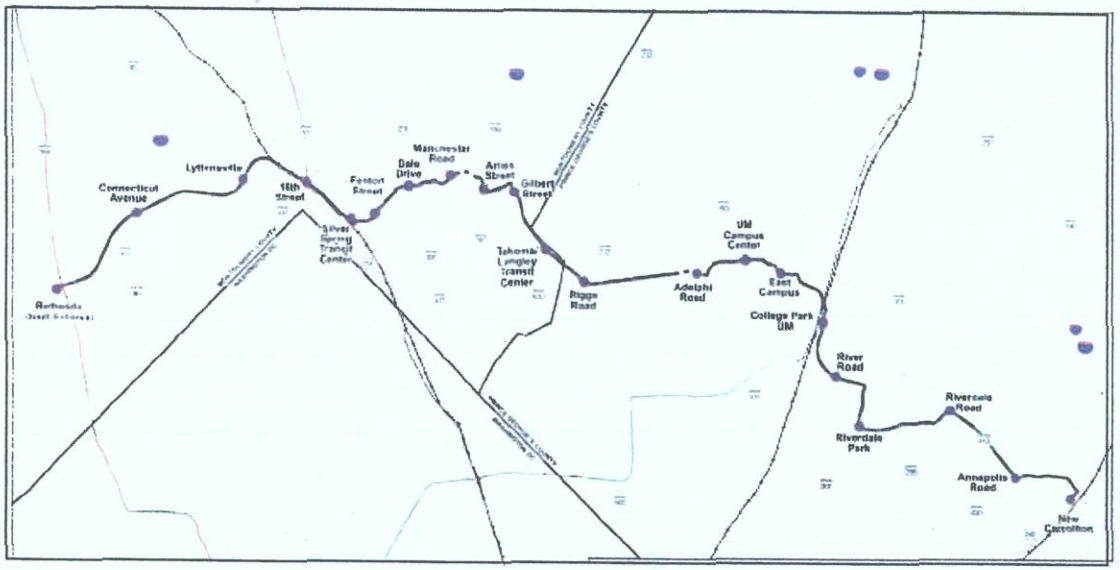
Estimated 2030 Travel Times (doesn't include access or walk, wait, or transfer time)

From	To	Minutes (Model Estimate)	Cumulative Time (Min.)
Bethesda Metrorail North	Bethesda Metrorail South	5.2	-
Bethesda Metrorail South	Connecticut Ave.	5.5	10.7
Connecticut Ave.	Lyttonsville	3.1	13.8
Lyttonsville	Woodside / 16th Street	2.4	16.2
Woodside / 16th Street	Silver Spring Transit Center	2.1	18.3
Silver Spring Transit Center / Metrorail	Dale Drive	2.6	20.9
Dale Drive	Manchester Place	2.1	23.0
Manchester Place	Arliss Street	1.4	24.4
Arliss Street	Gilbert Street	4.0	28.4
Gilbert Street	Takoma/Langley Transit Center	2.2	30.6
Takoma/Langley Transit Center	UM Campus Center	7.4	38.0
UM Campus Center	College Park – UM Metrorail	5.9	43.9
College Park – UM Metrorail	New Carrollton Metrorail	15.0	58.9

(28)

Alternative 6: Low Investment LRT

Key Features



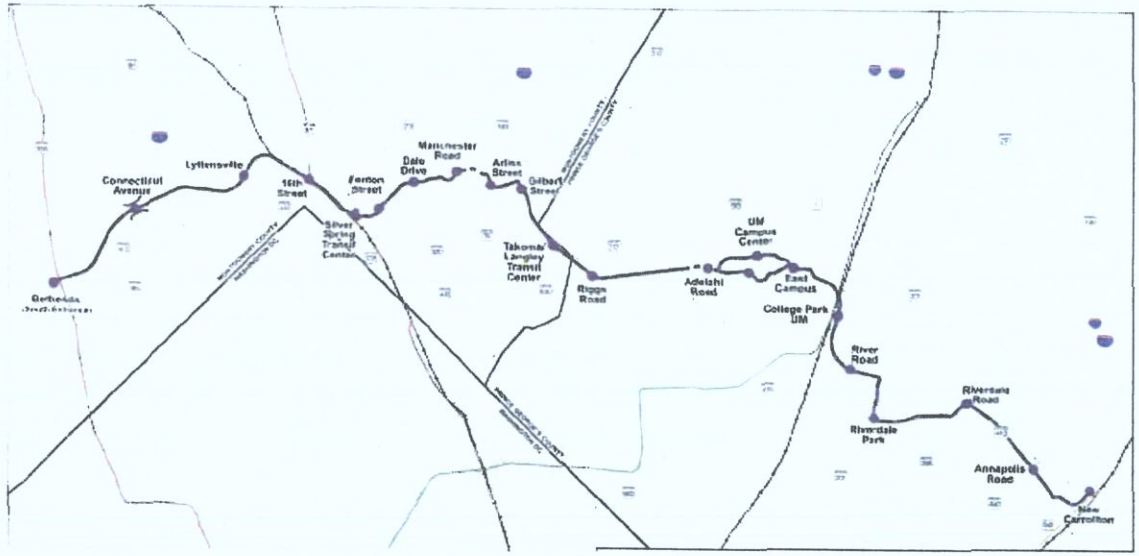
- Alignment is within Georgetown Branch right-of-way starting just west of Wisconsin Avenue with a connection to the Bethesda Metrorail south entrance
- The CCT exits the right-of-way just east of the tunnel under Wisconsin Avenue and goes through Elm Street Park, crossing Wisconsin Avenue at-grade
- The LRT and trail cross Connecticut Avenue at-grade
- There are two new bridges over Rock Creek—one for the LRT and one for the CCT. The LRT and CCT go under Jones Mill Road
- The LRT alignment in the CSX right-of-way and traveling east out of the SSTC is the same as Alternative 4 except that the LRT travels in the middle shared lanes of Wayne Avenue. Unlike Alternative 7: Medium Investment LRT, there are no new left turn lanes added at selected intersections
- The LRT enters a tunnel after Manchester Place and continues under Plymouth Street to emerge on Arliss Street
- The LRT is in dedicated lanes in the median of Piney Branch Road and University Boulevard. The intersections at New Hampshire Avenue and Riggs Road are crossed at-grade under this alternative.

Estimated 2030 Travel Times (doesn't include access or walk, wait, or transfer time)

From	To	Minutes (Model Estimate)	Cumulative Time (Min.)
Bethesda Metrorail South	Connecticut Avenue	4.0	-
Connecticut Avenue	Lyttonsville	2.3	6.3
Lyttonsville	Woodside / 16th Street	2.1	8.4
Woodside / 16th Street	Silver Spring Transit Center	2.8	11.2
Silver Spring Transit Center / Metrorail	Fenton Street	3.1	14.3
Fenton Street	Dale Drive	3.8	18.1
Dale Drive	Manchester Place	3.1	21.2
Manchester Place	Arliss Street	1.4	22.6
Arliss Street	Gilbert Street	3.8	26.4
Gilbert Street	Takoma/Langley Transit Center	2.2	28.6
Takoma/Langley Transit Center	UM Campus Center	8.6	37.2
UM Campus Center	College Park – UM Metrorail	6.0	43.2
College Park – UM Metrorail	New Carrollton Metrorail	18.7	61.9

Alternative 7: Medium Investment LRT

Key Features



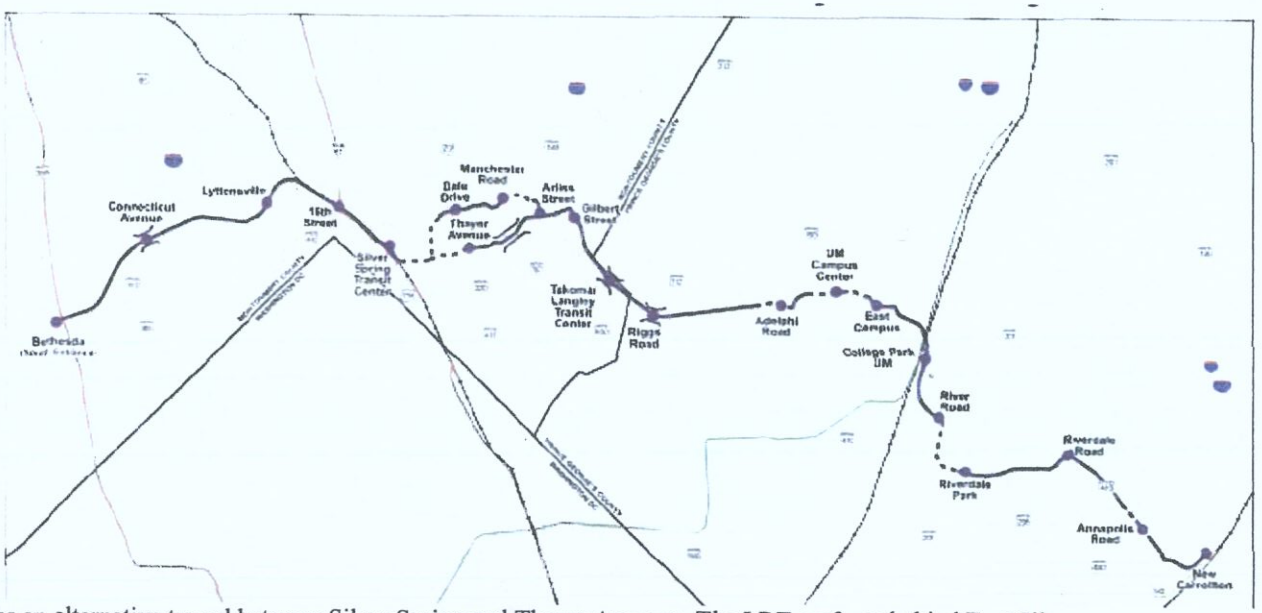
- Same routing as Alternative 6 in Bethesda- Chevy Chase area, except that there are two bridges over Connecticut Avenue, one for the LRT and one for the CCT
- Same alignment as Alternative 4 within the CSX right-of-way except that the transitway crosses 16th Street and Spring Street below grade
- Similar to Alternative 4, the transitway leaves the SSTC in dedicated lanes on Bonifant Street and then operates in the shared median of Wayne Avenue with additional left turn lanes at Cedar Street, Dale Drive, and Sligo Creek Parkway
- Like Alternative 6, the LRT enters a tunnel after Manchester Place and continues under Plymouth Street to emerge on Arliss Street.
- The crossing of New Hampshire Avenue and Riggs Road are at-grade in this alternative

Estimated 2030 Travel Times (doesn't include access or walk, wait, and transfer times)

From	To	Minutes (Model Estimate)	Cumulative Time (Min.)
Bethesda Metrorail South	Connecticut Avenue	2.4	-
Connecticut Avenue	Lyttonsville	2.3	4.7
Lyttonsville	Woodside / 16th Street	2.1	6.8
Woodside / 16th Street	Silver Spring Transit Center	2.0	8.8
Silver Spring Transit Center / Metrorail	Fenton Street	3.1	11.9
Fenton Street	Dale Drive	3.1	15.0
Dale Drive	Manchester Place	2.8	17.8
Manchester Place	Arliss Street	1.4	19.2
Arliss Street	Gilbert Street	3.8	23.0
Gilbert Street	Takoma/Langley Transit Center	2.2	25.2
Takoma/Langley Transit Center	UM Campus Center	8.6	33.8
UM Campus Center	College Park – UM Metrorail	6.0	39.8
College Park – UM Metrorail	New Carrollton Metrorail	18.7	58.5

(30)

Alternative 8: High Investment LRT



Key Features

- In the Bethesda-Chevy Chase area, the same as Alternative 7 except that the CCT doesn't leave the Georgetown Branch right-of-way at Elm Street Park but instead continues through the tunnel above the LRT
- Enters a tunnel south of the SSTC to go under Georgia Avenue and Grove Street before surfacing on Wayne Avenue just east of Cedar Street
- This alternative includes a design option that has an alternative tunnel between Silver Spring and Thayer Avenues. The LRT surfaces behind East Silver Spring Elementary School and crosses Sligo Creek on a bridge. This alignment does not have station stops on Wayne Avenue. The travel times shown below do not include this alignment
- Like Alternative 5, this alternative includes grade separation at New Hampshire Avenue and Riggs Road in addition to Connecticut Avenue

Estimated 2030 Travel Times (doesn't include access or walk, wait, and transfer times)

From	To	Minutes (Model Estimate)	Cumulative Time (Min.)
Bethesda Metrorail South	Connecticut Avenue	2.4	-
Connecticut Avenue	Lyttonsville	2.3	4.7
Lyttonsville	Woodside / 16th Street	2.1	6.8
Woodside / 16th Street	Silver Spring Transit Center	2.0	8.8
Silver Spring Transit Center / Metrorail	Dale Drive	3.6	12.4
Dale Drive	Manchester Place	2.4	14.8
Manchester Place	Arliss Street	1.4	16.2
Arliss Street	Gilbert Street	3.8	20.0
Gilbert Street	Takoma/Langley Transit Center	2.1	22.1
Takoma/Langley Transit Center	UM Campus Center	7.4	29.5
UM Campus Center	College Park – UM Metrorail	5.9	35.4
College Park – UM Metrorail	New Carrollton Metrorail	14.8	50.2

31

Service Profile of the Build Alternatives

Each of the six build alternatives share the same assumptions on hours and frequency of service.

The hours of service are similar to Metrorail as noted in the chart below:

Day of Week	Hours
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

The frequency varies by time of day and day of week as noted below:

Day of Week	Early AM	Peak	Midday	PM Peak	Evening	Late PM
Weekdays	10 min.	6 min.	10 min.	6 min.	10 min.	10 min.
Saturdays	20 min.	N/A	10 min.	N/A	10 min.	20 min.
Sundays	20 min.	N/A	10 min.	N/A	10 min.	20 min.

As previously noted, two types of vehicles are under consideration – Bus Rapid Transit (BRT) or Light Rail Transit (LRT).

A BRT vehicle can generally accommodate up to 120 passengers (including standees and assuming an articulated bus about 60 feet long as shown left) and can be powered by hybrid-electric, diesel, or compressed natural gas (CNG) engines. The vehicle shown is in use in Los Angeles.

An LRT vehicle can generally accommodate around 135 passengers (including standees and assuming an articulated car about 90 feet long as shown right) and can be powered by electricity. It is assumed the Purple Line trains would consist of two cars during the peak periods. One LRT train can therefore accommodate about 270 passengers or more than twice as many passengers as one BRT bus. The vehicle shown is in use in Charlotte.

The MTA has assumed the fare structure for the Purple Line will be the same as Metrobus:

Regular Fare (cash) - $1.35
Regular fare (SmarTrip) - $1.25
Express Bus Fare - $3.10
Transfers - free

It is also assumed that fares will be purchased at stations similar to Metrorail and that a proof of purchase will be required to show inspectors who periodically check for confirmation of the fare having been paid.

Estimates of Ridership, Costs, and Cost Effectiveness

The AA/DEIS estimates capital costs and overall benefits of each alternative. The estimates are reached using methodologies reviewed by the FTA and described in detail in Chapter 6 of the AA/DEIS. The cost and cost effectiveness estimates have the following characteristics:

- costs are in 2007 dollars
- cost effectiveness is an estimate of the incremental benefit over the TSM alternative
- the cost effectiveness number is an "annualized cost per hour of user benefit"
- the lower the cost effectiveness number the better
- when using 2007 dollars, if the cost effectiveness number exceeds $23.99 the alternative isn't eligible for federal funding using the current rating practice.
- the cost effectiveness measure reflects benefits to all travelers, not just transit users
- the methodology for arriving at an annualized cost per hour of user benefit is designed to capture as many costs as possible and provide an "apples to apples" comparison. It captures life cycle costs, the cost of capital, travel time savings, and other factors. It ignores funding sources and costs or revenues that are not directly related to the project.

The chart below presents the costs and the estimate of the cost effectiveness for each of the original six build alternatives along with three variations (4A, 4B, and 7A), two of which are included in the AA/DEIS and another that the staff requested the MTA to examine.

TABLE 6 – Cost and Ridership

Alternative	Total Capital Costs (2007)	Annual Operating Costs (2007)	Cost Effectiveness (CE) Measure – Annualized Cost Per Hour Of User Benefit	Average Weekday Boardings - 2030	Notes
2 - TSM	$81,960,000	$14,600,000	N/A	16,900	baseline alternative
3 - Low Investment BRT	$386,390,000	$17,300,000	$18.24	40,000	via Jones Bridge Road
4 - Medium Investment BRT	$579,820,000	$17,300,000	$14.01	51,800	
4A - Medium Investment BRT via Jones Bridge Road	$597,000,000	$17,300,000	$15.62[8]	50,000	reviewed in response to town of Chevy Chase concerns

[8] This CE number reflects the estimated $60 million cost of a new entrance at the southern end of the Medical Center Red Line Station. Without the entrance, the CE number is $14.04.

Alternative	Total Capital Costs (2007)	Annual Operating Costs (2007)	Cost Effectiveness (CE) Measure – Annualized Cost Per Hour Of User Benefit	Average Weekday Boardings – 2030	Notes
4B - Medium Investment BRT via Georgetown Branch and extended to Medical Center	$585,000,000	$18,300,000	$13.34	58,000	included by MTA for comparison with Medium Investment BRT via Jones Bridge Road
5 - High Investment BRT	$1,088,480,000	$15,800,000	$19.34	58,800	
6 - Low Investment LRT	$1,206,150,000	$26,400,000	$26.51	59,300	
7 - Medium Investment LRT	$1,220,150,000	$25,000,000	$22.82	62,600	
7A - Medium Investment LRT with tunnel from SSTC to east of Cedar Street[9]	$1,330,000,000	$24,000,000	$22.89	64,700	"Hybrid" Alternative analyzed by MTA at request Of staff[10]
8 - High Investment LRT	$1,634,840,000	$22,200,000	$23.71	68,100	

Master Plan Advisory Group (MPAG)

The MPAG was established by the Planning Board to work with the staff on Purple Line planning, including the review of the AA/DEIS and the development of a Purple Line Functional Plan after the selection of a LPA. The MPAG has met 17 times since its appointment in September of last year.[11] The MPAG comprises individuals and stakeholders along the Purple Line alignment. The MPAG's role is to assist the Planning Board and staff in reviewing the AA/DEIS, delving into the project details and informing staff and Planning Board of things (positive and negative) that deserve additional focus as well as things about the project they do or don't like.[12] The MPAG's input over the last year has been constructive and added value to the

[9] This alternative – like the other High Investment Alternatives – does not include stations at Dale Drive or at the proposed library site at Wayne Avenue and Fenton Street.

[10] The staff has also recently asked the MTA to consider analyzing (i.e., include in the coded network) a tunnel that would extend under Wayne Avenue and surface in the vicinity of Mansfield Road.

[11] A summary of the MPAG work – along with related Purple Line documents and reports – is available on the Planning Board Purple Line project web site at:
http://www.mcparkandplanning.org/Transportation/projects/bicounty.shtm

[12] See the Purple Line Functional Master Plan Purpose and Outreach Strategy Report, pages 15-18, at:
http://www.mcparkandplanning.org/planning/viewer.shtm#http://www.mcparkandplanning.org/Transportation/projects/documents/FINALPURPOSEANDOUTREACHREPORT010808.pdf for a discussion of initial issues raised by the MPAG.

planning process. To our knowledge, it is the only forum where the diverse views of residents and stakeholders along the alignment are heard on a regular basis. On a project of this scope, the absence of a consensus by the MPAG on any specific issue doesn't diminish the value of MPAG contributions. Additional information on major issues raised by the MPAG and the MTA and staff response to those issues is included throughout this memo.

2. PREFERRED PURPLE LINE MODE

This section of the staff memo reviews the issues related to the preferred mode of the Purple Line raised by MPAG members, in testimony at the MTA hearings, by other interested citizens and stakeholders, elected officials and staff. The staff's analysis is supplemented by other technical sources and input from the MTA Project Team, MPAG members, or other interested parties.

The staff recommends light rail as the preferred mode for the Purple Line.

Vehicle Capacity

In late October, staff asked the MTA to provide estimates for the peak directional line load (ridership) and the assumptions regarding mode capacities used in the AA/DEIS.

The table below presents this information:

TABLE 7 – Peak Load Point, Ridership, and Capacity

Alternative	Location	Direction	Peak Hour Directional Line Load	Peak Hour Capacity[13]
Low Investment BRT	Rt. 1/UM East to College Park Metro	Eastbound - PM	1,087	2,100
Med Investment BRT	SSTC[14] to 16th Street	Eastbound - PM	1,652	2,100
High Investment BRT	SSTC to 16th Street	Eastbound - PM	1,858	2,100
Low Investment LRT	SSTC to 16th Street	Eastbound - PM	2,147	2,800
Medium Investment LRT	SSTC to 16th Street	Eastbound - PM	2,239	2,800
High Investment LRT	SSTC to 16th Street	Eastbound - PM	2,533	2,800

The AA/DEIS notes that the "TSM and BRT vehicle fleets could be a combination of articulated or standard buses."[15]

Directional line capacity is dependent on the service frequency and the bus or train's capacity, among other things. The peak hour capacity of 2,100 shown in Table 7 for the BRT alternatives assumes that additional BRT vehicles are used during the busiest hour in the afternoon to accommodate the demand. It also assumes that each BRT vehicle can accommodate 140 passengers.

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[13] The MTA assumptions for Peak Hour Capacity include the following: For BRT – 10 vehicles per hour times 140 people per vehicle plus 5 trippers per hour times 140 people per vehicle. "Trippers" are extra buses placed in operation for only the period of time needed to accommodate the demand – in this case it is theoretically the busiest consecutive 15 minutes during the peak period. For LRT – the assumption is 10 trains per hour with each train consisting of 2 cars, each car carrying 140 people.

[14] SSTC is the Silver Spring Transit Center

[15] See Subsection 2.6.5, page 2-31.

There are numerous articles and professional references on transit capacity. The Transportation Research Board's *Transit Capacity and Quality of Service Manual* (2nd Edition) suggests a good range for BRT vehicle capacity is 100 to120 for a high floor vehicle.[16]

Another good reference for comparing LRT and BRT is a presentation by Jay Evans Consulting in 2005 at the Institute of Transportation Engineers annual meeting.[17] The presentation includes an objective look at the issues of capacity and costs. BRT vehicle capacity is estimated to range from 110 to 120, including more than one-third as standees. Mr. Evans concludes the presentation by noting:

"No rapid transit mode is singly superior in all contexts. Consideration of 'right sizing' should be paramount in decision making."

Fifteen BRT vehicles an hour would accommodate 1,800 passengers if you assume 120 passengers per BRT vehicle (lower than the MTA estimate presented in the above table). Ten LRT trains an hour would accommodate 2,700 passengers an hour (per the MTA estimate) if you assume two cars per train and each car accommodating 135 passengers.[18] Under those assumptions, the BRT vehicles would accommodate the estimated peak hour directional line load on two of the three alternatives.

The staff is concerned that BRT may not provide enough capacity to serve expected demand, especially given the Purple Line's connections with the Metrorail system, the forecasted peak hour passenger demand, and the fact that the forecasting model does not capture other external factors such as the risk that fuel costs rise faster than inflation.

If capacity were to be a problem, the introduction of additional BRT vehicles to accommodate directional line loads above 2,000 could be expected to adversely impact signal priority and pedestrian crossing phases —a key consideration at a number of locations along the alignment.[19] There are three primary reasons for this concern, as discussed with MTA staff at the December 8 Planning Board worksession (and exemplified by the query "why do buses come in threes?"):

- any BRT option must operate in mixed traffic for several blocks to execute the "turnaround" required at the Bethesda terminus, so the ability to maintain schedules on very short headways is unrealistic.
- Individual station boarding and alighting demands become more unpredictable as headways are reduced, so that buses will not serve equal demands.
- The typical traffic signal cycle length (generally up to 150 seconds in peak periods) means that should signal priority treatments fail, an individual BRT vehicle could fall one "headway" behind schedule.

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[16] See Transit Capacity and Quality of Service Manual – 2nd Edition (Exhibit 4-17)

[17] See the following link for the slide show: http://www.ite.org/meetcon/2005AM/Evans_Tues.pdf

[18] A 90 foot light rail vehicle is estimated to have a capacity equivalent to 1.5 passengers per foot length of the car, or 135 passengers (Source: Transit Capacity and Quality of Service Manual – 2nd Edition – page 5-29).

[19] See Transportation Research Record: Journal of the Transportation Research Board, No. 1927, 2006, pages 11-21.

Staff finds that the capacity advantage of LRT is one deciding factor in developing a recommendation for a preferred mode.

Vehicle Emissions and Greenhouse Gas Impacts

The AA/DEIS finds that the difference in emission levels among the various alternatives is insignificant.[20] This finding is consistent with other technical comparisons of BRT and LRT emissions. Transportation Research Record 1927 provides a summary comparison of the variety of BRT and LRT technologies and concludes that LRT is superior to BRT in that LRT produces lower regional or urban emissions levels.[21] However, the combined consideration of energy sources and greenhouse gas emissions has generated substantial discussion that requires further review, particularly in the selection of appropriate LRT vehicle technology. Additional analysis of the alternative LRT vehicle energy and emissions characteristics should be included in the FEIS. Therefore, at the moment, **staff finds that vehicle emission and greenhouse gas levels should not be a deciding factor in developing a recommendation for a preferred mode.**

Vehicle Noise and Vibration

Potential noise and vibration impacts were assessed using criteria established by the Federal Transit Administration (FTA). The assumption was that BRT service would be operated using 60-foot articulated buses and the LRT trains would consist of trains with two 90-foot articulated cars.

In general, there is moderate noise impact associated with the BRT alternatives at the following locations in the County:

- Leonard Drive
- 16th Street – Between East West Highway and Spring Street
- Wayne Avenue – Between Cedar Street and Cloverleaf Road
- Wayne Avenue – Between Dartmouth Avenue and Dale Drive
- Wayne Avenue – Between Mansfield Road and Sligo Creek Parkway
- Arliss Street – Between Flower Avenue and Walden Road
- Residences Near Lyttonsville Operations and Maintenance Facility

The impacts from the BRT alternatives are expected to average one to three dBA above the FTA impact limits. Noise mitigation for the BRT line operations is anticipated to be four-foot wall type barriers.

Noise mitigation for LRT line operations will take the form of vehicle skirts on all light rail vehicles and right-of-way walls on either side of the transitway within the entire length of the

[20] See page 4-48 of the AA/DEIS.

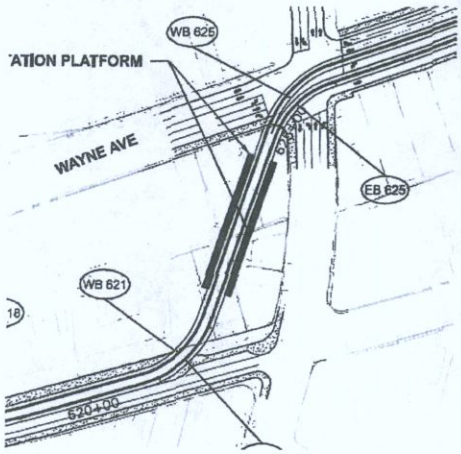
[21] See Transportation Research Record: Journal of the Transportation Research Board , No. 1927, 2006, pages 31-37, for a relatively recent article comparing the emission levels of BRT and LRT vehicles for CO, NOx, and VOC: http://www.actfortransit.org/docs/2008JulLRTvsBRTemmissions.pdf

Georgetown Branch right-of-way. No noise impacts are anticipated from LRT line operations as a result of these mitigation measures.

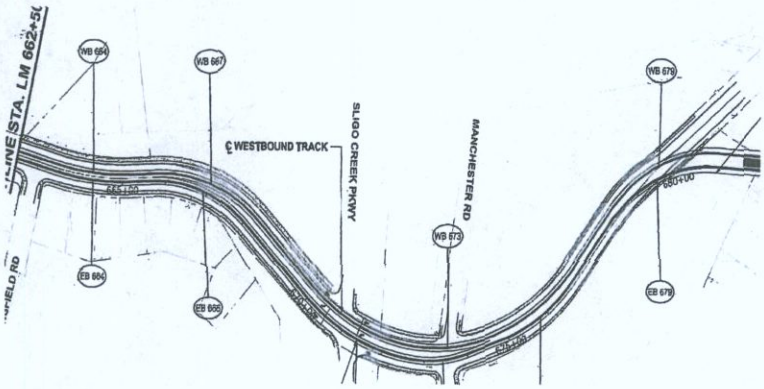
The potential for wheel squeal noise associated with the LRT operations exists at between five to eight locations in the County, depending on the alternative. The locations are primarily within 300 feet of Wayne Avenue.[22]

The specific segments susceptible to wheel squeal are shown below.

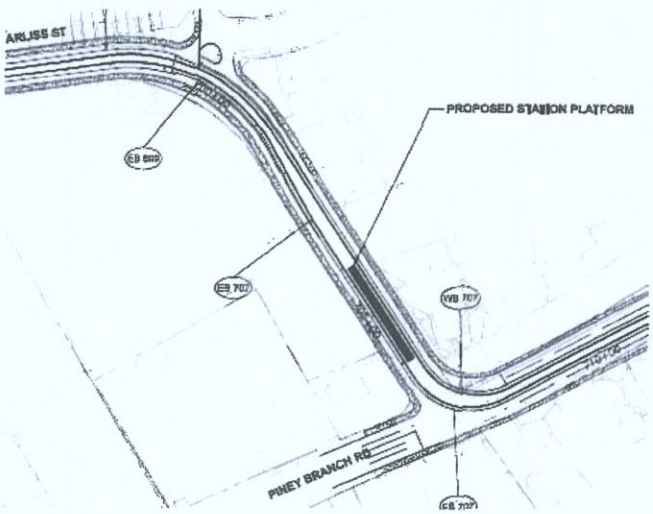
Wayne Avenue and Fenton Street



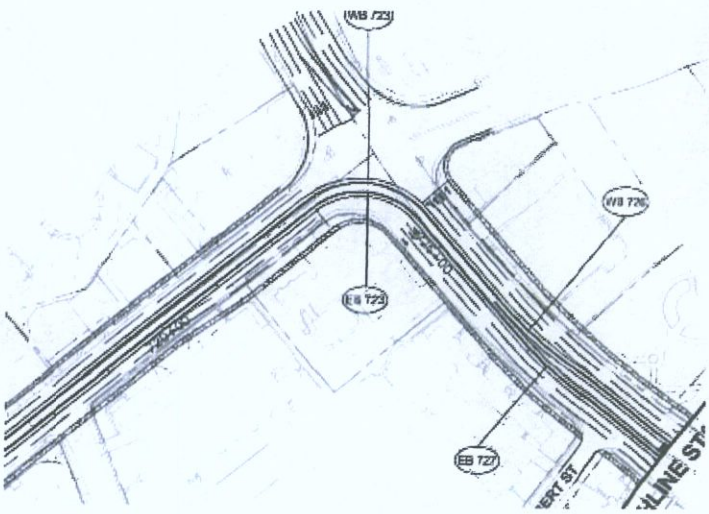
Wayne Avenue – From Mansfield Road East to Tunnel



Arliss Street – From the Tunnel Through the Turn onto Piney Branch Road



Turning from Piney Branch onto University Boulevard



[22] See pages 4-54, 4-55 and 4-56 of the AA/DEIS – along with Figure 4.8-1.

Mitigation options for wheel squeal noise include[23]:

- Using water to lubricate wheels and/or rails
- Optimizing track and wheel profiles to minimize flanging and riding on restraining rail
- Installing resilient or damped wheels.

Vibration impacts for the BRT alternatives would occur at the edge of Columbia Country Club under the Medium and High Investment Alternatives.

The LRT alternatives are expected to produce vibration impacts along the Georgetown Branch right-of-way at three locations:

- East-West Highway
- Edgevale Court
- Boundary of Columbia Country Club

Also, for all three alternatives, within the Georgetown Branch right-of-way, structures located within 40 feet of the proposed LRT centerline are expected to experience vibration levels at or above the FTA impact threshold for Category 2 land uses.[24]

The AA/DEIS indicates the preferred mitigation for ground borne vibration is the proper maintenance of wheels and rails and that with maintenance, the impacts would cease.[25]

The staff finds the noise and vibration analysis in the AA/DEIS is consistent with established FTA procedures and criteria. The proposed and potential mitigation techniques for line operations are reasonable for the noise elements that have been investigated. Site-specific mitigation techniques, however, have not yet been identified.

Staff finds that noise impacts should be a consideration in developing a recommendation for a preferred mode, and that the site-specific locations where wheel squeal has been identified for LRT is a lower overall impact than the noise levels associated with BRT. Mitigation of wheel squeal should be included in the FEIS.

Master Plan Conformance and Urban Design

Adopted Plans that include the Purple Line in some form include:

Georgetown Branch Master Plan Amendment, January 1990

This Plan designates the Georgetown Branch right-of-way as suitable for use as the Silver Spring and Bethesda Trolley and the Capital Crescent Trail between Silver Spring and Bethesda. The

[23] See presentation by David A. Towers P.E. at the following link:
https://www.commentmgr.com/projects/swne/docs/RailTransitNoiseVibration.pdf

[24] A category 2 land use includes residences and buildings where people normally sleep.
[25] See page 4-56 and 4-57 of the AA/DEIS.

plan includes a single track (as opposed to a double track) over certain segments of the alignment.[26]

Bethesda - Chevy Chase Master Plan, April 1990

This Plan reconfirms a light rail and trail combination on the Georgetown Branch alignment between the Silver Spring and Bethesda CBDs as described in the *Georgetown Branch Master Plan Amendment.*

Bethesda Central Business District Sector Plan, July 1994

This Plan reconfirms the connection of light rail service to the Silver Spring CBD using the Georgetown Branch right-of-way, with a terminal located near the Metrorail south entrance in the Bethesda CBD.

Silver Spring Central Business District Sector Plan, March 2000

This Plan reconfirms the Georgetown Branch Transitway as part of the design for the new SSTC. The Plan doesn't preclude consideration of a Purple Line north or east of the SSTC but does call for the Sector Plan to be revisited for any changes to right-of-way or easement acquisition, land use, design, and zoning recommendations, if they would have regional benefits.[27] This is important with respect to the Functional Master Plan since one of its purposes is to provide specific policy guidance on a Purple Line alignment east of the SSTC. This policy guidance is expected to be adopted in concurrence with the State and federal decision-making schedule and will therefore be in place to guide land use planning efforts and transportation decisions during implementation.

East Silver Spring Master Plan, December 2000 and *Takoma Park Master Plan,* December 2000

Both of these plans include recommendations to provide rail transit stops along University Boulevard, New Hampshire Avenue, and Piney Branch Road if a rail transit system is approved along University Boulevard. Maps in both plans depict an alternative rail alignment connecting the SSTC with a Takoma/Langley Transit Center.[28]

Staff finds that master plan conformance should be a consideration when considering the preferred mode for the Purple Line. The existing applicable plans recommend light rail.

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[26] Additional detail on the extent of the single track configuration is presented later in this staff memo – in the section on the consideration of issues related to the alignment of the Purple Line.

[27] See *Silver Spring CBD Sector Plan*, February 2000, page 100, for full discussion.

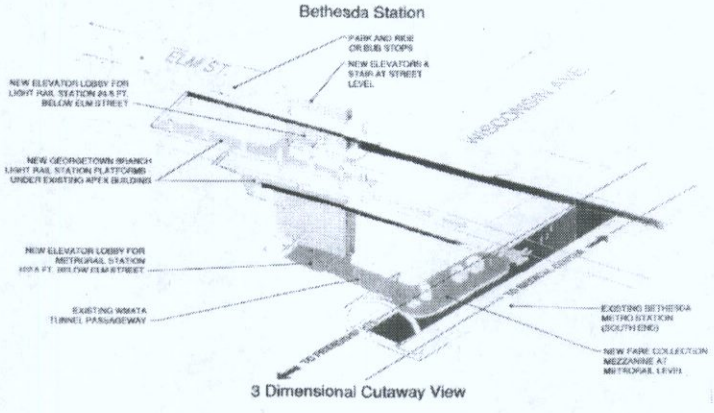
[28] See *East Silver Spring Master Plan*, December 2000, page 83, and *Takoma Park Master Plan*, December 2000, page 103.

Urban Design and Economic Development

The staff finds there are three locations along the alignment where urban design considerations in the context of the selection of a preferred mode need to be examined.

Woodmont East

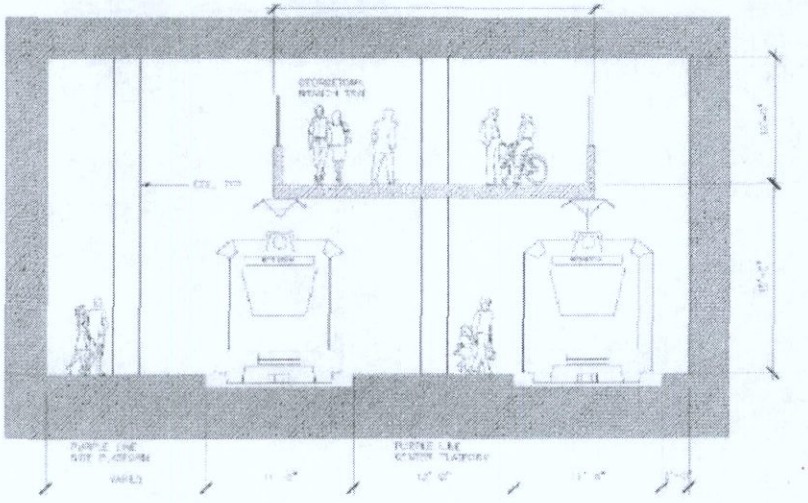
The Georgetown Branch Master Plan Amendment – January 1990 identifies a trolley with a station in Bethesda that connects to the southern end of the Metrorail platform and the street above via high capacity elevators. All of the LRT alternatives in the AA/DEIS include a similar arrangement (see diagram to right).[29] Two of the three BRT alternatives in the AA/DEIS also feature the connection to the southern end of the Bethesda Metrorail platform. The Low Investment BRT alternative is the only BRT alternative that would not have a station at this location. The connection to the Bethesda Metrorail station for the Low Investment BRT alternative is where the existing bus bays are located.



3 Dimensional Cutaway View

The staff finds there are three primary design considerations to take into account with respect to the Woodmont East area and the mode of the Purple Line:

First, the High Investment LRT alternative is the only LRT alternative that provides for the continuation of the trail through the tunnel under Wisconsin Avenue. The cost for this elevated section of the trail is not specified in the AA/DEIS.[30] Westbound trail users would return to the

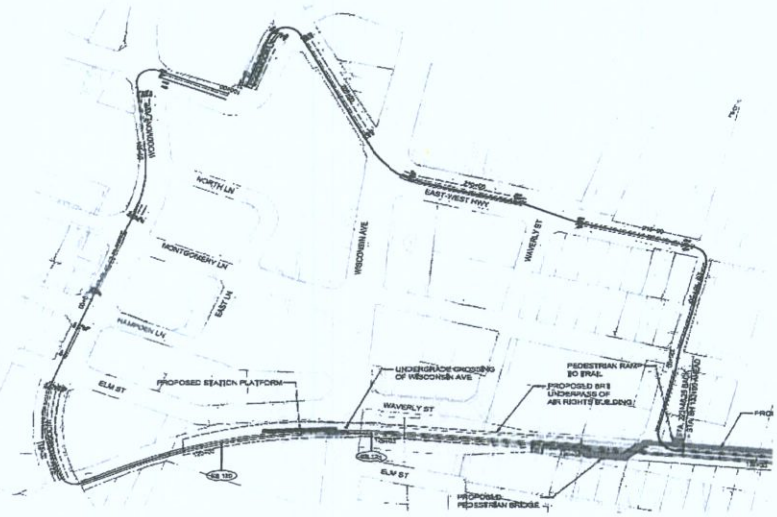


[29] The County has programmed funds for the design of a new southern entrance to the Bethesda Metrorail station. See the following link for additional information:
http://www.montgomerycountymd.gov/content/omb/MasterPDF/07-12/500722.pdf

[30] None of the costs of the trail are separated from the overall capital costs of any of the alternatives.

surface via a switchback ramp located just west of the tunnel.

Second, all of the Medium and High BRT alternatives provide for an at-grade trail within the tunnel and therefore there is no ramp as noted above under the High Investment LRT Alternative. The BRT vehicles in the Medium Investment and High Investment Alternatives enter the plaza area from Woodmont Avenue and continue eastbound through the plaza area to the station platform located in the tunnel (see drawing below). The BRT vehicle travel pattern at this location is one way (eastbound) only. The vehicles would move through the area every six minutes during weekday peak periods and every ten minutes mid-day.



Finally, all of the LRT alternatives include "tail-tracks" that would extend west from the tunnel area into the plaza area for an undetermined distance. The image below is provided by the MTA. Some stakeholders have suggested that the tail tracks are an area where light maintenance activities could be carried out. Tail tracks would be used periodically to store a train before it was returned to Lyttonsville or placed into service at the beginning of peak period service.

Woodmont East is located in the northeast quadrant of Woodmont Avenue and Bethesda Avenue and is the western terminus of the Purple Line. Other aspects of Woodmont East of note include the following:

- It is where the Interim Capital Crescent Georgetown Branch Trail meets the completed Capital Crescent trail that continues south to Georgetown.
- It is across from an approved planned mixed use joint development project on the existing County Parking Lot 31 site.
- With the completion of the Bethesda Row mixed use project, it has for many become a significant activity center that is active both day and night.

Consideration of a preferred mode for the Purple Line in the context of urban design and Woodmont East should take into account the following[31]:

- The Low BRT Alternative along Jones Bridge Road does not extend south to Woodmont East and is therefore the only option that avoids Woodmont East and the impact of having the transitway in the plaza and tunnel.
- The Low BRT Alternative along Jones Bridge Road is the only option where the trail is not completed between Jones Mill Road and Woodmont East.
- The Low BRT Alternative along Jones Bridge Road is the only option that would not provide for direct pedestrian connection to Woodmont East.
- The Medium and High BRT Alternatives are the only alternatives on the Georgetown Branch right-of-way that feature both the transitway and trail to continue through the tunnel at grade.
- The Medium and High BRT Alternatives are the only alternatives that involve Purple Line vehicles moving through the plaza area from one end to the other.
- The LRT Alternatives are the only alternatives where Purple Line vehicles could be parked in the plaza area – even if infrequently and for very short periods of time.
- The Low and Medium LRT Alternatives do not provide for a trail through the tunnel.
- The High LRT alternative includes a trail that continues through the tunnel above the trail in a confined space.

A summary of the considerations related to urban design, Woodmont East, and the mode of the Purple Line is presented below:

[31] There is admittedly some overlap between mode and alignment when discussing Woodmont East (and other areas or issues as well). We have chosen to include the discussion at this point in the report because the different alignments at this end of the Purple Line are largely based on the mode under consideration. That is not the case for most other areas (not all) along the alignment.

TABLE 8 – Summary of Woodmont East Urban Design Issues

Alternative	Maintains Status Quo At Woodmont East and Avoids Impacts To Trail	Improves Trail Connectivity To/From Woodmont East and Points East and South	Accommodates Improved Trail In Tunnel Without Grade Changes[32]	Avoids Transit Vehicle In Plaza On Regular Basis	Reinforces Street Activation In Area
Low BRT	Yes	No	No	Yes	No
Medium BRT	No	Yes	Yes	No	Yes
High BRT	No	Yes	Yes	No	Yes
Low LRT	No	Yes	No	Yes	Yes
Medium LRT	No	Yes	No	Yes	Yes
High LRT	No	Yes	No	Yes	Yes

After reviewing the issues in the context of mode, the staff finds there are advantages and disadvantages with either mode (and the associated alignments as well). Any conclusion as to the "best" mode would depend on the weight given the considerations we have focused on or other factors not considered. **Staff finds that the urban design considerations do not establish a basis for favoring either LRT or BRT at the Woodmont East plaza site.**[33]

Proposed Library Site In Silver Spring

Both the Low and Medium Investment BRT and LRT alternatives include a stop at the proposed library site in Silver Spring on the southwest quadrant of the intersection of Wayne Avenue and Fenton Street.

A rendering of how the Purple Line and the library might appear is depicted to the right. The plan calls for the transitway to bisect the corner of the site. One example of a similar treatment exists today on the campus of Portland State University where the Portland Streetcar alignment runs between academic buildings as shown in the adjacent photo.[34] **Staff finds that urban design considerations do not establish a basis for favoring either LRT or BRT at the Silver Spring library site.**[35]

[32] The trail connection through the tunnel is not depicted in Concept Plan drawings BM-05 and BH-05 for the Medium and High BRT alternatives.. The staff has confirmed with the MTA project team that this connection is included in these alternatives.

[33] It should be noted that the Vision Division staff does not support BRT operating through the plaza.

[34] While similar in concept, there are differences as well. The Portland vehicle is a streetcar and is smaller than the Purple Line vehicles. Also, there is a single track in the photo and the Purple Line would have a double track or two-way transitway.

[35] The library site is a key consideration when considering alignment, however and that discussion is presented later in the staff memo.

University Boulevard and Takoma/Langley Transit Center

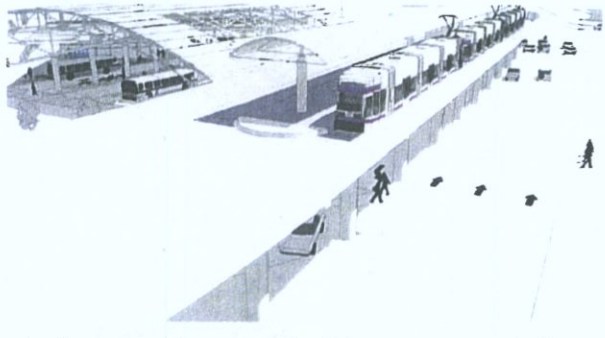
There are different concepts for how the Purple Line would operate along University Boulevard and connect with the Takoma/Langley Transit Center. The differences are important because the area (like Woodmont East and the proposed location of the Silver Spring Library) are in areas with high volumes of pedestrian activity.

The BRT Alternatives have the transitway in either shared (Low Investment) or dedicated (Medium and High Investment) curb or outside lanes along University Boulevard. The LRT Alternatives envision the alignment in the median of University Boulevard – at grade in the case of the Low and Medium Investment Alternatives and elevated in the case of the High Investment Alternative. The drawings below depict the different approaches.

Low & Medium Investment BRT Alternatives

Low & Medium Investment LRT Alternative

High Investment LRT Alternative[36]

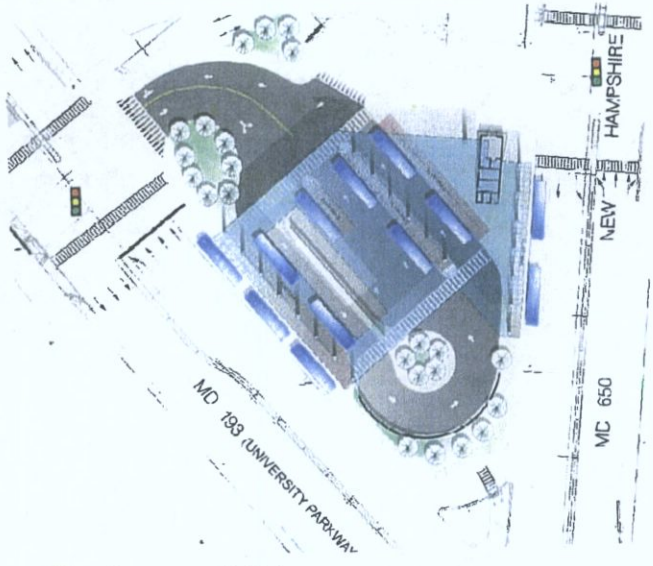


The most important urban design considerations in this area are as follows.

[36] High Investment BRT is described in one place in the narrative of the AA/DEIS as being in the median of University Avenue (see page 3-12) and in another (page 2-16 and 2-20) as being in dedicated (outside) lanes (as shown on page 2-14 but in the shared configuration as part of the Low Investment BRT Alternative). The plan drawings (drawing number BH-19 in the Conceptual Plans Technical Report) indicate the station platforms would be on the outside lanes and on an aerial structure over University Boulevard. As of this writing, the staff finds the plan drawings are the accurate representation of the concept plan for the High Investment BRT at this location.

- pedestrian connectivity
- pedestrian safety
- impacts on street activity along University Boulevard and New Hampshire Avenue
- access to the Purple Line and the proposed new Transit Center .

Recent improvements to this intersection include the installation of a fence in the median of both University Boulevard and New Hampshire Avenue to channel pedestrian flow toward crosswalks as well as improved sidewalk connectivity. Overall design of future improvements should continue to place an emphasis on reinforcing and controlling pedestrian flow across both state highways, to and from the Purple Line platform, and to and from the Transit Center.



Note in the drawings above for the surface alignments that the location of the crosswalk conflicts with the station platform for the LRT alternatives. A concept plan (without the Purple Line) of the Transit Center is shown on the right depicting crosswalks at the entrance to the Transit Center. The MTA Project Team has noted that the plan drawings (LL-19 and LM19) for the LRT surface alternatives also depict a conflict with eastbound buses on University Boulevard that would be turning into the Transit Center. This issue is being examined and it is possible the platform in the median will be shifted slightly toward the intersection with New Hampshire Avenue. Shifting the platform toward New Hampshire Avenue and eliminating the conflict with the crosswalk are examples of the type of modifications that acknowledge the need to give priority to pedestrian flow and safety in this area.

The AA/DEIS plan drawings for this area indicate where sidewalks are to be relocated as a result of the construction of the Purple Line. A comparison of the plans suggests that some sidewalk connectivity may be lost under the light rail alternatives. An example of this can be seen when examining the area on University Boulevard between Gilbert Street and Merrimac Drive. Segments that do not appear to have sidewalks include an area on the south side of University Boulevard immediately west of Carroll Avenue and the north side of University Boulevard west (and east) of Merrimac Drive.[37] The staff has reviewed this issue with the MTA project team and they have indicated that there will be no net loss of sidewalk segments along University Boulevard resulting from the construction of the Purple Line. We will continue to review this with the overall objective of insuring that the plans reflect no loss of connectivity and a sidewalk width of at least eight feet – consistent with the County standard and Master Plan

[37] See drawings BM-18 and LM-18 of the plan drawings in the Conceptual Plans Technical Report for comparison.

recommendations for shared use paths on both sides of University Boulevard that also include a (minimum) five foot planted buffer be located between the roadway and the sidewalk.[38]

Pedestrian access and mobility was also recently examined by a study funded under the COG's Transportation/Land Use Connections Program. This study recommended that light rail be designated as the preferred mode of the Purple Line noting the following:

"It is preferable that the Purple Line be light rail rather than Bus Rapid Transit. Light rail is more predictable for pedestrians seeking to cross the travel way and creates less noise and pollution which is especially important for those on foot. If the Purple Line is Bus Rapid Transit, special effort will be needed to ensure pedestrian access, mobility and comfort, given the vital link between pedestrians and transit. The Sector Plan process will look into this in working with MTA to develop recommendations for the Purple Line."[39]

The AA/DEIS does not indicate any material difference between the modes with respect to noise in this area nor any material difference with respect to pollution overall. As noted above, the plan drawings in the AA/DEIS seem to indicate that sidewalk connectivity may be more of an issue with the median alignment of Light Rail than the BRT alignment that operates in the outside lane.[40] We do know from the sections posted on the project web site that the median alignment requires on average an additional ten feet of right-of-way in this area.

Finally, there is the issue of the mode and the potential for economic revitalization. Mayor Bruce Williams of the City of Takoma Park has forwarded a letter to Chairman Hanson expressing the City's support for light rail and noting that light rail is:

"critical to joint economic revitalization efforts in the Takoma/Langley commercial district BRT would not give the strong economic shot in the arm" ...

In addition to the City of Takoma Park, Prince George's County Council Chairman Samuel H. Dean also submitted testimony at a recent MTA Purple Line public hearing in favor of light rail. Mr. Dean's testimony included the following comments about Langley Park:

"..This priority development and redevelopment area of the County offers some of the most valuable TOD opportunities once it is confirmed that the Purple Line will be built. And will be built as light rail, which provides the demonstrable public sector commitment that the development community often looks for before investing in first tier suburban communities such as ours."

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[38] The state standard width for a sidewalk in this area is five feet.

[39] See item number 8, pages 16 and 17, Takoma/Langley Crossroads Pedestrian Access and Mobility Study, July 2007, COG.

[40] It should be noted that the Study was completed over a year in advance of the release of the AA/DEIS and therefore the report authors did not have access to the AA/DEIS findings related to sidewalk connectivity.

There are a number of studies that have examined the impact transit has on property values including a 2007 study conducted by the University of Waterloo.[41] The study included a literature review that compared past analysis of the impact of both BRT and LRT systems. The results are summarized in the accompanying charts. As noted in the charts, there is no discernable difference between the two modes.

TABLE 9 – Representative BRT Benefits

BRT System	Land Development Benefits
Adelaide Guided Busway	Tea Tree Gully area is becoming urban village.
Bogotá TransMilenio	For every 5 minutes of additional walking time to a BRT station, the rental price of a property decreases between 6.8% and 9.3% after controlling for structural characteristics and neighborhood attributes
Boston Silver Line (rebuilt Washington Street)	$700+ million in new investment within two to three blocks of BRT line
Brisbane South East Busway	Up to 20% gain in property values near busway. Property values in areas within 6 miles of station grew two to three times faster than those at greater distances. Higher increase in median home values around busway than other suburban areas.
Ottawa Transitway System	$1 billion (Canadian) in new construction at Transitway Stations.
Pittsburgh East Busway	59 new developments within 1,500 feet of stations. $302 million in land development benefits of which $275 million was new construction. 80% clustered at stations.
Pittsburgh West Busway	Land development focused on six park-and-ride lots.

SOURCE: The Value of Accessibility to Bogotá's Bus Rapid Transit System (4) and *TCRP Report 90* (5)

TABLE 10 – Representative LRT Benefits

Light Rail Transit/Trolley Service		
Dueker and Bianco, 1999	Population Census' median house value in Portland between 1980 and 1990	Premium of $2,300 for properties within 0.06 km of a MAX station
Lewis-Workman and Brod, 1997	Cadastral information for nearly all properties (4,170) within 1.6 km of three MAX stations in Portland	Premium of $75 per 0.03 km closer to the station
Forrest et al., 1995	795 house sales in Manchester (UK) during 1990	Premium ranging from 2.1% to 8.1% depending on distance to station
Cervero and Duncan, 2002c	1,495 sales of properties in multi-family housing in San Diego in 2000	Premium for multi-family units ranging from 2% to 6%
Landis et al., 1995	134 single-family sales in San Diego during 1990	Premium of $272 for every 0.1 km closer to station
Dabinett, 1998	Sheffeld (UK) Supertram	No evidence of appreciable effects
Al-Mosaind et al., 1993	235 single-family home sales in Portland during 1988	Premium of $663 per 0.03 km closer to station

NOTE: Results apply to area and properties studied only. Refer to each source study for details.
SOURCE: The Value of Accessibility to Bogotá's Bus Rapid Transit System (4)

A similar research effort, *Measuring the Value Proposition for Transit Investment in the Washington Metropolitan Area,* was presented to the Transportation Planning Board this spring.[42] This report's primary focus is an examination of the shortcomings of reliance upon the FTA's cost per rider index as a means of selecting projects (or alternatives) for funding. The report includes a qualitative assessment of some of the area's planned projects and for the Purple Line specifically notes with respect to economic development that:

"(the) alignment through major centers could be expected to diminish the risk of East-West sprawl and create economic value and financing potential" and *"high trip generation community along this East-West alignment could generate substantial improvements in general mobility and low income mobility."*

[41] Presentation entitled " Land Use Impacts of New Bus and Subway Services", August 2007 TRB Conference, Jeffery Casello and Clarence Woudsma, University of Waterloo

[42] For complete working paper see the following link: http://www.mwcog.org/uploads/committee-documents/bF5fVl1Z20080425144722.pdf. The report was prepared by HDR/HLB Decision Economics.

With respect to comparing bus and rail the report notes:

"Bus investments can outperform rail alternatives in terms of absolute rate of return, but rail investment can generate significantly greater absolute levels of economic benefit and net benefit."

Finally, the Takoma/Langley Sector Plan joint planning process now underway with Prince George's County and the City of Takoma Park has included an examination of whether LRT or BRT is the preferred mode for the Purple Line. While not a final decision, there is consensus among the staff (and some public officials as noted above) that LRT would better serve the vision of a more compact, pedestrian friendly Crossroads area.

A summary of the comparison of BRT and LRT in the context of urban design (including the potential for economic development) would therefore include the following:

- LRT relative to BRT could make sidewalk connectivity more of a challenge in the Takoma / Langley area based on the extra space required for the median location for LRT compared to the curb lane design treatment for BRT considered in the AA/DEIS.
- A recent and fairly broad based literature survey comparing the impact of BRT and LRT on property values does not seem to suggest one mode is inherently better.
- Based upon one recent analysis of a region-wide improvements in the Cincinnati area, BRT may offer a greater return per dollar invested but LRT's total and net benefit far exceed that of BRT.
- Takoma Park and Prince George's County have formally endorsed light rail – both citing economic development as a reason. The on-going Sector Planning effort will likely reach a similar conclusion.

Staff finds that the urban design and economic development considerations we have examined for the Takoma/Langley area favor LRT but that it should not be a deciding factor for the entire alignment.[43]

<u>Cost, Cost Effectiveness, and Ridership</u>

Cost, cost effectiveness. and ridership estimates in the AA/DEIS were developed by the MTA using methodology that is both specified and reviewed by the FTA.

Estimated capital costs vary significantly by mode as noted in the graph below:

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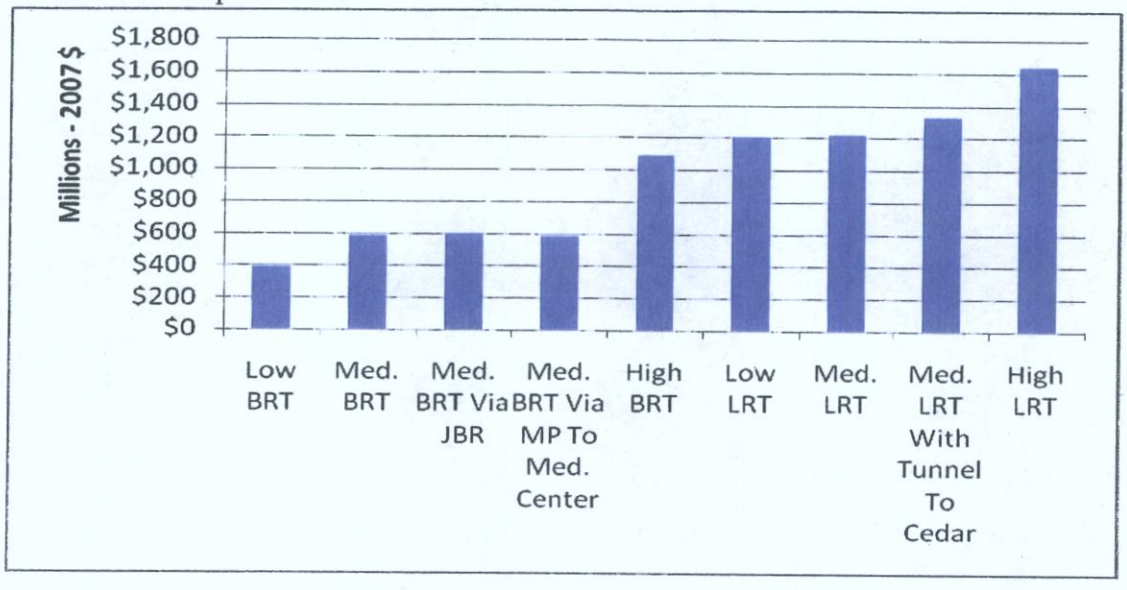
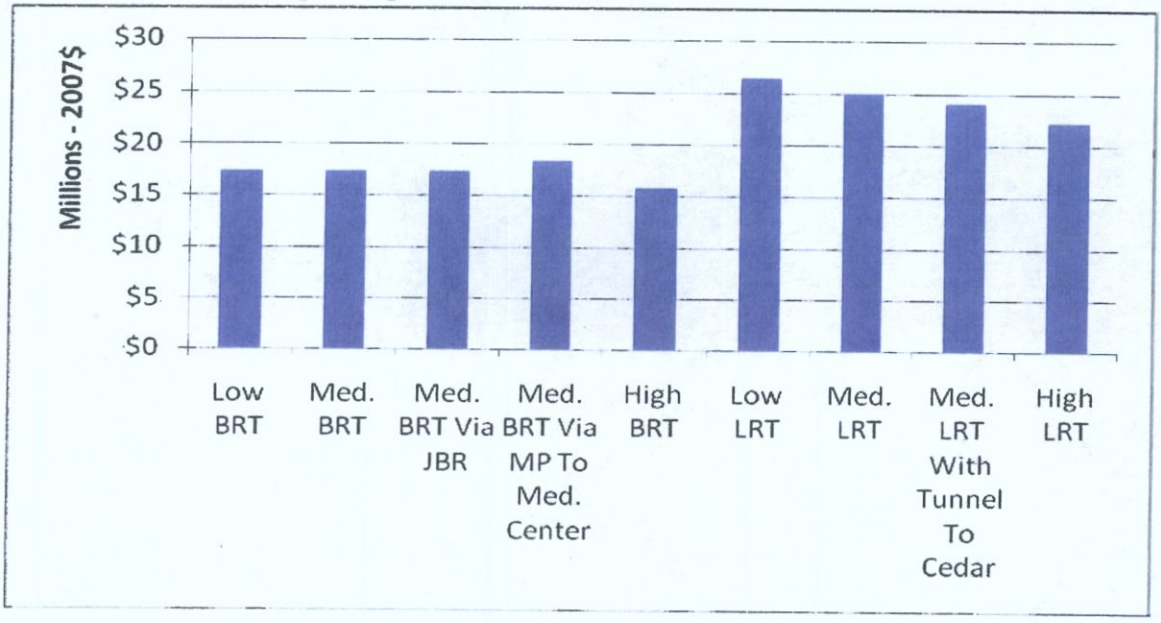
[43] It is important to note when considering the relative advantages and disadvantages of BRT and LRT in the context of economic development in particular, our assumption is that the BRT level and quality of service is the same as for the LRT system. Once that assumption is acknowledged, available objective studies we were able to locate do not lead the staff to conclude that one mode is preferable to another. It is the level and quality of transit service, the commitment to pedestrian access and safety reflected in the design of the surrounding public realm near the station areas, and the extent the transit service offers the potential user a real alternative to trips by auto that help create a place and set the stage for economic development and revitalization.

FIGURE 7 – Capital Costs



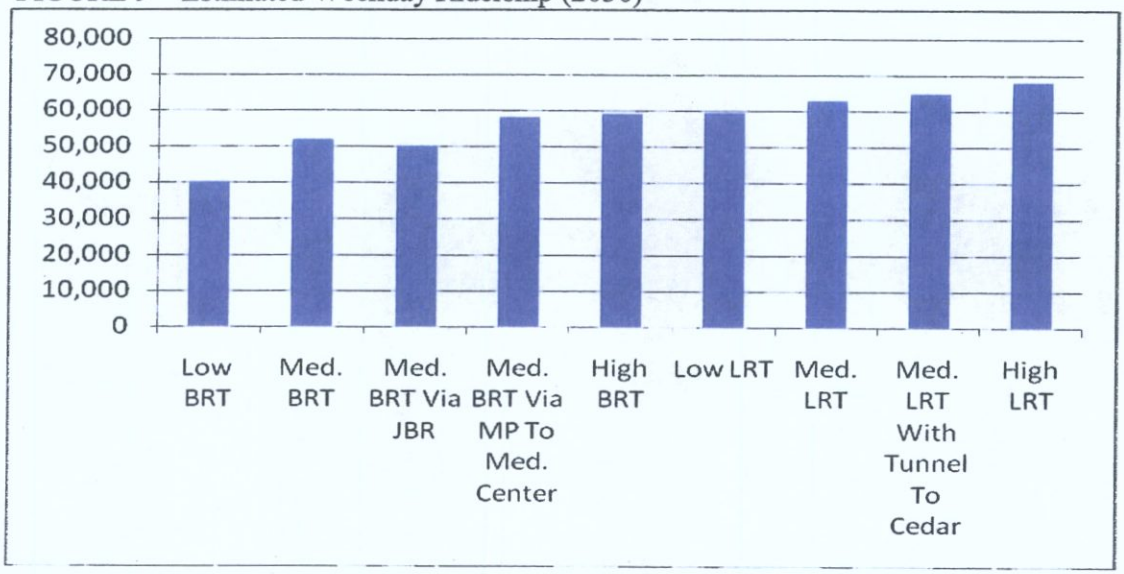
Estimated annual operating costs also vary by mode but the variance is not quite as large as the capital costs:

FIGURE 8 – Annual Operating Costs



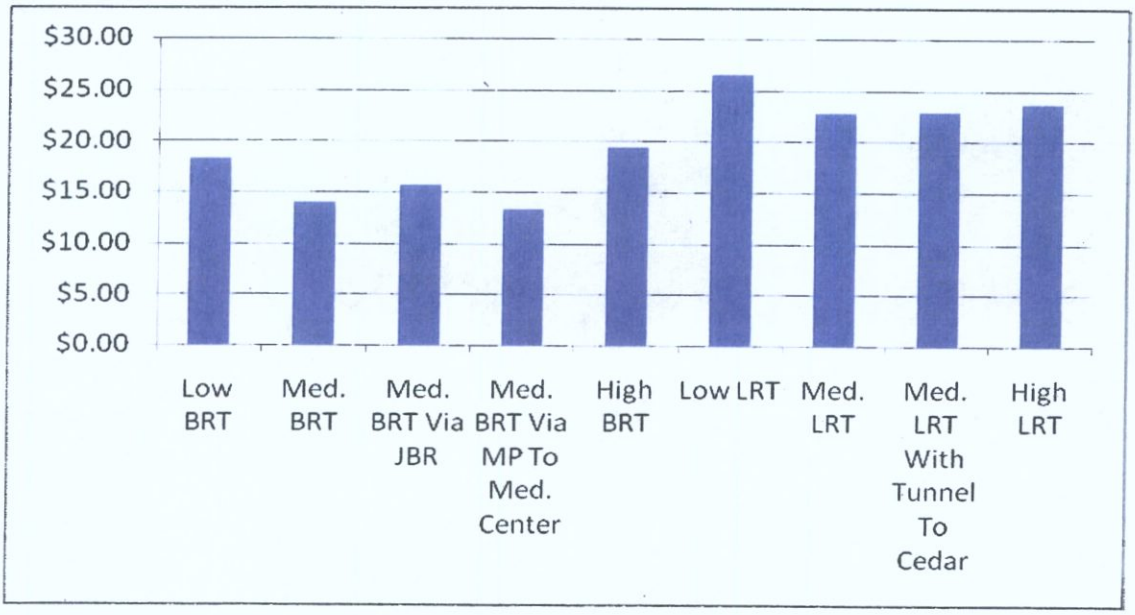
Estimated average weekday ridership in 2030 does not vary as much by mode:

FIGURE 9 – Estimated Weekday Ridership (2030)



Finally, the FTA measure of cost effectiveness, the "annualized cost per hour of user benefit", varies (one mode relative to the other) in a range somewhat similar to that of the annual operating costs[44]:

FIGURE 10 – Cost Effectiveness



[44] The cost effectiveness rating for the Low LRT alternative exceeds the FTA threshold and therefore would not attain a rating sufficient to secure funding under the FTA's New Start funding program.

As noted in the graphs, LRT alternatives cost more and generate more riders, although not in proportion to the difference in the estimated capital and operating costs. Proponents of BRT often cite this relationship as a reason to select BRT over LRT. LRT proponents often counter with the argument that the future (beyond 2030) cost per passenger will favor LRT for the Purple Line because the additional passengers can be accommodated without adding more buses.

As previously noted, there is considerable discussion on how, and to what extent, the cost profile required under the FTA New Starts program should be used to select the mode. One reason is that the secondary economic benefits attributable to either mode are simply not captured in the current process for evaluating projects. Complicating the issue in Maryland is the fact that the MTA currently has three active planning projects underway (the Purple Line in Montgomery and Prince George's County, the Corridor Cities Transitway in Montgomery County, and the Red Line in Baltimore). Some advocate selecting BRT for the Purple Line because doing otherwise could potentially jeopardize funding for the Corridor Cities Transitway.

The staff recognizes that serious consideration needs to be given to the cost implications of any recommendation on the selection of the mode for the Purple Line. The overriding fact that we think needs to be considered at this point, however, is that a decision should first be based upon the following goals:

- what is best for the community
- what mode best meets the goals of the County within costs that are reasonably thought to be potentially available.

There are many issues related to infrastructure funding at the local, state, and federal level. Some of the issues are as fundamental as to whether the current funding programs at the federal and state level need to be completely restructured to better insure long term funding for transit. A 2007 Study commissioned by the Maryland General Assembly provided some insight to the size of the challenge as depicted in the chart below:

FIGURE 11 – 20 Year Projection of Transit System Expansion Costs

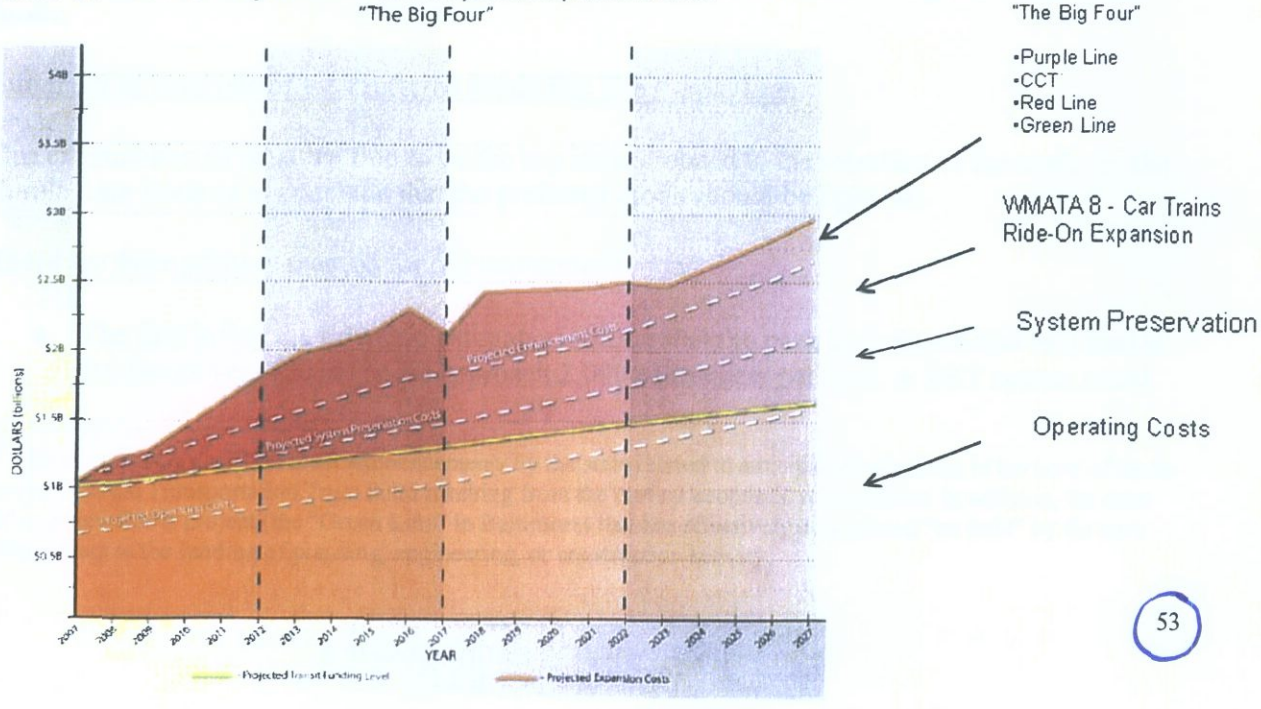


TABLE 12 – Ridership By Station

Segment	TSM	Low Invest. BRT	Medium Invest. BRT	High Invest. BRT	Low Invest. LRT	Medium Invest. LRT	High Invest. LRT
Bethesda Metro, North Entrance	800	1,400	5,600	6,000	N/A	N/A	N/A
Medical Center Metro	N/A	3,900	N/A	N/A	N/A	N/A	N/A
Bethesda Metro, South Entrance	N/A	N/A	2,800	3,000	11,300	12,700	13,300
Montgomery Avenue	100	N/A	N/A	N/A	N/A	N/A	N/A
Connecticut Avenue	100	400	500	500	900	900	1000
Grubb Road	500	N/A	N/A	N/A	N/A	N/A	N/A
Lyttonsville	N/A	600	700	700	800	800	900
Woodside/16th Street	N/A	1,400	2,000	2,500	2,200	2,300	2,400
Silver Spring Transit Center	1200	5,100	8,700	10,400	11,100	12,200	13,600
Fenton Street	600	600	600	N/A	700	700	N/A
Dale Drive	500	1,200	1,300	1,400	1,300	1,400	1,500
Manchester Place	600	700	800	1,100	800	900	1,200
Arliss Street	600	800	900	1,700	1,300	1,500	2,200
Gilbert Street	300	300	900	1,300	1,200	1,200	1,400
Takoma/Langley Transit Center	1300	1,400	2,300	3,200	2,700	3,000	3,700
Riggs Road	300	400	600	800	700	800	900
Adelphi Road	400	500	600	700	600	700	700
UM Campus Center	600	1,500	2,100	2,200	2,100	2,200	2,200
US 1 – East Campus	700	4,400	4,400	4,700	4,500	4,500	4,700
College Park Metro	2400	8,000	8,600	9,100	8,600	8,600	8,900
River Road	500	1,500	1,500	1,500	1,500	1,500	1,500
Riverdale Park	600	1,400	1,500	1,600	1,600	1,500	1,600
Riverdale Road	500	500	500	700	600	500	700
Annapolis Road	500	900	1,100	1,200	1,000	1,000	1,200
New Carrollton Metro	1,700	3,100	3,800	4,500	3,800	3,700	4,500
Total Boardings	**14,800**	**40,000**	**51,800**	**58,800**	**59,300**	**62,600**	**68,100**

The first thing to note when considering station ridership and the potential alignment of the Purple Line is that some stations are excluded from some alignments (and therefore alternatives):

- The LRT alternatives do not provide a direct connection with the existing Bethesda Metrorail (north) entrance.
- The Low Investment BRT Alternative does not serve the proposed new south entrance to the Bethesda Metrorail Station.
- The Medical Center Metrorail Station would be served only by alternatives that use Jones Bridge Road or the supplemental BRT alternative (labeled Alternative 4B) developed by MTA that would operate over the Georgetown Branch right-of-way and extend north along Woodmont Avenue to the Medical Center.
- The proposed new library site in the southwest quadrant of Wayne Avenue and Fenton Street would not be served by either of the two High Investment alternatives or any other alternative that would feature a tunnel under the Silver Spring CBD east of the SSTC.

One issue raised by the MPAG during the analysis of the ridership estimates for individual stations was the estimate for the Dale Drive station. The concern expressed was that the ridership estimates seemed high given the low residential density adjacent to and near the station.

In response to this question, the staff examined available on/off data for Ride-On Route 15. Route 15 operates between the SSTC and Takoma/Langley on a 4-5 minute frequency in the peak direction during the peak period (similar to the Purple Line frequency) over an alignment also similar to the Low and Medium Investment alternatives. Route 15 is one of Ride-On's busiest routes. The data provided by the Department of Transportation indicated that only about 5 %of the 6,000 daily riders are getting on or off along the segment between Cedar Street and Sligo Creek. The likelihood is that today there are about 150 passengers boarding Route 15 along

this segment going in one direction or another – far below the 1,200 – 1,500 that is estimated in the AA/DEIS for the 2030 build alternative .

The staff finds the model used to estimate ridership is reflecting reasonable estimates for the alignments and alternatives overall but is not able to necessarily forecast ridership at a station specific level along segments of the alignment where the station spacing is close.[46]

There is also some community opposition to a station at Dale Drive under any alternative. There is concern that it will ultimately result in pressure to develop the area around the station. The Vision / Community Based Planning staff does not support a station at Dale Drive under any alternative.

The staff recommends that no further consideration be given to locating a Purple Line station on Wayne Avenue at Dale Drive, or any other location on Wayne Avenue between the proposed library site station and the proposed station at Manchester Place.

Walk Access

Walk access is a critical element of station area planning. WMATA's latest mode of arrival survey found that more than half of Metrorail passengers walk to the Montgomery County Metrorail stations that could be served by the Purple Line[47]:

- Medical Center Metrorail – 66 %of 5,174 daily boardings
- Bethesda Metrorail – 73 %of 10,511 daily boardings
- Silver Spring Metrorail – 53 %of 14,476 daily boardings
- College Park Metrorail – 33 %of 4,727 daily boardings
- New Carrollton Metro – 8 %of 10,444 daily boardings

The staff's review of walk access as it relates to the consideration of alignment will focus primarily on consideration of the area within a ½ mile radius of the station – a ten minute walk for most people.

There are two station entrances to consider in Bethesda – one is the existing entrance to the Metrorail Station (i.e., the "north entrance) and the other is a new "south" entrance that would serve the Purple Line and connect to the southern end of the existing Metrorail platform.

With respect to the alignments under consideration, the following observations can be made related to walk access in Bethesda:

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[46] This concern is also applicable to the capacity issue previously discussed. The peak load point is thought to be just west of the SSTC on what is essentially a dedicated right-of-way. In practice, it could turn out to be just east of the SSTC on a part of the alignment that may not be on dedicated right-of-way – potentially making the introduction of "tripper" service during the peak hour more problematic.

[47] Percentages are from the 2008 WMATA Rail Passenger Survey. The station boardings represent average weekday boardings for the period July 2007 through June 2008.

- The walk radius of the two entrances in the Bethesda CBD provide adequate coverage for the CBD core.
- The proposed St. Elmo Avenue station included in alternatives 4A and 4B is within one-half mile of the north entrance to the Bethesda Metrorail station.

Staff finds that there would be a benefit to adding a station on Woodmont Avenue near St. Elmo Avenue if an alignment at that location is selected. However, the value of this station alone is not a compelling reason to either extend an alignment north from the end of the Purple Line alternatives that terminate at Woodmont Plaza or to select Jones Bridge Road as an alignment for the Purple Line.

Staff examined impacts of four stations in the vicinity of the Silver Spring CBD:

- 16th Street – this station is common to all alignments.
- SSTC – the Purple Line has two potential station locations here, depending upon the alternative. The Low Investment BRT Alternative would enter the SSTC from Wayne Avenue. All of the other build alternatives would enter the SSTC above the CSX right-of-way.
- Fenton Street – the Purple Line has two potential station locations here, depending upon the alternative. The Low Investment BRT Alternative would stop on Wayne Avenue east of Fenton Street.[48] The Low and Medium Investment LRT Alternatives and the Medium Investment BRT Alternative would stop at this location via an alignment that goes through the middle of the proposed library site. The High Investment Alternatives that utilize tunnels to get to Wayne Avenue do not have a station stop at this location.
- Dale Drive – this station is common to all alignments with the exception of the Silver Spring Avenue / Thayer Avenue Design Option. As previously noted, the staff is recommending that this station be dropped from further consideration. This station is within the walk radius of both the Fenton Street station and the Manchester Place station (although the latter would involve walking up a steep slope).[49]

The staff finds the following observations are important with respect to walk access in Silver Spring:

- There is considerable overlap in the one-half mile radius among the four station areas. This is not unusual within a CBD core.
- Densities around the 16th Street station are not expected to increase between now and 2030 but the existing household density in the immediate area is high enough to be considered "transit supportive".[50]
- The densities within the CBD core are obviously transit supportive. Significant growth in household density is forecast for the CBD core – especially in traffic zone 34 – the area defined or bordered by East West Highway, Fenton Street and Wayne Avenue. The

[48] The AA/DEIS drawing (BL-16) in the conceptual plan technical report does not reflect a platform in this area but there is a ridership estimate for this station for this alternative.
[49] As previously noted, the Fenton Street station is not included in High Investment alternatives – the alternatives that have the tunnel immediately east of the SSTC.
[50] See Table 4. The average household density for traffic zone 36 is estimated to be 11 households per acre.

household density in this traffic zone is expected to increase from an estimated 4 per acre to 39 per acre by 2030. The household densities in the other two traffic zones within the CBD core will double from 18-19 to 37-38 per acre.[51]

- There is about a 30 foot rise in elevation from the SSTC to Georgia Avenue – a fact that may affect walk access between the SSTC and the Fenton Village vicinity.
- Convenient access to high quality transit service that can compete with auto travel time slows the growth rate of trips made by auto. The extent to which forecast growth can be located as close as reasonably possible to high quality transit is a factor in increasing trips made by transit instead of autos.
- Georgia Avenue is perceived by some as a pedestrian barrier.

Staff finds the alternative alignments that include a stop at Fenton Street are preferable to the alignments that do not have a stop at Fenton Street.[52]

There are four station locations between downtown Silver Spring and the Prince George's County boundary:

- Manchester Place – this station is common to all alignments except the Silver Spring Avenue / Thayer Avenue design option. The location of the station varies depending on the alternative. The station platform is on Wayne Avenue under the Low and Medium BRT alternatives and near the tunnel portal on Plymouth Street for High Investment BRT Alternative and all of the LRT alternatives.
- Arliss Street – this station is common to all alignments.
- Gilbert Street – this station is common to all alignments. The station platform is in the median of University Boulevard under the LRT alternatives.
- Takoma/Langley Transit Center – this station is common to all alignments.

The staff observations about the walk access of these stations include:

- As previously noted, the proposed Dale Drive station is within the ½ mile radius of the Manchester Place station although there is a significant change in elevation that makes this access problematic.
- Walk access for the other station locations in this area of residents that are highly dependent upon transit overlaps somewhat but in general provides relatively uniform coverage.
- The stations locations for the most part are all largely common to a single alignment in this area.

Staff finds that walk access to these stations does not favor one alignment over another.

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[51] See Table 4.

[52] The Vision staff (formerly Community Based Planning) supports only alternatives that include a station at Fenton Street as a means of supporting existing development and future revitalization activity.

Urban Design and Economic Development

The Vision staff has specifically noted in their review that the Fenton Street station is "necessary to support existing development and future revitalization activity."[53] The staff also finds that the impact of the elimination of parking along the north side of Bonifant Street needs to be examined in greater detail but does not recommend that this impact preclude consideration of a surface alignment along Bonifant Street that would serve the proposed new library site.

The common alignment with stations in the Long Branch and Takoma/Langley areas are consistent with long standing economic development and revitalization goals.

The proposed new library site offers considerable potential as a signature site east of Georgia Avenue. A preliminary concept plan (not adopted) is shown on the right. The proposed stations in Long Branch and Takoma/Langley offer similar potential for those areas.

Ground Floor Plan

Staff finds the County's adopted plans, design objectives, and strategies for revitalization in these areas are a deciding factor in selecting a preferred alignment for the Purple Line and that the alignments that include a stop at the proposed library are preferred over those that do not provide a stop.

Jones Bridge Road Alignment

The Town of Chevy Chase believes that the AA/DEIS does not adequately consider the advantages of an alignment on Jones Bridge Road. The Town retained a consulting firm, Sam Schwartz Engineering (SSE), to review the MTA study. SSE issued an initial report on April 23, 2008 and an update on July 31, 2008.[54]

The Low Investment BRT Alternative is the only AA/DEIS build alternative that does not use the Georgetown Branch. The MTA, in response to concerns expressed by the Town of Chevy Chase, examined additional alternatives that paired the Jones Bridge Road alignment with the Medium Investment BRT Alternative for all other segments of the alignment. For comparison, the MTA also examined a Medium Investment Alternative BRT that would operate within the Georgetown Branch right-of-way and extend north to the National Navy Medical Center

[53] See supporting staff memoranda at the end of this staff memo.

[54] A summary of the various reports – along with the staff's response to the initial SSE report – is available for review at the following link:
http://www.mcparkandplanning.org/planning/viewer.shtm#http://www.mcparkandplanning.org/Transportation/projects/documents/SummaryofSSEandMTAReports092508_000.pdf

(NNMC) – in effect a mirror image of the other new Medium Investment BRT Alternative.[55] The model run indicated that the alignment over the Georgetown Branch alignment would result in an increase of over 8,000 passengers on an average weekday in 2030.

The Planning Board reviewed the Jones Bridge alignment in June 2003 and recommended that the alternative be dropped from further consideration.[56] Supporters of the Jones Bridge alignment would note that the Planning Board action predates the decision to relocate the activities at Walter Reed Army Hospital to the National Naval Medical Center in Bethesda and was based upon an assumed typical section for Jones Bridge Road east of Connecticut Avenue that is significantly wider than that assumed in the SSE work.

The SSE reports stated that with greater existing and future population and employment along the Jones Bridge Road alignment more people and jobs would have direct access to the Purple Line and the result would be a Purple Line that was more effective and more attractive.

The staff noted after reviewing the initial SSE report that it was really a question for the model. **Staff finds the model results as presented by the MTA in the AA/DEIS are reasonable and reflect the attractiveness of the reduced travel time provided by the Georgetown Branch alignment coupled with the greater density of both housing and employment in Bethesda and Silver Spring – as opposed to the campus settings at NIH and the NNMC[57] Staff finds the travel time savings that can be attributed to the alignment along the Georgetown Branch right-of-way are a deciding factor in selecting a preferred alignment.**

Wayne Avenue

One focus of the MPAG work has been on the alignment in the Silver Spring CBD and in East Silver Spring, especially on Wayne Avenue as there was (and still is) opposition to a surface alignment on Wayne Avenue. It is also worth noting that there is also support for a surface alignment. The MTA Project Team developed a supplemental analysis of a potential tunnel under Wayne Avenue and concluded in part that:

"this (tunnel with a portal between Sligo Creek and Mansfield Road) did not provide any travel benefits and added to the project cost. For both tunnel options the addition of stations was an issue. The high cost of underground stations weighed against their inclusion, but if stations were not included in these alignments the communities would not benefit from the project and ridership would be lower. It was determined that these tunnels did not provide sufficient benefit and had such a detrimental effect (referring to the portal primarily) that further study was not justified."[58]

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[55] These alternatives are identified as Alternative 4A and 4B, respectively.

[56] See the staff report at:
http://www.montgomeryplanningboard.org/meetings_archive/03_meeting_archive/agenda_062603/item12_062603.pdf

[57] A summary of the forecast growth (including growth attributable to BRAC impacts for the NNMC are included in Table 4 (for housing density) and Table 5 (for job density).

[58] See pages 2-4 and 2-5 of the AA/DEIS.

As previously noted, the staff examined the boarding / alighting profile of the one Ride-On route (Route 15) that essentially duplicates the proposed Purple Line alignment between the SSTC and Takoma/Langley. The route operates on an average 4-5 minute frequency in the peak direction – very similar to the proposed Purple Line frequency. It is one of the most heavily used routes in the Ride-On system but the majority of the boardings and alightings are between points east of Sligo Creek and the Silver Spring Metrorail Station.

Given the concern in the community, we asked the MTA to couple the High Investment LRT tunnel in the Silver Spring CBD with the Medium Investment LRT Alternative for the balance of the alignment (from Bethesda to New Carrollton) with no station at Dale Drive.[59]The MTA Project Team has noted throughout the AA/DEIS process that eventually consideration could be given to matching segments of alternatives to address specific issues or conduct "what if" scenarios.[60] The results indicated the total ridership would increase by 2,100 and the cost effectiveness would remain under the current FTA threshold for a project to remain competitive for funding. It is important to note that this finding could be considered both (1) contrary to part of the reason given in the AA/DEIS for not conducting further study of the alternative, and (2) not the results of an "apples to apples" comparison – analysis that resulted in the finding in the AA/DEIS did not "match" the tunnel option with anything but was a "stand alone' or discrete type of analysis.

Once we confirmed that the tunnel was under the FTA threshold the staff examined the likelihood that an extended tunnel – to the Mansfield Road area – would also result in a cost effective rating under the FTA threshold. Our simple extrapolation of the costs (based upon an additional $65,000,000 for the tunnel extension from Cedar Street east to some point near Mansfield Road) suggests the resulting cost effectiveness rating would be right at the FTA threshold.[61] The MTA will analyze this alternative for comparison with the other alternatives that are listed in Table 6.

It should be noted that even if the longer tunnel would prove to be "cost-effective" under the FTA criteria, there are a number of other issues to be considered when attempting to reach a recommendation on the preferred alignment. Some of these include:

- Cost – a tunnel to Mansfield Road as part of a "Hybrid" Alternative would add $175,000,000 to the Medium Investment Light Rail Alternative.
- The proposed library site and surrounding area would not be served.
- There are concerns about how to make a tunnel portal work in the area just west of Sligo Creek.

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[59] There is also no station at Fenton Street under this "Hybrid" Alternative. None of the tunnel options in the Silver Spring CBD have a station stop at Fenton Street at the proposed library site.

[60] The inclusion of the additional Medium Investment BRT alternatives is another example where additional alternatives were analyzed by the MTA project team.

[61] This "back of the envelope" extrapolation is a simple very preliminary step to see if there is a basis for a more detailed analysis that would involve coding the forecast model network to reflect the longer tunnel and any time savings that might be gained by not having to travel on the surface.

Some stakeholders who object to a surface alignment on Wayne Avenue cite the following[62]:

- Without a station at Dale Drive the widening of Wayne Avenue attributable to the station does not need to take place.
- The traffic study in the AA/DEIS is inadequate and does not reflect intersection delays that will occur with 180 foot trains moving slowly through the CBD.
- The size of the library is reduced to accommodate the Purple Line.
- The library station would serve an area where residents, employees, and visitors could easily walk to and from the SSTC to use the Purple Line.
- The loss of parking on Bonifant Street will harm small businesses.
- The back-ups that occur with access and egress at the Wayne Avenue garage will get worse.
- Access and egress at the entrance to Whole Foods will be compromised.
- Wayne Avenue will be widened for over a mile - the widening will be both within the right-of-way and outside of the right-of-way. The widening will impact the front yards of some residents – even widening within the right-of-way.
- The construction of left turn lanes at the signalized intersections will result in increased traffic over time.
- A Dale Drive station will result in delays for westbound traffic on Wayne turning south onto Dale Drive.
- Pedestrian safety for the residents of the Springvale Terrace Assisted Living facility could be compromised with a wider Wayne Avenue.
- A Dale Drive station would result in the closure of the access point on Wayne Avenue to the parking lot for the Silver Spring International School and Sligo Creek Elementary School.
- The Silver Spring Green Trail would be built as a combined bike / pedestrian path and that raises safety concerns.
- The AA/DEIS does not address noise that would result from having a station at Dale Drive.

Staff agrees with some of the above points, thinks other deserve additional analysis, and disagrees with some of the above points.

- We agree that the absence of a Dale Drive station would lessen the amount of area needed for the improvements and that the station would likely result in the closure of an access point to the schools.
- **We recommend that the MTA conduct further study in the next phase of project planning relating to the loss of parking on Bonifant, the access to Whole Foods, the potential for backs-ups related to access to the Wayne Avenue garage, the operation of the intersection at Wayne Avenue and Fenton Street, and the extent of the impact on residences along Wayne Avenue.**

[62] This a summary compiled by staff of written comments forwarded to the MTA by the Seven Oaks – Evanswood Association on December 11, 2008. It is a summary and therefore does not represent all of any specific comment nor does it represent all of the comments in the letter or e-mail.

- We disagree that the traffic study is inadequate for alternatives evaluation purposes and that – given County objectives – the Fenton Street station could be eliminated because it is within ½ mile of the SSTC. A station at the proposed library site is entirely consistent with the purpose and need of the Purple Line and the vision for the urban ring as identified in the General Plan. The library and Purple Line have been designed to complement each other and the Purple Line has not reduced the size of the proposed library.

In order to get a rough idea of the extent of the potential impact of a surface alignment, staff has used an MTA estimate of the width of the likely property taking along Wayne Avenue and combined it with pre-conceptual plan drawings dated December 2008 also provided by the MTA. These estimates are subject to change. The estimate is summarized in the table below:

TABLE 13 – Preliminary Estimates of Property Takings Along Wayne Avenue

Wayne Avenue Segment	Estimated Distance of Segment[63]	Existing Right-of-way	Proposed Right-of-way	Property Taking	Estimated Length of Taking[64]	Notes
Fenton St. to Cedar St.	965'	74-76'	80-94'	North: 10'- 19'	165'	For WB LT Lane @ Fenton St.
				South: 5'- 6'	385'	For EB LT Lane Inside Median Of Transitway @ Cedar St.
Cedar St. to Dartmouth Ave.	1,085'	70'+/-	70'-74'	North: 2'- 3'	825'	For WB Thru Lane
				South: 2'- 4'	93'	For Transitway Taper
Dartmouth Ave. to Mansfield Rd.	1,688'	100'- 102'	100'- 104'	North: 2' – 4'	550'	For Dale St. Station Center Platform
				South: 0'	N/A	N/A
Mansfield Rd. to Sligo Creek Parkway	1,604'	60' – 62'	72' – 80'	North: 12' – 20'	468'	For WB LT Lane In Median At Sligo Creek Parkway
				South: 0'	N/A	N/A
Total	5,342'				2,486	

The MTA also provided concept drawings dated February 2008 that depict a portal in the area in front of the football field / running track at the middle school – between Mansfield Road and the Parkway. The existing right-of-way in front of the school is estimated to be about 80 feet. The right-of-way between Sligo Creek Parkway and Manchester Road is estimated to be about 70 feet. Parkland is located between the school and Manchester Road. It appears from the drawing that an additional (estimated) 20-30 foot wide strip of right-of-way would be required on the north side of Wayne Avenue – from the school running track to Sligo Creek Parkway (a distance of about 590 feet) to accommodate two lanes of traffic in each direction and the trail to Sligo Creek Parkway. There would be some impact to the homes on the south side of Wayne Avenue –

[63] This is an estimate made by staff using GIS.

[64] This is an estimate made by staff using the December 2008 drawings – except for the Cedar Street to Dartmouth Avenue segment which is an estimate from the MTA's original table. This is the only segment where the length of the segment of impact was identified.

the primary impact being an estimated 5-10 feet of additional right-of-way for about the same distance (590 feet) and a two foot retaining wall on each side of the transitway for a distance of about 240 feet. The retaining wall would be in front of a minimum of three homes on the south side of Wayne Avenue and would require access to those properties to be right in and right out.

Additional detail on the impacts of both the surface alignment and the tunnel portal need to be provided in the FEIS so that the community and decision makers can consider the tradeoffs.

At this point, the trade-offs with respect to the impacts (ignoring for a moment the issue of the advantages - or disadvantages depending upon one's view) of a station at the proposed library site, would seem to be:

- A surface alignment that would result in linear strip takings of about ½ mile in front of about 34 residences. A very rough estimate of the total area – about 17,000 square feet. The staff estimates that this total would be reduce by about 1,700 – 1,800 square feet if there were no station at Dale Drive.
- A tunnel alignment that would result in linear strip takings for a distance of about 590 feet in front of a school and five residences while limiting access to at least three of the five residences. A very rough estimate of the total area – about 21,000 square feet.

It should be noted that the traffic analysis conducted by the MTA as part of the AA/DEIS indicated the shared lanes with added left turn lanes on Wayne Avenue would result in fewer delays at intersections than the dedicated lanes that are paired with the High Investment alternatives with the tunnel portal located east of Cedar Street (not the longer tunnel to or near Mansfield Road). The review of the traffic analysis is presented elsewhere in the staff memo but staff does not feel the differences in traffic congestion along Wayne Avenue are a deciding factor in selecting a preferred alignment.

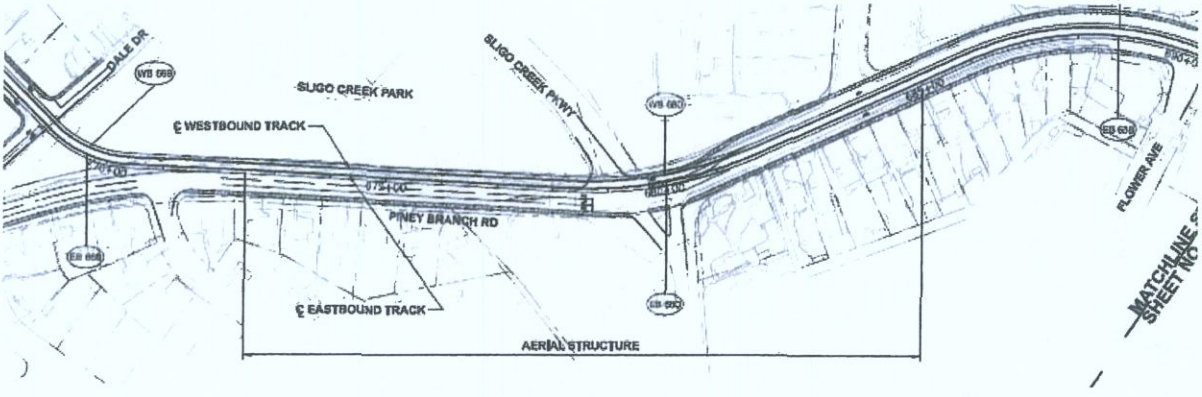
Staff recommends selection of the surface alignment along Wayne Avenue based on the value we believe the alignment and Fenton Street Station will add to the Fenton Village area of the Silver Spring CBD. We find, however, that further review of the tunnel option to Mansfield Road is needed. Our recommendation for further study of this option is based upon the fact that the tunnel:

- May prove to be a viable alternative in the event subsequent forecasts or analysis do indicate a problem with the surface alignment and intersection delays in the CBD core.
- Has the opportunity to serve a higher number of transit riders due to increased travel speeds

<u>Silver Spring / Thayer Design Option</u>

The Silver Spring/Thayer Design Option describes an optional tunnel alignment that would extend from the SSTC with either the BRT or LRT vehicles surfacing behind East Silver Spring Elementary School. The AA/DEIS includes this alternative as a "design option". The alternatives matrix in the AA/DEIS indicates that this option is included for consideration under both High

Investment Alternatives.[65] This design option would reduce the High Investment LRT and BRT costs by $50,000,000 to $53,000,000, as indicate on page 5-2 of the AA/DEIS. It should be noted that this option would require a separate aerial structure over Sligo Creek as shown below.



There is little support within the community or among staff for this design option – due in large part to a portal near East Silver Spring Elementary school, the aerial structure over the Sligo Creek and Sligo Parkway, and the need to widen Piney Branch Road.[66]

Master Plan Conformance

As previously noted, the alignment for the Purple Line between Bethesda and Silver Spring was *established in the* Georgetown Branch Master Plan Amendment (1990). The alignment designated along the Georgetown Branch right-of-way was reconfirmed in the following subsequent approved and adopted Master and Sector Plans:

- Bethesda-Chevy Chase
- Bethesda CBD
- North and West Silver Spring
- Silver Spring CBD
- East Silver Spring and Takoma Park

Recommendations include a largely single track fixed rail system, convenient pedestrian connections, direct access to Metrorail stations (Bethesda and Silver Spring) and pedestrian friendly amenities (e.g., *wider sidewalks, signalized crossings,* benches, bike racks and attractive transit stops).
The Georgetown Branch Trolley track described in the 1990 Master Plan between Bethesda and Silver Spring is a distance of 4.4 miles (22,585 feet). Of the 22,585 feet of track, only 8,320 linear feet consists of double track in the 1990 Master Plan. All of the light rail alternatives being examined in the DEIS/AA include a double track corridor. The BRT transitway east of Pearl Street in Bethesda is also a two-way transitway.

[65] See pages 2-10 and 2-12 of the AA/DEIS.
[66] See page 2-28 of the AA/DEIS for additional discussion of the design option.

Single tracking affects line capacity. The degree of the capacity effect is based on several other factors, including:

- The number of stations within the single track segment
- The length of the single track segment
- Whether there are multiple single track segments
- How much variability there is in the running time due to conflicts along the right-of-way (e.g., at grade intersections, etc.)

Any of the above factors (in combination or together) could result in an inability to achieve a frequency of service that otherwise (with double tracking) would be attainable. We often now experience the impact of single tracking on weekends on Metrorail as repairs are made (and single-tracking affects repair and maintenance flexibility as well).

The operations plan developed for the trolley in the Georgetown Branch Master Plan Amendment was able to assume a six minute frequency of service in large part because the entire segment was devoted exclusively to the trolley (i.e., there was no shared right-of-way assumed). That important fact is no longer present with the extension of the service east of Silver Spring.

The result is that from an operational standpoint any configuration of a Purple Line that extends from Bethesda to New Carrollton should be a continuous bi-directional transitway – whether LRT or BRT.

Georgetown Branch Trail

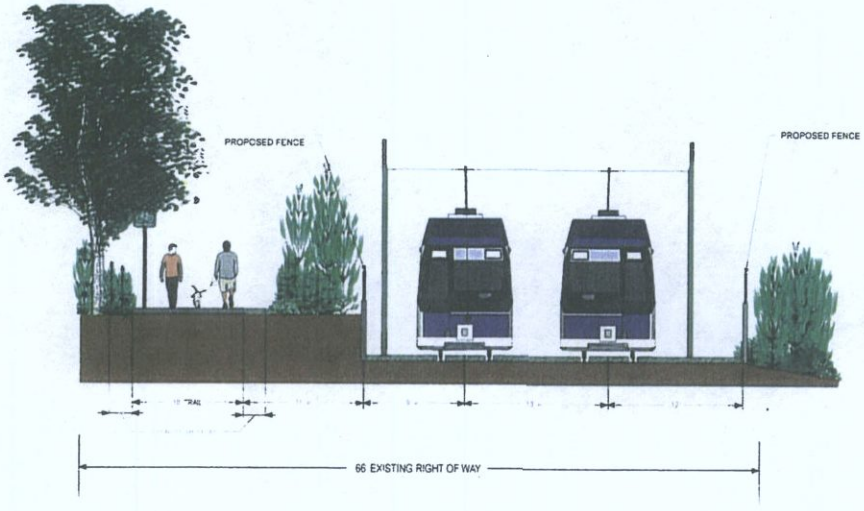
The Georgetown Branch Trail is identified as SP-6 in the 2005 Countywide Bikeways Functional Master Plan. The limits of SP-6 are Woodmont Avenue to the SSTC. It is part of a larger regional trail route and serves as a critical link between the Capital Crescent Trail in Bethesda and the Metropolitan Branch Trail in Silver Spring. It also offers a vital off-road connection to the Rock Creek Trail.

The Georgetown Branch right-of-way was purchased by the County in 1988 for the purpose of a future joint transit/trail corridor. In 1998, recognizing that the transit component would likely not be implemented until many years in the future, the County renovated and opened the tunnel under Wisconsin Avenue and constructed the Interim Georgetown Branch Trail (as crushed stone) east of the Bethesda Avenue/Woodmont Avenue intersection to connect to Rock Creek Park and to downtown Silver Spring. In part, this was done to in order to extend the Capital Crescent Trail experience east of Bethesda.

The trail is considered "interim" because it is a temporary facility until such time that the master planned transit use is implemented. It is not parkland, although some residents and trail advocates consider it as such because of its "greenway" nature particularly between Bethesda and Rock Creek, and because of its proximity to Capital Crescent Trail south of Bethesda Avenue that is operated and maintained by the Department of Parks. The Georgetown Branch is a transportation right-of-way that is envisioned in County master plans to include both a transitway and a trail.

All alignments and options include the trail between Pearl Street and the SSTC. However, only the Medium and High Investment BRT and High Investment LRT option includes the trail west of Pearl Street and passing through the Wisconsin Avenue tunnel. The other five options, therefore, are not consistent with master plan guidance which envisions the trail passing through the tunnel and connecting to the Bethesda Avenue/Woodmont Avenue intersection and thus offer a direct connection to the Capital Crescent Trail south of Bethesda Avenue.

The DEIS recommends a trail pavement width of 10'. While staff has recognized the right-of-way and community constraints, we now find a 12' trail is needed where it is feasible. The trail is a regional resource and will feature heavy user volumes as it offers grade-separated connections for bicyclists and pedestrians to reach the Bethesda and Silver Spring transportation management districts, which have 37 %and 50 %non-auto driver mode share goals respectively. It will also be a popular recreational route as the trail offers connections to major trails and parks.



During the January 8th public hearing, the Board will hear considerable testimony about two issues: 1) tree loss and tree canopy; and 2) the impact of double tracks on the trail. The DEIS proposes to remove all trees in the ROW. This is a highly emotional issue for many constituents, and staff finds it a valid concern, particularly between Bethesda and Rock Creek. Many large trees will be removed. MTA should investigate minimization techniques during the preliminary engineering phase to preserve/protect as many trees as possible.

Preserving/protecting trees not only retains environmental benefits, but also offers shade to trail users and serves as a buffer between the trail/transitway and adjoining properties, providing privacy and noise abatement benefits.

Some trail advocates are concerned about the loss of green space and "parkland." We remind the Board that the interim trail is a transportation facility in a transportation right-of-way. It is not parkland. The trail certainly offers recreational value, but the trail and right-of-way are owned and operated by Montgomery County Department of Transportation. And our master plans are unambiguously clear that the Georgetown Branch Trail is a transportation facility (bikeway). We ask the Board to focus on how to mitigate the tree loss and on providing the MTA with clear guidance on the Board's expectations for high quality design and landscaping to ensure a visually appealing trail experience in the future.

As for the double tracks, this is a valid concern where right-of-way is constrained. The 1990 Georgetown Branch Master Plan Amendment envisioned single track. Because of the double track, the trail will not be off-set from private property as much as it would be under a single track scenario. Single track is not among the options being considered for the reasons noted above so we ask the Board to again provide clear guidance to the MTA regarding high quality design and landscaping.

The staff finds the Georgetown Branch trail is not a deciding factor in the selection of a preferred mode. A trail can be accommodated within the Georgetown Branch right-of-way regardless of mode. However, staff recommends including the trail west of Pearl Street and passing through the Wisconsin Avenue tunnel to connect to the Bethesda Avenue/Woodmont Avenue intersection and the Capital Crescent Trail, to provide continuity for this regional transportation and recreational facility. As previously noted, a trail on an alignment within the Georgetown Branch right-of-way is consistent with previously adopted Master Plans.

The following issues should be addressed in the FEIS:

- Corridor design that can accommodate a trail pavement width of 12' with 2' shoulders on both sides
- Plan for tree replantings of a sufficient size to provide shade to trail users
- Adequate buffer between trail and private property to reduce "cattle chute" effect. This is particularly important in locations where the right-of-way is constrained and the trail may be located next to a retaining wall between the tracks and the trail
- Protection of trees and tree root zones outside the right-of-way (to protect and maintain any remaining shade after the trees within the right-of-way are removed during construction)
- If lighting is provided for the tracks, lighting should also be provided for the trail, or designed in a matter that can accommodating lighting fixtures in the future
- A signing and marking plan (directional and interpretive)
- Adequate bicycle racks and lockers at stations, sufficient to meet demand in the short term but ensuring the station is designed in a manner not to preclude more bicycle parking facilities in the future
- Plans for all trail access points, including the connection to the Rock Creek Trail
- Aesthetic design of the bridge crossings of Rock Creek (including coordination with the National Park Service.

<u>Silver Spring Green Trail (Wayne Avenue)</u>

The Silver Spring Green Trail is SP-10 in the 2005 Countywide Bikeways Functional Master Plan as well as Bikeway Route 2 (Regional Connector) in the 2000 Silver Spring CBD Sector Plan. Its limits are Fenwick Lane to the Sligo Creek Trail. It functions as a critical off-road bikeway link between the Sligo Creek Trail and the SSTC/Metro Station as well as to the Metropolitan Branch/Georgetown Branch trails and westward to Rock Creek. The trail exists between Cameron Street to the west and Cedar Street to the east. The section between Cedar Street and Sligo Creek Parkway is the subject of a Montgomery County Department of Transportation Phase I Facility Planning Study. It is among the County's highest priority bicycle

and pedestrian facilities, but is on hold until the mode and alignment for the Purple Line is selected. The Plan showed the trail as 10' next to a 5' sidewalk and a 6' landscape panel. The trail project is independent of the Purple Line project, but the transitway impacts the future design and implementation of the trail.

Under any of the Purple Line options involving a surface alignment on Wayne Avenue, achieving this cross-section will be very difficult. The AA/DEIS highlights past conversations between MTA and M-NCPPC (page 3-17, Alternatives Analysis) to reduce the width of the trail to 8' and to reduce the landscape panel to 5'. The 8' trail would be a shared use path – functioning both as a recreational trail and a sidewalk. These minor changes are not critical flaws, but as part of the selected alternative FEIS we would like to see cross-sections and/or profiles to better visualize the resulting design and travel space for pedestrians and bicyclists. The station platform at Dale Drive under all alternatives causes some impacts to private property. To accommodate the trail through this area, additional right-of-way will be needed, or the trail will need to be placed in a public use easement (PUE).

Staff finds the potential impacts to the Silver Spring Green Trail are not a determining factor in the selection of a preferred alignment or mode for the Purple Line.

Parks Impacts and Mitigation

The Meadowbrook Maintenance Annex is a park property which is designated as the site for the yard and shop. This site was not identified as public parkland in the AA/DEIS – possibly because it is not signed as parkland and is titled to Montgomery County (as is much of the M-NCPPC parkland in the County). An aerial view of the area in question is shown to the right.

Another park that will be impacted is New Hampshire Estates Neighborhood Park. The AA/DEIS notes that the construction of the transitway will require the removal of brick columns, walkways, and benches in front of the park. Staff expects that the parking lot will also likely be removed. All of these facilities should be studied and replaced, with Department of Park's oversight.

Staff recommends that the FEIS identify park minimization and mitigation strategies. Staff finds that the location of both park facilities are on segments of the Purple Line alignment that is common to all alternatives. Additional detail on the Park Department's review of the AA/DEIS is included in the following section of the staff memo and in a supporting staff memo in the Appendix.

Historic Preservation

Staff finds that in general, impacts are minimal to historic resources listed in the Montgomery Locational Atlas, the Montgomery County Master Plan for Historic Preservation, or potentially eligible for listing in the Master Plan for Historic Preservation or the National Register of Historic Places.

Of note is that the Purple Line alignment would result in removal of one structure on the north parcel of the Falkland's complex.[67] This demolition would diminish the historic property's integrity of setting, feeling, and association and would be an adverse impact. The Maryland Historical Trust, the State Historic Preservation Office, determined in 1999 that the Falkland Apartments are eligible for listing in the National Register of Historic Places.

According to the MTA assessment, the alignment on the south side of the CSX right-of-way will result in a small reduction in the amount of land in the northeastern parcel, the removal of approximately ten %of the building on North Falkland Lane, and the removal of approximately 25 %of the north building on East Falkland Lane.

The Planning Board has recently considered redevelopment of the entire north parcel of the Falklands apartment complex. The Board decided in September 2008 that full redevelopment of the parcel was preferable to preserving the existing buildings. The location, 800 feet from the Silver Spring Metro station along with the advantages of mixed use opportunities and investment on other parcels of the complex, outweighed the advantages of retaining the existing structures on that parcel.

The Planning Board specifically recommended that only the two parcels on the south side of East-West Highway should be listed on the Locational Atlas and sent that recommendation on to County Council who will be taking the matter up in early 2009. Considering that the Planning Board specifically decided on the issue of the north parcel, including being informed of the potential impact of the Purple Line, staff find that these impacts are not a factor that enters into the alignment decision. We understand that the property owner intends to proceed with the detailed site planning for the north parcel and the subsequent demolition of the buildings.

The MTA project team and the owner (and potential developer) of the north parcel have worked to minimize the extent of the impacts while at the same time providing space for the Purple Line on the south side of the CSX right-of-way. Mitigation of the impact should be identified in the FEIS.

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[67] The Low Investment BRT Alternative and the Design Options for the CSX right-of-way that result in the transitway being located on the north side of the CSX right-of-way are the only build alternative that would avoid the impact to the Falkland Apartments.

Staff finds the impact on the Falkland Apartments can be mitigated in light of the fact that the north parcel is expected to be replaced with a new development that would provide for the Purple Line alignment.

Natural Environment

The impacts to protected natural resources in the Purple Line study area are generally comparable for each of the alternatives analyzed. Subsequent study efforts should incorporate more detailed information on the following sensitive resources:

- In section 2, page 20 of the Natural Resources Technical Report, it is noted that effects to groundwater could potentially occur with the High Investment BRT Alternative and the LRT alternatives due to the tunnel components. The FEIS should evaluate the effect this will have on the adjacent streams, wetlands, and groundwater table.
- In section 2, page 22 of the Technical Report, it is noted that Coquelin Run originates south of Bethesda and flows east paralleling the south side of the Georgetown Branch Trail. The FEIS should examine the potential impacts to Coquelin Run from the construction of the light rail.
- In section 2, page 75-76 of the Technical Report, potential wetland mitigation sites are selected for the project as compensation for the wetland loss. Most of the proposed sites are located within existing parkland and must be approved for selection with M-NCPPC Park Department staff. Any adverse effects must be mitigated. Additional comment on these potential sites is provided in the staff memorandum in the Appendix.
- In section 2, page 69 of the Technical Report, the wetland impacts by alternative does not specify which wetlands will be impacted or the watershed in which they are located.
- In section 2, page 78-79 of the Technical Report, the terrestrial habitat includes the existing forests within the 18 mile corridor along the proposed alignments but does not provide a breakdown by stream valley.
- There is no summary of the direct impacts and associated acreage by watershed or road segment.
- Staff estimates that the tree loss along the Georgetown Branch right-of-way as a result of the Purple Line would be approximately six acres. Because trees do not count as a forest, and because the trail is not technically parkland, the MTA does not propose mitigation or reforestation for the loss of trees. The FEIS should recognize the importance of the trail as a community resource and determine if mitigation is possible to reduce impacts and restore some of the green edge over time. Mitigation of the tree loss should include the planting of larger canopy tress of varying species ranging in size from 4"-6" dbh. Larger understory and shrub species should also be planted throughout the trail network.

Staff finds the issues related to environmental impacts are not a deciding factor in selecting a preferred alignment for the Purple Line.

Traffic and Parking Impacts

The AA/DEIS notes the following with respect to traffic and level of service at major intersections along the corridor in 2030 including six in Montgomery County:

"The Build alternatives are generally expected to maintain traffic conditions. The addition of left turn lanes is expected to improve traffic congestion in some locations, while the use of shared lanes by the Purple Line would degrade conditions in other locations."

Level of service or LOS is a measure of the efficiency of traffic flow through an intersection. LOS A represents uncongested flow with an average delay of less than ten seconds for each vehicle that passed through the intersection. LOS F represents congested conditions with demand that exceeds the intersection capacity resulting in average delays exceeding 80 seconds per vehicle. More information is available in the AA/DEIS Traffic Analysis Technical Report (page 4-10).

The intersections shown in Tables 14 and 15 are only those where it is estimated that the LOS will change (either positive or negative) for one or more Purple Line build alternatives when compared to the "2030 No Build" state. The Purple Line is only expected to materially change LOS at six intersections in the morning peak hour and six intersections in the evening peak hour. The dedicated transit lanes under the High Investment Alternatives result in more roadway congestion along Wayne Avenue due to the "take-a-lane" strategy. Additional widening of the roadway (beyond that envisioned in the Medium Investment Alternatives) would be required to achieve improvements estimated under the Medium Investment Alternatives.

Table 14 – Impacts On Intersection Level of Service – AM Peak Hour

Intersection	2030 No Build	Low BRT	Med BRT	High BRT	Low LRT	Med LRT	High LRT
Jones Bridge Rd. @ Wisconsin Ave.	E	F	E	E	E	E	E
Wayne Ave. @ Fenton Street	C	D	C	C	C	C	C
Wayne Ave. @ Cedar St.	C	C	A	C	B	B	C
Wayne Ave. @ Dale Drive	C	D	B	F	B	B	F
Wayne Ave. @ Mansfield Rd.	A	A	A	D	A	A	D
Wayne Avenue @ Sligo Creek Pkwy	E	E	C	F	C	C	F

Table 15 – Impacts On Intersection Level of Service – PM Peak Hour

Intersection	2030 No Build	Low BRT	Med BRT	High BRT	Low LRT	Med LRT	High LRT
Jones Bridge Rd. @ Jones Mill Rd.	E	F	E	E	E	E	E
Wayne Ave. @ Fenton Street	C	C	D	C	D	D	C
Wayne Ave. @ Cedar St.	D	D	C	C	D	D	C
Wayne Ave. @ Dale Drive	E	F	D	F	D	D	F
Wayne Ave. @ Mansfield Rd.	A	A	A	C	A	A	C
Wayne Avenue @ Sligo Creek Pkwy	E	F	E	F	E	E	F

The tables above reflect the improvements attained with the addition of the left turns at selected intersections along Wayne Avenue under the Medium Investment alternatives. The traffic volumes are expected to be similar for each Purple Line alternative. Like any major investment study, the forecasting process reflects the fact that traveler behavior adjusts in response to changes in provided transportation service. Therefore, the value in constructing the Purple Line is not in reducing traffic congestion but rather in improving travel choices and increasing accessibility for all modes of travel.

The comparison of traffic congestion is not useful as a deciding factor between modes or alignments. For example, the AA/DEIS confirms that congestion will increase over 20 years with growth. The differences between mode choice and investment alternatives on traffic impacts are considerably less than the growth in vehicular volume alone. For example – the Wayne Avenue and Fenton Street intersection under the Medium Investment alternative of either BRT or LRT would add approximately 10 vehicles in each direction in the peak hour. So from the County's congestion standard perspective, while the CLV of the intersection may increase from 1060 in 2006 to 1493 by 2030, the Purple Line would only account for less than one percent of the difference. Many of the at-grade crossings, the DEIS states, "are proposed to occur at existing signalized intersections; by utilizing opportunities to cross a roadway at a location when traffic on the cross street is already stopped, the impacts to automobile traffic can be reduced." The clear exception is where an impact is avoided altogether, as by a grade separation or tunneling. Fewer at grade crossings are better for traffic network operation as well as safety, but the difference is not significant enough in general to warrant selecting one alternative over another.

Staff finds that the traffic analysis and congestion considerations in general are not a primary factor in selection between modes or investment alternatives.

The AA/DEIS includes the following analysis of the impact the respective alternatives would have on on-street parking:

TABLE 16 – Impact On-Street Parking

Alternative	Street & Segment	Impact
Low Investment BRT	Woodmont Avenue From Old Georgetown Road To Wisconsin Avenue	Extend Peak Period Restrictions In Both Directions For Entire Segment
	Jones Bridge Road Near Jones Mill Road	Introduce Peak Period Restriction To Accommodate East Bound Bus By-Pass Lane
	Wayne Avenue From Cedar Street To Mansfield Road	Extend Peak Period Restrictions In Both Directions For Entire Segment
Medium Investment BRT	Bonifant Street From SSTC To Fenton Street	Eliminate On-Street Parking On North Side of Street. Parking On South Side Remains If Bonifant Is Converted To One Way Eastbound
	Wayne Avenue From Cedar Street To Mansfield Road	Extend Peak Period Restrictions In Both Directions For Entire Segment
High Investment BRT	Wayne Avenue From Cedar Street To Mansfield Road	Extend Peak Period Restrictions In Both Directions For Entire Segment
Low Investment LRT	Bonifant Street From SSTC To Fenton Street	Eliminate On-Street Parking On North Side of Street. Parking On South Side Remains If Bonifant Is Converted To One Way Eastbound
	Wayne Avenue From Cedar Street To Mansfield Road	Extend Peak Period Restrictions In Both Directions For Entire Segment
Medium Investment LRT	Bonifant Street From SSTC To Fenton Street	Eliminate On-Street Parking On North Side of Street. Parking On South Side Remains If Bonifant Is Converted To One Way Eastbound
High Investment LRT	Wayne Avenue From Cedar Street To Mansfield Road	Extend Peak Period Restrictions In Both Directions For Entire Segment

Staff finds that while the loss of parking on the north side of Bonifant Street and additional peak hour restrictions on Woodmont Avenue and Wayne Avenue are of concern, these impacts should not be considered as a deciding factor in selecting an alignment for the Purple Line.

Community Impacts

A summary of the community impacts as identified in the AA/DEIS is presented below[68]:

In Bethesda …

- Low Investment BRT would result in strip acquisitions of property on the NIH and the NNMC campuses.
- Under each of the Build Alternatives, access (now unlimited) to the permanent Capital Crescent Trail would be limited to specific locations.[69]
- Under each of the Build Alternatives, loss of trees and other vegetation along the Georgetown Branch right-of-way.[70] The loss in Bethesda and Chevy Chase (i.e., the trail west of Jones Mill Road) does not occur under the Low BRT Alternative that would operate on Jones Bridge Road.
- Four locations in Bethesda were monitored for noise and no impacts are anticipated from any of the alternatives.

In Chevy Chase …

- Low Investment BRT could result in the displacement of one residential property at Jones Bridge and Jones Mill Roads.[71] The Low Investment BRT would also require temporary construction easements at nine residential properties on Jones Bridge Road as well as North Chevy Chase Elementary School. All of the other Build Alternatives would require temporary construction easements within the Columbia Country Club in order to relocate a golf cart path.
- As noted above, the Build Alternatives (excluding the Low Investment BRT) result in the loss of trees and other vegetation along the Georgetown Branch right-of-way.
- Under the High Investment BRT and the Medium and High Investment LRT alternatives, there would be an aerial structure over Connecticut Avenue.
- Eleven locations in Chevy Chase were monitored for noise impacts and no noise impacts are anticipated from any of the Build Alternatives.

In Rock Creek Forest/Lyttonsville/Rosemary Hills …

- The Build Alternatives require a strip acquisition from the Roundhill Apartments on Freyman Drive.[72]
- All of the LRT alternatives would require a temporary construction easement from five properties on Talbot Avenue.

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[68] In order to group all of the documented impacts in the AA/DEIS by community, the findings related to noise impacts are repeated in this section of the staff memo. Property acquisitions are noted in bold type.

[69] While this is noted in Chapter 4, this statement may not apply to the trail west of Jones Mill Road as that segment of the trail would not be constructed as part of one Build Alternative – the Low Investment BRT Alternative.

[70] M-NCPPC Environmental Planning staff estimate the trail area (including the trail and adjoining tree and vegetation cover) from Bethesda to just east of Rock Creek to total about six acres)

[71] A "displacement" is the complete taking of property.

[72] A "strip acquisition" is the taking of a smaller (usually linear or longer than it is wide) piece of property and does not involve the displacement of a residence. The staff has been unable to locate a quantitative summary of the total area that could be impacted by "strip acquisitions."

- All of the Build Alternatives would require a strip acquisition from Rosemary Hills Elementary School for the construction of the Capital Crescent Trail.
- All of the Build Alternatives would also limit access to the trail to specific locations.
- All of the Build Alternatives would result in the loss of trees and other vegetation along the Georgetown Branch right-of-way.
- Under any build alternative, the existing County operations and maintenance facility in Lyttonsville would be expanded to accommodate the Purple Line fleet. The existing viewshed is not expected to change significantly.[73]
- Introduction of the transitway between the CSX right-of-way and the residential property and school along Porter Road would change the existing viewshed in that area.
- Three locations in the community were monitored for noise and no impacts are anticipated from any of the Build Alternatives.

In Woodside …

- Under any build alternative, the construction of the Capital Crescent Trail along the north side of the CSX right-of-way would require temporary construction easements from two residential properties.
- Two locations in the community were monitored for noise and no impacts are anticipated.

In Silver Spring…

- Each of the Build Alternatives requires strip acquisitions along the CSX right-of-way.
- Each of the Build Alternatives would require property acquisition from one residence and the displacement of two other residences on Leonard Drive.
- Each of the Build Alternatives except Low Investment BRT would result in displacements from one building of the Barrington Apartments and two buildings of the Falklands Apartments.
- Medium and High Investment BRT and LRT would require strip acquisitions on Wayne Avenue where widening is required for left turn lanes. These alternatives would also require temporary construction easements from some residences along Wayne Avenue to re-grade and reconstruct driveway connections.
- High Investment BRT would require temporary construction easements along Wayne Avenue.
- The Silver Spring Avenue / Thayer Avenue design option for the High Investment BRT and LRT Alternatives would require both property acquisition and temporary construction easements at some residences along Thayer Avenue, Hartford Avenue, and Dale Drive.
- All Build Alternatives except for the Low Investment BRT would require temporary construction easements from the Silver Spring International Middle School.

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[73] There are two Purple Line Operations and Maintenance locations. One is on Brookville Road in Lyttonsville and the other is the M-NCPPC's Glenridge maintenance facility in Prince George's County. The use of the Glenridge facility will require the relocation of the Park Department vehicle maintenance activity. The use of the Lyttonsville site will require the acquisition of additional (commercial) property in the area . The Lyttonsville site will also require use of the existing M-NCPPC Meadowbrook Maintenance Annex which is technically public parkland and is subject to Section 4(f) of the Department of Transportation Act of 1966.

- The Silver Spring Avenue / Thayer Avenue design option for the High Investment BRT and LRT Alternatives includes a portal behind East Silver Spring Elementary School and as a result, would require property acquisition from the school.
- Introduction of the transitway between the CSX right-of-way and the commercial and residential apartment areas along 16th Street would introduce a new visual element under all of the Build Alternatives.
- The introduction of any LRT alternative along Wayne Avenue and along Thayer Avenue (in the case of the design option) would result in a substantial visual effect.
- The High Investment BRT and LRT Alternatives include a portal on Wayne Avenue east of Cedar Street and that would introduce a new visual element.
- Eight locations in Silver Spring were monitored for noise impacts with the following results:

    - One location along the CSX right-of-way at Leonard Drive would experience moderate noise impacts under all of the BRT alternatives.
    - The area on 16th Street between East West Highway and Spring Street would experience noise impacts under the Medium and High BRT Alternatives.
    - Two locations along Wayne (one near Cedar Street and another near Mansfield Road) would experience moderate noise impacts under each of the BRT Alternatives.
    - A location along Wayne Avenue near Dale Drive would experience moderate noise impacts under the Medium and High Investment BRT Alternatives.

In East Silver Spring …

- Each of the Build Alternatives would require strip acquisitions of residential property along Wayne Avenue and Piney Branch Road.
- On Wayne Avenue, the LRT and (under the High Investment Alternatives) the tunnel portal would introduce new visual elements.
- Two locations were monitored for noise and neither location is expected to experience any impact.

In Long Branch …

- The High Investment BRT Alternative and all of the LRT Alternatives would result in the displacement of one apartment building on Plymouth Street and one residence at the corner of Arliss Street and Flower Avenue. In addition, there would be the need for six right-of-way acquisitions from residential property along Plymouth and Reading Streets for the Plymouth Street tunnel. [74]
- Under the Silver Spring Avenue / Thayer Avenue design option, there would be strip acquisitions from 13 residential properties on Piney Branch Road.

- The two tunnel portals, one off of Wayne Avenue and one on Arliss Street would introduce new visual elements.
- Two locations were monitored for noise and one of those (along Arliss Street) is expected to experience moderate impacts under the Medium and High Investment BRT alternatives.

[74] These impacts are avoided by the Silver Spring Avenue / Thayer Avenue design option.

In Takoma Park …

- Under each of the Build Alternatives, some strip property acquisition and temporary construction easements would be required under each of the Build Alternatives.
- Five locations in Takoma Park were monitored for noise and none are anticipated to experience noise impacts.

In Langley Park …

- Each of the Build Alternatives except Low Investment BRT would require strip acquisitions from four apartment complexes along University Boulevard.
- Parking impacts in Langley Park are not included in the table above and there would be impacts along University Boulevard where the service road, now used for parking, would be removed.[75]

Staff finds community impacts are one of the determining factors used in selecting a preferred alignment.[76] The communities with the most significant potential impacts are the residential areas along Jones Bridge Road west of Connecticut Avenue, the residential area adjacent to the Georgetown Branch Trail, some residences along the CSX right-of-way, and the residential areas along Wayne Avenue – from the SSTC to Flower Avenue, and the residential area near Arliss Street and Flower Avenue. On Jones Bridge Road and on the Capital Crescent Trail, we find the impacts are of a similar level and therefore do not lead us to favor one alignment over another based solely upon community impact. We find the Wayne Avenue issue (tunnel vs. surface) needs additional analysis with respect to the potential impact.

Preinkert/Chapel Drive Design Option

The AA/DEIS identifies one design option for the Medium Investment LRT Alternative in Prince George's County, the Preinkert/Chapel Drive Design Option. This Design Option would increase the construction cost by approximately $10,000,000 and staff finds the impacts on Montgomery County constituents to be minimal. **Staff recommends that the findings related to this Design Option be deferred to Prince George's County government**.

Summary of Analysis of Factors In Recommending a Preferred Alignment

The following table summarizes the factors examined in selecting the Medium Investment LRT Alternative along the Georgetown Branch right-of-way and its surface alignment on Wayne Avenue as the preferred alignment for the Purple Line. Staff also recommends the addition of Capital Crescent Trail connection under Wisconsin Avenue, the elimination of the Dale Drive

[75] As previously noted, it also appears that the LRT alternatives could result in some loss of sidewalk connectivity along University Boulevard.

[76] It should be noted that impacts on commercial properties are not identified in the AA/DEIS. Staff is aware of two properties – one on Bonifant Street adjacent to the SSTC and another in Lyttonsville that would be required for the Purple Line Yard and Shop area.

station, and further analysis of the potential for a Wayne Avenue tunnel - extending under Wayne Avenue to the vicinity of Mansfield Road.

Issue	Key Findings	Consideration Given In Arriving At Eventual Recommendation On Alignment
Station Area - Ridership	• Silver Spring – Thayer Design Option Station and Alignment Impact Unacceptable • Dale Drive Station Ridership Questionable • Community Opposition To Dale Drive Station	Drop Silver Spring – Thayer Design Option and Dale Drive Station from Further Consideration
Station Area – Walk Access	• St Elmo Avenue Station Just Outside of Purple Line Master Plan Alignment Walk Radius • Fenton Street Station In Area of Greatest Absolute and Percentage of Growth In HH Density	Favors Georgetown Branch Alignment and Surface Alignment On Wayne Avenue
Station Area – Urban Design and Economic Development	• Fenton Street Station Necessary To Support Existing and Future Revitalization	Favors Surface Alignment On Wayne Avenue
Jones Bridge Road Alignment	• Georgetown Branch Master Plan Alignment Provides Faster Travel Time Between Activity Centers of Greater Existing & Future HH and Job Density	Favors Georgetown Branch Alignment
Wayne Avenue	• Tunnel Option Needs Further Analysis • Tunnel May Result In Net Ridership Gain • Surface and Tunnel Alignment Impacts Need More Analysis	Favors Studying Tunnel Alignment On Wayne Avenue To Mansfield Road Area
Master Plan Conformance	• Confirms Georgetown Branch Alignment • Confirms Trail Through Wisconsin Tunnel	Favors Georgetown Branch Alignment & Trail Through Tunnel
Georgetown Branch Trail	• Purchased For Transit Use • Twelve Foot Width For Hard Surface Recommended • Focus Should Be On Mitigation Of Tree Loss	Favors Georgetown Branch Alignment
Silver Spring Green Trail	• Need Additional Information On Typical Section • Recent Change To 8 Foot Width Not Critical But Could Be Partially Avoided With Tunnel	Favors Studying Wayne Avenue Tunnel

Issue	Key Findings	Consideration Given In Arriving At Eventual Recommendation On Alignment
Parks	• Meadowbrook Maintenance Annex May Be 4(f) Impact • New Hampshire Estates Neighborhood Park Will Be Impacted	No Result – All Alignments Adjacent To These Facilities
Historic Preservation	• Falkland Apartments Impacted – Will Require Mitigation • Development Plan To Be Considered	Favors Retention of Design Option On North Side Of CSX Right-of-Way
Natural Environment	• Tree Loss On Trail Totals Estimated Six Acres • Focus Should Be On Mitigation	Favors Jones Bridge Road Alignment
Traffic	• Purple Line Impact Not Significant	No Result – Impact Deemed Not Significant Enough To Favor Any Alignment
Parking	• Purple Line Impact Not Significant	No Result – Impact Deemed Not Significant Enough To Favor Any Alignment
Community Impacts	• See Narrative For Summary	Favors Studying Wayne Avenue Tunnel Option

4. ADDITIONAL ITEMS FOR FURTHER STUDY

This section of the staff memo identifies recommendations relating to next study steps.

Historic Preservation

The Historic Preservation Section supporting memo is included in Appendix C. In addition to the Falkland Apartments, coordination will be required regarding:

- Potential impacts to the Columbia Country Club. The Country Club has been determineto be eligible for the National Register of Historic Places. While staff is not concerned about removal of the non-historic portion of the country club golf course for the Purple Line project, we are concerned that removal of this parcel might negatively impact the remaining historic portion of the course, due to adjustments that will have to be made to the historic setting due to this undertaking. Staff would want to work closely with MTA and the property owner to ameliorate any potential adverse effect.
- Potential historic impacts on the Montgomery Blair High School site, which has been determined to be eligible for the National Register of Historic Places.

Station Area Planning

The Planning Department's Draft FY 2010 Work Program includes an element for Purple Line Corridor Land Use Master Plan. The staff would like to emphasize the importance of this planning effort in the context of the information in the AA/DEIS, the analysis of the alternatives in this staff memo, and both the concern and support expressed in the community and within the MPAG. There is apprehension in some sectors of the community that neighborhoods, small businesses, and workforce housing may experience negative impacts in some areas along the Purple Line alignment as well as potentially not being able to take advantage of the benefits that accrue with surface public transit. A proactive planning effort at addressing these important issues would be welcomed by many in the community.

The work would look at a range of issues including the benefits that could accrue to Fenton Village from surface public transit. Work as been ongoing in the neighborhood building densities and heights and the proposed study would benefit from this work.

One area of focus in the station planning effort (and the FEIS) should be a continuing review of the walk access to all stations. The staff has previously noted some of the potential issues in the vicinity of the Takoma/Langley Transit Center. In Silver Spring, the 16th Street station and the Lyttonsville stations in particular should be reviewed for issues related to walk access. The staff has in the past noted that there should be a traffic signal at Merrimac Drive on University Boulevard and we continue to include this as a recommendation to be considered in subsequent studies.

Station Area Urban Design

Urban Design Guidelines for the Station Areas are expected to accompany the Purple Line Corridor Land Use Master Plan. Many of the issues associated with the Purple Line concern urban design.

They concern not just the stations themselves, but the relationship of the stations to their neighborhoods. Especially where a station is anticipated to contribute to the economic development of an area, such as in Long Branch, urban design guidelines for those areas are important.

Funding Transit

Staff recommends that the selection of mode and alignment should precede the establishment of a funding plan. The staff has acknowledged throughout the analysis the current cost effectiveness threshold established by the FTA for determining if a project will be competitive for federal funding support. The FTA New Start program may be modified with the upcoming reauthorization of the federal funding statutes for transportation projects. Complicating matters is the current economic recession and the resulting impact on state and local governments. The challenges in developing a credible funding plan for the Purple Line and the Corridor Cities Transitway are significant and the time is relatively short.

Similarly, the AA/DEIS does not specifically address funding the Purple Line – indicating that the state will select the preferred alternative for the three active New Start projects and then determine the most feasible approach to funding and phasing. The AA/DEIS does contain a very good description of the trade-offs involved in the decision of the selection of a preferred alternative and in reaching a decision on phasing and funding.

Staff recommends funding the region's transit service include the following tenets:

- We must first take care of Metrorail as virtually everything we do now and in the future is in some way dependent upon Metrorail.
- We cannot ignore the maintenance and system preservation needs of our existing regional (Metrobus) and local (Ride-On) bus systems.
- The staff supports the vision of an evolving network of enhanced Bus Rapid Transit routes and we think it deserves further study – coordinated with WMATA, DOT, SHA, and the Planning Department. We do not think Bus Rapid Transit is the preferred mode for the Purple Line, however.
- The County should establish a transit infrastructure financing committee to identify more sustainable dedicated funding from both the public and the private sectors. Local option taxes and value capture financing mechanisms for new projects in particular are examples of approaches that may offer potential.

The Purple Line Functional Plan

Once an LPA is selected by MTA, the staff will finalize and forward to the Planning Board a draft of the Purple Line Functional Plan. This plan will formally establish the mode and alignment between Bethesda and the County boundary in the Takoma/Langley Crossroads area.

Our MPAG will continue to assist us in this effort. The staff would like the Planning Board to know that the MPAG has played a significant role in shaping this analysis of the AA/DEIS. They were unable to arrive at a consensus with respect to mode or alignment and many members will not agree with all of the analysis in this memo. It is important, however, for the staff to acknowledge that almost every issue examined in this memo has been either initiated by, or reviewed by, the MPAG. The staff (all divisions) would like to thank them for their expertise, time, and energy. We look forward to continue to work with them.

Additional Studies

The Vision staff memo includes a recommendation that the FEIS address additional transit options for the National Naval Medical Center in Bethesda and the Federal Food and Drug Administration (FDA) site at White Oak. The Department's position is that it is important to continue to examine the potential for expanded transit service and access to and from both of these locations these studies are beyond the Purpose and Need of the EIS process.

Development Review

The staff and the MTA Purple Line Project Team continue to coordinate on development applications that could impact any potential Purple Line alignment. We will continue this approach until a LPA is selected, using the publication of the AA/DEIS and the Functional Plan effort to reserve rights-of-way if necessary. Once the alternative is selected, we will focus on that alignment and any applicable design options that may still be under consideration.