T&E COMMITTEE #2
March 1, 2012

MEMORANDUM

February 28, 2012

TO: Transportation, Infrastructure, Energy and Environment Committee

FROM: Glenn Orlin, Deputy Council Staff Director

SUBJECT: FY13-18 Capital Improvements Program—transportation: Capital Crescent Trail project

This is the third Committee worksession scheduled to review the transportation portion of the FY13-18 Capital Improvements Program. This worksession will include a presentation by the Maryland Transit Administration (MTA) of its report evaluating options for carrying the Capital Crescent Trail through the Bethesda CBD. The report is an update of the report presented to the Planning Board late last fall, and it includes evaluations of additional alternatives. The report also addresses other issues for the trail between Silver Spring and Bethesda, including:

- Should the County's trail project include continuous lighting along the trail, and if so, what kind?
- Should the project include call-boxes?
- Should the project include extra landscaping and amenities?

The Chair has indicated that, for this meeting, the Committee will hear MTA's presentation, get reaction from the Planning Board, Executive Branch and specific stakeholders, hear Council staff's analysis and recommendations, and ask questions of staff. The Committee will craft its recommendation on March 8, and that recommendation will be reported to the Council on March 13. The agenda is:

1. Opening remarks by the Chair.
2. Presentation by Michael Madden, Purple Line Study Manager, Maryland Transit Administration (approximately 30 minutes). MTA's latest report is on ©A-B, 1-47.
3. Comment period (up to 3 minutes each):
   David Anspacher, Montgomery County Planning Board staff (November 30 letter, ©48-54)
   Arthur Holmes, Jr., Director, Montgomery County Department of Transportation
   Patricia Burda, Councilmember, Town of Chevy Chase
   Ron Tripp, Chair, Coalition for the Capital Crescent Trail
   Ajay Bhatt, President, Friends of the Capital Crescent Trail
   Wayne Phyillaier, Treasurer, Purple Line NOW
   Shane Farthing, Executive Director, Washington Area Bicyclist Association
   Ginanne Italiano, Executive Director, Greater Bethesda-Chevy Chase Chamber of Commerce
4. Council staff analysis and recommendations to fund a Capital Crescent Trail project in the CIP (approximately 10 minutes).
5. Questions and answers between Councilmembers and staffs.

Background. Ever since the 1990 Georgetown Branch Master Plan, it has been the County's intent that both a light rail line and a paved trail should be built along the Georgetown Branch and Metropolitan Branch rights-of-way between the Bethesda and Silver Spring CBDs. Also, ever since 1990, the understanding has been that the State would pay for the light rail line and the County would pay for the trail.

Since then, important design aspects of these two elements have changed. The light rail had been planned as a largely single-track line with double tracks at (and on the approaches to) the stations, but now it is to be double-tracked for its entire length. The trail had planned to be 10' wide, but now it is to be 12' wide. Meanwhile, of course, neither the physical constraints nor the right-of-way has changed, making the design much more challenging.

The most challenging part of the design has been trying to accommodate the Capital Crescent Trail, the light rail line, the platform for its Bethesda station, and its connection to a southern entrance to the Bethesda Metro Station through the "tunnel" beneath the Air Rights Building, Wisconsin Avenue, and the Apex Building. Tracing back to the 1990 Georgetown Branch Plan, the concept has been to place the trail above one of the two tracks.

The 1994 Bethesda CBD Sector Plan foresaw potential problems with the concept, and so it recommended two hiker-biker paths: Route A1 through the tunnel and Route A2 through Elm Street Park, and along Willow and Bethesda Avenues. The Plan acknowledges the desire for both, but states:

> The tunnel area for the CCT may be greatly reduced or perhaps eliminated if double tracks for the trolley are needed there. In the event that the CCT does not run through the tunnel, the CCT will follow only a street level route. (Bethesda CBD Sector Plan, p. 156)

Route A2 is being designed as part of the Bethesda Bikeway and Pedestrian Facilities project in the County's CIP. On February 27 the Committee tentatively recommended accelerating it so that it would be built in FY15, a year sooner than proposed by the Executive.

Last fall MTA presented its analysis of tunnel options to the Planning Board, noting that Route A1's trail-over-transit concept (Alternative A in MTA's report) requires excavating 8-10' beneath the ground level under the Apex Building and Wisconsin Avenue, costing about $50 million more (in 2020 dollars) than if solely Route A2 were built (Alternative B). Furthermore, it would pose serious risks to the structural integrity of the Apex Building. The Planning Board's response was to request more options to be studied, including: relocating the station east of the Air Rights Building entirely, at the foot of Pearl Street and behind homes on Elm Street in the Town of Chevy Chase (Alternative C); and razing and rebuilding the Air Rights Building to create an envelope wide enough for two tracks, a station platform, and the trail (Alternative D).

MTA has evaluated Alternatives C and D and found them wanting. The tear-down option was found to be infeasible from a cost standpoint. It would also delay the entire Purple Line for several years, since the State would have to condemn a major occupied office/retail building. (The State does not have "quick take" authority for buildings.) The east-of-Air Rights option places the station more than a 1000' away from the southern entrance, adding at least 3 off-board minutes of delay for transit

riders (equivalent to 6 minutes in travel forecasting models), which would have a serious deleterious effect on the Purple Line's ridership and effectiveness. MTA has ruled out both options.

The Town of Chevy Chase opposes Alternative C because of the impacts of many of its residences, but also for the reasons cited by MTA. It does not have enough information to comment on Alternative D, but it is concerned about the design's potential impact on Elm Street Park. The Town does support Alternative A, the trail above the tracks in the tunnel (©55-56).

Initially MTA was expected to report back to the T&E Committee with its analysis of the Planning Board's options by late January, but it asked for more time to evaluate other alternatives that would keep the trail in the tunnel by single-tracking the light rail line there until it reached a double-track station. It developed and evaluated three such "gauntlet track" options (Alternatives E, F, and G). Unfortunately it has concluded that all of them would introduce the potential for unacceptable delays that would seriously affect the reliability of service on the entire Purple Line.

Therefore, MTA is left with presenting the County two options: the alternative option in the Locally Preferred Alternative (Alternative A) and solely on the on-street Route A2 (Alternative B). The difference in cost is now characterized as being about $47.2 million, compared to the $50 million noted last fall; the difference is due to MTA's decision to inflate project costs to 2018 dollars rather than 2020 dollars.

MTA addressed three other issues that affect the design and cost of the entire trail. It examined two types of continuous lighting: one that would follow the County's current streetlighting practice, which would place poles 70' apart providing 1.0 foot-candles of horizontal illumination, and another that would follow new standards recommended by the Illuminating Engineering Society of North America (IESNA), setting poles 50' apart. The cost of the two options is $3.8 million and $5.2 million, respectively (2018 dollars).

The Parks Department's practice is to install emergency call boxes along most of its trails; MTA estimates this would add $0.5 million to the trail's cost. MTA also estimates that: the cost of supplementing the landscaping budget to provide 2.5"-caliper shade trees, 8'-high ornamental trees, and 6'-high evergreen trees and shrubs along the length of the trail would be $1.5 million; the cost of enhanced landscaping at 12 significant locations or junctions along the trail would cost another $0.5 million; and the cost of 40 6'-long benches would cost about $0.1 million (all costs in 2018 dollars).

The Planning Board recommends that the Council program the cost of the Capital Crescent Trail in the FY13-18 CIP concurrent with the construction schedule for the Purple Line, including the costs of lighting, call-boxes, and landscaping. MTA estimates that the entire cost of the trail, assuming Alternative A (trail elevated through the tunnel), plus the more expensive lighting option, emergency call-boxes, supplementary landscaping, and benches, and including engineering and contingencies, is $126.5 million (2018 dollars). This cost would be the County's responsibility, and none of it is currently programmed in the Approved FY11-16 CIP nor proposed by the Executive in his Recommended FY13-18 CIP.

Council staff's comments. Alternative A's $47 million added cost to the Council is prohibitive, considering it is already, it may invest $80.5 million for the Bethesda Metro Station's south entrance and at least $48.1 million for the balance of the CCT between Bethesda and Silver Spring (see Council staff's recommendation, below). Constructing it would pose a substantial risk to the structural integrity of the Apex Building; MTA notes that "the costs of the modifications and the risks (structurally and due to the lost productivity/occupancy of the tenants) associated with the construction may exceed the appraisal of the existing building." Council staff concurs with MTA that Alternative A should be dropped from further consideration.

There is not enough information in the report, however, to rule out gauntlet track alternatives yet. The Council should ask MTA to present its detailed analysis of these options, especially Alternative E, which would keep the station beneath the Apex Building and closest to the new south entrance to Metrorail. MTA notes that none of the gauntlet track options allow operation of a 6-minute headway. By how much does it miss this goal? The report also notes that due to the traffic interference at intersections, train operations need to recover their schedules at the terminals. Could a "tripper" train be made available to fill in the schedule, as is done for bus service?

For the purpose of this worksession, however, the only real question is how much funding is needed for the CCT. If MTA were to continue pursuing Alternative E, and if it were ultimately chosen, the added trail cost to the County would only be for extending it at-grade through the tunnel, extending the fencing between tracks and trail, and adequate lighting. This added cost should not be more than several hundred thousand dollars.

Whether or not Alternative E is found to be doable ultimately, more attention should be turned to Route A2—the at-grade trail in the master plan—since it will be built whether or not the tunnel route is. This at-grade route should be made as safe and attractive as it can be. The Planning Board recommends that an agency working group be convened to advise County DOT on the design of this route. The group would include the State Highway Administration, the Town of Chevy Chase, the Parks Department and the Planning Department, and it would be mandated to find means to:

- upgrade its design so that it is comparable to the trail along the Purple Line;
- separate trail users from non-trail users where a number of non-trail users are present (the Bethesda Farm Women's Market is an example);
- minimize the number of driveways crossing the trail; and
- provide a safer and more convenient protected crossing at the intersection of Wisconsin Avenue, Willow Lane, and Bethesda Avenue.

The Bethesda Urban Partnership should be included in this group. So should the Coalition for the Capital Crescent Trail; even though it is not a government agency, for over two decades it has been instrumental in providing critical input to the trail's design, contributing to its maintenance, and funding some low-cost improvements to the trail.

Regarding the Wisconsin Avenue ped/bike crossing at Willow Lane/Bethesda Avenue, Council staff suggests that the working group evaluate at least the following three measures:

1. *Alter the traffic signal phasing to give more "green time" to pedestrians and bikers crossing Wisconsin Avenue during rush hours.* The current and future constraints to traffic flow on Wisconsin are the East-West Highway and Montgomery Avenue (MD 410) intersections to the north, and the Bradley Boulevard/Bradley Lane (MD 191) intersection to the south. Theoretically it should be possible to set the signal phases at the Willow Lane/Bethesda Avenue intersection so that the ped/bike crossing would get a longer phase than it does now.

2. *If the at-grade trail continues to be planned for the north-side of Bethesda Avenue, then create a longer ped/bike crossing phase by prohibiting left turns from eastbound Bethesda Avenue to northbound Wisconsin Avenue and left turns from Willow Lane to southbound Wisconsin Avenue.* Although more circuitous for motor vehicle travel, both of these movements could be accommodated at the Wisconsin Avenue/Leland Street intersection instead.

3. *Provide substantially more "green time" for the ped/bike crossing on weekends and holidays, when the trail use is at its peak and traffic on Wisconsin Avenue is not.*

A convincing case for continuous lighting along the mainline of the trail has not been made. There is no continuous lighting on the CCT west of the Bethesda CBD, and while true that most park trails are closed at night, the CCT west of Bethesda is open for commuters. Bike commuters navigate the current trail quite well at night if their bikes have headlights. The cost to install continuous lighting is expensive, and it carries with it the ongoing operating cost for power and maintenance that the County would have to absorb. Lighting at some spots along the trail would be useful, however, especially at junctions with connecting paths and in the few underpasses. Rather than spending up to $5.2 million for continuous lighting, including $1 million in the project's budget instead for spot lighting is more appropriate.

In this day and age, with the near universality of cellular phones, the need for call-boxes is unclear, especially along the CCT. There are no segments of this trail where cell service would not be available, and the emergency would have to be within a very short distance from a call-box to be used. It is noteworthy that, unlike most park trails, the existing CCT west of Bethesda does *not* have call-boxes.

On the other hand, the additional budget for supplemental enhanced landscaping along the route and at certain landmarks and trail junctions is warranted. The cost is not unreasonable and, once mature, this added landscaping will restore some of lush foliage in the right-of-way that patrons of the interim trail have enjoyed over the past two decades.

Council staff recommendation: Include into the CIP a <u>Capital Crescent Trail</u> project for $48.1 million ($27.6 million in the FY13-18 period) that includes the mainline trail from Elm Street Park in Bethesda to Silver Spring as a largely 12'-wide hard-surface hiker-biker path, connecting paths, a new bridge over Connecticut Avenue, a new underpass beneath Jones Mill Road, supplemental landscaping, and lighting at trail junctions, in underpasses, and at other critical points (©57). If approved, this would be the first time that the permanent trail between Bethesda and Silver Spring will have ever been funded in a Capital Improvements Program. The cost in the PDF includes two other key assumptions:

1. The State's estimate for Alternative B is in the range of $65-70 million in 2018 dollars, not including additional costs for lighting, call-boxes, or enhanced landscaping and amenities. However, this assumes that the so-called "shared" costs between the light rail and trail—retaining walls and other similar elements—will be split between the State and County. However, the State and County have not yet negotiated how such costs will be split. If the Council is going to program funds for the CCT ahead of the State's programming of construction funds for the Purple Line, then the County should program only the amount that would be "floor" of what it might expect would be the ultimate contribution.

   This "floor" figure of $48.1 million is based on the position that, since the Georgetown Branch trail exists, any cost associated with fitting the Purple Line with the CCT in that right-of-way should be a State cost. Costs which enhance the existing trail, however, should be County costs: extending the trail along the Metropolitan Branch to Silver Spring, paving the existing Georgetown Branch trail, building the CCT bridge over Connecticut Avenue, improving its connecting paths, lighting in spots, and enhanced landscaping along the CCT. MTA has reviewed Council staff's calculations to reach the $48.1 million figure, and it concurs with the math. However, MTA wishes to ensure that the Council understands that this cost estimate differs from MTA's position regarding the light rail/trail cost allocation, and that it does not concur with Council staff's characterization of the trail's costs.

2. Councilmember Floreen's point at the February 13 worksession was that if the Bethesda Metro Station Southern Entrance needs to be funded concurrent with the construction of the Purple Line, the same is true for the CCT. Council staff agrees with her logic, *but only where the trail is cheek-by-jowl with the Purple Line—along the Georgetown Branch, that is.* Along the Georgetown Branch all the construction in the right-of-way will be built at the same time: in FYs16-17 and the first half of FY18, according to MTA's production schedule.

   However, this schedule is not necessary for the 1.1-mile-long segment along the Metropolitan Branch, where the CCT will be on the northeast side of the CSX tracks and the Purple Line will be on the southwest side. In this segment, Council staff's assumption is that the trail would be built in FYs 19-20, so that the entire trail between Silver Spring and Bethesda would open when the Purple Line opens in 2020. With this construction schedule, only $27.6 million of the $48.1 million cost would be in the FY13-18 period.

Council staff also recommends that the Council ask MTA to pursue Alternative E further. Should it be found that there is a way this option—or a variation of it—is workable in providing frequent and reliable service for the Purple Line, then the Council should program the additional funds needed to extend an at-grade trail through the tunnel, with appropriate fencing and lighting.

f:\orlin\fy12\fy12t&e\fy13-18cip\120301te.doc

Purple Line

CAPITAL CRESCENT TRAIL CONSIDERATIONS FOR MONTGOMERY COUNTY

FEBRUARY 24, 2012

VERSION 02

MTA Maryland

DCN: 2012.02.20.PO.PE.12.CCT Considerations for MoCo-02

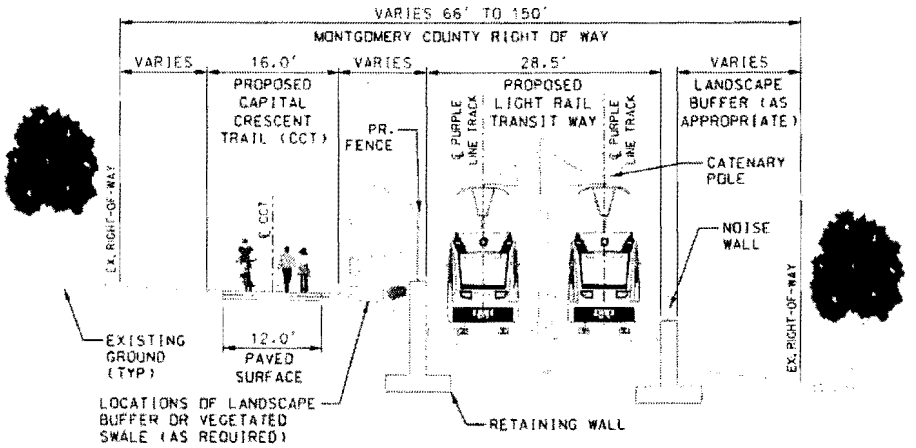
Table of Contents

B

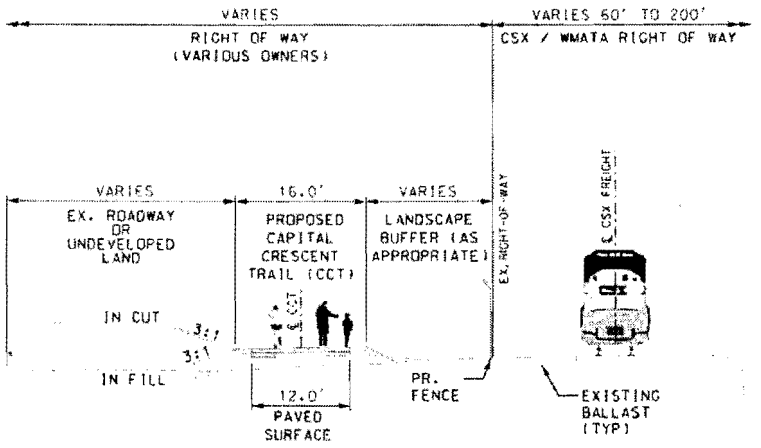
1 Introduction

The Maryland Transit Administration (MTA) has proposed the Purple Line, an east-west Light Rail Transit (LRT) line through Montgomery and Prince George's Counties in Maryland. At the west end of the Purple Line, the terminal station is in Bethesda, Montgomery County, Maryland. The main purpose of this station is to provide connectivity between the Purple Line and Washington Metropolitan Area Transit Administration's (WMATA) Red Line and downtown Bethesda. To meet these goals, this station is proposed be constructed in the vicinity of Woodmont Avenue, Wisconsin Avenue and Elm Street. Therefore, the Purple Line will travel through an underground tunnel along an alignment previously used by the Baltimore and Ohio (B&O) Railroad's Georgetown Branch, which is beneath two existing buildings (the Apex Building and the Air Rights Building) and beneath Wisconsin Avenue, which is carried across the easement by a single span multi-girder bridge.

The Capital Crescent Trail (CCT) is a mixed-use trail that will be constructed from the Bethesda Station to the Silver Spring Transit Center where it will connect to the Metropolitan Branch Trail and the Silver Spring Green Trail (a Montgomery County Project that will likely be constructed at the same time as the CCT, which is not part of the project). The CCT is envisioned to be both a recreational trail and a commuter trail. As a commuter trail it will connect residential communities to proposed Purple Line stations at Bethesda, Connecticut Avenue/Chevy Chase Lakes, Lyttonsville, Woodside and Silver Spring Transit Center. The CCT is proposed to be adjacent to the Purple Line transitway along the north side from Bethesda to Lyttonsville. East of Lyttonsville the CCT and the Purple Line split and run on opposite sides of the CSX/WMATA corridor until they reach the Silver Spring Transit Center. The trail will run along the north side of this corridor with the Purple Line running on the south side of the corridor. The trail will be paved, and will typically be 12' wide with 2-foot unpaved shoulders on each side. Refer to the proposed typical sections below.



Typical Section Bethesda to Lyttonsville



Typical Section Lyttonsville to Silver Spring Transit Center

The goals of the Bethesda Station are to present a welcoming station experience; to provide platforms of sufficient width for the expected ridership of 11,500 weekday boardings; to connect with the proposed Bethesda South access for the Washington Metro Area Transit Authority's (WMATA) Red Line; to maximize the available open space for the station; to minimize the impacts to the existing structures, the risks associated with construction and re-development of properties surrounding the station/alignment, and the cost of the project; to include tail tracks or over run tracks beyond the platform; and to accommodate the CCT. The five station platform alternatives are evaluated in this report are:

1. Alternative A - The Locally Preferred Alternative with a platform under the Apex Building with the CCT elevated above the Purple Line through the tunnel
2. Alternative B - A platform under the Apex Building with the CCT connecting to a surface alignment through Elm Street Park
3. Alternative C - A platform east of the Air Rights Building with the CCT on the surface through the tunnel
4. Alternative D - A platform under the Air Rights Building following the redevelopment of the Air Rights Building with the CCT through the tunnel
5. A family of "reduced transitway width" like options:
    a. Alternative E - A platform under the Apex Building with gauntlet tracks through the Air Rights Building with an adjacent CCT
    b. Alternative F - A platform in the Woodmont Plaza with reduced track centers through the Apex and Air Rights Building with an adjacent CCT
    c. Alternative G - A platform in the Woodmont Plaza with a single track through the Apex and Air Rights Building with an adjacent CCT

The current estimated total construction cost of the CCT is $68.25 M (2011 dollars). The total trail cost of $93.94 M (2011 dollars) includes engineering services (engineering through construction) and unallocated contingencies. Refer to Appendix 1 for the May 2011 trail cost breakdown that was

presented in 2010 dollars and does not include updated costs covered in this paper. Appendix 1 also includes mapping that defines the components of the trail cost that are either costs assigned to the trail, costs shared between the trail and the Purple Line Transitway, or costs that are assigned fully to the Purple Line Transitway. This cost does not include provisions for trail lighting, emergency communications, and supplemental landscape and hardscape features. County decisions required on these topics are covered later in this white paper.

A significant component of the trail cost is related to both the CCT and the Purple Line occupying the space beneath the existing Apex Building, Wisconsin Avenue and the Air Rights Building. Refer to the table below that summarizes the costs related to the various components of the trail. This white paper outlines updated costs, some of the risks associated with constructing both the CCT and the Purple Line in this space and new issues that have come to light upon further more detailed investigation and design of the Bethesda Station.

Location	Neat Construction (Millions)	Engineering Services (Millions)	Unallocated Contingency (Millions)	Total (Millions)	% Total
Apex Building	$19.60	$6.27	$1.11	$26.98	28.7%
Wisconsin and Air Rights Building	$9.80	$3.14	$0.55	$13.49	14.4%
Other Segments of Trail	$38.85	$12.43	$2.19	$53.47	56.9%
Total	$68.25	$21.84	$3.85	$93.94	100.0%

Trail Costs Associated with the Locally Preferred Alternative

The Capital Crescent Trail will be planned and built as part of the Purple Line, but construction will be funded by sources to be identified by Montgomery County and MTA. This white paper is being prepared to assist Montgomery County in defining their ultimate vision for the permanent Capital Crescent Trail. The decisions made by the County will be coordinated with the Maryland Transit Administration (MTA) to ensure that the Purple Line is designed to accommodate this ultimate vision with MTA's feasible station platform alternatives. They are meant to help define a long-term vision for the trail, and therefore some elements could be implemented in the future.

2 Bethesda Station and Capital Crescent Trail Alternatives Considered

Five alternatives have been evaluated for the Bethesda Station and CCT. As described above, these alternatives were developed in order to better meet the goals of the MTA, the Purple Line, the CCT, and the community.

2.1 Alternative A - Locally Preferred Alternative

Plan and Profile: See Drawings 1 and 2

Station: 200' side platforms would be provided under the Apex Building, with access from Woodmont Plaza and the street level via elevators and stairs at the corner of Elm Street and Wisconsin Avenue. The platforms are 12' and 15' wide. The station will be constructed around the existing columns and caisson foundations which will come through the platform. In order to provide adequate platform length and to meet the required running clearances, the platform requires a slight horizontal curve. This is undesirable from an operational point of view due to the gap created between the platform and the train. In order for patrons to reach the south track from the Bethesda South Access, an at-grade crossing is required at the station.

Tail Track: Each track will be extended 130' from the end of the station platform to provide room for overrun and an energy absorbing bumping post. This overrun track will extend approximately 80' past the end of the Apex building.

Catenary: A termination pole and tie down for the catenary will be provided beyond the limits of the Apex Building.

Trail: The CCT begins west of the Apex Building along the existing CCT alignment. The CCT then climbs to an aerial structure above the south track adjacent to the south wall of the building. The aerial structure ties into a mezzanine that connects the CCT to the MTA Purple Line/WMATA Red Line elevator lobby. The mezzanine ties into a concrete box structure under the Wisconsin Avenue Bridge to support the trail over the LRT tracks. Coming off of the box structure at the transition to the Air Rights Building, a truss structure, with single-column integral piers centered between the tracks, carries the trail eastward out of the Air Rights Building where it comes back down to grade north of the LRT tracks. No columns for the structure will be located on the station platforms. A connection between the CCT and Elm Street Park will be provided.

Structural Considerations: At least 35 of the existing columns of the Apex Building, founded on unreinforced caissons, will require strengthening due to lowering the grade by up to 8' from the existing ground in order to accommodate the necessary clearances for the LRT and the CCT. Because the caissons are unreinforced, removing any ground material from around them reduces their capacity, which is nearly reached under the present loading conditions of the building. If the existing caissons were to be strengthened by wrapping them and the uncertainties of the caisson size may result in significant structures in the middle of the station platform. The existing building requires temporary support at each caisson location during the excavation and strengthening. Significant structural monitoring will be required. The columns

cannot be relocated due to the use of the first floor of the building as a transfer slab. Due to the need for a crash wall adjacent to the LRT tracks, the south wall of the Apex Building will require strengthening in order to meet the requirements of a crash wall.

The exterior wall of the Apex Building along Elm Street needs to be underpinned for up to 20'+ vertically due to the bottom of wall elevation as high as 339.25 at some locations at the east end. This elevation is significantly higher than the proposed platform elevation. There are existing grade beams that are above the proposed platform location that may require strengthening.

Due to continued occupancy, the age of the existing structure, and uncertainties of the structures' design, the risks and costs associated with modifying the existing Apex Building are extremely high.

The tracks would be inside of a concrete box structure that would carry the trail above the tracks under the Wisconsin Avenue Bridge. The box structure will be supported on micropiles and will not impact the structural integrity of the existing bridge.

The existing Wisconsin Avenue Bridge was constructed around an older structure. The piers of the original bridge structure were to be cut off below grade during the construction of the existing structure, and they are likely in the vicinity of the proposed concrete box structure and its pile foundation. The presence of the previous foundation needs to be considered during design and construction. Removal of these structures could result in an increased cost which is not currently included in the cost estimate.

The clearances for the LRT are very tight to avoid impacting the walls at the Air Rights Building. The impact is expected to be minimal.

Geotechnical Considerations: The Designers cannot be certain of the caisson diameters and quality; field conditions likely do not match the plans. If they are to be exposed, particularly in the Apex Building, the existing elements could be very unsightly and require significant facings in order to make the caissons look presentable.

The original piers of the old Wisconsin Avenue Bridge may need to be removed.

Architectural Considerations: There will be potentially large "columns" in the middle of the platform due to the need to strengthen and or retrofit the existing building's columns and caissons. Existing beams which are currently buried will be exposed and possibly will require strengthening.

Operational Considerations: None expected.

2.2 Alternative B - Platform Under the Apex Building with the Capital Crescent Trail Connecting To A Surface Alignment Through Elm Street Park

Plan and Profile: See Drawings 3 and 4

Station: 200' center platform will be provided under the Apex Building, with access from the street level via elevators, stairs and a ramp at the corner of Elm Street and Wisconsin Avenue.

The platform is 15' wide. The station will be constructed around the existing columns which will come through the platform. In order to provide adequate platform length and to meet the required running clearances, the platform requires a slight horizontal curve. This is undesirable from an operational point of view due to the gap created between the platform and the train. In order for patrons to reach the platform from the Bethesda South Access, an at-grade crossing is required at the station.

Tail Track: Each track will be extended an extra 130' to provide room for overrun and an energy absorbing bumping post. This overrun track will extend 75' past the end of the Apex building.

Catenary: A termination pole and tie down for the catenary will be provided beyond the limits of the Apex Building.

Trail: The CCT follows the "surface alignment" currently under development by the County that starts at Woodmont Plaza, travels east on the north side of Bethesda Avenue, crosses Wisconsin Avenue at a signalized intersection, continues onto Willow Lane, and then heads north through Elm Street Park. At Elm Street Park the CCT connects to a truss structure. The structure carries the trail eastward out of the Air Rights Building where it comes back down to grade north of the LRT tracks.

Structural Considerations: There are no expected impacts at the existing Apex Building, Wisconsin Avenue Bridge and the Air Rights Building.

Geotechnical Considerations: None expected.

Architectural Considerations: There will be six 20" x 14" existing columns for the Apex Building in the middle of the center platform. There will be columns in the middle of the path from the east end of the center platform to the WMATA Red Line Access point.

Operational Considerations: None expected.

2.3 Alternative C - Platform East of Air Rights Building With Trail to Woodmont Plaza

Plan and Profile: See Drawings 5 and 6

Station: 200' side platforms will be provided just to the east of Pearl Street. The platforms are each 12' wide. Connections to the platforms will be from the west end of the platforms via the CCT or from Elm Street Park. The CCT will be able to be accessed from the street level at Elm Street and Wisconsin Avenue and Pearl St. Patrons can also access the CCT from Woodmont Plaza west of the Apex Building and at the Elm Street Park. An at-grade crossing is required at the west end of the platforms in order for patrons to access the south platform.

A station east of Pearl Street would be approximately ¼ mile from the planned south entrance to the Bethesda Metro station, Woodmont Plaza and downtown Bethesda. This location would add three more minutes on the walk time to reach the Metro connection, Woodmont Avenue and Wisconsin Avenue. In choosing to use transit, walk time as part of a transfer or as part of the trip getting to and from a station is perceived by passengers as more onerous than time spend riding

on a train by a factor of two. The additional three minute walk time will have an adverse effect not only on the level of ridership attracted to the Purple Line but reduced the travel time saving (user benefits) to those who would use the system. While this not only reduces the benefits gain from the investment in the Purple Line, it will also have an adverse effect on the FTA cost-effectiveness index that is critical to obtaining federal funding for the project. In addition, the station would be located on the edge of the development area adjacent to residential properties in the Town of Chevy Chase.

For these reasons this alternative is not viable from a transit service standpoint and was dropped from further consideration.

Tail Track: One (1) tail track, 250' long, will be provided under the Air Rights Building with a turn out.

Catenary: A termination pole and tie down for the catenary will be provided under the Air Rights Building.

Trail: The CCT will run along its existing alignment under the Apex Building and Wisconsin Avenue Bridge. Under the Air Rights Building, the trail will run at existing elevation, but will shift from the existing horizontal alignment to run adjacent to the existing north crash wall. An at-grade connection between the CCT and Elm Street Park will be provided, east of the Air Rights Building.

Structural Considerations: A retaining wall will be required on the north side of the Trail east of the Air Rights Building. Structural impacts to the Air Rights Building are expected to be minimal. There are no expected impacts at the existing Wisconsin Avenue Bridge or the Apex Building.

Geotechnical Considerations: None expected.

Architectural Considerations: None expected.

Operational Considerations: None expected.

2.4 Alternative D - Platform Under A New Air Rights Building With Trail to Woodmont Plaza

Plan and Profile: See Drawings 7 and 8

Station: 200' long side platforms will be provided under a redeveloped Air Rights Building. The platforms are each 15' wide. Connections to the platforms from the street level will be provided at Elm Street and Wisconsin Avenue, Waverly Street and Wisconsin Avenue, Elm Street Park, and, via the CCT, at the Woodmont Plaza west of the Apex Building.

A station under the Air Rights building would require the redevelopment of at least a portion of the Air Rights complex. A high level review was conducted to determine the economic feasibility of this redevelopment concept under the existing development density limits. Factors considered include the allowable density, value of the towers, cost of new construction, potential increase in value (higher rents, more efficient buildings, etc.), loss of revenue during

construction, and the risk associated with finding new tenants. It was determined that purchasing the buildings was not economically feasible since the public investment would likely not be recouped by redevelopment on-site. Joint development with the property owner was also considered. This could reduce some of the financial burden as there would be no purchase of the buildings, however, the increase in value would have to be great enough to warrant the owner to take on the additional risk and cost of redevelopment and finding new tenants. It was determined that this would still require significant public subsidies, possibly including compensating the owner for the loss of income during the years of construction, and was also not economically feasible. Based on this analysis it was determined that this alternative is not economically viable and was dropped from further consideration.

Tail Track: Each track will be extended 130' from the end of the station platform to provide room for overrun and an energy absorbing bumping post.

Catenary: The catenary for both tracks will be tied down to the underside of the box structure under Wisconsin Avenue.

Trail: The CCT will enter the Apex building at existing ground level and will then begin to climb, supported by two MSE walls, within its existing easement. It will rise up to an aerial structure at a mezzanine level where it connects with the MTA Purple Line/WMATA Red Line elevator lobby. This mezzanine ties into a concrete box structure that supports the CCT under the Wisconsin Avenue Bridge. Coming off of the box structure at the transition to the Air Rights Building, a truss structure, with single-column integral piers, carries the trail eastward out of the Air Rights Building, where it comes back down to grade north of the LRT tracks. No columns will be placed on the platforms. A connection between the CCT and Elm Street Park will be provided.

Structural Considerations: This option results in no impact to the Apex Building. This option assumes complete reconstruction of the Air Rights property, with an easement provided for the tracks, the station, and the CCT.

Inside of the concrete box under Wisconsin will be the walkway to connect the Elm Street and Wisconsin Avenue access point to the station under the Air Rights Building. The box structure will be supported on micropiles and will not impact the structural integrity of the existing bridge.

The existing Wisconsin Avenue Bridge was constructed around an older structure. The piers of the original bridge structure were to be cut off below grade during the construction of the existing structure, and they are likely in the vicinity of the proposed concrete box structure and its pile foundation. The presence of the previous foundation needs to be considered during design and construction.

Geotechnical Considerations: None expected.

Architectural Considerations: The redevelopment of the Air Rights property allows for open space, both horizontally and vertically, for the concourse area. A walkway will be provided through the box structure at Wisconsin Avenue in order to tie the access point at the corner of Elm Street and Wisconsin Avenue into the MTA Purple Line Station.

This option also allows for additional access points through the Air Rights property and the Elm Street Park to both the Purple Line and the CCT. The potential to bring natural light into the station exists in this option as well.

Operational Considerations: None expected.

2.5 Reduced Transitway Width Family of Alternatives

This family of alternatives utilizes three different track scenarios to minimize the footprint of the transitway to allow for the CCT to run adjacent to the transitway under various portions of the Apex Building, Wisconsin Avenue and the Air Rights Building.

2.5.1 Alternative E - Platform Under Apex Building with Gauntlet Track Under Air Rights Building

Plan and Profile: See Drawings 9 and 10

Station: A 200' long center platform will be provided under the Apex Building, with access from the street level via elevators and stairs at the corner of Elm Street and Wisconsin Avenue, and via sidewalk from the corner of Woodmont Avenue and Bethesda Avenue. The platform will be 16' wide. The station will be constructed around the existing columns which will come through the platform. In order to provide adequate platform length and to meet the required running clearances, the platform requires a slight horizontal curve. This is undesirable from an operational point of view. In order for patrons to reach the platform from the Bethesda South Access, an at-grade crossing is required at the station.

Tail Track: Each track will be extended 130' from the end of the station platform to provide room for overrun and an energy absorbing bumping post. This overrun track will extend into the Woodmont Plaza.

Catenary: A termination pole and tie down for the catenary will be provided in the Woodmont Plaza.

Trail: The CCT begins as a 5' wide sidewalk to the north of the Purple Line tracks in the Woodmont Plaza. The sidewalk continues into the Apex Building and begins to climb to an aerial structure to go over the crossing from the platform to the proposed Bethesda South access. The sidewalk then widens out to 10' as it descends down to grade under the Wisconsin Avenue Bridge, eventually widening out to 11' and then 12' as space permits under the Air Rights Building. An at-grade connection between the CCT and Elm Street Park will be provided, east of the Air Rights Building.

Structural Considerations: To grade-separate the trail from the access path from the platform to the WMATA Red Line, a retaining wall is required along the north column line of the Apex Building. The trail will cross the access path with an approximately 30' long bridge. The north wall of the Apex Building along Elm Street needs to be

underpinned up to 8'+ vertically due to the Building bottom of wall elevation being as high as 340.5' at the east end. This elevation is slightly higher than the trail.

The trail and LRT will be aligned parallel to each other below the existing Wisconsin Avenue Bridge. This will require retaining walls on the north side of the trail and south side of the LRT guideway to remove a portion of the bridge slope protection. In addition, the trail is elevated as compared to the LRT so an additional retaining wall will be required between the trail and the LRT.

The existing Wisconsin Avenue Bridge was constructed around an older structure. The piers of the original bridge structure were to be cut off below grade during the construction of the existing structure, and they may be in the vicinity of the proposed retaining walls. The presence of the previous foundation needs to be considered during design and construction.

Structural impacts to the Air Rights Building are expected to be minimal.

Geotechnical Considerations: The original piers of the old Wisconsin Avenue Bridge may need to be removed.

Architectural Considerations: There will be six 20" x 14" existing columns for the Apex Building in the middle of the platform. There will be approximately five additional columns in the middle and south side of the WMATA access path.

2.5.2 Alternative F - Platform In Woodmont Plaza with Reduced Track Centers Through the Apex and Air Rights Building

Plan and Profile: See Drawings 11 and 12

Station: 180' side platforms will be provided in the Woodmont Plaza, with access from the street level via elevators and stairs at the corner of Elm Street and Wisconsin Avenue, via stairs and a ramp from Elm Street, via sidewalk from the corner of Woodmont Avenue and Bethesda Avenue, and the CCT. The platforms are each 10' wide. The desirable 200' platform length cannot be provided due to Woodmont Avenue and the columns under the Apex building. In order to provide adequate platform length and to meet the required running clearances, the platform requires a slight horizontal curve. This is undesirable from an operational point of view. In order for patrons to reach the south platform from the Bethesda South Access, an at-grade crossing is required at the station.

Tail Track: Each track will be extended approximately 60' from the end of the station platform to provide room for overrun and an energy absorbing bumping post. The desirable 130' length cannot be provided due to Woodmont Avenue and the associated sidewalk.

Catenary: A termination pole and tie down for the catenary will be provided in the Woodmont Plaza.

Trail: The CCT begins west of the Apex Building along the existing CCT alignment. The trail continues near existing ground elevation adjacent the south wall of the Apex Building at a width of 18'. The trail begins to narrow as it passes under the Wisconsin Avenue Bridge, and settles in at a width of 10' as it continues under the Air Rights Building, still continuing along the south wall. The trail then narrows to 9' wide and begins to rise above the elevation of the Purple Line tracks, supported by structure, to provide a connection between the CCT and Elm Street Park. The structure carries the trail eastward out of the Air Rights Building where it comes back down to grade north of the LRT tracks.

Structural Considerations: The sidewalk from the north platform to the WMATA access will be supported on a retaining wall along the north column line of the Apex Building. The sidewalk will have a connection to Elm Street by removing a portion of the Apex Building north wall. This wall also needs to be underpinned for up to 15'+ vertically due to the Building bottom of wall elevation being as high as 340.5' at the east end. This elevation is significantly higher than the sidewalk.

The trail and LRT will run parallel to each other below the existing Wisconsin Avenue Bridge. This will require retaining walls built on the south side of the trail and north side of the LRT guideway to remove a portion of the bridge slope protection.

The existing Wisconsin Avenue Bridge was constructed around an older structure. The piers of the original bridge structure were to be cut off below grade during the construction of the existing structure, and they may be in the vicinity of the proposed retaining walls. The presence of the previous foundation needs to be considered during design and construction.

Under the Air Rights Building, a retaining wall is required between the LRT and the trail and on top of the Air Rights crashwall to support the trail. To the east of the Air Rights Building, an approximately 100' long pedestrian bridge will carry the trail over the LRT.

Geotechnical Considerations: The original piers of the old Wisconsin Avenue Bridge may need to be removed.

Architectural Considerations: No impacts expected.

2.5.3 Alternative G - Platform In Woodmont Plaza with Single Track Through the Apex and Air Rights Building

Plan and Profile: See Drawings 13 and 14

Station: 180' side platforms will be provided in the Woodmont Plaza, with access from the street level via elevators and stairs at the corner of Elm Street and Wisconsin Avenue, via stairs and a ramp from Elm Street, via sidewalk from the corner of Woodmont Avenue and Bethesda Avenue, and from Elm Street Park via the CCT. The platforms are each 10' wide. The desirable 200' platform length cannot be provided due to Woodmont Avenue and the columns under the Apex building. In order to provide

adequate platform length and to meet the required running clearances, the platform requires a slight horizontal curve. This is undesirable from an operational point of view. In order for patrons to reach the south platform from the Bethesda South Access, an at-grade crossing is required at the station.

Tail Track: Each track will be extended approximately 60' from the end of the station platform to provide room for overrun and an energy absorbing bumping post. The desirable 130' length cannot be provided due to Woodmont Avenue and the associated sidewalk.

Catenary: A termination pole and tie down for the catenary will be provided in the Woodmont Plaza.

Trail: The CCT begins west of the Apex Building along the existing CCT alignment. The trail continues near existing ground elevation adjacent the south wall of the Apex Building at a width of 18'. The trail begins to narrow as it passes under the Wisconsin Avenue Bridge, and settles in at a width of 14' as it continues under the Air Rights Building, still continuing along the south wall. The trail then begins to rise above the elevation of the Purple Line tracks, supported by structure, to provide a connection between the CCT and Elm Street Park. The structure carries the trail eastward out of the Air Rights Building and over the LRT tracks, where it comes back down to grade north of the LRT tracks.

Structural Considerations: The sidewalk from the north platform to the WMATA access will be supported on a retaining wall along the north column line of the Apex Building. The sidewalk will have a connection to Elm Street by removing a portion of the Apex Building north wall. This wall also needs to be underpinned for up to 15'+ vertically due to the Building bottom of wall elevation being as high as 340.5' at the east end. This elevation is significantly higher than the sidewalk.

The trail and LRT will run parallel to each other below the existing Wisconsin Avenue Bridge. This will require retaining walls built on the south side of the trail and north side of the LRT guideway to remove a portion of the bridge slope protection.

The existing Wisconsin Avenue Bridge was constructed around an older structure. The piers of the original bridge structure were to be cut off below grade during the construction of the existing structure, and they may be in the vicinity of the proposed retaining walls. The presence of the previous foundation needs to be considered during design and construction.

Under the Air Rights Building, a retaining wall is required between the LRT and the trail and on top of the Air Rights crashwall to support the trail. To the east of the Air Rights Building, an approximately 100' long pedestrian bridge will carry the trail over the LRT.

Geotechnical Considerations: The original piers of the old Wisconsin Avenue Bridge may need to be removed.

Architectural Considerations: No impacts expected.

2.5.4 Operational Considerations:

All three alternatives were developed to physically enable some version of a limited width trail to share the space under the Air Rights Building, Wisconsin Avenue Bridge, and the Apex Building with the Purple Line by reducing the width of the space needed for the Purple Line transitway. The reduced transitway width has the effect of restricting train operations to one direction at a time through this area as well as increasing operating time requirements for the associated signal and safety features required. This additional operating time would reduce the number of trains that could operate in and out of the Bethesda terminal station and along the entire Purple Line. All three of the reduced transitway width alternatives yielded very similar performance results in operational simulations. None of the three will enable the Purple Line to operate at the six-minute headway required to carry the peak period passenger demand. With substantial portions of the Purple Line operating in street-running conditions subject to traffic interference especially at intersections, the train operations need to be able to have a schedule recovery time at terminal stations, including the Bethesda Station. The operational limitations imposed by these reduced transitway width concepts at the Bethesda Station would not allow for this recovery time, which would severely reduce the reliability of the service for the entire Purple Line. Therefore, due to these fatal operational deficiencies, this family of alternatives was eliminated from further study.

2.6 Comparison of Station Alignment Alternatives

The table below presents a comparison between the alignment alternatives for the proposed Purple Line through the terminal station at the west end of the line in Bethesda, Montgomery County, Maryland. The table reviews the five (5) alternatives with respect to the Capital Crescent Trail (CCT), the Purple Line tracks, access from various points in the vicinity of the station, the structural requirements and impacts, the property and right-of-way impacts, and the risks of each alternative. There are undesirable impacts to varying degrees stemming from each of the items reviewed. For each alternative, the undesirable impacts are highlighted in yellow to help to identify the disadvantages.

	Factor	Alternative A: Apex Platform with Trail in Tunnel	Alternative B: Apex Platform with Surface Trail	Alternative C: Platfrom East of Air Rights Building	Alternative D: Platform Under New Air Rights Building	Alternative E: Apex Platform with Gauntlet Track	Alternative F: Woodmont Plaza Platform with Reduce Track Centers	Alternative G: Woodmont Plaza Platform Single Track
	TRAIL							
1	The trail will be completely within the easement	No	No	Yes	Yes	No	No	No
2	Access to the trail is provided from Elm Street Park	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	RAIL							
1	Two (2) tracks allow for maintenance of operating headways	Yes	Yes	Yes	Yes	No	No	No
2	Each track would have a 100' tail track for overrun	Yes	Yes	No	Yes	Yes	No	No
3	Platform(s) are located in a horizontal curve	Yes	Yes	No	No	Yes	Yes	Yes
4	The termination poles and trolley wires will be within the limits of the buildings	No	No	Yes	Yes	No	No	No
5	Purple Line service could be interupted if buildings were to redevelop following Purple Line construction	Yes	Yes	No	No	Yes	Yes	Yes
	ACCESS							
1	Station Access is from only 2 locations	No	Yes	No	No	Yes	No	No
2	Station Access is from more than 2 locations	Yes	No	Yes	Yes	No	Yes	Yes
3	Elevators to Red Line tie into CCT and Purple Line Platform	Yes	N/A	Yes	Yes	No	Yes	Yes
4	There is sufficient space to house ticketing machines and passenger information.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	Walking distance (from access point to red line at elevators) to edge of platform(s)	75' & 100'	100'	1000' & 1050'	350' & 350'	175'	475' & 400'	475' & 400'
6	Columns for the trail structure will obstruct the platform(s)	Yes	No	No	No	No	No	No
7	Requires an at grade pedestrian crossing to access both platforms from elevators at Bethesda South	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8	Direct access from Elm Street Park to the Purple Line Station will be provided	Yes	No	Yes	Yes	No	Yes	Yes
9	Potential for natural light to be provided to station	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10	An open concourse area adjacent to the platforms will be provided	No	No	No	Yes	No	Yes	Yes
	STRUCTURAL							
1	Structural integrity of Wisconsin Avenue Bridge will be impacted	No	No	No	No	No	No	No
2	The impact to the Air Rights Building will be minimal	Yes	Yes	Yes	No	Yes	Yes	Yes
3	The impact to the Apex Building will be minimal	No	Yes	Yes	Yes	Yes	Yes	Yes
4	Wall & caisson retrofitting required within the Apex Building	Yes	No	No	No	Yes	No	No
5	The north wall of the Apex building requires underpinning	Yes	Yes	No	No	Yes	Yes	Yes
6	Grade beams will be exposed and will likely need strengthening retrofits	Yes	No	No	No	No	No	No
7	The caissons at the east end of the APEX Building will be exposed	Yes	No	No	No	No	No	No
	Property/ROW Impacts							
1	The CCT west of the APEX Building will remain in its current location	No	No	Yes	Yes	No	No	No
2	The station platforms are within the Apex building	Yes	Yes	No	No	Yes	No	No
3	The station platforms are within the Air Rights building	No	No	No	Yes	No	No	No
4	The Apex Building property will be completely redeveloped	No	No	No	No	No	No	No
5	The Air Rights Building property will be completely redeveloped	No	No	No	Yes	No	No	No
	Risks and Costs							
1	The modifications to the existing structures are extremely risky.	Yes	No	No	N/A	No	No	No
2	Level of structural monitoring required.	High	Low	None	N/A	Low	Low	Low

KEY: Unfavorable Difference

2.7 Future Redevelopment Considerations

Should a surface alternative for the CCT be chosen rather than stacking the CCT over the Purple Line, it would be costly and disruptive to stack them in the future with Apex and Air Rights redevelopments. As noted above, the advantage of selecting a surface alignment for the CCT is that the elevation of the tracks can be set high enough such that the existing foundations will not be impacted by the Purple Line/CCT. In doing so, regardless of the future development initiatives, the Wisconsin Avenue Bridge becomes the controlling point for the vertical clearance over the Purple Line. Even if the developers of the future buildings provide enough clearance to include a trail over the tracks, the Wisconsin Avenue Bridge cannot be raised high enough to provide a stacked track and trail beneath the roadway above.

This does not mean that the CCT would always have to cross Wisconsin Avenue at-grade. If a surface CCT alternative was selected, the CCT could remain in the Master Plan under the Apex Building, Wisconsin Avenue and the Air Rights Building. Upon redevelopment, additional width can be reserved adjacent to the Purple Line and a tunnel could be created beneath Wisconsin Avenue, adjacent to the existing bridge, to connect the trail between the future Apex Building and the future Air Rights Building.

3 Bethesda Station and Capital Crescent Trail Alternatives Retained for Consideration

3.1 Alternative A - The Locally Preferred Alternative

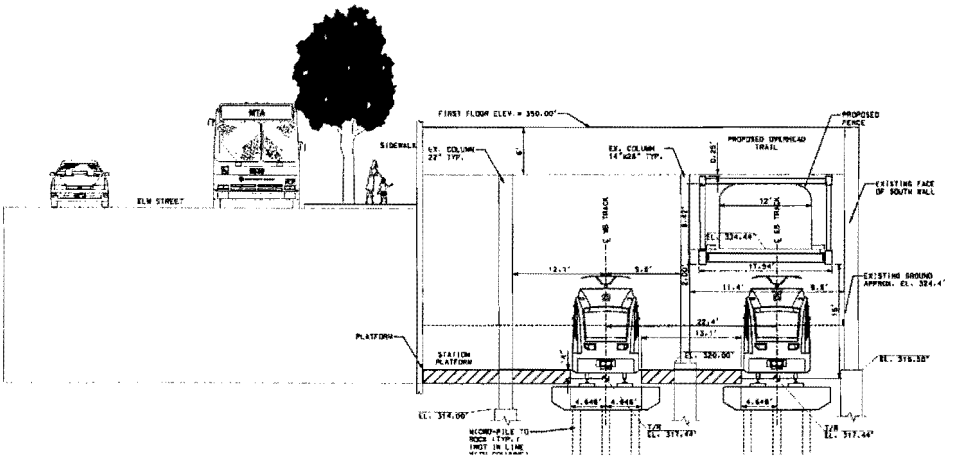
The Locally Preferred Alternative (LPA) layout includes a station with two curved platforms beneath the Apex Building with tail or run out tracks and bumping posts extending into the Woodmont East development parcel, located to the west of the Apex Building. Side platforms would be provided under the Apex Building, with access from the street level via elevators and stairs at the corner of Elm Street and Wisconsin Avenue, as well as pedestrian access from Woodmont East. The station will be constructed around the existing columns and caisson foundations, which would protrude through the platforms. These columns will impede pedestrian flow and boardings and alightings. In order to provide adequate platform length and to meet the required vehicle clearances, the platform requires a slight horizontal curve. Patrons would have access to the proposed WMATA Red Line Bethesda South Entrance at the corner of Elm Street and Wisconsin Avenue from the station.

As part of the LPA layout, the CCT would be on an aerial structure above the tracks that gained elevation through a switchback ramp in the Woodmont East plaza. The alignments then continue east, beneath the Maryland State Highway Administration bridge that carries MD 355 (Wisconsin Avenue) over the former Georgetown Branch right-way, on a proposed rigid box structure. Beneath the Air Rights Building, a bridge structure is included to carry the CCT out of the buildings and back down to grade. A connection between the CCT and Elm Street Park will be provided. Refer to Sheet 1 for plan and typical sections that show the arrangement of the Purple Line at several key points of interest along the alignment.

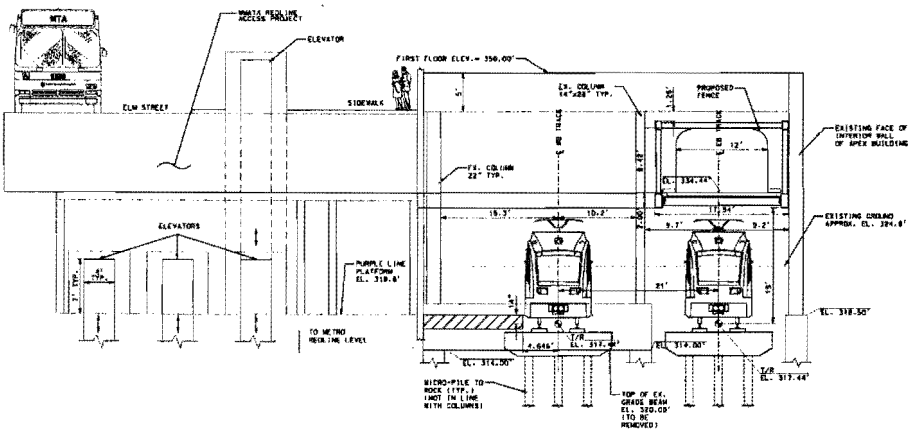
3.1.1 Investigation

3.1.1.1 Apex Building

In order to accommodate the construction of the trail above the Purple Line, but beneath the existing Apex Building, the reconstruction or strengthening of at least 35 existing columns would be required, as well as the relocation/reconfiguration of the 3 bracing grade beams along Elm Street to provide enough room for station platforms. The column foundations for the existing building are made up of unreinforced caissons that are founded on bedrock. The first floor of the Apex Building is a transfer slab to these columns, which means that the columns cannot be relocated in order to minimize impacts to the foundations/columns.



Typical Section through Apex Building and Station Platforms



Typical Section through Apex Building at WMATA Access Point

In order to accommodate the CCT and the Purple Line, the ground surrounding the unreinforced caissons would need to be lowered by approximately 8 to 10 feet, resulting in the need to modify and strengthen or replace the columns/caissons. The elevations of the tops of these caissons in the Apex Building are high enough such that the trail and the tracks cannot both be constructed without exposing the unreinforced caissons. These columns and caissons are near their intended structural capacities, which further complicates the process of lowering the grade while safely and effectively supporting the structure above it. Because the caissons are unreinforced, the surrounding ground is acting as the confining element that interacts with the structural element to provide the capacity. Removing this surrounding soil would compromise the caisson's structural integrity and require the construction of temporary

foundations and support frames to transfer the loads off the columns and caissons while the grade is lowered and the columns/caissons are modified, strengthened, or reconstructed. Due to the type of construction, the caisson as constructed may be irregular in shape, orientation, and size, which may result in substantial structures/obstructions in the middle of the station platforms in order to make the necessary structural modifications. Rather than retrofitting the existing columns, another option is to replace the columns at the Apex Building and extend them to the existing caisson at a lower elevation than the track subgrade; this allows for smaller column sections coming through the platform compared to the retrofitting option, but larger columns than those that currently exist. Due to low overhead clearances, however, this is likely to be a very time-consuming and expensive procedure that carries great risks.

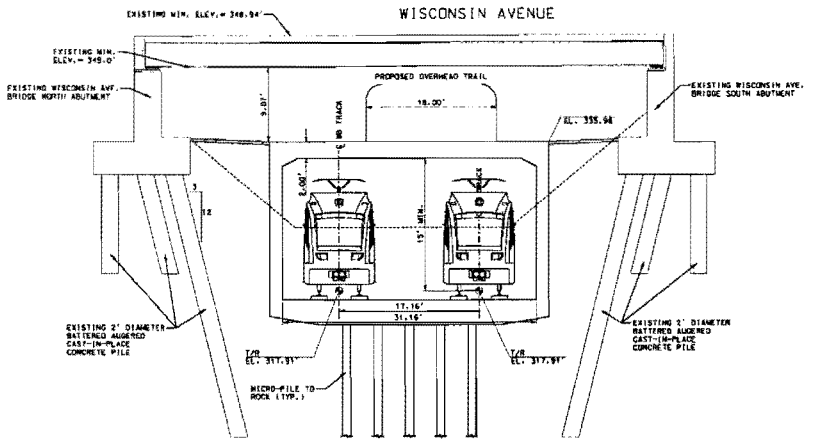
While all buildings within the vicinity will require some level of monitoring, the Apex Building will need additional and more comprehensive monitoring for settlement and rotation throughout construction while daily building activities/operation takes place. Should settlement or rotation of the building occur, construction would be halted and the building evacuated. The building would need to be inspected/stabilized/recertified for occupancy before construction could proceed. The costs of the modifications and the risks (structurally and due to the lost productivity/occupancy of the tenants) associated with the construction may exceed the appraisal of the existing building.

Regardless of whether the columns and caissons are retrofitted or replaced, the exterior wall of the Apex Building along Elm Street needs to be underpinned for up to 20'+ vertically due to the fact that the bottom of wall elevation is as high as 339.25' at some locations at the east end. This elevation is significantly higher than the proposed platform elevation of 318.5'required in order to accommodate the CCT. There are existing grade beams that are above the proposed platform location that require removal and reconstruction. Additionally, the wall on the south side of the railroad corridor along the parking garage is not structurally adequate to act as a crash wall as required by current MTA LRT design criteria. Therefore, a wall would need to be constructed to protect the existing structure, or guardrails would need to be provided.

Due to the risks and costs associated with constructing the trail within the existing constraints of the Apex Building, the idea of waiting until the Apex Building redevelops and then constructing the trail at that time has been considered. The developer would be given an envelope to redevelop around the Purple Line station and incorporate the trail at that time. However, even under redevelopment of the Apex Building, the constraints for installing the CCT above the Purple Line are driven by the Wisconsin Avenue Bridge, thereby setting the profile under the Apex Building. Refer to Sheet 1 for the relationship between the LPA station platforms and the modified building columns.

3.1.1.2 Wisconsin Avenue Bridge

As the Purple Line and CCT moves east, the tracks run inside of a concrete box structure that carries the trail above the tracks under the Wisconsin Avenue Bridge.

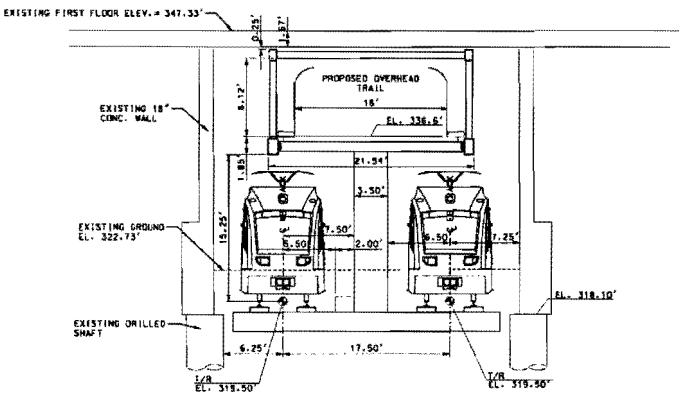


Typical Section through Wisconsin Avenue Bridge

The box structure would be supported on micropiles and would not compromise the structural integrity of the existing bridge. However, the existing Wisconsin Avenue Bridge was built around an older structure. The piers of the original bridge structure were to be cut off below grade during the construction of the existing structure, and they are likely in the vicinity of the proposed concrete box structure and its pile foundation. The presence of the previous foundations needs to be considered during design and construction. In addition, the clearances for installing the Purple Line and CCT in the same space beneath the bridge are very tight. The task of avoiding impact to the existing foundations while at the same time providing the absolute minimum operating clearances for the Purple Line and the catenary system, as well as the vertical clearance for the trail is extremely tedious. The construction will need to take place with low overhead equipment and will require significant structural reinforcement of the box due to span and foundation geometry to prevent loading effects from the proposed structure on to the existing foundations. Micropiles would be used to support the box to prevent these load effects by carrying the proposed loads directly to bedrock through a below ground pile cap.

3.1.1.3 Air Rights Building

Inside the Air Rights Building, the track elevation is such that the top of rail is above the top of the existing caissons and the existing crash walls are acceptable for the proposed tracks, requiring no modifications to the existing building.



Typical Section through Air Rights Building

3.1.1.4 CCT Structure

The truss/bridge structures required to support the trail within the Apex and Air Rights Buildings are significant structures. In order to support the CCT and minimize impacts to the Purple Line, the structures would need to span lengths of up to 240' in order to minimize support locations on an already constrained platform, and would require tighter engineering and construction controls to reduce deflections and camber due to tight construction clearances. The span lengths may possibly be reduced for the structures not over the platforms to optimize the costs of construction and the tighter tolerances required. Due to access requirements for construction, the CCT structures and their infrastructure beneath the Wisconsin Avenue Bridge and the Air Rights Building would need to be in place before the Purple Line could be built. The Apex and Air Rights Buildings and the Wisconsin Avenue Bridge surround the Purple Line, which make it impractical to construct these CCT structures once the Purple Line is in operation without taking the Bethesda Station out of service for an extended period of time. The structures would be expensive and inefficient because of the tight site constraints and limited clearances for deflection of the truss under load. The deflection limits are necessary in order to minimize the effect of the truss on the operations of the light rail vehicles as the pantograph travels along the catenary/trolley wire. The clearance between the truss and the top of rail is less than preferred by the MTA, making the deflection requirements even more pertinent. The box structure beneath the Wisconsin Avenue Bridge will be heavily reinforced and require significant support of excavation and bracing during construction. All of these factors drive up the cost of the trail and Montgomery County's portion of the infrastructure costs to support the Purple Line beneath

these buildings. The aforementioned items are unchangeable, whether the Apex Building is redeveloped or not.

3.1.2 Alternative A - Summary and Cost Analysis

In summary, below are the significant facts and costs for consideration:

a. The tight horizontal and vertical clearances within the Air Rights Building and underneath the Wisconsin Avenue Bridge, along with, more specifically, the control of the Wisconsin Avenue Bridge, drive the profile of the Purple Line for incorporating the CCT above.

b. The profile and existing building constraints require the use of inefficient, constrained and expensive temporary works in order to construct the project beneath the Apex Building and Wisconsin Avenue Bridge. This does not include the substantial and costly modifications required to the Apex Building columns/foundations, not to mention the associated risks.

c. In order to control the camber and deflections to maintain less-than-preferred minimum clearances for the catenary/trolley wires for the Purple Line, the truss structures will need to be built outside the Air Rights Building on temporary supports, the deck placed to control the camber, and then adjusted prior to moving the structures into position within the Air Rights Building and jacking them into place. This is specialized construction that results in additional costs. Once the structures are in place, the catenary/trolley wire can be installed and the remainder of the Purple Line built.

d. Moving a structure of this size and weight into place within the tight constraints of the Air Rights Building will require specialized construction techniques and skilled labor, resulting in additional costs.

e. The construction cost impacts associated with accommodating the trail with respect to the Apex Building and making the necessary modifications to the Apex Building are approximately $19.6 million (Neat Construction Costs in 2011 Dollars with allocated construction contingencies). This amount is in addition to the costs associated with simply placing the Purple Line within the Georgetown Branch right-of-way.

f. The risks of structural damage to the Apex Building and lost productivity/occupancy of the tenants in the Apex Building, associated with the above construction may translate into costs that exceed the appraisal of the existing building. These costs are not included in the estimates reported herein.

g. The costs of accommodating the trail with respect to the Wisconsin Avenue Bridge and Air Rights Building are approximately $9.8 million (Neat Construction Costs in 2011 Dollars with allocated construction contingencies). This amount is in addition to the costs associated with simply placing the Purple Line within the Georgetown Branch right-of-way.

h. The total costs of accommodating the trail along its current alignment and above the Purple Line are approximately $29.4 million (Neat Construction Costs in 2011 Dollars with allocated

construction contingencies). Escalating this cost out to Year 2018 (approximate average rate of 3.1% per year) and including Engineering Services (32% of neat construction cost) and unallocated contingencies (5% neat construction costs and 2% engineering services) the total cost is $50.92 million.

i. The costs associated with constructing the CCT beneath the Wisconsin Avenue Bridge or the Air Rights Building do not change whether the Apex Building is redeveloped or not.

Location	2011 Neat Construction Cost (with allocated Contingencies)	Neat Construction Cost, Year 2018 Escalated Rate	Engineering Services (32% of Neat Construction Cost, Escalated)	Unallocated Contingency (5% of Neat Construction Cost, Escalated)	Unallocated Contingency (2% of Engineering Services, Escalated)	Total (Millions)
Apex Building	$19.6	$24.26	$8.24	$1.29	$0.16	$33.95
Wisconsin Avenue Bridge and Air Rights Building	$9.8	$12.13	$4.12	$0.64	$0.08	$16.97
Total	$29.4	$36.39	$12.36	$1.93	$0.24	$50.92

Trail Costs in the Tunnel Associated with Alternative A

3.2 Alternative B - Platform Under the Apex Building with the Capital Crescent Trail Connecting To A Surface Alignment Through Elm Street Park

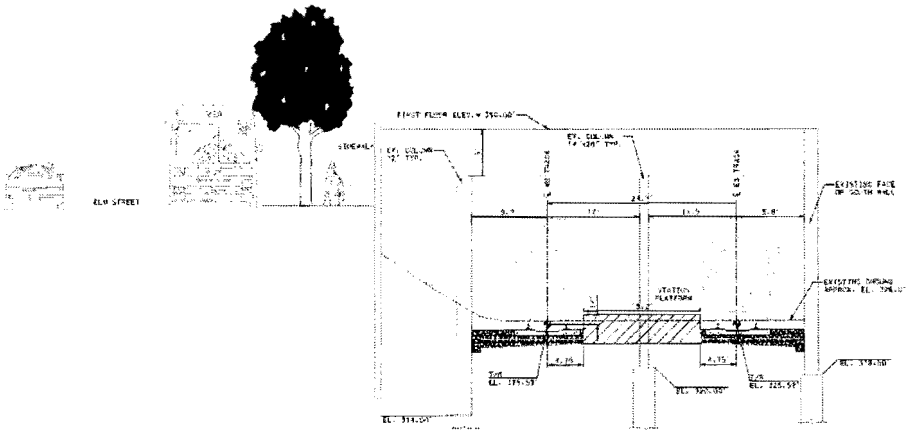
Alternative B layout includes a station with a center platform beneath the Apex Building with tail or run out tracks and bumping posts extending into the Woodmont East development parcel, located to the west of the Apex Building. Center platforms would be provided under the Apex Building, with access from the street level via elevators and stairs at the corner of Elm Street and Wisconsin Avenue, as well as pedestrian access from Woodmont East. The station will be constructed around the existing columns and caisson foundations, which would protrude through the platform. These columns will impede pedestrian flow and boardings and alightings. In order to provide adequate platform length and to meet the required vehicle clearances, the platform requires a slight horizontal curve. Patrons would have access to the proposed WMATA Red Line Bethesda South Entrance at the corner of Elm Street and Wisconsin Avenue from the station.

The CCT follows the "surface alignment" currently under development by the County that starts at Woodmont Plaza, travels east on the north side of Bethesda Avenue, crosses Wisconsin Avenue at a signalized intersection, continues onto Willow Lane, and then heads north through Elm Street Park. At Elm Street Park a connection to the CCT on the north side of the Purple Line will be made. Refer to Sheet 3 for plan and typical sections that show the arrangement of the Purple Line at several key points of interest along the alignment.

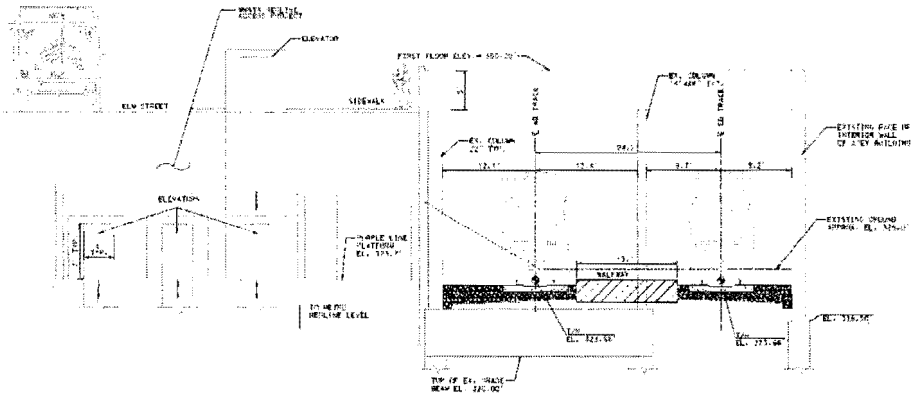
3.2.1 Investigation

3.2.1.1 Apex Building

Refer to the typical sections below for the relationship between the transitway, station platform and the Apex Building. There are no anticipated impacts at the existing Apex Building.



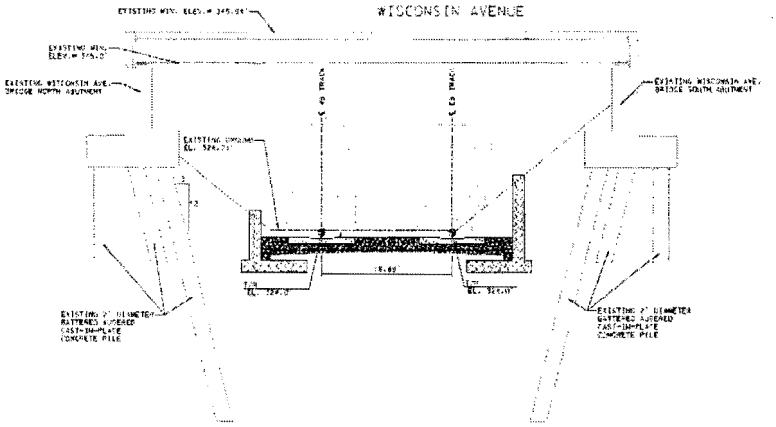
Typical Section through Apex Building and Station Platforms



Typical Section through Apex Building at WMATA Access Point

3.2.1.2 Wisconsin Avenue Bridge

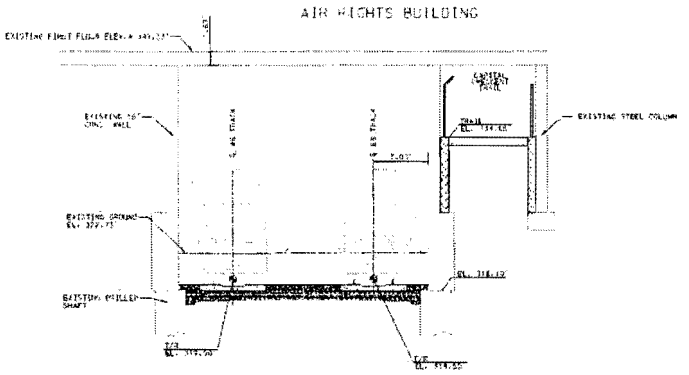
Refer to the typical section below for the relationship between the transitway and the Wisconsin Avenue Bridge. There are no anticipated impacts at the Wisconsin Avenue Bridge.



Typical Section through Wisconsin Avenue Bridge

3.2.1.3 Air Rights Building

Refer to the typical section below showing the transitway and the CCT structure making the connection to Elm Street Park. There are no expected impacts at the existing the Air Rights Building.



Typical Section through Air Rights Building

3.2.1.4 CCT Structure

At Elm Street Park the CCT connects to a truss structure. The structure carries the trail eastward out of the Air Rights Building where it comes back down to grade north of the LRT tracks.

3.2.2 Alternative B - Summary and Cost Analysis

The costs of accommodating the trail connection to Elm Street Park on a structure through the eastern end of the Air Rights Building are approximately $2 million (Neat Construction Costs in 2011 Dollars with allocated construction contingencies). This amount is in addition to the costs associated with simply placing the CCT within the Georgetown Branch right-of-way.

Location	2011 Neat Construction Cost (with allocated Contingencies)	Neat Construction Cost, Year 2018 Escalated Rate	Engineering Services (32% of Neat Construction Cost, Escalated)	Unallocated Contingency (5% of Neat Construction Cost, Escalated)	Unallocated Contingency (2% of Engineering Services, Escalated)	Total (Millions)
Apex Building	$0	$0	$0	$0	$0	$0
Wisconsin and Air Rights Building	$2	$2.48	$0.84	$0.13	$0.05	$3.50
Total	$2	$2.48	$0.84	$0.13	$0.05	$3.50

Trail Costs in the Tunnel Associated with Alternative B

3.3 Considerations

a. In light of the above noted feasible station platform alternatives, constraints, risks and costs, what is the County's recommended location for the trail?

4 Trail Lighting

4.1 Background

It is anticipated that the Purple Line will operate 1 hour before and after the hours of operation of the WMATA Metro due to the connections between the two systems. It is also anticipated that the Capital Crescent Trail will connect residential communities to the proposed Purple Line stations. Given the commuter use of the Capital Crescent Trail it is expected that pedestrians may be using it during hours of darkness. Current Montgomery County practice for a trail within public right-of-way that expects significant use during darkness would require that all portions of the trail be lit for safety concerns. Other options for consideration could include providing no lighting or only lighting select portions of the trail, such as in the vicinity of stations, at entrances to the trail or portions where use is expected to be highest.

The Montgomery County Department of Transportation, Division of Traffic Engineering and Operations (DTEO) document *Streetlight Installation Guidelines Underground Distribution (Policy LTG-2)* indicates that the preferred light fixture for pathways in publicly maintained land is a post top fixture mounted from twelve to sixteen feet above ground. Three styles of post top fixtures are listed; colonial, contemporary and decorative Washington globe. The preferred lamp for use in each style of luminaire is a 70 watt high pressure sodium vapor lamp. All luminaires use an Illuminating Engineering Society of North America (IESNA) Type III distribution.

The IESNA publication *RP-8-00 Roadway Lighting* is the current standard that most state departments of transportation and other municipalities adopt in its entirety or portions for establishing their own lighting standards. The publication recommends that three criteria be satisfied when completing the lighting design for a shared walkway/bikeway. These criteria are:

- Average Horizontal Illuminance – An average of the light levels reaching all the points on the horizontal surface of the shared walkway/bikeway. Average horizontal illuminance criteria should be met or exceeded.
- Uniformity Ratio (Average Horizontal Illuminance to Minimum Horizontal Illuminance) – A ratio between the average horizontal illuminance and the light level of the point with the minimum horizontal illuminance level. This ratio indicates how even or uniform the lighting is. Lower uniformity ratios indicate more uniform light which is preferable.
- Minimum Vertical Illuminance – The lowest light level of the set of points on a vertical plan set 4.9 feet above the surface of the shared walkway/bikeway. Minimum vertical illuminance criteria should be met or exceeded.

Horizontal illuminance is what enables a user of a shared walkway/bikeway to see the path itself and any objects that may be within it. The uniformity ratio is an indication of the variance of lighting levels in the area of concern and is used to minimize the occurrence of very bright spots and very dark spots. Vertical illuminance helps light vertical surfaces which contribute to the

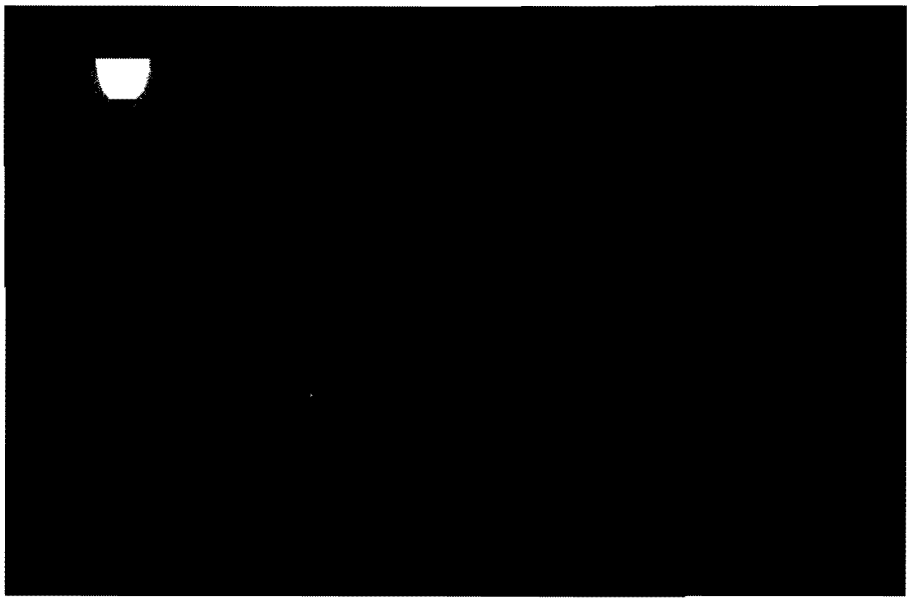
brightness of the environment and aides in facial recognition, valuable for security considerations.

Montgomery County's current practice is to light pathways to an average horizontal illuminance of 1.0 foot-candles. Criteria for the uniformity ratio and minimum vertical illuminance are not specified by Montgomery County standards. When providing an average horizontal illuminance of 1.0 foot-candles per Montgomery County standards, additional guidance from *RP-8-00* for shared walkway/bikeway lighting suggests that a minimum vertical illuminance of 0.5 foot-candles at a height of 4.9 feet above the surface of the walkway/bikeway also be provided. Finally, a horizontal uniformity ratio (average illuminance: minimum illuminance) of 4.0:1 is recommended by *RP-8-00*.

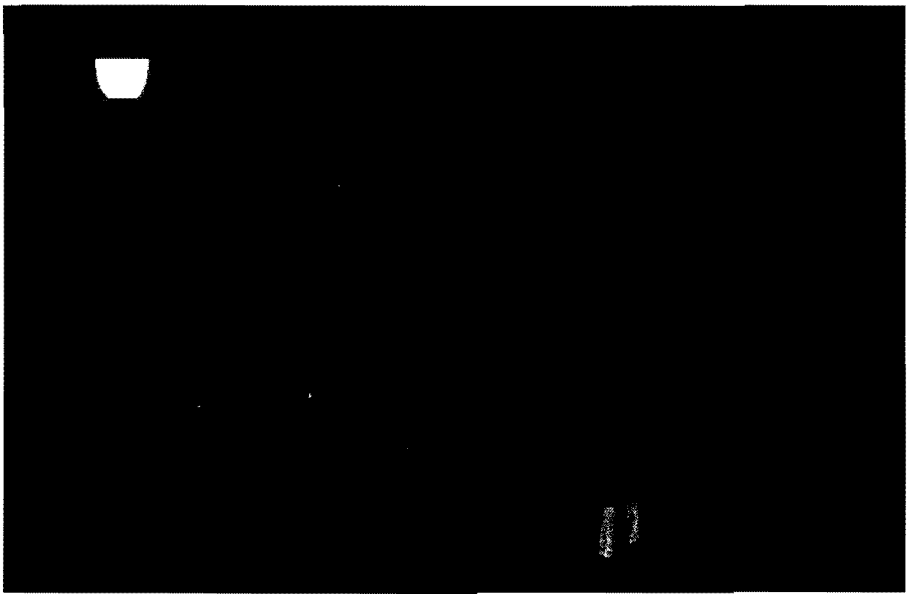
In order to estimate a typical pole spacing that would be needed for continuous lighting along the trail, photometric calculations were completed for a 12' wide segment of the proposed trail representative of the typical section for several different options (light poles assumed on one side only).

- Using the luminaires described above from TEO *Policy LTG-2* with 70 watt high pressure sodium vapor luminaires a pole spacing of approximately 65-70 (all luminaire styles) feet provides an average illuminance of 1.0 foot-candles.
- In order to satisfy the minimum vertical illuminance criteria as recommended by *RP-8-00* a pole spacing ranging from 30 feet (colonial/contemporary style) to 50 feet (decorative Washington globe style) is required and the horizontal illuminance is typically increased by 1.5-2.0 times the required 1.0 foot-candles.
- Under both scenarios the uniformity ratio is satisfied.

Rendering 1 below illustrates the amount of light reaching a person when only horizontal illuminance levels are considered using a light pole spacing of 70 feet. Rendering 2 illustrates the amount of light reaching a person when horizontal and vertical illuminance levels are considered using a light pole spacing of 50 feet, which results in higher average horizontal illuminance compared to Rendering 1. A graphical interpretation of the differences is shown in Figures 1 and 2 below. In these figures, cooler colors (blue to green - Figure 1) represent a lower light intensity shown on the vertical plane, warmer colors (yellow to red – Figure 2) represent higher light intensity.



Rendering 1 – Depiction of Average Horizontal Illuminance Only
(70 foot light pole spacing)



Rendering 2 – Depiction of Minimum Vertical Illuminance (50 foot light pole spacing)

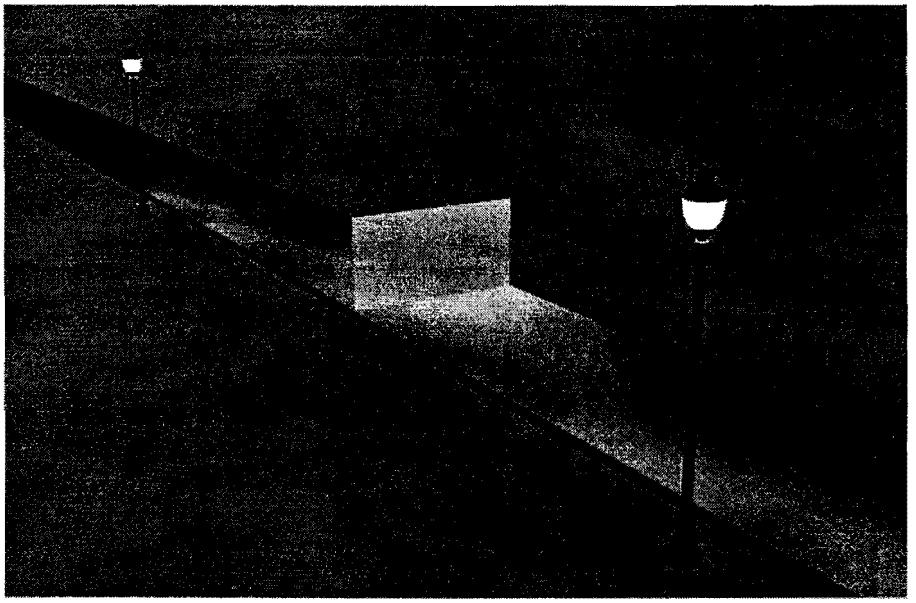


Figure 1 – Depiction of Average Horizontal Illuminance Only
(70 foot light pole spacing)

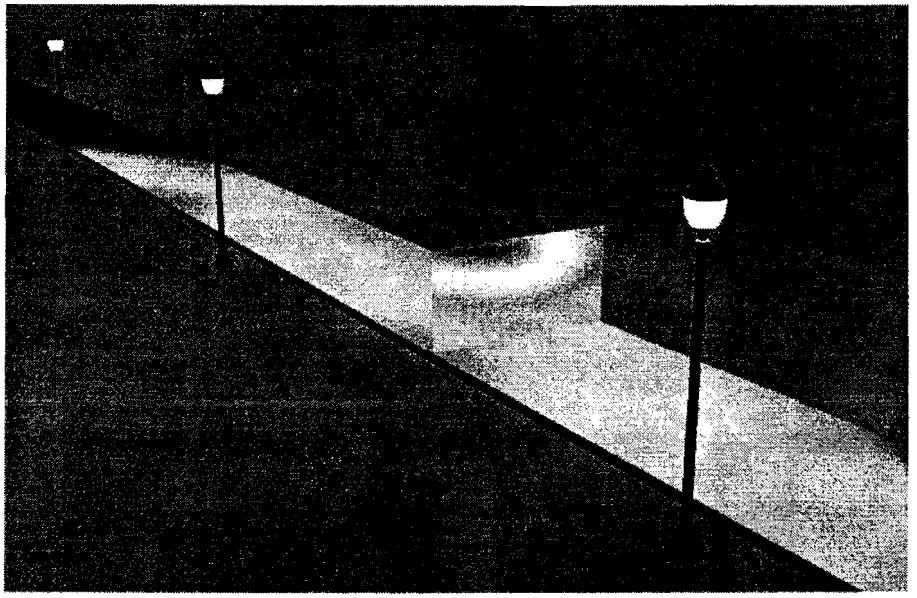


Figure 2 – Depiction of Minimum Vertical Illuminance (50 foot light pole spacing)

The proposed trail is approximately 4.5 miles long (23,760 feet). Additionally, there is approximately 4,500 feet of pathways that will be constructed to provide access/connections to the trail and Purple Line. In total, approximately 28,260 feet of trail is proposed. Using the pole

spacings determined from the photometric calculation options above the following total number of poles would be required:

- For 70 watt high pressure sodium vapor lamps approximately 450 light poles (all luminaire styles) would be required to provide a horizontal illuminance of 1.0 foot-candles on all portions of the trail in accordance with current Montgomery County practice. This would add approximately $3.1 million (2011 dollars) to the total cost of the trail including engineering services and unallocated contingencies.
- If the vertical illuminance criteria recommended by RP-8-00 is considered, approximately 600 light poles would be required along the trail, dependent on the luminaire style chosen for use. This would add approximately $4.2 million (2011 dollars) to the total cost of the including engineering services and unallocated contingencies.

If only key areas were selected for lighting the total number of poles would be reduced significantly; however, this would leave segments of the trail unlit.

4.2 Considerations

i. Should the Capital Crescent Trail and the connections be designed with continuous lighting? If so, should the lighting be designed to Montgomery County's current practice or the higher IESNA standard?

ii. If not, should the Capital Crescent Trail and the connections be designed with lighting only select portions of the trail, such as in the vicinity of stations, at entrances to the trail or portions where use is expected to be highest? If so, should the lighting be designed to Montgomery County's current practice or the higher IESNA standard?

iii. If not, should the Capital Crescent Trail be designed without lighting?

5 Emergency Communications

5.1 Background

Emergency communication is vital to creating a safe environment along trails, and emergency call boxes are a successful way to create a safe environment. It is Montgomery County's current practice to install emergency call boxes along trails. It is likely that at the time of construction, the type of call box that could be used will have solar power, wireless, two-way audio and strobe lights on the call boxes. A two-way audio box will allow for a person to have a conversation with security. The strobe light will flash to support quick location of the emergency. Generally the spacing for emergency call boxes on a trail of this type would be every ¼ mile with additional boxes placed at key points like stairwells and tunnels. A call box system consisting of 25 emergency call boxes would add approximately $400,000 (2011 dollars) to the total trail cost including engineering services and unallocated contingencies.

5.2 Considerations

i. Should the Capital Crescent Trail be designed with emergency call boxes?

6 Landscape and Hardscape Requirements

6.1 Background

The current trail cost estimate does not include extensive or specific landscaping along the outside of the trail adjacent to the community, but rather an allowance for general seeding and turf establishment. The landscaping between Purple Line and the CCT is accounted for in the trail cost.

The following additional landscape and hardscape features could be considered for the Capital Crescent Trail:

- Longitudinal landscape treatments for the Capital Crescent Trail could help knit the new Purple Line Transitway and trail improvements into the existing landscape. Trail plantings could be focused along the outside edges of the trail adjacent to the community. Plants would be selected that are native or adapted to the region and could be implemented in a manner to minimize maintenance. Including 2.5" cal. shade trees, 8' Ht. ornamental trees, 6' Ht. evergreen trees and shrubs as appropriate would add approximately $1.2M (2011dollars) to the total trail cost including engineering services and unallocated contingencies.

- At key points along the alignment such as trail connections to the community and in the vicinity of stations, enhanced landscaping may be desired. In these areas a higher level of finish and detail may be utilized to highlight important connections and to provide for a variety of experiences along the length of the alignment. Including enhanced landscaping at 12 locations/connections would add approximately $400,000 (2011dollars) to the total trail cost including engineering services and unallocated contingencies.

- Site furnishings such as benches could be installed at regular intervals along the outside edge of trail for users to rest and for general enjoyment. Including forty (40) 6-foot long benches would add approximately $100,000 (2011 dollars) to the total trail cost including engineering services and unallocated contingencies.

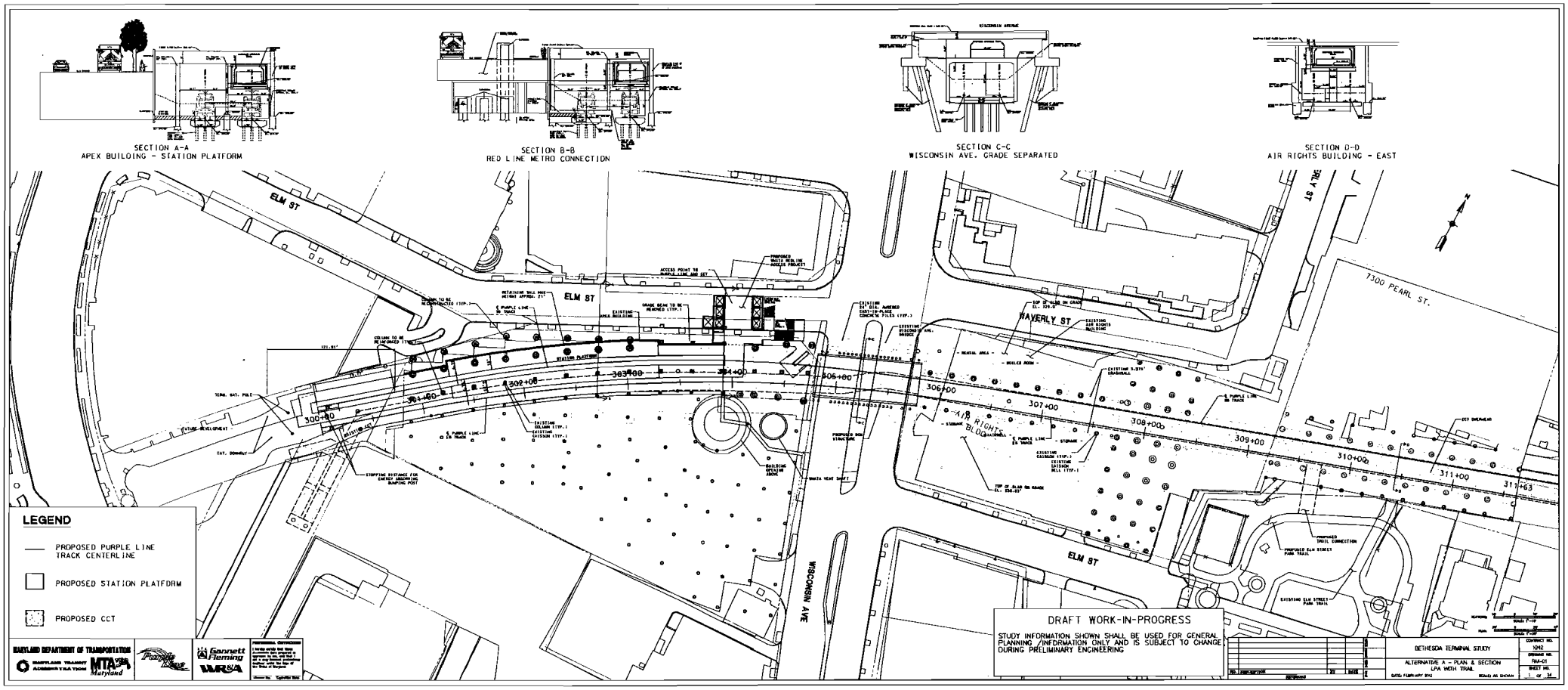
6.2 Considerations

ii. Should the Capital Crescent Trail be designed to include longitudinal landscape treatments along the outside edge of the trail adjacent to the community?

iii. Should the Capital Crescent Trail be designed to include enhanced landscaping at key points such as connections and stations?

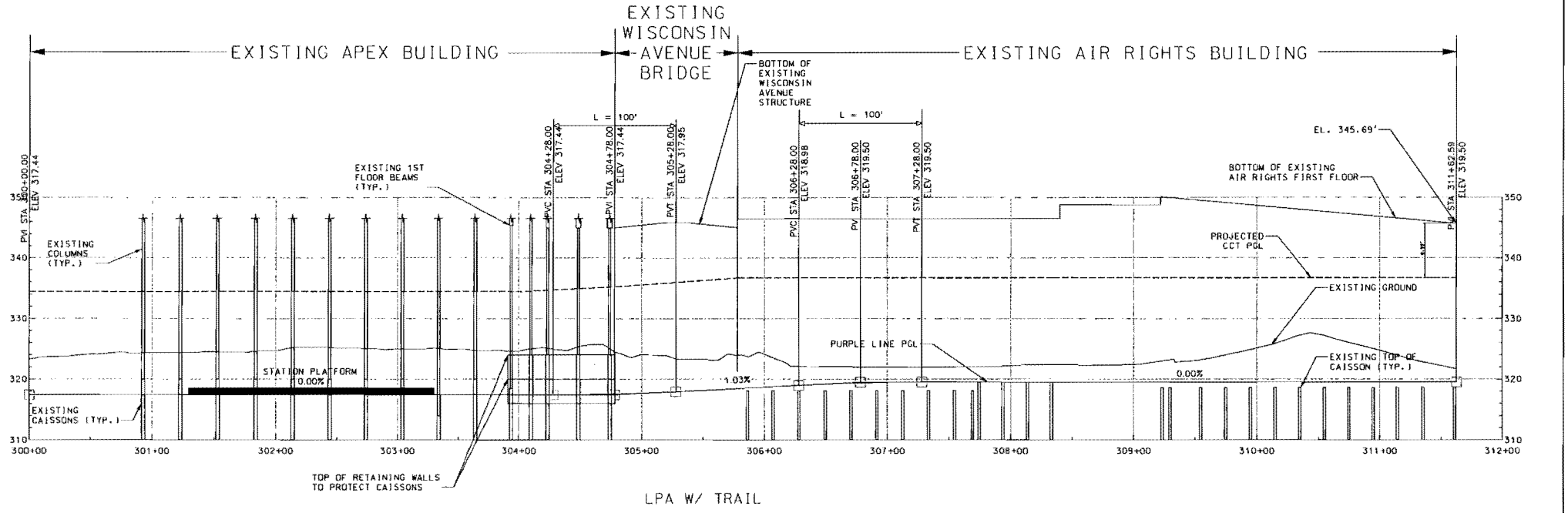
iv. Should the Capital Crescent Trail be designed to include site furnishings adjacent to the trail?

ALTERNATIVE A (DRAWING 1)



(34)

ALTERNATIVE A (DRAWING 2)



LPA W/ TRAIL

DRAFT WORK-IN-PROGRESS

STUDY INFORMATION SHOWN SHALL BE USED FOR GENERAL PLANNING INFORMATION ONLY AND IS SUBJECT TO CHANGE DURING PRELIMINARY ENGINEERING

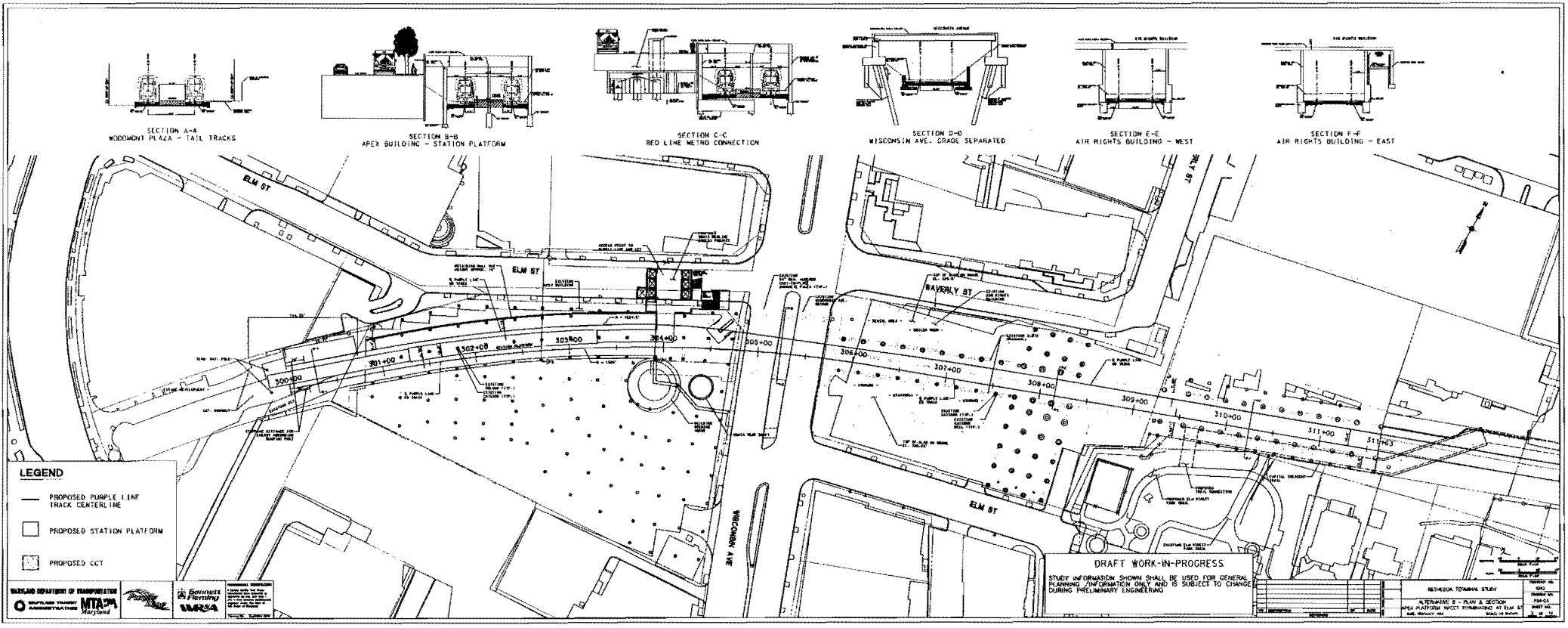
MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND TRANSIT ADMINISTRATION
MTA Maryland
Gannett Fleming
WRSA

BETHESDA TERMINAL STUDY
ALTERNATIVE A – PROFILE
LPA WITH TRAIL

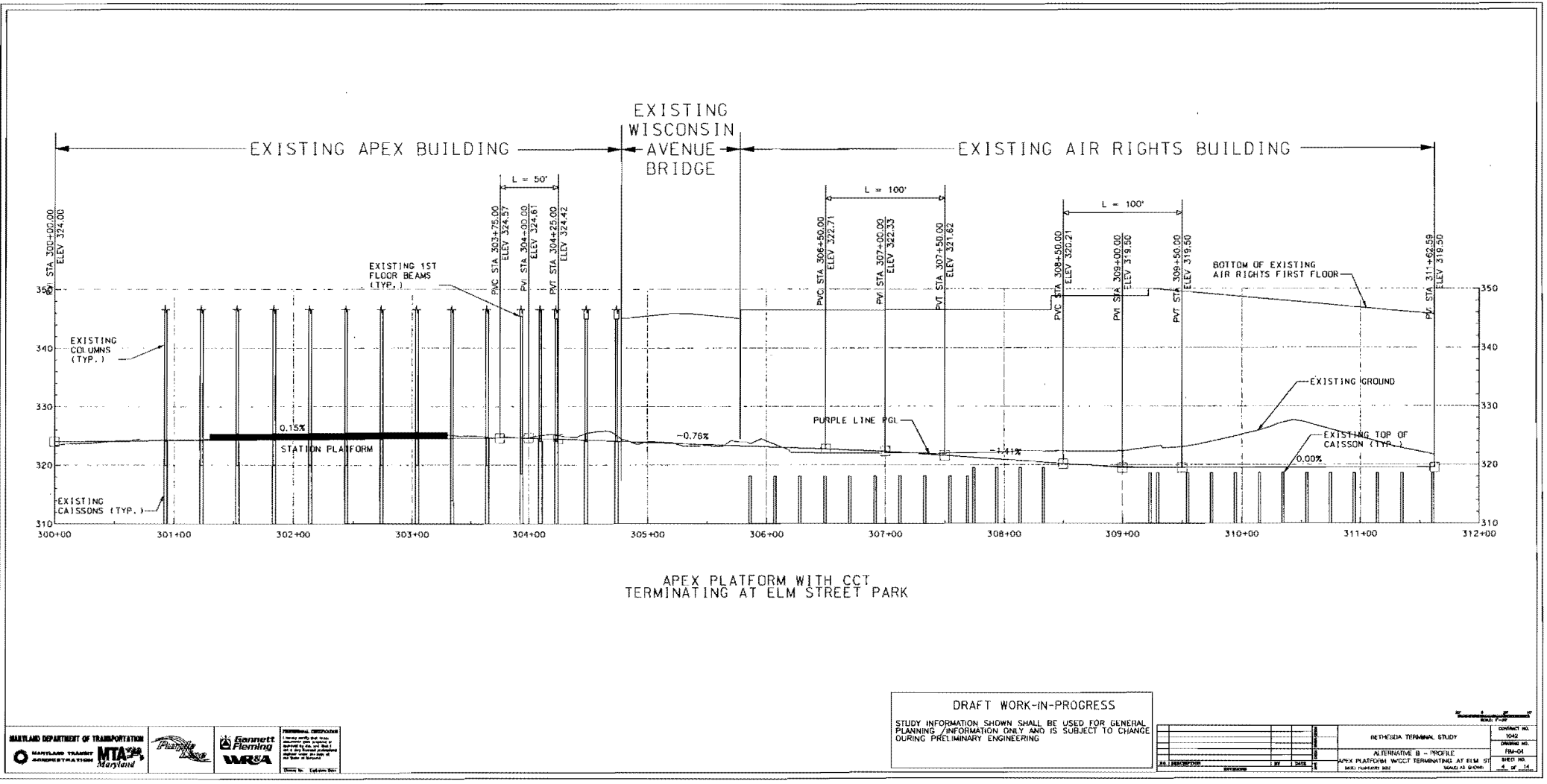
CONTRACT NO. 1042
DRAWING NO. PM-02
SHEET NO. 2 OF 14

35

ALTERNATIVE B (DRAWING 3)



ALTERNATIVE B (DRAWING 4)



APEX PLATFORM WITH CCT
TERMINATING AT ELM STREET PARK

DRAFT WORK-IN-PROGRESS

STUDY INFORMATION SHOWN SHALL BE USED FOR GENERAL PLANNING /INFORMATION ONLY AND IS SUBJECT TO CHANGE DURING PRELIMINARY ENGINEERING

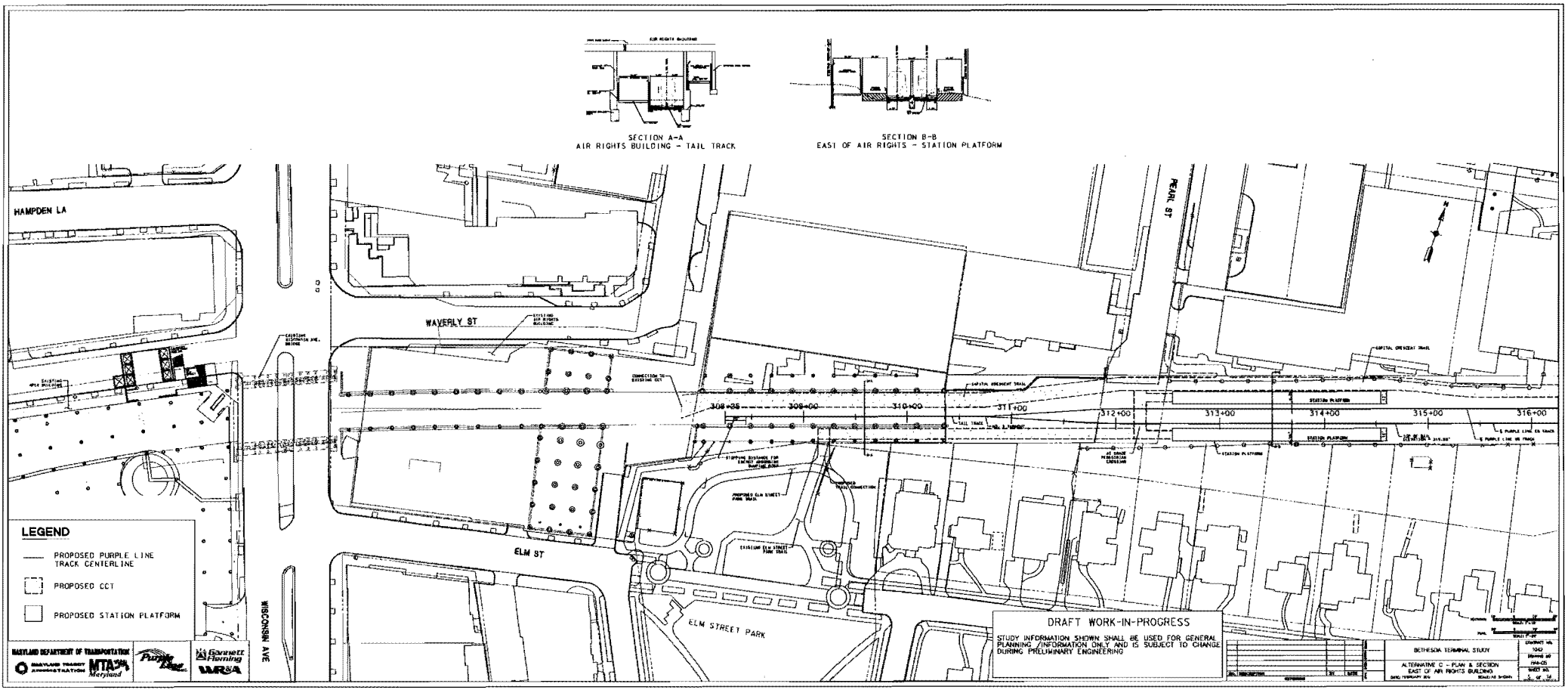
MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND TRANSIT ADMINISTRATION MTA Maryland
Parsons Brinckerhoff
Gannett Fleming
WR&A

BETHESDA TERMINAL STUDY
ALTERNATIVE B - PROFILE
APEX PLATFORM W/CCT TERMINATING AT ELM ST

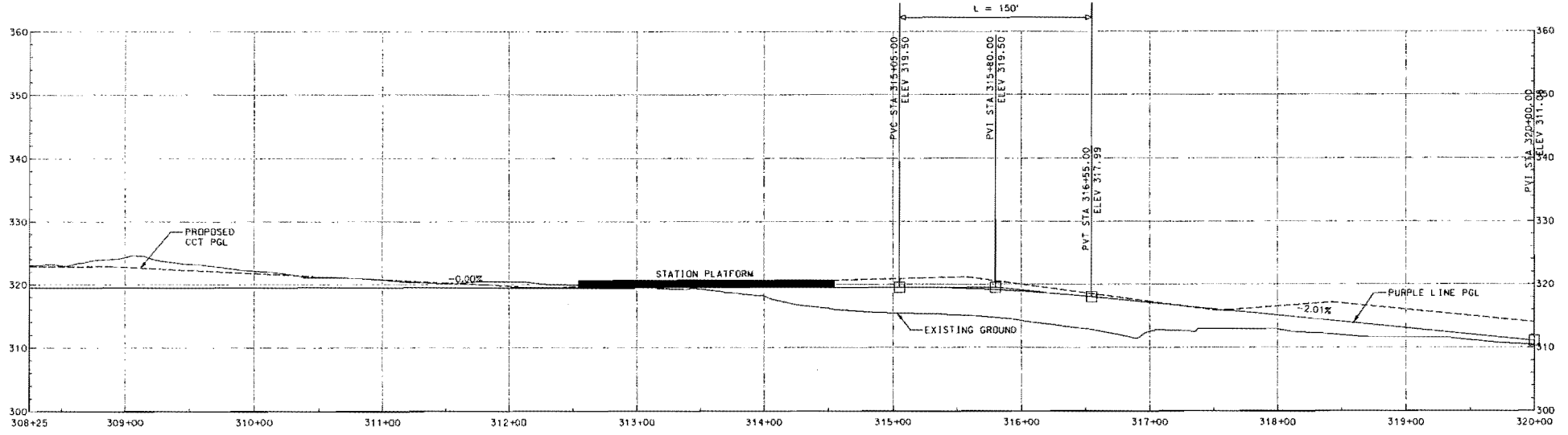
CONTRACT NO. 1042
DRAWING NO. FRA-04
SHEET NO. 4 OF 14

27

ALTERNATIVE C (DRAWING 5)



ALTERNATIVE C (DRAWING 6)



EAST OF AIR RIGHTS

DRAFT WORK-IN-PROGRESS

STUDY INFORMATION SHOWN SHALL BE USED FOR GENERAL PLANNING /INFORMATION ONLY AND IS SUBJECT TO CHANGE DURING PRELIMINARY ENGINEERING

MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND TRANSIT ADMINISTRATION
MTA Maryland
Purple Line
Gannett Fleming
WRSA

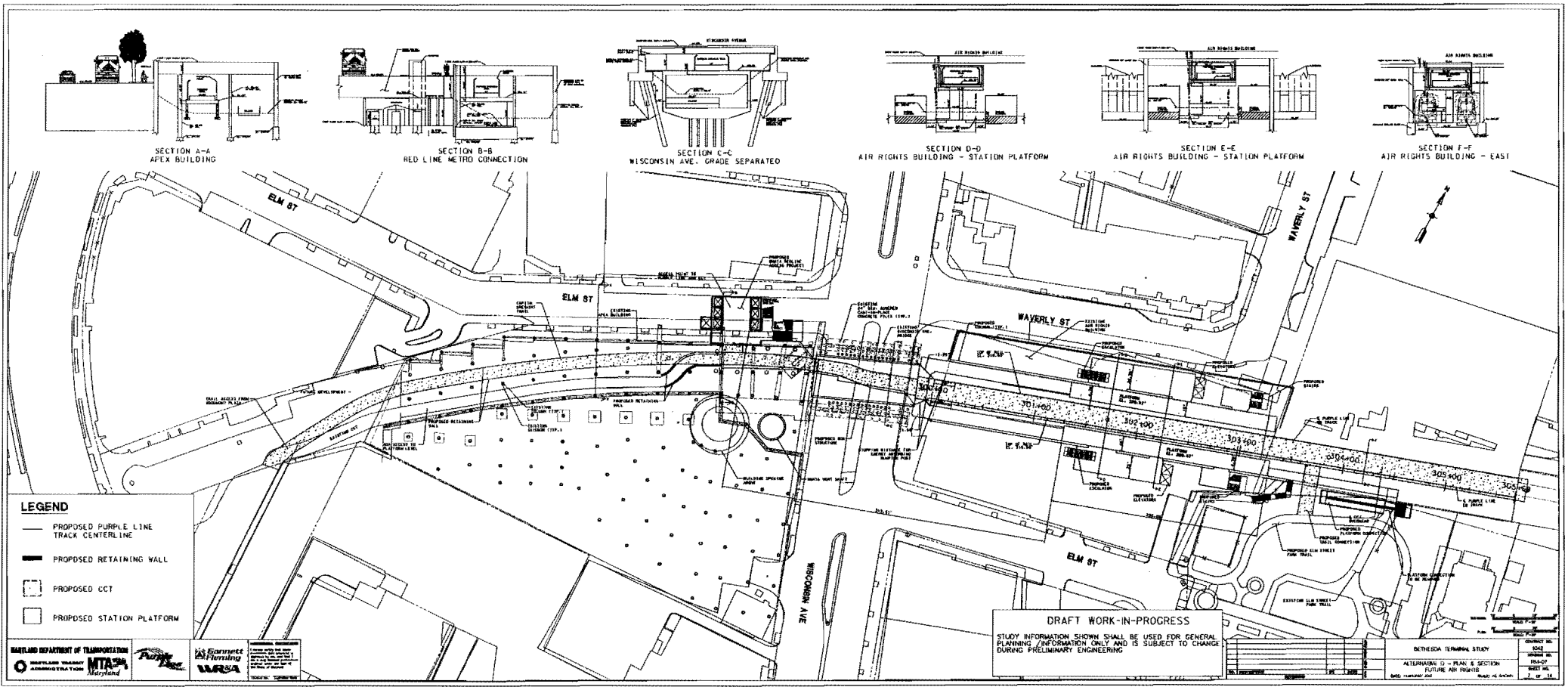
BETHESDA TERMINAL STUDY

ALTERNATIVE C - PROFILE
EAST OF AIR RIGHTS BUILDING

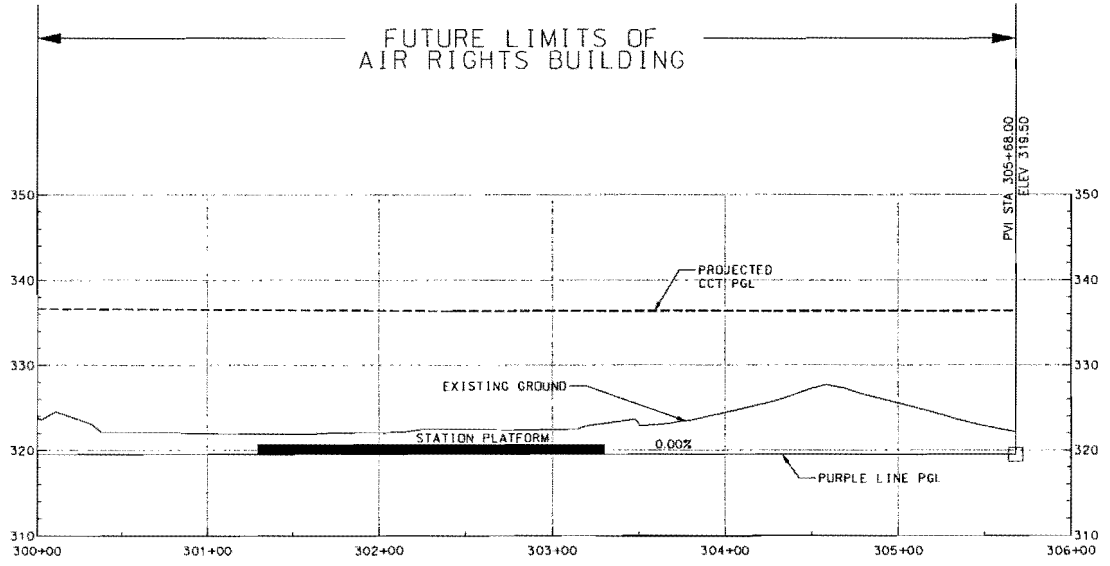
CONTRACT NO. 1042
DRAWING NO. PM-06
SHEET NO. 6 OF 14

36

ALTERNATIVE D (DRAWING 7)



ALTERNATIVE D (DRAWING 8)



FUTURE AIR RIGHTS

DRAFT WORK-IN-PROGRESS

STUDY INFORMATION SHOWN SHALL BE USED FOR GENERAL PLANNING /INFORMATION ONLY AND IS SUBJECT TO CHANGE DURING PRELIMINARY ENGINEERING

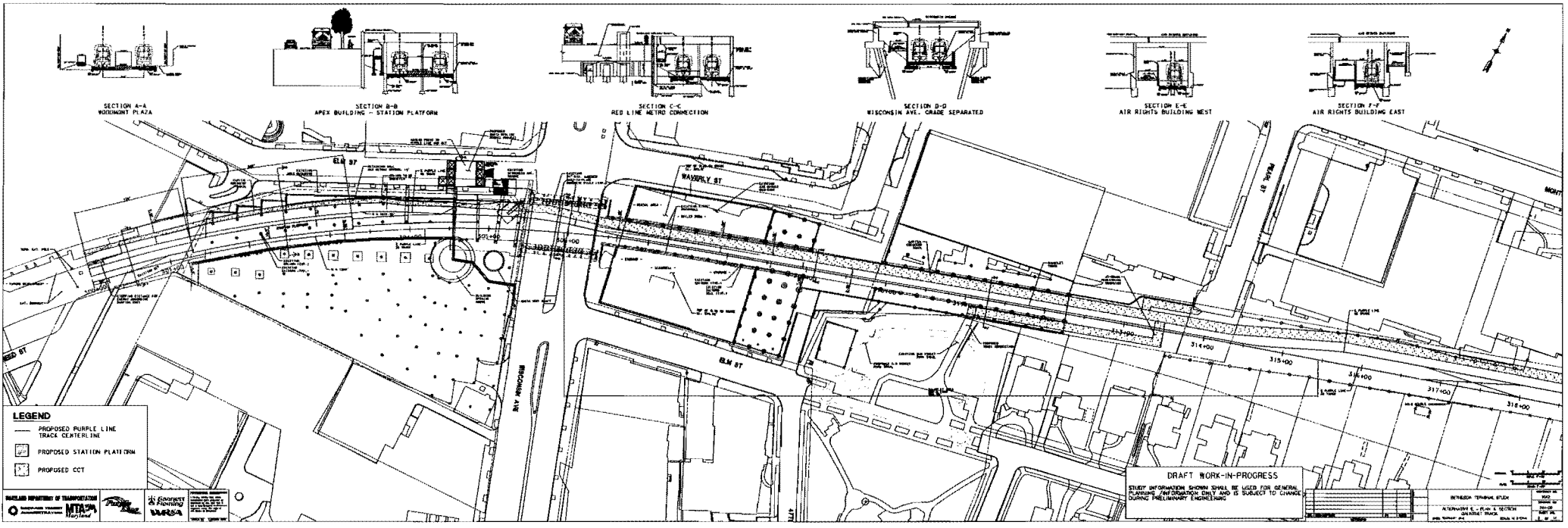
MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND TRANSIT ADMINISTRATION
MTA Maryland
Purple Line
Gannett Fleming
WR&A

BETHESDA TERMINAL STUDY
ALTERNATIVE D - PROFILE
FUTURE AIR RIGHTS

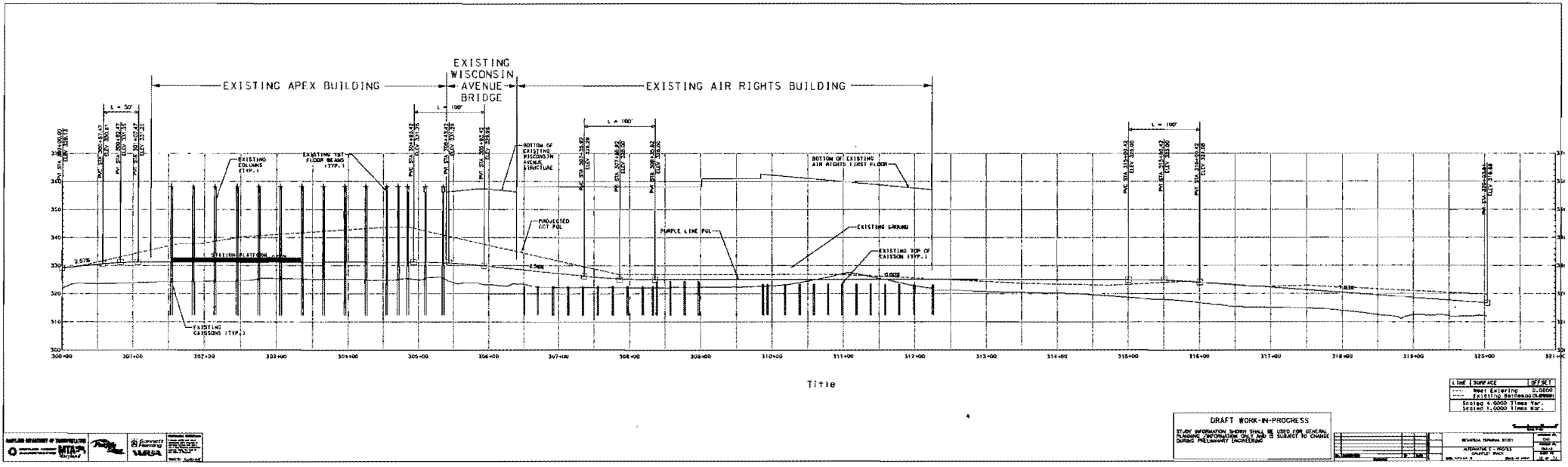
CONTRACT NO. 1042
DRAWING NO. PM-08
SHEET NO. 8 OF 14

(14)

ALTERNATIVE E (DRAWING 9)



ALTERNATIVE E (DRAWING 10)



Title

LINE	SURFACE	OFFSET
	West Exterior	0.0000
	Existing Bethesda Elevation	

Scaled x 0.0000 Times Ver.
Scaled 1.0000 Times Hor.

DRAFT WORK-IN-PROGRESS

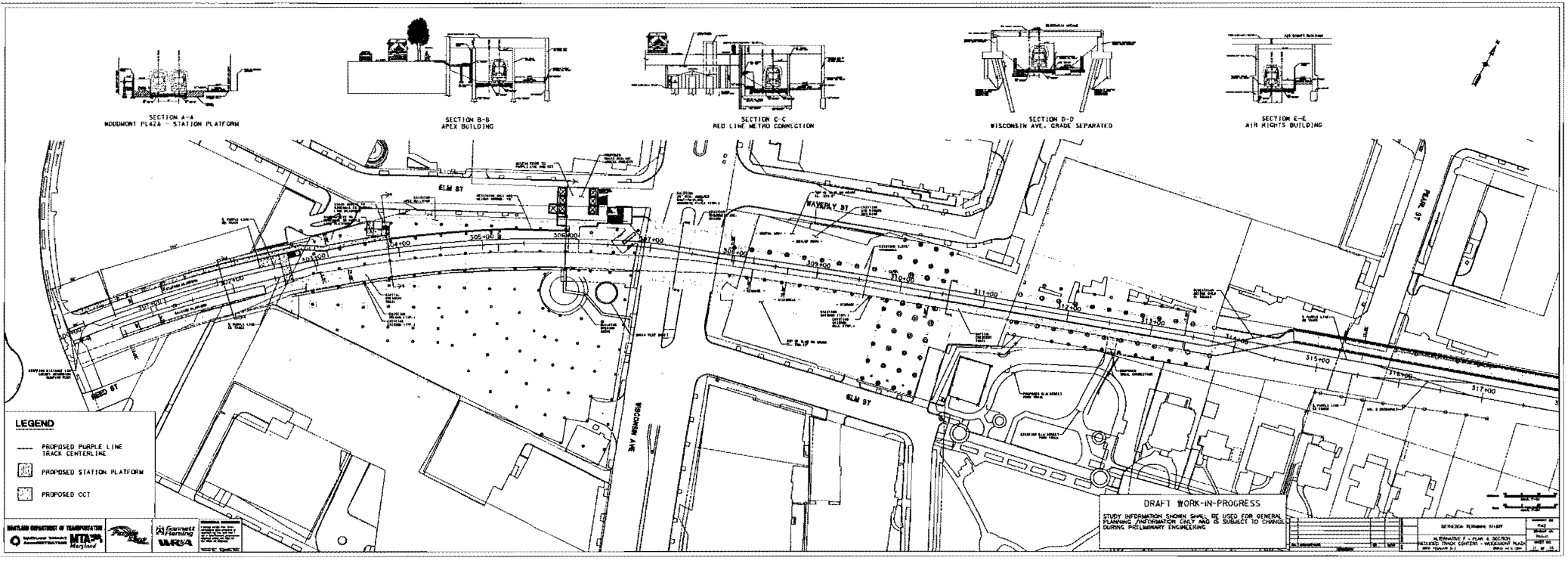
STUDY INFORMATION SHOWN SHALL BE USED FOR GENERAL PLANNING INFORMATION ONLY AND IS SUBJECT TO CHANGE DURING PRELIMINARY ENGINEERING

BETHESDA TERMINAL STUDY

ALTERNATIVE E - PROFILE

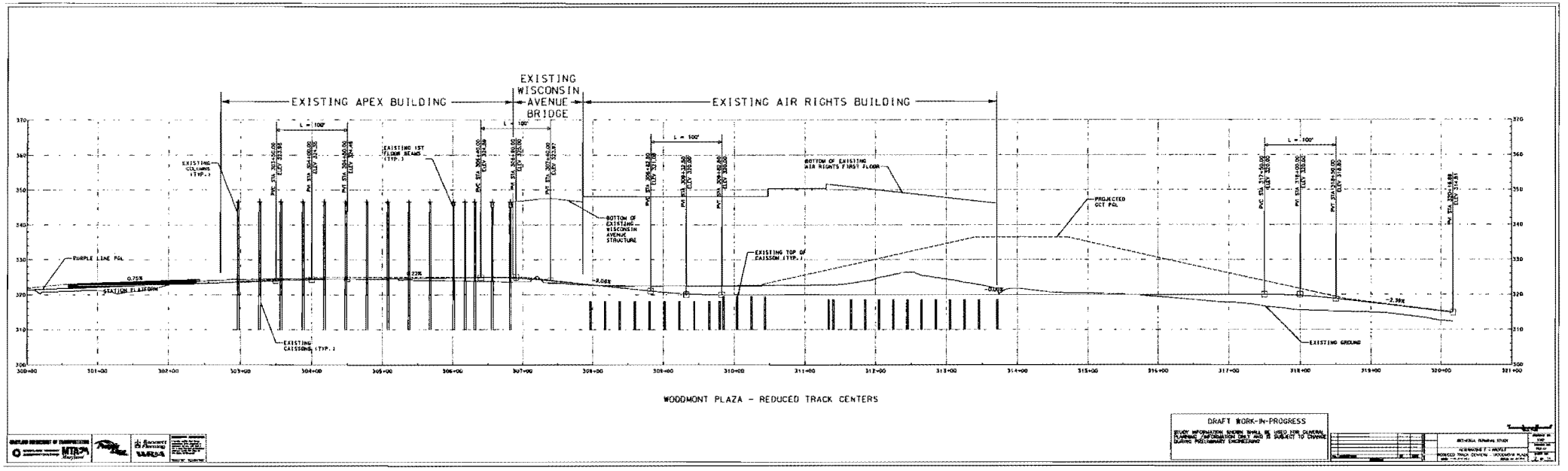
(43)

ALTERNATIVE F (DRAWING 11)



(4)

ALTERNATIVE F (DRAWING 12)



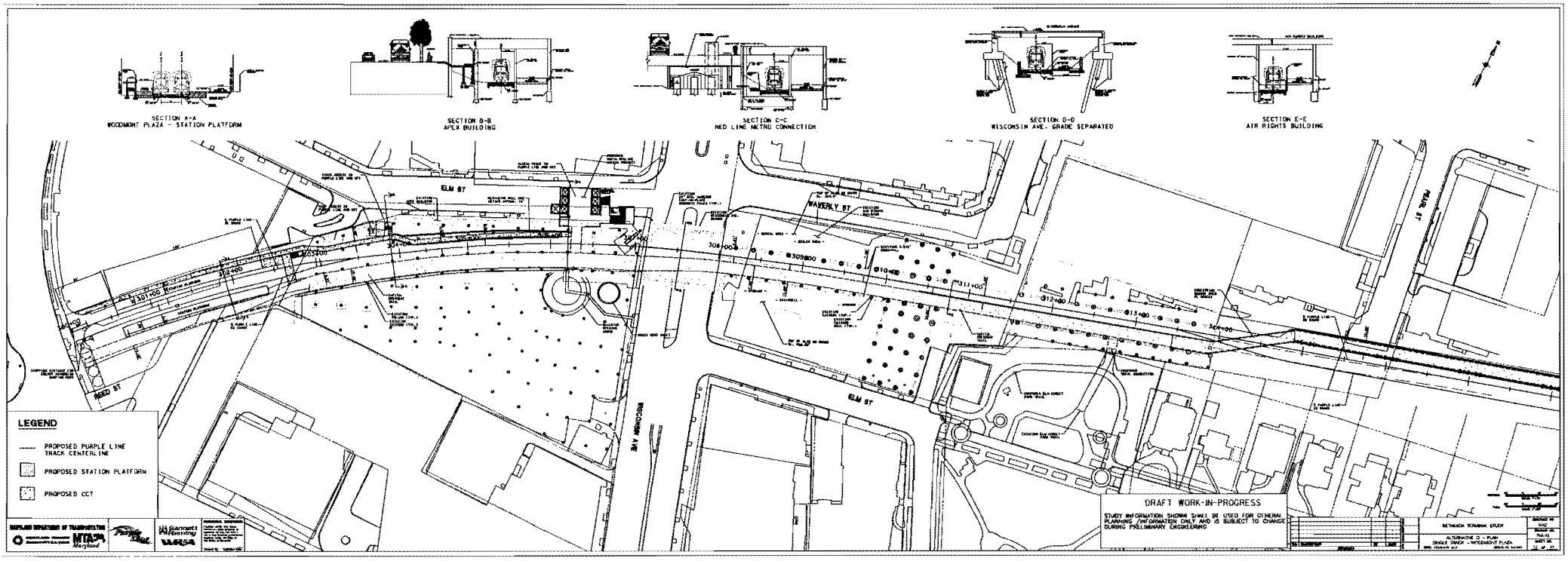
WOODMONT PLAZA - REDUCED TRACK CENTERS

DRAFT WORK-IN-PROGRESS

SELECT INFORMATION SHOWN SHALL BE USED FOR GENERAL PLANNING INFORMATION ONLY AND IS SUBJECT TO CHANGE DURING PRELIMINARY ENGINEERING

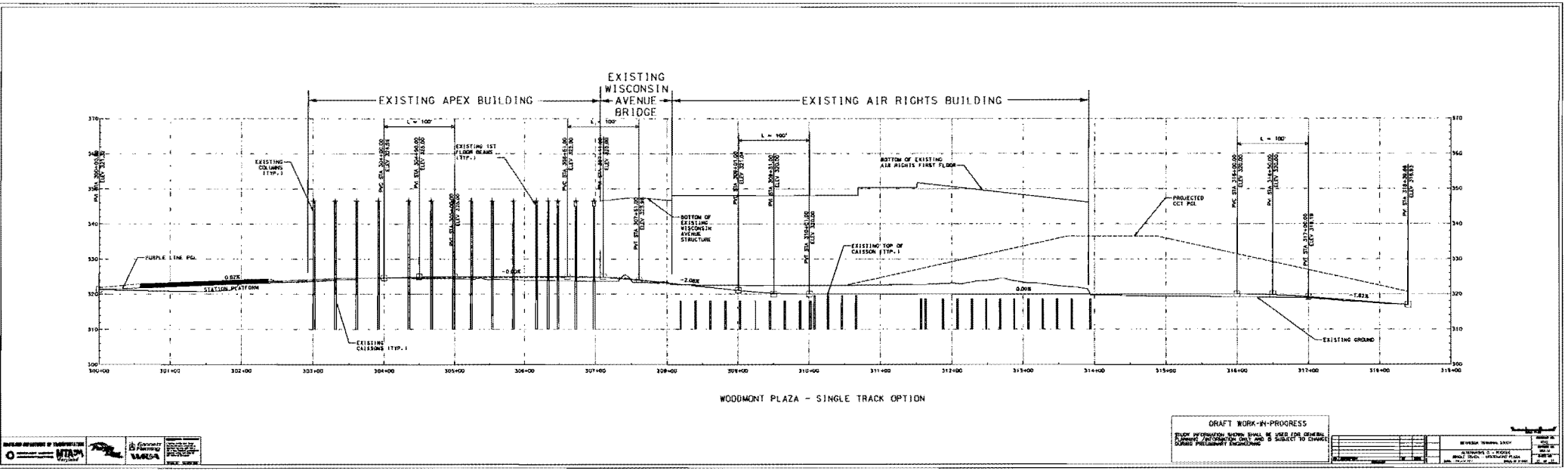
45

ALTERNATIVE G, DRAWING 13



(96)

ALTERNATIVE G (DRAWING 14)



(47)

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

OFFICE OF THE CHAIR

November 30, 2011

The Honorable Valerie Ervin
President, Montgomery County Council
Stella B. Werner Council Office Building
100 Maryland Avenue
Rockville, Maryland 20850

RE: Capital Crescent Trail Scope Refinement

Dear President Ervin:

At our regularly scheduled meeting on November 17th, the Planning Board reviewed several scope questions regarding the Capital Crescent Trail that have been raised by the Maryland Transit Administration (MTA). The following list summarizes the Planning Board's recommendations. A detailed list of recommendations is included as Attachment A.

1. Create a CIP project for the Capital Crescent Trail to evaluate MTA engineering drawings for the trail and to construct the trail in conjunction with the Purple Line.
2. More design work is needed before a recommendation can be made with confidence on whether to construct the Capital Crescent Trail in the tunnel.
    a. Constructing the trail may be feasible if:
        i. further engineering investigation reveals that the cost or risk differential between building the Purple Line and the Capital Crescent Trail in the tunnel and building the Purple Line only in the tunnel (with an upgraded surface trail) is significantly smaller than currently estimated; or
        ii. a mechanism is found to reduce the public outlay and/or risk to the Apex Building associated with putting both the trail and the Purple Line in the tunnel.
    b. We recommend that MTA brief the County Council in six months time with designs, updated cost estimates and risk comparisons for the following scenarios so that this decision can be made with greater assurance.
        i. Purple Line only in the tunnel with an upgraded surface trail
        ii. Trail in the tunnel with the Purple Line station under the Air Rights Building, removing the need to put the Purple Line through the tunnel.

8787 Georgia Avenue, Silver Spring, Maryland 20910 Phone: 301.495.4605 Fax: 301.495.1320
www.montgomeryplanningboard.org E-Mail: mcp-chair@mncppc-mc.org

iii. Trail in the tunnel with the Purple Line station just east of the Air Rights Building, removing the need to put the Purple Line through the tunnel.

c. If the cost and risk differential between building both the Purple Line and the Capital Crescent Trail in the tunnel and building only the Purple Line in the tunnel (with an upgraded surface trail) remains as great as currently estimated, we recommend that the County Council determine the tunnel route to be financially infeasible and concentrate more effort on building the planned surface trail with an alignment and features that will accommodate the volume and variety of user groups anticipated.

3. Convene an agency working group with the mandate to develop a design and circulation concept that upgrades the planned surface alignment, especially if the tunnel route is found financially infeasible. This alignment should provide a safe, convenient, and protected crossing for pedestrians and cyclists at the intersection of Wisconsin Ave / Willow Lane / Bethesda Ave. Attachment A details the types of upgrades to be considered.
4. Provide continuous lighting on the Capital Crescent Trail between Bethesda and Silver Spring to the Illuminating Engineering Society of North America (IESNA) standard for vertical illuminance, and provide maximum protection for undesirable spillover onto adjacent properties.
5. Include emergency call boxes in the design of the Capital Crescent Trail.
6. Continue to include the master-planned switchback connection to the Rock Creek Trail on the east side of the creek in the design of the Capital Crescent Trail, but evaluate a new option that would route the connection through park land to the south of the Georgetown Branch right-of-way, to reduce environmental and aesthetic impacts.
7. Include additional landscaping and hardscaping in the design of the Capital Crescent Trail. Landscaping and hardscaping (including benches and trash cans) should be provided along the community side of the trail as well as the Purple Line side, with enhanced landscaping at stations.
8. The master-planned surface route should remain on the north side of Bethesda Avenue and any private development or public projects potentially affecting that route will be required or advised, respectively, that the Bethesda Avenue bike route needs to be accommodated until:[1]
   a. A better surface alignment is identified.

[1] The bulk of this recommendation relates to how the Planning Board would determine appropriate conditions to place on any development proposed along the north side of Bethesda Ave. Should the Council prefer options that would reroute the surface alignment, a master plan amendment likely would be needed.

b. We have assurance from other parties involved – including the State Highway Administration and the Montgomery County Department of Transportation – that they concur with the new surface alignment and will ensure that a high-quality, safe route is feasible.
c. The master plan is amended.

There were two corrections to the staff memo regarding cost, which are identified in an errata sheet in Attachment B. The full Planning Board packet is included as Attachment C.

If you have any additional questions or would like to discuss this further, please contact me at (301) 495-4605 or David Anspacher of our staff at (301) 495-2191.

Sincerely,

Françoise M. Carrier
Chair

cc: Roger Berliner, Chairman T&E Committee
Senator Richard S. Madaleno, Jr.
Mike Madden, MTA
Edgar Gonzalez, MCDOT
Gary Erenrich, MCDOT
Glenn Orlin
Mary Bradford
Rollin Stanley
Mary Dolan
Rose Krasnow
Tom Autrey
David Anspacher

Attachment A: Detailed Planning Board Recommendations

Lighting

1. Provide continuous lighting on the Capital Crescent Trail between Bethesda and Silver Spring to the Illuminating Engineering Society of North America (IESNA) standard for vertical illuminance, and provide maximum protection for undesirable spillover.

Tunnel

2. It appears that more design work is needed before a recommendation can be made with confidence on whether to construct the Capital Crescent Trail in the tunnel.
    a. Constructing the trail may be feasible if:
        i. further engineering investigation reveals that the cost or risk differential between building the Purple Line and the Capital Crescent Trail in the tunnel and building the Purple Line only in the tunnel (with an upgraded surface trail) is significantly smaller than currently estimated; or
        i. a mechanism is found to reduce the public outlay and/or risk to the Apex Building associated with putting both the trail and the Purple Line in the tunnel.
    b. We recommend that the Maryland Transit Administration brief the County Council in six months time with designs, updated cost estimates and risk comparisons for the following scenarios so that this decision can be made with greater assurance.
        i. Purple Line only in the tunnel with an upgraded surface trail
        ii. Trail in the tunnel with the Purple Line station under the Air Rights Building, removing the need to put the Purple Line through the tunnel.
        iii. Trail in the tunnel with the Purple Line station just east of the Air Rights Building, removing the need to put the Purple Line through the tunnel.
    c. If the cost and risk differential between building both the Purple Line and Capital Crescent Trail in the tunnel and building only the Purple Line in the tunnel (with an upgraded surface trail) remains as great as currently estimated, we recommend that the County Council determine the tunnel route to be financially infeasible and concentrate more effort on building the planned surface trail with an alignment and features that will accommodate the volume and variety of user groups anticipated.
3. Create a CIP project for the Capital Crescent Trail. The CIP project should provide funds to:
    a. Evaluate MTA engineering drawings for the trail.
    b. Construct the trail in conjunction with the Purple Line.

Emergency Call Boxes

4. Emergency call boxes should be included in the design of the Capital Crescent Trail. Emergency call boxes should be located as follows:
    a. Where there is no access to other assistance, such as long stretches between access points.
    b. Where cell phone coverage is spotty, such as in tunnels.
    c. For other reasons as deemed necessary.
5. Emergency call box locations should be selected in consultation with the Montgomery County Police Department and the Maryland-National Capital Park Police, Montgomery County Division.

Rock Creek Trail

6. Continue to include the master-planned switchback connection to the Rock Creek Trail on the east side of the creek in the design of the Capital Crescent Trail, but evaluate a new option that would route the connection through park land to the south of the Georgetown Branch right-of-way, to reduce environmental and aesthetic impacts.
7. Include additional landscaping and hardscaping in the design of the Capital Crescent Trail. Landscaping and hardscaping (including benches and trash cans) should be provided along the community side of the trail as well as the Purple Line side, with enhanced landscaping at stations.

Landscaping / Hardscaping

8. Include additional landscaping and hardscaping in the design of the Capital Crescent Trail. Landscaping and hardscaping (including benches and trash cans) should be provided along the community side of the trail as well as the Purple Line side, with enhanced landscaping at stations.
    a. The plant materials that are selected should establish an acceptable aesthetic character for trail users when the trail is constructed and should replace the existing tree canopy over time.
    b. The landscaping plan should be consistent with Crime Prevention Through Environmental Design principles so that appropriate materials are used, for instance so they do not block trail lighting or grow to interfere with trail lighting.
    c. Provide hardscaping that is consistent with a park-like experience.
    d. Provide benches with uneven, non-level seating.

A Better Surface Alignment for the Capital Crescent Trail between Elm Street Park and Woodmont Ave

If the tunnel route is not financially feasible, the surface route becomes much more important. The following steps should be taken to provide a premier surface route through Bethesda. Even if a way is found to retain the trail in the tunnel, a similar approach should be used to assure that local access to the trail is provided in the best possible way.

9. Implement a bold redesign of the area surrounding the Capital Crescent Trail surface alignment.
10. Convene an agency working group with the mandate to develop a design and circulation concept that prioritizes the trail along the surface alignment.
11. The working group will be composed of representatives from the Montgomery County Department of Transportation (MCDOT), the State Highway Administration (SHA), the Department of Parks, the Town of Chevy Chase and the Planning Department.
12. The priorities of the working group will include:
    a. Providing an off-road path that is wide enough to accommodate anticipated demand (12 ft is recommended).
    b. Creating a continuous trail experience from Silver Spring to downtown Bethesda that extends the lighting, landscaping, benches, and other amenities to the surface alignment.
    c. Providing a safe, convenient, and protected crossing for pedestrians and cyclists at the intersection of Wisconsin Ave / Willow Lane / Bethesda Ave.
    d. Separating trail users from non-trail users in areas where a large number of non-trail users are likely to be present.

e. Minimizing the number of driveways that cross the trail.
f. Completing the surface alignment prior to completion of the Purple Line as part of the Bethesda Bikeway and Pedestrian Facilities CIP project.

13. The following treatments are the level of investment that we recommend as the starting point for the working group:
    a. Evaluate the design of the surface alignment through Elm Street Park to ensure that it will safely accommodate the anticipated heavy use, and to minimize negative impacts to park users and facilities.
    b. The working group should identify a preferred location for the path on 47th Street.
    c. At the intersection of 47th Street and Willow Lane create a four-way stop with a raised crosswalk due to the expected volumes of trail users.
    d. The working group will determine on which side of the road to locate the trail on Willow Lane.
    e. Eliminate conflicts for pedestrians crossing Wisconsin Ave. This could be accomplished by:
        - Prohibiting left turns from Bethesda Ave to northbound Wisconsin Ave and prohibiting right turns on red in the southbound direction, to eliminate all conflicts between trail users and motor vehicles.
        - Providing a pedestrian only phase across Wisconsin Ave.
    f. Realign the crosswalk on the north leg of the Wisconsin Ave / Willow Lane intersection so that it connects directly to Willow Lane.
    g. On Bethesda Avenue:
        - Locate the trail on the north side of Bethesda Ave
        - Remove a row of parking between Wisconsin Ave and Woodmont Ave as recommended in the sector plan.
        - Implement the following typical section on Bethesda Ave between the existing curbs: from north to south include a 12 ft trail, 2 ft buffer, two 11 ft traffic lanes, and an 8 ft row of parking.
        - Consolidate driveways to the extent possible.
14. The master-planned surface route should remain on the north side of Bethesda Avenue and any private development or public projects potentially affecting that route will be required or advised, respectively, that the Bethesda Avenue bike route needs to be accommodated until:[2]
    d. A better surface alignment is identified.
    e. We have assurance from other parties involved – including SHA and MCDOT – that they concur with the new surface alignment and will ensure that a high-quality, safe route is feasible.
    f. The master plan is amended.

[2] The bulk of this recommendation relates to how the Planning Board would determine appropriate conditions to place on any development proposed along the north side of Bethesda Ave. Should the Council prefer options that would reroute the surface alignment, a master plan amendment likely would be needed.

Attachment B: Planning Board Memo Errata Sheet

Two costs items were incorrectly reported in the November 17, 2011 memo to the Planning Board for the Capital Crescent Trail (item #3).

The cost of lighting to the Illuminating Engineering Society of North American (IESNA) standard for vertical illuminance should be changed from "$7.3 million" to "$4.2 million" in the following locations:

- Page 4, second bullet
- Page 7, fourth paragraph

The cost of the master-planned Rock Creek Trail connection should be changed from "$1.4 million" to "$1.9 million" on:

- Page 4, fifth paragraph
- Page 16, sixth paragraph

TRAN

GO
CC
SBF
LL

The Town of Chevy Chase

066836

February 22, 2012

Montgomery County Councilmembers
100 Maryland Avenue
Rockville, MD 20850

Dear County Councilmembers:

As you know, the County's Planning Board has asked the Maryland Transit Authority to consider other design options for the Bethesda/Chevy Chase Purple Line station in order to accommodate both a trail and trains in the narrow tunnel under Wisconsin Avenue. While we applaud the Planning Board's open-mindedness and creativity in thinking about options that would allow the trail to continue safely through the tunnel—something we strongly support—we do oppose the particular option that would place the station completely outside of the tunnel, adjacent to Town residences.

In the area outside of the tunnel, the available right of way is just 33 feet opening up only to 66 feet. We believe that placing a station in this particularly narrow area would put it within 50 feet of actual residences. We can't help but believe there is the potential for property condemnation, as well as increased lighting, noise and safety concerns for those properties. Inevitably, any station is accompanied by extensive platform lighting, general station noises such as PA systems, people talking, and trains breaking.

Currently – without a station adjacent to the Town – the State's noise estimates for this area are within one decibel point of the Federal Transit Administration's Severe Impact Threshold, which would require much higher levels of mitigation than the Moderate Impact Threshold at which the Town's impacts are currently estimated (see attached study by MTA, September 19, 2011). It is clear that the noise levels associated with a station outside of the tunnel would tip that equation and force further, more costly, mitigation measures adding more costs to the overall project.

While these issues alone should be enough to condemn this option, a station located outside of the tunnel also will have negative impacts for users of the Purple Line. In particular, placing the station at this location would add a several minute walk to the elevators allowing for a transfer between the Purple Line and Metro's Red Line. Lessening connectivity to Metro will have

55

4301 Willow Lane • Chevy Chase, Maryland 20815 • 301/654-7144 • Fax 301/718-9631 • townoffice@townofchevychase.org
www.townofchevychase.org

serious consequences for overall ridership estimates. Likewise, the station would be that much farther from downtown Bethesda, another factor used in estimating ridership. Additionally, it remains unclear how this proposed station would interact with the Trail, bringing into question the overall viability of the current Trail design configuration in this area. The County and State went to great lengths to move the Trail to the north side of the alignment but this will potentially interfere with station access at Pearl Street.

At this time, the Town does not have enough information to weigh in on the potential station location at the Air Rights building adjacent to Elm Street Park. However, we are concerned about what negative changes could occur at Elm Street Park, particularly the playground that has been promised to the larger community as part of a development project at Pearl Street.

We have attached for your review our testimony as presented to the County Planning Board explaining why we feel a tunnel option for the Trail remains so important. In particular, we would like to highlight the detailed information—prepared by the County itself—as to why this section of Wisconsin Avenue is a dangerous "high incidence area" and wholly inappropriate for a heavily-trafficked Trail crossing.

The locally preferred alternative was presented and approved by the community with the tunnel-trail option and an above-grade crossing at Connecticut Ave. We hope and expect that our elected representatives will keep faith with the community by adhering closely to the promises made when the project was sold to the community and adopted by the Council. On behalf of the Town, thank you for your continuing commitment to do so.

Sincerely,

David J. Lublin

David Lublin
Mayor

DRAFT

Capital Crescent Trail

Category	Transportation	Date Last Modified	February 24, 2012
Subcategory	Pedestrian Facilities/Bikeways	Required Adequate Public Facility	No
Administering Agency	Transportation	Relocation Impact	None
Planning Area	Bethesda-Chevy Chase/Silver Spring	Status	Planning Stage

Expenditures Schedule ($000)

Cost Element	Total	Thru FY11	Est. FY12	Total 6 Years	FY13	FY14	FY15	FY16	FY17	FY18	Beyond 6 Years
Planning, Design, and Supervision	6,000	0	0	6,000	0	0	3,000	0	0	3,000	0
Land	0	0	0	0	0	0	0	0	0	0	0
Site Improvements and Utilities	0	0	0	0	0	0	0	0	0	0	0
Construction	42,100	0	0	21,600	0	0	0	8,700	8,700	4,200	20,500
Other	0	0	0	0	0	0	0	0	0	0	0
Total	**48,100**	**0**	**0**	**27,600**	**0**	**0**	**3,000**	**8,700**	**8,700**	**7,200**	**20,500**

Funding Schedule ($000)

GO Bonds	48,100	0	0	27,600	0	0	3,000	8,700	8,700	7,200	20,500
Total	**48,100**	**0**	**0**	**27,600**	**0**	**0**	**3,000**	**8,700**	**8,700**	**7,200**	**20,500**

Operating Budget Impact ($000)

Energy											
Maintenance											
Program Staff											
Net Impact											

DESCRIPTION

This project provides for the funding of the Capital Crescent Trail, including the main trail from Elm Street Park in Bethesda to Silver Spring as a largely 12'-wide hard-surface hiker-biker path, connecting paths at several locations, a new bridge over Connecticut Avenue, a new underpass beneath Jones Mill Road, supplemental landscaping and amenities, and lighting at trail junctions, in underpasses, and at other critical points.

ESTIMATED SCHEDULE

The interim trail along the Georgetown Branch right-of-way between Bethesda and Lyttonsville will be upgraded to a permanent trail in FYs16-18, concurrent with the construction of the Purple Line in that segment. The new extension of the trail on the northeast side of the Metropolitan Branch between Lyttonsville and the Silver Spring Transit Center will be built in FYs19-20. The Metropolitan Branch segment will be open concurrent with the planned opening of the Purple Line in 2020.

JUSTIFICATION

This trail will be part of a larger system of trails to enable non-motorized travel around the Washington region. This trail will connect to the existing Capital Crescent Trail from Bethesda to Georgetown, the Metropolitan Branch Trail from Silver Spring to Union Station, and the Rock Creek Bike Trail from northern Montgomery County to Georgetown. The trail will serve pedestrians, bicyclists, joggers, and skaters, and will be American with Disabilities Act of 1990 (ADA) Plans & Studies: Bethesda CBD Sector Plan, Purple Line Functional Master Plan

Appropriation and Expenditure Data		
Date First Appropriation		($000)
First Cost Estimate Current Scope (FY13)		48,100
Last FY's Cost Estimate		0
Appropriation Request	FY13	0
Appropriation Request Est.	FY14	0
Supplemental Approp. Request		0
Transfer		0
Cumulative Appropriation		0
Expenditures/Encumbrances		0
Unencumbered Balance		0
Partial	FY11	0
New Partial Closeout	FY12	0
Total Partial Closeout		0

Coordination

Maryland Transit Administration
Department of Transportation
State Highway Administration
M-NCPPC
Bethesda Bikeway and Pedestrian Facilities
Coalition for the Capital Crescent Trail

Map