

2 ALTERNATIVES EVALUATED

Since the publication of the Final Environmental Impact Statement (EIS) in December 2004, the design of the project's initial construction phase—the Extension to Wiehle Avenue—has evolved from conceptual plans to preliminary engineering. The additional engineering analysis has yielded more detailed information on site conditions, soils, and anticipated construction techniques. This information, in combination with efforts to reduce project costs, has resulted in a number of changes to the plans presented in the Final EIS.

This chapter describes the two alternatives being evaluated in this Environmental Assessment (EA): the **Final EIS Wiehle Avenue Extension** and the **Preliminary Engineering (PE) Wiehle Avenue Extension**. The first two sections provide a description of the alignment, stations, yard and ancillary facilities, and Metrorail operations and ridership for each alternative. Section 2.1 describes the Wiehle Avenue Extension that was evaluated in the Final EIS and Section 2.2 describes the design changes adopted during Preliminary Engineering (the Preliminary Engineering Wiehle Avenue Extension). In determining the potential environmental effects associated with these design refinements, the impacts reported in the Final EIS serve as the basis for comparison. Section 2.3 provides a summary of the capital and operating costs for each alternative, and Section 2.4 provides a summary of the design refinements.

2.1 FINAL EIS WIEHLE AVENUE EXTENSION

This section includes a description of the stations, alignment, yard facilities, ancillary facilities, operations, and ridership associated with the Final EIS Wiehle Avenue Extension. The Final EIS Wiehle Avenue Extension would be constructed from the Metrorail Orange Line in the vicinity of the West Falls Church Station to Wiehle Avenue, which would function as an interim terminal station. The Final EIS Wiehle Avenue Extension is scheduled to be completed and operational by late 2011.

2.1.1 Final EIS Wiehle Avenue Extension Alignment

The **Final EIS Wiehle Avenue Extension** would connect to the Orange Line between the East Falls Church and West Falls Church stations. The tracks would diverge from the Orange Line tracks on flyover structures, turning north and first passing over the westbound lanes of I-66, then over the outbound bus ramp between the West Falls Church Station and the Dulles Connector Road. The tracks would continue on an aerial structure to the median of the Dulles Connector Road, returning to grade just south of Idylwood Road.

The alignment would leave the Dulles Connector Road at the Route 123 interchange, transitioning to an aerial structure near Chain Bridge Road and passing through the Route 123 interchange on flyover bridges. The aerial alignment would then proceed along the north side of Route 123 to the Capital

Beltway (I-495), with an aerial station (Tysons East Station) located in the northwest quadrant of the intersection of Scotts Crossing Road/Colshire Drive and Route 123.

From the Tysons East Station, the alignment would proceed west, passing over the Capital Beltway and continuing to the core of Tysons Corner. The alignment would include two stations in the core of Tysons Corner: Tysons Central 123 and Tysons Central 7. Neither of these stations would have Kiss & Ride and park-and-ride facilities, because the stations are intended to facilitate pedestrian access to and from the surrounding activity centers.

After passing through the Tysons Central 123 Station, the alignment would transition underground approximately 400 feet to the west. It would travel underground along the north side of Route 123 to the Route 123/Route 7 interchange, curve westward, and then continue underground along the south side of Route 7 to the Tysons Central 7 Station which is located on the south side of Route 7, between the Route 7/Westpark Drive intersection and the Route 123/Route 7 interchange. The underground alignment would include a double crossover outbound of the Tysons Central 7 Station, just east of Westpark Drive.

West of Westpark Drive, the alignment would transition from an underground to an aerial alignment, running along the south side of Route 7 to an aerial station, Tysons West Station, at the western edge of Tysons Corner. West of the Tysons West Station, the aerial alignment would continue along Route 7. At the Dulles International Airport Access Highway (DIAAH), the alignment would pass over the interchange ramps and continue west on the DIAAH, transitioning to grade approximately 1,600 feet west of Route 7.

The alignment would continue west at-grade in the median of the DIAAH. In the vicinity of Trap Road, the alignment would incorporate various design provisions so that the possible future construction of a median station at Wolf Trap National Park for the Performing Arts (Wolf Trap) would not be precluded. The alignment would continue at-grade in the DIAAH median to the Wiehle Avenue Station, a median station located approximately 500 feet west of the Wiehle Avenue overpass, where the Dulles Toll Road was previously realigned to accommodate a transit station. The DIAAH would be similarly realigned for the station and its tail tracks.

The Final EIS Wiehle Avenue Extension would end at a point approximately 2,000 feet west of the Wiehle Avenue Station. This section would include tail tracks with a pocket track.

2.1.2 Final EIS Wiehle Avenue Extension Stations

The Final EIS Wiehle Avenue Extension would include five new Metrorail stations:

- **Tysons East Station.** This station is an aerial facility located at the intersection of Scotts Crossing Road/Colshire Drive and Route 123 that would be accessible from the street level on the north side of Route 123, and from a pedestrian bridge touching down on the south side of Route 123 near Colshire Drive. The station facilities along Colshire Drive would include bus bays and Kiss & Ride spaces.
- **Tysons Central 123 Station.** This station is an aerial facility located in the core of Tysons Corner at the intersection of Route 123 and Tysons Boulevard and would be partially aerial and partially on retained fill. The station would have two entrances, one in the northwest quadrant of the intersection of Tysons Boulevard and Route 123, and one at Tysons Corner Center mall on the south side of Route 123. The north station facilities would include bus

bays and a new bus-only turn lane along the west side of Tysons Boulevard. The south station facilities would include bus facilities on the north side of the mall to provide feeder bus service to the station.

- **Tysons Central 7 Station.** This station would be located underground near Pike 7 Plaza on the south side of Route 7, between the Route 7/Westpark Drive intersection and the Route 123/Route 7 interchange. The station would be approximately 75 feet below ground, with entrances on the north and south sides of Route 7. Underground walkways would provide access to the station. The Tysons Central 7 Station would not include off-street bus bays.
- **Tysons West Station.** This station is an aerial facility located on the south side of Route 7 between Westwood Center Drive and Spring Hill Road, with station entrances at the south end of the station near Spring Hill Road and a pedestrian overpass over Route 7. Off-street bus bays and a Kiss & Ride area would be located between Tyco Road and Spring Hill Road, with access into the facilities via Tyco Road. This would be a new entrance and would be protected by a new traffic signal on Tyco Road.

A 500-space park-and-ride facility may be constructed near the bus bays and short-term parking as part of future redevelopment. The Tysons West Station would also include a pocket track west of the station platform. Pocket tracks would be located between the main tracks and would be used to store out-of-service trains or equipment, and to provide trains turn-around capability for short-run service.

- **Wiehle Avenue Station.** This station is an at-grade facility in the median of the DIAAH west of the Wiehle Avenue overpass. Station facilities on the south side of the Dulles Toll Road would include five bus bays on the eastbound ramp, an entrance pavilion, and a paved walkway extending from the pavilion to Wiehle Avenue. On the north side of the Dulles Toll Road, the pedestrian bridge would connect to station facilities, including twelve revenue bus bays, Kiss & Ride spaces, and a multi-level park-and-ride structure. The station facilities would replace the current Reston East Park-and-Ride and would be designed to accommodate up to 2,300 parking spaces and future development. A second vehicular entrance to the station facilities would be provided by an extension of the present access road and conversion of a private road to public use. For the Final EIS Wiehle Avenue Extension, the Wiehle Avenue Station would serve as an interim terminal station.

2.1.3 Final EIS Wiehle Avenue Extension Yard Facilities

The Final EIS Wiehle Avenue Extension would include a new yard lead into the existing West Falls Church Storage and Inspection (S&I) Yard. The yard lead would connect to the loop track on the north side of the yard, extending eastward and passing under the eastbound travel lanes of the Dulles Connector Road before surfacing in the median of the Dulles Connector Road. Here, the yard lead would be located between the inbound and outbound revenue tracks.

In addition, eight storage tracks would be added within the loop track of the West Falls Church S&I Yard, and a cover box would be constructed over the yard's existing loop track and a portion of the new yard lead. The storage tracks would have the capacity to store 42 rail cars, with room to maneuver an additional 6 cars, for Metrorail operations in the Dulles Corridor.

The Final EIS Wiehle Avenue Extension would also require expansion of the maintenance building at the yard. Improvements to the maintenance building would include the addition of two service tracks with four maintenance bays, which could service up to eight rail cars. Expansion of the maintenance building would require relocation of the current vehicle access road and construction of a retaining wall adjacent to the westbound lanes of I-66. Some employee parking, loading docks, and ramps would also be relocated within the yard. These yard improvements would be located within existing public rights-of-way.

The Final EIS Wiehle Avenue Extension would not include any improvements or construction activities at the future S&I Yard Site 15, which would be constructed as part of the project's second phase, the Extension to Dulles Airport/Route 772.

2.1.4 Final EIS Wiehle Avenue Extension Ancillary Facilities

The Final EIS Wiehle Avenue Extension would include additional ancillary facilities, such as traction power substations, tie-breaker stations, and stormwater management facilities. Traction power substations are typically one-story buildings of approximately 8,000 square feet that house facilities to supply direct current power for the rail system. Tie-breaker stations are one-story buildings of approximately 900 square feet that house equipment to break the rail line into sections, allowing power in one or more sections to be shut down for maintenance without affecting the power supply of the rest of the system.

The traction power substations and tie-breaker stations included in the Final EIS Wiehle Avenue Extension were sited based on systems engineering requirements, environmental conditions, and right-of-way constraints. A power analysis was conducted to determine the number and size of substations required and the optimal spacing for these stations. Based on this analysis, the Final EIS Wiehle Avenue Extension would include 11 traction power substations and 4 tie-breaker stations.

The Final EIS Wiehle Avenue Extension would also require 11 stormwater management facilities, most located along the Dulles Toll Road.

2.1.5 Final EIS Wiehle Avenue Extension Operations

With the opening of the Final EIS Wiehle Avenue Extension, the Dulles Corridor Metrorail service would operate as a new line between the Wiehle Avenue Station and the Stadium-Armory Station in the District of Columbia. This service would operate in both directions throughout the entire day and be fully integrated with the existing Orange Line service. The supplemental Orange Line service (known as "trippers") that currently operates during peak periods between the West Falls Church and New Carrollton stations would be discontinued and replaced with a new supplemental service operating between the Vienna and Largo stations. These changes would provide current Orange Line riders with today's service levels during peak-periods and additional service during off-peak periods for riders between the East Falls Church and Stadium-Armory stations.

Service on the Dulles Line would have the same operating hours as today's Metrorail service. In the opening year (2011), the Dulles Line would operate with a mix of six- and eight-car trains during peak periods. In the off-peak periods, four-car trains would be used. In the forecast year (2025), the Dulles Line would operate with all eight-car trains during peak periods. In the off-peak periods, four-car trains would be used. Consistent with the Washington Metropolitan Area Transit Authority's (WMATA's) future operating plan for the entire Metrorail system, the Dulles Line would operate on 7-minute

headways (eight to nine trains per hour) in the peak hours (6:00 to 9:30 a.m. and 3:30 to 6:30 p.m. on weekdays) and 12-minute headways (five trains per hour) during off-peak hours, except after 10:00 p.m., when trains would run every 20 minutes. Combined with planned changes to the headways and routing of trains on the Orange, Blue, and Yellow Lines, the Dulles Corridor service would result in approximately 26 to 27 trains per hour through the Rosslyn portal during peak periods. During the off-peak hours and over weekends, Orange Line, Blue Line, and Dulles Corridor service would run on 12- to 20-minute headways (9-15 trains per hour).

The Final EIS Wiehle Avenue Extension would also include express and feeder bus service to the new Metrorail stations along the Dulles Corridor. Express buses would provide connections between Wiehle Avenue Station, the Herndon-Monroe transit center, Dulles Airport, the Dulles North Transit Center, and a new transit center in the vicinity of the future Route 772 Station. This service would have frequencies comparable to proposed Metrorail headways. Where necessary, existing bus routes would be realigned to provide better service to the proposed Metrorail stations in the corridor, and numerous routes would be eliminated and replaced by the modified routes or the Wiehle Avenue Extension service. The service frequencies would be modified for other routes to be more consistent with the new transit service in the corridor, reduce duplication of service, and in some cases to better coincide with Metrorail headways. These express and feeder bus routes would be operated by WMATA, Fairfax County, and Loudoun County.

2.1.6 Final EIS Wiehle Avenue Extension Ridership

The Final EIS Wiehle Avenue Extension is expected to generate 34,400 new transit trips in the Washington metropolitan region in the forecast year (2025). Total transit ridership in the corridor would include an average of 73,300 weekday riders, including 68,500 Metrorail riders and 4,800 express bus riders who would not transfer to Metrorail.

2.1.7 Final EIS Wiehle Avenue Extension Construction Activities

The Final EIS Wiehle Avenue Extension would connect with the Orange Line at a point between the East and West Falls Church Metrorail stations. This connection would require new special track work including turnouts and a double crossover, and some realignment of the existing Orange Line track. Due to the proximity of the new track construction to the eastbound lanes of I-66, during construction there may be limited closures of the inside shoulder and potentially the inner lanes of I-66 during off-peak and overnight periods. WMATA would be able to maintain Orange Line operations by single-tracking trains to implement such improvements. If construction would require closure of both tracks, most likely on weekends, then bus service would be provided between East Falls Church and West Falls Church stations.

Improvements at the West Falls Church S&I Yard would affect yard operations during construction. In addition, yard modifications would require work within the north concrete embankment of I-66; however, use and conveyance of I-66 right-of-way would not preclude potential improvements for I-66. The new yard lead for the Final EIS Wiehle Avenue Extension would cross under the eastbound lanes of the Dulles Connector Road and connect to the Dulles main line in the median of the Connector Road (roughly 1,000 feet north of the West Falls Church Station). Construction of this lead track would most likely use a cut and-cover technique that would require building a Dulles Connector Road temporary detour for the eastbound lanes.

At the eastern edge of Tysons Corner, construction of the aerial structure transitioning from the Dulles Connector Road to Route 123 would require temporary lane closures on both the Connector Road and Route 123. The pier placements for the aerial structure crossing Route 123 will be coordinated to not preclude future improvements to Route 123.

In Tysons Corner, the Final EIS Wiehle Avenue Extension requires slightly more than a mile of underground structure (including the Tysons Central 7 Station). This underground section may be mine-tunneled or excavated using cut and-cover techniques, except at the underground station, which would be constructed with cut-and-cover techniques only. Maintenance of traffic plans for cut-and-cover construction would require significant staging to limit extended lane closures and keep as many lanes open to traffic as possible. Temporary roadways, structures, and detours may be required to direct traffic through this area during construction along Route 7. Construction of the western portal for the underground section would require detouring the service roadway adjacent to Route 7 during construction and realigning the service road after the portal is built.

Construction of feeder bus bays and Kiss & Ride facilities associated with the Tysons Corner area Metrorail stations is expected to have minimal impacts. Construction of Kiss & Ride and bus facilities on the south side of Route 123 at the Tysons East Station may require occasional lane closures on Route 123 and Colshire Drive. At Tysons Central 123 Station, the construction of the bus bays and the bus lane on the north side of Route 123 may require brief closures of some lanes of Route 123 and Tysons Boulevard. Similarly, construction of facilities at the Tysons West Station could require occasional lane closures on Tyco Road. For all stations in Tysons Corner, construction of pedestrian bridges would include some temporary closures of lanes in the vicinity of stations. The construction of the aerial flyover segment across the eastbound lanes of the DIAAH and Dulles Toll Road would also involve limited partial closures of these roadways.

Construction of the Wiehle Avenue Extension between the DIAAH/Route 7 interchange and Wiehle Avenue would require DIAAH realignment at both the Wiehle Avenue Station and its tail track. Realignment activities, as well as construction of pedestrian bridge and station site facilities, would require occasional lane closures along the DIAAH.

2.2 PE WIEHLE AVENUE EXTENSION

This section provides a detailed description of the stations, alignment, yard facilities, ancillary facilities, operations and ridership of the PE Wiehle Avenue Extension. Except for the design revisions noted below, the PE Wiehle Avenue Extension is the same as the Final EIS Wiehle Avenue Extension. Figure 2-1 provides an overview of where the design changes occur. All of the figures referenced in this chapter are located at the end of the chapter.

2.2.1 PE Wiehle Avenue Extension Alignment

Like the Final EIS Wiehle Avenue Extension, the **PE Wiehle Avenue Extension** would connect to the Orange Line between the East Falls Church and West Falls Church stations. It would continue to the Tysons East Station along the same horizontal alignment as the Final EIS Wiehle Avenue Extension, except that the transition of the alignment from I-66 to the Dulles Connector Road would shift slightly to the east due to a change in the radius of the curve (see Figure 2-2). The vertical alignment would also be similar to the Final EIS Wiehle Avenue Extension, except that the portion of the alignment from its connection with the Orange Line to a point approximately 2,000 feet north would be lowered.

From the Tysons East Station, the PE Wiehle Avenue Extension alignment would proceed west, passing over the Capital Beltway and continuing into the core of Tysons Corner. Along this portion of the aerial alignment, American Association of State Highway and Transportation Officials (AASHTO) concrete box girders would replace the concrete segmental girders proposed in the Final EIS Wiehle Avenue Extension, except where the alignment crosses over the Capital Beltway. Figure 2-3 shows the various types of aerial structure that would be used in the Tysons Corner area.

Like the Final EIS Wiehle Avenue Extension, the PE Wiehle Avenue Extension alignment would transition underground just west of the Tysons Central 123 Station, traveling underground along the north side of Route 123 to the Route 123/Route 7 interchange and turning westward to continue under Route 7. However, under the PE Wiehle Avenue Extension alignment, the horizontal and vertical alignment would be redesigned between Route 123 and the Dulles Toll Road, a distance of approximately one mile. The horizontal alignment would shift approximately 70 feet north, from the service road south of Route 7 to the median of the existing divided roadway. The vertical profile of the tunnel section and the Tysons Central 7 Station would be raised by approximately 45 feet, replacing the underground Tysons Central 7 Station with an at-grade station in the Route 7 median. The portal located between Westpark Drive/Gosnell Road and Spring Hill Road in the Final EIS design would also shift to the median of Route 7 and be relocated approximately 2,300 feet to the east (near the Route 7/Route 123 interchange). As a result of these changes, the tunnel portion of the Route 7 alignment would be shortened in length from roughly 5,300 feet to 3,000 feet and the length of the aerial alignment along Route 7 would be increased. For this portion of the aerial alignment, AASHTO box girders would replace the concrete segmental girders proposed in the Final EIS Wiehle Avenue Extension, except at major intersections (see Figure 2-3). The traction power substation and ventilation building associated with the station would also move from the southern edge of Route 7 to the median. In addition, the underground double crossover that would be located outbound of the Tysons Central 7 Station under the Final EIS Wiehle Avenue Extension would be moved to the section of alignment between Tysons Central 123 station and the outbound portal under the PE alternative. The changes in the alignment and tunnel segment in central Tysons Corner are shown in Figure 2-4.

West of the Tysons Central 7 Station, the PE Wiehle Avenue Extension alignment would transition from an underground to an aerial alignment in the median of Route 7 to provide vehicular clearance at Gosnell Road/Westpark Drive.

Construction of the PE Wiehle Avenue Extension would include roadway modifications to Route 7. Based on a formal request from Fairfax County and coordination with the Virginia Department of Transportation (VDOT), the reconstructed Route 7 would not include the two-way service roads that currently parallel the roadway on its north and south sides. Instead, an additional through/continuous right-hand turn lane would be added to Route 7 in either direction in order to address on-going concerns regarding safety and operational issues associated with the service roads. Figure 2-5 illustrates the proposed change in the configuration of Route 7 under the PE Wiehle Avenue Extension.

The reconstructed Route 7 would also include left-turn lanes in both directions at key intersections that are currently congested during peak periods, providing additional storage capacity in locations where queues typically overflow into adjacent travel lanes. Left turns and U-turns would be limited to these intersections; all intermediate openings in the median would be eliminated. The Westpark Drive/Gosnell Road and Tyco Road/Westwood Center Drive intersections would have two left-turn lanes in both directions, while the Spring Hill Road intersection would include two left-turn lanes in the eastbound direction and one left-turn lane heading westbound. The left-turn lanes at Tyco Road (westbound) and

Spring Hill Road (eastbound) would flank the aerial structure of the Tysons West Station, adding approximately 50 feet to the roadway width in this area.

The PE Wiehle Avenue Extension alignment would continue west from the Tysons West Station in the median of Route 7. Because the alignment would be in the median of Route 7 rather than along the south edge of the roadway, the aerial guideway crossing of the alignment over the exit ramps from the eastbound Dulles Toll Road/DIAAH to eastbound Route 7 would not be required under this alternative.

Like the Final EIS Wiehle Avenue Extension, the PE Wiehle Avenue Extension alignment would continue westward in the median of the DIAAH and would not preclude the possible future construction of a median station at Wolf Trap. However, this portion of the alignment would more closely follow the existing grade of the roadway than that proposed for the Final EIS Wiehle Avenue Extension, reducing the costs for retaining walls and cut and fill. The PE Wiehle Avenue Extension would continue at-grade in the DIAAH median to the Wiehle Avenue Station, where the Dulles Toll Road was previously realigned to accommodate a transit station. The DIAAH would be similarly realigned for the station and its tail tracks.

The PE Wiehle Avenue Extension would end at a point approximately 2,000 feet west of the Wiehle Avenue Station. Like the Final EIS Wiehle Avenue Extension, this section would include tail tracks with a pocket track.

2.2.2 PE Wiehle Avenue Extension Stations

The same five stations are included in the PE Wiehle Avenue Extension as in the Final EIS Wiehle Avenue Extension. Changes to each of the five stations occurred in Preliminary Engineering as described below. Figures 2-6 through 2-15 show both the change in profile and station layout in comparison to what was included in the General Plans and Final EIS.

- **Tysons East Station.** The station platform would be shifted 200 feet to the west and the height of the structure supporting the aerial station reduced to prevent the need to place support piers in Scotts Run. At the time the Final EIS was published, detailed engineering had not yet advanced to the point where the exact placement of support piers was established, and it was therefore assumed that this section of alignment would have no impact on Scotts Run. Once it was determined that the Final EIS alignment would require the placement of piers in the stream, the station plans were revised to eliminate these new impacts.

Although the number of bus bays would remain the same, the Kiss & Ride spaces would be reduced by ten from those included in the Final EIS Wiehle Avenue Extension to further decrease the station's impact on Scotts Run. The length of the station canopy covering the Tysons East Station platform would be reduced from 600 feet to approximately 300 feet (a level of coverage typical at most Metrorail stations).

Shifting the station platform to the west would consequently locate the station farther from the south entry building, increasing the length of pedestrian bridge by approximately 50 feet. The width of the pedestrian bridge would be reduced from 23 feet to 12 feet. The bridge structure would be raised fifteen feet to be at the same floor elevation with the mezzanine and would be enclosed with woven wire mesh panels rather than glazing, reducing the weight of the structure and eliminating the need for mechanical ventilation and a sprinkler system. In

addition, the second elevator at the south entry building would be eliminated. The single elevator entrance complies with code and Americans with Disabilities Act (ADA) requirements. In the event of an elevator outage at either entrance, bus service to adjacent entrances would be provided to maintain accessibility for disabled passengers.

- **Tysons Central 123 Station.** The station fare collection facilities would be shifted to ground level below the platform, removing the need for a third level and significantly reducing the overall height of the station and the cost of construction. As a result, the pedestrian bridge would be lowered 20 feet. Transit passenger access from the pedestrian bridge as well as from a pedestrian network of aerial walkways and plazas planned for adjacent developments would be more circuitous, requiring passengers to proceed down to street level in order to enter the station and then go up to reach the aerial platform.

Like the Tysons East Station, the length of the Tysons Central 123 station canopy would be reduced from 600 feet to approximately 300 feet, and the width of the pedestrian bridge would be reduced from 23 feet to 12 feet and enclosed with woven wire mesh panels rather than glazing. The bus bays would be relocated from Route 123 to Tysons Boulevard, where the site gradient is somewhat better suited for ADA-compliance.

The second elevator and escalator at both the north and south entry pavilions of the Tysons Central 123 Station would be eliminated. In the event of an elevator outage at either entrance, bus service to adjacent entrances would be provided to maintain accessibility for disabled passengers.

- **Tysons Central 7 Station.** Like the Route 7 segment of the PE Wiehle Avenue Extension alignment, the Tysons Central 7 Station would shift from the south side of Route 7 to the median. The platform would shift approximately 300 feet east, although the location of the station entry buildings would remain unchanged. Because the station would be partially at-grade and partially above grade rather than underground, a portion of the underground ventilation equipment included in the Final EIS alternative would be eliminated, the underground walkways for pedestrian circulation would be replaced by pedestrian bridges, and a 300-foot station canopy would be added. The station incorporates the tunnel portal in a masonry structure, and masonry walls for much of its length.

Like the other stations in this portion of the alignment, the width of the pedestrian bridge would be 12 feet and enclosed with woven wire mesh panels. The second elevator at both the north and south station entrances of the Tysons Central 7 Station would be eliminated, as would the second escalator at both the north and south station entrances. In the event of an elevator outage at either entrance, bus service to adjacent entrances would be provided to maintain accessibility for disabled passengers.

- **Tysons West Station.** The aerial platform would shift from the south side of the road to the median of Route 7; the north entrance pavilion would be shifted to the south, closer to the station platform; and the bus facilities would be relocated closer to the station. The location of the south entrance pavilion would remain the same as it was under the Final EIS alternative. Due to these changes, the length of the pedestrian bridge connecting the platform to station facilities on the north side of Route 7 would be reduced by about 250 feet, while the south pedestrian bridge would be increased to 85 feet. West of the station platform, the

pocket track included in the Final EIS Wiehle Avenue Extension would be replaced by a double crossover in the same location, allowing track centers to narrow more quickly outbound of the station, reducing guideway costs.

In addition, the bus bays on the north side of Route 7 would be relocated from an interior parcel between Tyco Road and Spring Hill Road to a bus pull-off lane on the north side of Route 7. The bays would be redesigned as a continuous curb-side boarding rather than the sawtooth bays included in the Final EIS alternative, with room for five buses along Route 7. The Kiss & Ride access road would be realigned to minimize impacts to surrounding properties, although the location of the Kiss & Ride lot would remain unchanged.

Like the other stations in this portion of the alignment, the length of the Tysons West station canopy would be reduced from 600 feet to approximately 300 feet, and the width of the pedestrian bridge would be reduced from 23 feet to 12 feet and enclosed with woven wire mesh panels rather than glazing. The second elevator at both the north and south station entrances of the Tysons West Station would also be eliminated. In the event of an elevator outage at either entrance, bus service to adjacent entrances would be provided to maintain accessibility for disabled passengers.

- **Wiehle Avenue Station.** The facilities on the north side of the Dulles Toll Road would be modified somewhat, with orientation of the park-and-ride structure and the bus bays rotated 90 degrees to align north-south, improving circulation. The total number of bus bays (12) and parking spaces (2,300) would remain the same. With the new configuration, the length of the pedestrian bridge is reduced from roughly 525 feet to roughly 275 feet, because it would no longer span the bus bays to reach the park and ride garage. The station platform would also be shifted under the mezzanine, approximately 200 feet to the east.

Like the other stations in this portion of the alignment, the length of the Wiehle Avenue station canopy would be reduced from 600 feet to approximately 300 feet, although the effective coverage of the station platform would be approximately 400 feet, due to the shift of the platform under the mezzanine. The width of the pedestrian bridge would be reduced from 23 feet to 12 feet and enclosed with woven wire mesh panels rather than glazing, and the second elevator at the south station entrance would also be eliminated.

2.2.3 PE Wiehle Avenue Extension Yard Facilities

Like the Final EIS Wiehle Avenue Extension, the PE Wiehle Avenue Extension would include a new yard lead into the West Falls Church S&I Yard. The yard lead would connect to the loop track on the north side of the yard, extending eastward and passing under the eastbound travel lanes of the Dulles Connector Road before surfacing in the median of the Connector Road. Here, the lead would be located between the inbound and outbound revenue tracks. In addition, eight storage tracks would be added within the loop track of the existing West Falls Church S&I Yard, and a cover box would be constructed over the yard's existing loop track and a portion of the new yard lead. The storage tracks would have the capacity to store 42 rail cars, with room to maneuver an additional 6 cars, for Metrorail operations in the Dulles Corridor.

However, the PE Wiehle Avenue Extension would not include expansion of the maintenance building, nor would it include the roadway reconstruction, utility relocation, and other improvements associated

with the maintenance building expansion. Instead, maintenance for the PE Wiehle Avenue Extension fleet would be conducted at existing WMATA facilities. These facilities will provide sufficient shop capacity to maintain the Dulles Corridor fleet until the S&I Yard is constructed at the Y-15 site on Dulles Airport property during the project's second phase. A stormwater management facility would also be added at the West Falls Church Yard. Figure 2-16 shows the changes to the plan for the West Falls Church Yard under the PE Wiehle Avenue Extension. Dominion Virginia Power has proposed to construct a new electric transmission substation within the yard site. In addition to providing additional capacity for its customers, this substation would be used to supply electrical power to the Metrorail facilities. The new substation location, which is located on WMATA property, must be approved by Fairfax County and WMATA. Its construction would comply with all applicable regulations.

A portion of the future Y-15 site on Dulles Airport property (approximately 36 acres) would be used for construction staging, precast concrete fabrication, and precast storage for the PE Wiehle Avenue Extension. The site would be used to stockpile soil from the excavation and tunneling activities in Tysons Corner. The excavated soil would be stored for possible later reuse as fill, or possibly to construct a berm along Old Ox Road (Route 606) to screen future yard operations. All soil stored on this site would be placed to avoid any known wetlands and with proper sediment and erosion control. Figure 2-17 depicts the proposed layout of the Y-15 site for these uses. In addition, soil will be placed on this site in coordination with MWAA to ensure soil compatibility with local conditions.

2.2.4 PE Wiehle Avenue Extension Ancillary Facilities

Like the Final EIS Wiehle Avenue Extension, the PE Wiehle Avenue Extension would include additional ancillary facilities, such as traction power substations, tie-breaker stations, and stormwater management facilities. A new power analysis was conducted to reevaluate the number and size of substations required and the optimal spacing for these stations. This analysis recommended no change in the number, size, or location of these facilities; the PE Wiehle Avenue Extension would include the same 11 traction power substations and the same 4 tie-breaker stations included in the Final EIS Wiehle Avenue Extension.

The PE Wiehle Avenue Extension would require 12 stormwater management facilities, one more than the Final EIS Wiehle Avenue Extension. Two new stormwater management facilities—one at the West Falls Church S&I Yard and one on the south side of the DIAAH near the end of Chathams Ford Drive—would be added, and the stormwater management facility planned for the north side of the DIAAH west of Hunter Mill Road would be removed. The locations of stormwater management facilities under the Final EIS Wiehle Avenue Extension and the PE Wiehle Avenue Extension are shown in Figure 2-18. No changes in the capacity or size of ponds are anticipated.

Finally, the PE Wiehle Avenue Extension would require two ventilation structures that were not identified as part of the Final EIS Wiehle Avenue Extension. One ventilation structure would be located on top of the outbound portal located just west of the Tysons Central 123 Station (see Figure 2-8). The other ventilation structure would be incorporated within the Tysons Central 7 Station and would be located at the eastern end of the station, with the height of the ventilation structure about the same as the station canopy (see Figure 2-10).

2.2.5 PE Wiehle Avenue Extension Operations

The operating plans for trains running on the Dulles Line and the existing Orange Line would be the same as for the Final EIS Wiehle Avenue Extension (see Section 2.1.5).

In general, the express and feeder bus service included in the Final EIS Wiehle Avenue Extension would remain unchanged for the PE Wiehle Avenue Extension. However, in the Tysons Corner area, ten feeder bus routes would be re-routed due to the relocation of the bus bays at Tysons West Station. These route changes would be minor, and the total number of feeder bus routes would not change. Service frequencies on the ten routes would remain the same.

For some circulator routes, schedules would be modified to stagger the arrival of buses at Tysons West Station. For the Final EIS, all circulators were scheduled to arrive at Tysons West at the same time. Staggering the bus arrival times would allow both revenue service and layovers to be accommodated with five bus bays.

2.2.6 PE Wiehle Avenue Extension Ridership

The preliminary engineering design refinements would not result in changes to the number of stations for the project or the Metrorail operating plan for service on the Dulles Corridor line. The minor platform shifts for several stations in Tysons Corner would not affect the locations of the entrance pavilions for stations. In addition, the bus re-routings required by the modifications at Tysons West Station would not change bus running times, and proposed headways for each route would be the same. Therefore, the PE Wiehle Avenue Extension would have the same projected ridership as that presented for the Final EIS Wiehle Avenue Extension. Ridership is summarized in Section 2.1.6 of this chapter.

2.2.7 PE Wiehle Avenue Extension Construction Activities

The construction activities for the PE Wiehle Avenue Extension would be generally similar to and include those documented above in Section 2.1.7 for the Final EIS Wiehle Avenue Extension. Construction of the underground section would be reduced from approximately 1.1 miles to slightly more than one-half mile and the Tysons Central 7 Station would now be constructed at-grade.

Based on the construction plan developed for the PE Wiehle Avenue Extension during preliminary engineering, the number of construction staging areas required has increased from eight to ten. Construction staging areas required for the PE Wiehle Avenue Extension include one inside I-66/Dulles Connector Road interchange; one inside the Route 123/Dulles Connector Road interchange; one on the north side of Route 123 at Scotts Crossing Road; one in the median of I-495 north of the I-495/Route 123 interchange; one inside the I-495/Route 123 interchange; one on the north side of Route 123 between Tysons Boulevard and International Drive; two inside the DIAAH/Route 7 interchange; one at the Reston East Park-and-Ride facility west of Wiehle Avenue; and one at S&I Yard Site 15 at Dulles Airport. The locations of these construction staging areas are shown in Figure 2-19.

In addition, more information is now known about temporary easements that would be needed during construction and for placement of utilities. The changes in the predicted construction staging areas and the new information regarding easements are presented in further detail in Chapter 3, Section 3.1 (Displacements and Relocations).

2.3 CAPITAL AND OPERATING COSTS

This section outlines the difference in the estimated capital and operating costs between the Final EIS Wiehle Avenue Extension versus the PE Wiehle Avenue Extension and summarizes the current financial plan for the project. The difference in costs of the two alternatives is due to a combination of factors,

including the design refinements, a better understanding of the planned construction approach, and changes in the cost of materials, labor, and fuel. In addition, the capital cost estimate for the PE Wiehle Avenue Extension includes short-term financing costs required to bridge the gap between the timing of construction and the availability of federal funds.

2.3.1 Final EIS Wiehle Avenue Extension Costs

The estimated total capital costs of the Final EIS Wiehle Avenue Extension are approximately \$1.52 billion in year of expenditure (YOE) dollars. This cost estimate does not include short-term financing costs for the project which were not known at the time the Final EIS was published in December 2004. The incremental annual operating and maintenance costs for the Final EIS Wiehle Avenue Extension in 2011 and 2025 (over the No Build Alternative) are estimated to be \$47.47 million and \$67.64 million (YOE dollars), respectively.

2.3.2 PE Wiehle Avenue Extension Costs

The PE Wiehle Avenue Extension has an estimated capital cost of \$1.84 billion (YOE dollars), which includes short-term financing costs for the project required to bridge the gap between the timing of construction and the availability of federal funds. The current estimate represents a 20 percent increase over the projected cost reported in the Final EIS. This increase is based on several factors, including a more detailed design, a better understanding of the planned construction approach, and changes in right-of-way, materials, labor, and fuel costs. The incremental annual operating and maintenance costs for the PE Wiehle Avenue Extension over the No Build Alternative are the same as reported in the Final EIS: are estimated to be \$47.47 million (YOE dollars) in 2011 and \$67.64 million (YOE dollars) in 2025.

2.3.3 Summary of Financial Plan

DRPT and its funding partners have developed a comprehensive financial plan for the project. Funding sources for both the project's capital and operating plans have been identified and local funding commitments have been made. Over \$200 million in federal funding has been appropriated to date. Administrative or legislative actions necessary to appropriate or program funding for the project have also been completed in the past year. The Project Financial Plan for the PE Wiehle Avenue Extension submitted to FTA in August 2005 as part of its annual News Starts review process is summarized below.

Capital Funding Plan

The proposed capital funding partners and contribution levels are described below. The current capital funding plan for the project is compared to the Final EIS capital funding plan in Table 2-1.

- Federal Transit Administration – DRPT and its funding partners are seeking \$920 million in Federal funding for the Wiehle Avenue Extension through the FTA Section 5309 New Starts program. This funding level represents 50 percent of the estimated project costs. FTA has not accepted the increased New Starts amount proposed by DRPT. DRPT's request of \$920 million in New Starts funds is significantly higher than what has historically been provided by FTA to other major transit capital investment projects.
- Commonwealth of Virginia – The Commonwealth of Virginia will fund 25 percent of the Wiehle Avenue Extension capital costs, approximately \$460 million (YOE), using Virginia

Transportation Act (VTA) of 2000 funds and Dulles Toll Road revenues. To meet the project's schedule, the Commonwealth plans to use a direct loan of \$145 million from the U.S. Department of Transportation provided under the Transportation Infrastructure Finance and Innovation Act (TIFIA) which will be repaid by Dulles Toll Road revenues.

- Fairfax County – Approximately \$460 million (YOE), representing 25 percent of the capital costs for the Wiehle Avenue Extension, will be provided by Fairfax County. Up to \$400 million of the County's contribution would be provided from debt proceeds backed by revenues from the Dulles Rail Transportation Improvement District. The remainder of the County's contribution will come from one or more alternative funding sources, including cash contributions on a pay-as-you-go basis or alternative forms of debt financing.

TABLE 2-1: CAPITAL FUNDING PLAN (MILLIONS YOE DOLLARS)

Funding Source	Final EIS Wiehle Avenue Extension	Change (Final EIS vs. PE)	PE Wiehle Avenue Extension
Federal (FTA)	\$760.7	+159.3	\$920.0¹
5309 New Starts	\$760.7	+159.3	\$920.0
Commonwealth of Virginia	\$380.4	+79.6	\$460.0
Virginia Transportation Act of 2000	\$75.0	-23.3	\$51.7
Dulles Toll Road Revenues	\$305.4	+102.9	\$408.3
Fairfax County	\$380.4	+79.6	\$460.0
Dulles Rail Transportation Improvement District	\$380.4	+19.6	\$400.0
Other Revenues	\$0	+60.0	\$60.0
TOTAL CAPITAL COSTS	\$1,521.5	+318.6	\$1,840.1

Notes:

1 FTA has not accepted the increased New Starts amount proposed by DRPT. DRPT's request of \$920 million in New Starts funds is significantly higher than what has historically been provided by FTA to other major transit capital investment projects.

Anticipated costs for possible short-term financing are included in the current cost estimate for the PE Wiehle Avenue Extension. Additional financing may be required if annual federal appropriations do not match the terms of the project's Full Funding Grant Agreement. If this short-term debt is needed to support and maintain the project's construction schedule, a variety of short-term debt financing instruments are available to the Commonwealth. The terms and repayment schedules would vary depending on the type of debt instrument used.

Operating Funding Plan

WMATA will be the operator of the Dulles Corridor Metrorail Project. Annual operating subsidies are provided by member jurisdictions of the WMATA Compact. As an extension to the existing Metrorail system, the project would receive incremental operating revenue and subsidies consistent with the Metrorail operating formula developed by the Compact jurisdictions. The additional operating subsidy required from WMATA Compact member jurisdictions would total \$19.95 million (YOE dollars) in 2011 and \$28.17 million (YOE dollars) in 2025.

2.4 SUMMARY OF PE DESIGN REFINEMENTS

The design refinements incorporated into the PE Wiehle Avenue Extension and being evaluated in this EA are summarized in Table 2-2 below.

TABLE 2-2: SUMMARY OF PRELIMINARY ENGINEERING DESIGN REFINEMENTS

Area	Design Refinement
Alignment	<ul style="list-style-type: none"> ▪ Shift and lower the alignment for the Orange Line connection (see Figure 2-2). ▪ Use precast concrete segmental girders and AASHTO box girders for the aerial guideway (see Figure 2-3). ▪ Lower the alignment along Route 123 between the Tysons East Station and Tysons Central 123 stations. ▪ Shift Route 7 portion of the Tysons Corner alignment and stations (Tysons Central 7 and Tysons West) from the south side (service road) to the median between Route 123 and the Dulles Toll Road (see Figure 2-4). ▪ Raise and shorten tunnel segment between Tysons Central 123 and Tysons Central 7 stations. West of Tysons Central 7 station, replace underground alignment section with aerial alignment. ▪ Relocate underground double crossover from just west of Tysons Central 7 Station to the section of the alignment between Tysons Central 123 Station and outbound portal. ▪ Eliminate service roads along Route 7; reconfigure roadway and replace service roads with additional travel lane in each direction (see Figure 2-5). ▪ Replace pocket track near the Tysons West station with double crossover in same location.
Stations	<ul style="list-style-type: none"> ▪ Shift location of aerial station platform and reduce height of support structure (Tysons East—see Figures 2-6 and 2-7). ▪ Relocate mezzanine to street-level; decouple pedestrian bridge from mezzanine (Tysons Central 123—see Figures 2-8 and 2-9). ▪ Relocate bus bays from Route 123 to Tysons Boulevard (Tysons Central 123—see Figures 2-8 and 2-9). ▪ Replace the underground Tysons Central 7 Station on the south side of Route 7 with an at-grade station in the median of Route 7. No changes to station entrance locations (Tysons Central 7—see Figures 2-10 and 2-11). ▪ Replace underground pedestrian walkways with pedestrian bridges (Tysons Central 7—see Figures 2-10 and 2-11). ▪ Relocate off-street bus bays to north side of Route 7; Kiss & Ride lot location unchanged (Tysons West—see Figures 2-12 and 2-13). ▪ Reduce length of pedestrian bridge connection to north side of Route 7, and increase length of pedestrian bridge connection to south side of Route 7 (Tysons West—see Figures 2-12 and 2-13).

TABLE 2-2: SUMMARY OF PRELIMINARY ENGINEERING DESIGN REFINEMENTS

Area	Design Refinement
Stations (cont.)	<ul style="list-style-type: none"> ▪ Shift platform under mezzanine (Wiehle Avenue—see Figures 2-14 and 2-15).
Yard and Shop	<ul style="list-style-type: none"> ▪ Eliminate proposed maintenance building expansion at West Falls Church Yard (see Figure 2-16). ▪ Use Y-15 yard site on Dulles Airport property for construction staging and soil storage (see Figure 2-17).
Ancillary Facilities	<ul style="list-style-type: none"> ▪ Add two ventilation structures, one at the outbound portal west of the Tysons Central 123 Station, and one at the east end of the Tysons Central 7 Station (see Figures 2-8 and 2-10). ▪ Add new stormwater management ponds at West Falls Church Yard and south of DIAAH near Chathams Ford Drive (see Figure 2-18). ▪ Remove stormwater management pond on the north side of the DIAAH west of Hunter Mill Road (see Figure 2-18). ▪ Add two additional construction staging areas (see Figure 2-19).