

## **2.0 ALTERNATIVES CONSIDERED BETWEEN PUBLICATION OF THE FAAR AND THE DRAFT EIS**

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This section provides an overview of alternatives identified between the publication of the FAAR (May 2001) and the Draft EIS (June 2002), and presents a summary of the evaluation results for these options. New alternatives included design refinements of the Bus Rapid Transit (BRT) and Metrorail alignments carried forward from the alternatives analysis process, several new options for the Metrorail Service & Inspection (S&I) Yard, and options for converting the median stations from BRT to Metrorail use. These alternatives are briefly described, and the reasons for carrying particular alternatives forward or eliminating them are summarized. In addition, the issues affecting the selection of the location for the Tysons West Station are discussed.

More detailed analyses are presented in the technical memoranda in Appendix A.

### **2.1 BRT ALTERNATIVE**

Prior to the publication of the Draft EIS, the BRT Alternative carried forward from the alternatives analysis phase was refined to include two additional alignment options. These refinements were developed in response to a request from the Project Steering Committee, which asked that the Project Team examine possible ways to optimize the BRT Alternative under consideration, reducing costs where possible. The Project Team examined different ways to reduce the costs of the BRT Alternative, while still providing improved transportation service in the corridor. As a result, the BRT 2 and BRT 3 alignment options, with fewer median stations and more BRT stops, were developed. All three BRT alignment options are described below.

The BRT alignment originally carried forward (now called BRT 1) extends through the full length of the Dulles Corridor, primarily operating on the Dulles Connector Road, the Dulles International Airport Access Highway (DIAAH), and the Dulles Greenway. The alignment includes six stations and three stops. Five stations (similar to Metrorail stations) are located in the DIAAH median at Spring Hill Road, Wiehle Avenue, Reston Parkway, Herndon-Monroe, and Route 28. All but the Spring Hill Road Station would be convertible to Metrorail stations if Metrorail was later developed in the corridor. A sixth station is located at the existing West Falls Church Metrorail station. Here, passengers would be required to transfer to the Metrorail Orange Line to continue to Arlington and the region's core. BRT stops are located at Dulles Airport, Route 606, and Route 772. At these locations, buses will leave the DIAAH or Dulles Greenway to access "offline" park-and-ride facilities.

BRT 2 is nearly identical to BRT 1, except that it does not include a station or stop at Route 28, and the Spring Hill Road Station is replaced with a BRT stop at the existing Tysons-West\*Park Transit Station. Overall, this alignment includes three median stations, one transfer station, and four stops. The median stations for BRT 2 would be a simpler version of those proposed for BRT 1, but would still be convertible to Metrorail stations.

Although all three alignment options were designed to allow for future conversion to Metrorail in the Dulles Corridor, BRT 2 would be closest to the transit system that would be constructed if BRT were to be implemented without any provisions for Metrorail conversion. This is because the stations for BRT 2 are shorter, only including space sufficient to support BRT operations. Converting these shorter stations to Metrorail stations in the future would be more complex than the conversion process for BRT 1.

For BRT 3, most of the median stations in the DIAAH are replaced with BRT stops. The alignment includes only one median station at Reston Parkway. This station is a multi-level station that offers a different conversion approach for later Metrorail use; it would be configured with a BRT platform at ground level, with a Metrorail platform on the level above. For BRT 3, stops would be located at the Tysons-West\*Park Transit Station, the Reston East Park-and-Ride (Wiehle Avenue), the Herndon-Monroe Park-and-Ride, Dulles Airport, Route 606, and Route 772. BRT 3 also includes a transfer station at the West Falls Church Metrorail Station.

The evaluation of BRT 2 and BRT 3 indicated that these alignment options would offer cost savings and some constructability benefits. Both options would have fewer median stations than BRT 1, and the median stations proposed for BRT 2 would be simpler than those for BRT 1. These factors lower the capital costs for BRT 2 and BRT 3, and should make them easier to construct. However, the increased complexity in the design of the one median station for BRT 3 could minimize some of the constructability advantages of this alignment.

Although the new BRT alignment options would offer some benefits, they would also be less consistent with local plans than BRT 1, and could reduce ridership for the BRT Alternative. Neither BRT 2 nor BRT 3 include a station or stop in the vicinity of Route 28, a growing activity center in the Dulles Corridor; therefore, they do not support local plans as well as BRT 1. In addition, because BRT 2 and BRT 3 have fewer stations than BRT 1 (eight total, rather than nine) they would attract fewer riders. On the other hand, it was also thought that changes in operating patterns for these alignments could have resulted in more direct service for some trips, which may have ridership benefits.

At the preliminary level of evaluation conducted for the new BRT alignment options, it was difficult to fully assess the likely cost effectiveness of these design variations. Therefore, BRT 2 and BRT 3 were carried forward for full evaluation in the Draft EIS, in addition to the original BRT alignment (now BRT 1), to allow for a wider range of configurations to be examined in detail.

## **2.2 METRORAIL ALTERNATIVE**

Two new Tysons Corner Metrorail alignments were introduced after the publication of the FAAR. Brief discussions of the T9 (Revised) and T9 Design Option alignments are provided below.

### **2.2.1 T9 (REVISED)**

Alignment T9 was initially developed as a design variation of the alignment recommended in the *Dulles Corridor Transportation Study*, a Major Investment Study (MIS) completed in 1997. The Alignment T9 that was originally carried forward from the alternatives analysis process extended through the core of Tysons Corner along Route 7 and 123. This alignment was entirely aerial and included four aerial stations.

Alignment T9 (Revised) is similar to Alignment T9 in several regards. Alignment T9 (Revised) would include four aerial stations at the same locations as those on Alignment T9. Moreover, the revised alignment would have a similar horizontal alignment to that of Alignment T9. The primary difference is that Alignment T9 (Revised) would cross under Route 123 west of the Tysons Central Station, then would run along the south side of the Route 123/Route 7 interchange, rather than extending along the north side of Route 123 and the interchange, as in Alignment T9. Alignment T9 (Revised) would also use narrow track centers and side-platform stations throughout Tysons Corner, rather than at the Tysons Central Station only.

Alignment T9 (Revised) performs well relative to several evaluation criteria. The revised alignment would offer cost savings, enhanced structural efficiencies, and several other benefits such as the reduction of visual impacts on surrounding communities. However, Alignment T9 (Revised) would also have a number of drawbacks including increased right-of-way requirements, and the increased potential for noise impacts in certain residential areas adjacent to the alignment.

The trade-offs of the revised alignment could not be fully evaluated during screening due to the lack of detailed cost and environmental data. However, it was recommended that Alignment T9 (Revised) be carried forward as Alignment T9 for full evaluation in the Draft EIS, replacing the original Alignment T9, and thus allowing for a wider range of configurations to be examined in detail.

### **2.2.2 T9 DESIGN OPTION**

The T9 Design Option is a variation of Alignment T9 located within the Tysons Corner section of the Dulles Corridor Rapid Transit Project. The T9 Design Option would be collocated with VDOT's planned improvements for the I-495/Route 123 interchange, having a higher vertical profile between the Tysons East and Tysons Central stations than Alignment T9; this profile would be identical to that for Alignments T1 and T6. Also, the T9 Design Option would not conflict with proposed improvements for the Route 7/123 interchange.

Rather than passing under Route 123, the T9 Design Option would include a tunnel segment that would run along the north side of Route 123, similar to the tunnel for Alignments T1 and T6. The tunnel would surface east of the Route 7/Route 123 interchange, further west than that for Alignment T9. The design option tunnel would still be shallower than the tunnels for Alignments T1 and T6.

Both Alignment T9 and the T9 Design Option would include a Tysons Central 123 Station and a Tysons Central 7 Station. As with Alignments T1 and T6, the Tysons Central 123 Station for Alignment T9 would be located at the intersection of Route 123 and Tysons Boulevard and would be partially elevated and partially on retained fill. However, for the T9 Design Option, the station would have a dual side-platform configuration rather than a center-platform configuration. Additionally, because the T9 Design Option would involve cut-and-cover construction adjacent to but not crossing under Route 123, it would be less disruptive during construction than Alignment T9, which would have a skewed cut-and-cover crossing of Route 123.

Because the T9 Design Option would be more consistent with proposed roadway plans in Tysons Corner than T9, and because it would be less disruptive during construction, the T9 Design Option was carried forward and evaluated alongside Alignment T9 in the Draft EIS.

## 2.3 PHASED IMPLEMENTATION ALTERNATIVE

In the FAAR, the three Build Alternatives carried forward for evaluation in the Draft EIS were envisioned as three construction stages in a phased implementation program. The BRT Alternative would be constructed first; then Metrorail would be constructed from the Orange Line through Tysons Corner, connecting to BRT service between Tysons Corner and Loudoun County; and finally, Metrorail would be constructed between Tysons Corner and Loudoun County, replacing BRT service in the corridor. Although the three Build Alternatives were to be evaluated as stand-alone alternatives, it was initially proposed that the overall project move forward with the phased approach.

As work on the Draft EIS progressed, it was decided to evaluate the phased implementation program as a fourth Build Alternative, called the Phased Implementation Alternative. A key element of this alternative were the DIAAH median stations, which were to be constructed during the BRT phase for BRT use, then later converted to Metrorail stations for Metrorail use.

The Project Team explored seven concepts for converting the median BRT stations to Metrorail stations. All of the concepts focused on two primary issues: (1) the platform height required to facilitate level boarding for BRT and Metrorail; and (2) the desire to maintain BRT service to the extent possible during Metrorail construction, start up, and testing.

In order to convert the median BRT stations for Metrorail use, it was necessary to develop a concept that reconciled the difference in height between the standard Metrorail platform and the lower BRT platform. This is because Metrorail vehicles have a floor that is approximately 3-feet, 4-inches above the top of the Metrorail and the BRT buses would have a floor approximately 12 to 15 inches above street level. Due to the construction and start-up schedule for Metrorail, joint-use guideway areas and other station elements could be unavailable for BRT use for a period up to 15 to 18 months prior to the implementation of Metrorail service. BRT stations would not be closed during this conversion period; alternative service would be provided to the station facilities on the north and south sides of the DIAAH and Toll Road. However, several station concepts were designed in an attempt to reduce this period of down time.

The Project Team assessed the potential station configuration concepts based on three main evaluation criteria:

- 1) Minimize downtime during conversion;
- 2) Limit BRT station width to a maximum of 80 feet so as to avoid additional widening of the DIAAH or Dulles Toll Road; and
- 3) To the extent feasible, preserve MWAA's ability to construct and operate future third lanes of the DIAAH independently of the Dulles Corridor Rapid Transit Project. In order to meet this criterion, overall station widths of 60 feet or less are necessary.

The following is a summary of the evaluation results (see Appendix A for a more detailed discussion of each concept):

- Concept #1 – BRT Guideway on Fill. This concept would meet the station width criteria, but would have high downtime during conversion. The BRT operation of median stations would be displaced during Metrorail conversion. This concept would have a relatively low conversion cost because the entire Metrorail platform would be constructed during the initial buildout.

- **Concept #2 – Shared Guideway on Street Track.** This concept would meet the station width criteria and would have moderate downtime during conversion. It would permit BRT service with limited off-hours Metrorail testing and startup. To provide an adequate driving lane for BRT vehicles, a reduced platform width and/or reduced bus speeds and/or use of a bus guidance system would be required.
- **Concept #3 – Separate Guideways with Retractable Boarding Bridges.** This concept would not meet the station width criteria, but would have low downtime during conversion. It would permit BRT service with limited off-hours Metrorail testing and startup. This concept could not be implemented at Reston Parkway or Route 28 stations due to vertical profile issues. In addition, the daily deployment of bridges over the Metrorail guideway would be labor and time intensive.
- **Concept #4 – Side Platform with Shared Guideway.** This concept would meet the station width criteria and would have moderate downtime during conversion. It would permit BRT service with limited off-hours Metrorail testing and startup, and would allow use of right-door BRT vehicles without crossover operations. To provide an adequate driving lane for BRT vehicles, a reduced platform width and/or reduced bus speeds and/or use of a bus guidance system would be required. In addition, the side platform configuration would have higher construction and operating costs.
- **Concept #5 – Side Platform with Separate Guideways.** This concept would not meet the station width criteria, but would have low downtime during conversion. The configuration would permit BRT service with largely independent Metrorail testing and startup. The concept favors left-door BRT vehicles. The side platform configuration would have higher construction and operating costs.
- **Concept #6 – Center Platform with Bypass Lane.** This concept would meet one but not both station width criteria, and would have high downtime during conversion. The median operation of stations would be displaced during Metrorail conversion. The primary advantages of this concept are improved operational flexibility and failure management (in all other schemes, a disabled bus would obstruct the entire inbound or outbound guideway within the station). However, these operational advantages are less important to the Project, since the BRT operating plan is headway-based rather than time-point service.
- **Concept #7 – Bi-level Station.** This concept would meet the station width criteria and would have virtually no downtime during conversion. This configuration eliminates the need for displacement of median operations during conversion, but would have significantly higher construction costs (approximately 60 percent greater than median stations with an at-grade Metrorail platform).

Concept #1, BRT Guideway on Fill, was the preferred approach for converting the median stations from BRT to Metrorail use and was carried forward for further evaluation in the Draft EIS as part of the BRT 1 and BRT 2 alignment options. For this concept the 600-foot station platform would be built as a permanent Metrorail platform, three feet four inches above the future top of Metrorail. To accommodate BRT service, temporary fill would be constructed in the track bed to raise the driving surface to approximately 1 foot below the top of the platform. Although this concept would require that the BRT median operation of stations be displaced during conversion, it would not require the relocation of the DIAAH or Dulles Toll Road. Additionally, it would not limit MWAA's ability to construct and implement the proposed third lane of the DIAAH at any time.

In addition, because Concept #7 met all three evaluation criteria—although at a significantly higher cost—it was carried forward as part of the BRT 3 alignment option. The Reston Parkway Station described for BRT 3 in Section 2.1 uses this configuration.

## 2.4 ANCILLARY FACILITIES

The Metrorail Service and Inspection (S&I) Yard is a critical element of the Metrorail Alternative. Such a facility is typically located at or near the end of the Metrorail line, and in this case would need to be sufficient size to store, inspect, and service 184 Metrorail cars, with the potential to accommodate 250 Metrorail cars. Sufficient capacity does not exist within the completed Metrorail system to store and maintain the new cars needed for the Dulles Corridor Rapid Transit Project. As part of the alternatives analysis process documented in the FAAR, a total of 13 sites were evaluated for the S&I Yard and a BRT Maintenance and Storage Facility (MSF). Based on that process, Site 7 in Loudoun County was selected for the S&I Yard site, while Site 14 on Dulles Airport property was selected for the BRT MSF. Both of these sites were carried forward for full evaluation in the Draft EIS.

At the request of the project Steering Committee, a supplemental Metrorail yard study was conducted between December 2001 and March 2002 to consider six additional sites. The supplemental study was needed because of approved changes to the *Loudoun County Revised General Plan*, which stated that a conditional Transit-Related Employment Center (TREC) or special activity destination is planned for Site 7. The plan identifies that the conditional TREC is intended to provide compact, high-intensity employment uses and/or special activity use (i.e., a professional sports stadium), with a support retail and service component.

Four of the six additional sites selected for the supplemental study were located on Dulles Airport property, and the remaining two sites were located elsewhere in Loudoun County. A Technical Memorandum presented in Appendix A provides a more detailed analysis for each of the sites studied. A summary of the findings is presented below:

- Site 15 is on Dulles Airport property near the approach zone of existing and future runways. This site would have minimal effects on wetlands and water resources. While Site 15 would not be consistent with the Airport Land Use Plan, MWAA stated that, of the other sites located on airport property, Site 15 would be the most compatible and could potentially act as an airport buffer.
- Site 16 is on the south side of Route 606 and owned by the National Oceanic and Atmospheric Administration (NOAA). A Metrorail yard at this site would not be compatible with plans to continue using the site as a weather station for the Washington, D.C. area.
- Sites 18 and 19 are also on Dulles Airport property. A Metrorail yard at these sites would not be compatible with the existing Dulles Airport Land Use Plan and the future plan for public parking on these sites.
- Site 20 is on the north side of Route 606. Use of this site would have minimal effects on wetlands and water resources, but would be inconsistent with current Loudoun County zoning and future planned land use.
- Site 21 is located in the southwest quadrant of the Dulles Greenway/Route 606 interchange. Use of this site would result in extensive, avoidable impacts on wetlands and important water resources in Loudoun County.

Based on the screening analysis, Site 15 and 20 were carried forward for full evaluation in the Draft EIS, in addition to Sites 7 and 14.

## 2.5 TYSONS WEST STATION LOCATION

The site selection for the Tysons West Station and its intermodal transfer facility has been addressed in numerous studies, all of which agree that the principal criteria for identifying the optimum station location were (1) to provide maximum access to jobs and other activities in Tysons Corner, and (2) to foster additional transit-oriented development in the vicinity of the station. These reports, published between 1997 and 1999, proposed various locations for the Tysons West Station, including:

- Route 7 and Westwood Center Drive (a particular intersection quadrant was not specified);
- Fronting the Moore Cadillac property, with the station platform immediately west of the Route 7/Tyco Road intersection; and
- In the median of the DIAAH and Route 7 (for Metrorail, or for a temporary BRT/Metrorail transfer station).

In 2000, the project developed a platform location between Tyco Road and Spring Hill Road, as this location would provide greater opportunities for pedestrian access and transit-oriented development. The proposed park-and-ride structure was sited at the north corner of Tyco Road and Route 7 since the existing low-intensity land uses would provide the best potential for transit-oriented redevelopment or joint development on Route 7 in this area. The location of the station platform and park-and-ride structure, as developed, was carried forward for detailed evaluation in the Draft EIS. Plans for the in-median BRT/Metrorail transfer facility were discontinued in February 2001. The facility was collocated with the proposed park-and-ride structure, and was carried forward for detailed evaluation in the Draft EIS.