

10 EVALUATION OF ALTERNATIVES CARRIED FORWARD

This chapter presents a comparative evaluation of the alternatives carried forward in this Final Environmental Impact Statement (EIS). The intent of this evaluation is to demonstrate the relative effectiveness of the alternatives in meeting the stated project goals and objectives, and to highlight the key differences between alternatives to facilitate the decision-making process.

The alternative formerly known as “LPA Phase 1” in the October 2003 *Supplemental Draft Environmental Impact Statement and Section 4(f) Evaluation* has been renamed the Wiehle Avenue Extension in this Final EIS and is expected to begin operations in 2011. This change reflects the federal approach to the project’s funding under the Federal Transit Administration’s New Starts program. It will assure consistency among the environmental, engineering and financial documents during the project’s development.

In the October 2003 *Supplemental Draft Environmental Impact Statement and Section 4(f) Evaluation* as well as this Final EIS, the term “full LPA” represents the Wiehle Avenue Extension and the second phase of the Dulles Corridor Rapid Transit Project. This second phase would extend west from Wiehle Avenue to Washington Dulles International Airport and Route 772 and is expected to begin operations in 2015.

The term “LPA”, “proposed action”, or “selected LPA” refers to both the Wiehle Avenue Extension and the full LPA collectively.

Consistent with FTA’s project development process, the New Starts Baseline Alternative is introduced in this chapter. The New Starts Baseline Alternative is required by the FTA for comparison the Wiehle Avenue Extension. The resulting New Starts data is also summarized in this chapter.

Section 10.1 discusses the performance of the No Build Alternative, the Wiehle Avenue Extension and the full LPA relative to the measures of effectiveness that reflect the project goals and objectives.

Section 10.2 summarizes the Wiehle Avenue Extension performance relative to the FTA New Starts Criteria based on a comparison with the New Starts Baseline Alternative. This comparison is required for all projects seeking FTA funding under the New Starts program.

10.1 EVALUATION RELATIVE TO PROJECT GOALS AND OBJECTIVES

This section presents the evaluation of the Wiehle Avenue Extension and the full LPA in comparison to the No Build Alternative. Project goals form the basis of evaluation, which are translated into objectives, which are, in turn, translated into quantifiable measures of effectiveness. In general the measures correspond to the effects documented in Chapters 3 through 9 of the Final EIS. As previously defined, the alternatives are:

No Build Alternative. The No Build Alternative includes all existing highway and transit infrastructure and services within the corridor, and any that are committed to be implemented by 2025, aside from the Dulles Corridor Rapid Transit Project. The No Build Alternative is consistent with the “no-action alternative” required by the Council of Environmental Quality’s (CEQ’s) regulations for implementing the National Environmental Policy Act of 1969 (NEPA), as amended, and provides a baseline for comparison against the full LPA and the Wiehle Avenue Extension.

The Wiehle Avenue Extension. The Wiehle Avenue Extension is the first 11.6 miles of the full LPA with four stations in Tysons Corner and a fifth interim end-of-line station at Wiehle Avenue. Express Bus Service would be provided between Wiehle Avenue and the western portion of the corridor until the remainder of the full LPA is constructed.

The full LPA. The full LPA is a 23.1 mile extension of Metrorail that generally follows an alignment between the Metrorail Orange Line near the West Falls Church Station and Route 772 in Loudoun County, using the median of the Dulles Connector Road, the DIAAH, and the Dulles Greenway. The alignment diverges from these routes to serve Tysons Corner and Dulles Airport. The LPA would include 11 new stations, as well as ancillary facilities, such as a new Metrorail S&I Yard on Dulles Airport property, traction power substations, tie-breaker stations, and storm water management ponds.

As described in Chapter 1, Table 10.1-1 outlines the goals and objectives for the Dulles Corridor Rapid Transit Project which are intended to reflect the transportation needs of the corridor.

The goals and objectives include the following:

Table 10.1-1: Goals and Objectives

Goals	Objectives
<p>Goal 1 Improve Transportation Service</p>	<ul style="list-style-type: none"> § Provide more frequent service for trips to the core of the region, Tysons Corner, Reston/Herndon, Dulles Airport, and eastern Loudoun County. § Provide multi-modal access. § Improve travel times within the corridor and the region. § Provide integrated, seamless transit service to Tysons Corner and other major activity centers. § Provide improved transit service in the corridor in the near term.
<p>Goal 2 Increase Transit Ridership</p>	<ul style="list-style-type: none"> § Provide more frequent service for trips to the core of the region, Tysons Corner, Reston/Herndon, Dulles Airport, and eastern Loudoun County. § Provide multi-modal access. § Improve the amenities of the existing transit service within the corridor and the region. § Improve travel times within the corridor and the region. § Provide integrated, seamless transit service to Tysons Corner and other major activity centers. § Provide improved transit service in the corridor in the near term.
<p>Goal 3 Support Future Development</p>	<ul style="list-style-type: none"> § Provide improved accessibility to existing and planned activity centers in the corridor and the region. § Provide transit service that supports and is consistent with the character of the existing and future land use and development. § Provide stations that are compatible with the character of the surrounding neighborhoods and encourage transit use.
<p>Goal 4</p>	<ul style="list-style-type: none"> § Contribute to the attainment of regional air quality standards.

Goals	Objectives
Support Environmental Quality	§ Minimize negative impacts to traffic patterns. § Minimize negative impacts on neighborhoods and residential land uses. § Minimize negative impacts to ecologically sensitive areas. § Minimize negative impacts to historic and cultural resources. § Minimize negative visual and aesthetic impacts.
Goal 5 Provide Cost-effective, Achievable Transportation Solutions	§ Develop transportation improvements that are consistent with the funding and financial capacity of the region. § Minimize project-operating costs. § Optimize cost-effectiveness.
Goal 6 Serve Diverse Populations	§ Balance benefits and impacts to all residents within the corridor. § Improve accessibility to existing and planned employment centers from low-income and minority areas. § Provide transportation improvements that comply with the Americans with Disabilities Act standards. § Minimize and mitigate negative impacts to low-income and minority populations.

In general, the No Build Alternative would not meet the goal of providing improved transit service in the Dulles Corridor. Moreover, the No Build Alternative would be inconsistent with local and regional comprehensive plans, which specifically identify rapid transit improvements in the Dulles Corridor as a critical element in shaping development in the corridor and meeting regional economic development goals.

The Wiehle Avenue Extension and the full LPA would offer a much better level of transit service than what is included under the No Build Alternative, enhancing mobility for corridor residents and employees, especially during the midday. The full LPA would provide higher transportation and economic development benefits than the proposed the Wiehle Avenue Extension. Only the full LPA would be consistent with future land use designations or future land development patterns west of Wiehle Avenue and provide high-quality, high-capacity transit service to the Dulles International Airport, one of the world's fastest growing airports.

The Wiehle Avenue Extension would have fewer negative effects on environmental resources and communities in the Dulles Corridor than the LPA. In general, the Wiehle Avenue Extension would perform similarly to the full LPA from Wiehle Avenue Station to the existing Metrorail Orange Line. Implementation of Express Bus Service in the western end of the corridor for the Wiehle Avenue Extension would typically have minimal physical effects and fewer transportation and development benefits.

The general consensus among elected officials, public agencies, and the general public, including property owners, community groups, civic associations, and businesses, has been that Metrorail should be ultimately extended for the full length of the Dulles Corridor from the existing Orange Line through Tysons Corner to Route 772 in Loudoun County.

By use of measures of effectiveness, Table 10.1-2 summarizes each alternative relative to the project's goals and objectives for the No Build Alternative, the full LPA, and the Wiehle Avenue Extension.

Table 10.1-2: Measures of Effectiveness

Measures of Effectiveness by Objective	Locally Preferred Alternative			
	No Build Alternative	Wiehle Avenue Extension Opening Year (2011)	Wiehle Avenue Extension (2025)	Full LPA (2025)
Goals 1 and 2: Improve Transit Service and Increase Transit Ridership				
Provide More Frequent Service				
Peak Period Headways (Minutes)	5 – 30	7	7	7
Off Peak Period Headways (Minutes)	30 - 60	12	12	12
Provide Multi-Modal Access				
Access to Park and Ride Facilities	4	5	5	6
Access to New Rail Stations	0	5	5	11
Rail Service to Dulles Airport	0	0	0	1
Improve Travel Times	No	Partial	Partial	Yes
Provide Integrated, Seamless Service	No	Partial – East of Wiehle Ave.	Partial –East of Wiehle Ave.	Yes
Improve the Amenities of the Existing Transit Service	No	Yes – Less than full LPA	Yes – Less than full LPA	Yes
Goal 3: Support Future Development				
Improved Accessibility to Activity Centers	No	Partial	Partial	Yes
Consistent with Existing Land Use	Yes	Yes	Yes	Yes
Consistent with Future Land Use Plan	No	Partial	Partial	Yes
Stations Compatible with Neighborhoods	No Stations	Yes	Yes	Yes
Goal 4: Support Environmental Quality				
Attainment of Air Quality Goals				
Reduced Vehicle Emissions	Yes	Yes	Yes	Yes
Reduction in Regional VMT (Miles)	-	251.6M	153.8M	401.7M
NAAQS Violations	No	No	No	No
Minimize Negative Impacts to Traffic Patterns				
Number of Intersections at LOS F – p.m.	16	3	6	16
Number of Intersections Requiring Mitigation	-	7	0	13

Measures of Effectiveness by Objective	Locally Preferred Alternative			
	No Build Alternative	Wiehle Avenue Extension Opening Year (2011)	Wiehle Avenue Extension (2025)	Full LPA (2025)
Minimize Negative Impacts on Neighborhoods and Residential Land Use				
Residential Displacements	0	0	0	0
Residential Parcels Partially Acquired	0	11	11	11
Community Cohesion	-	No Effect	No Effect	No Effect
Community Facility Impacts	0	1	1	1
Minimize Negative Impacts to Ecologically Sensitive Areas				
Wetlands Effects (Acres)	0	0	0	5.2
Stream/Water Quality Effects (Linear Feet)	0	0	0	245
Minimize Negative Impacts to Historic and Cultural Resources				
Potential Adverse Effects Archaeological Sites	0	0	0	0
Potential Adverse Effects Historic Sites	0	0	0	1
Section 4(f) Use	0	0	0	1
Minimize Negative Visual and Aesthetic Impacts				
Tysons Corner	No	No Effect	No Effect	No Effect
W&OD Railroad Regional Park	No	No Effect	No Effect	No Effect
Dulles Airport Historic District	No	No Effect	No Effect	Substantial
Goal 5: Provide Cost Effective, Achievable Transportation Solutions				
Improvements Consistent with Funding Capacity				
Capital Costs (YOE\$)	\$0	\$1.5B	\$1.5B	\$3.5 B
Non-Federal Funding Sources	-	Commonwealth of Virginia, Fairfax County	Commonwealth of Virginia, Fairfax County	Commonwealth of Virginia, Fairfax and Loudoun Counties, MWAA
Minimize Project Operating Costs				
Annual Incremental O&M Costs – (YOE\$)	Base	\$47.5M	\$67.6M	\$117.9M
Optimize Cost-Effectiveness				
Metrorail O&M Cost Per Revenue Mile (2004\$)	\$9.29 (2011) \$12.15 (2025)	\$8.94	\$11.81	\$11.69
Incremental Metrorail O&M Cost Per New trip	Base	\$5.55	\$6.68	\$8.39

Measures of Effectiveness by Objective	Locally Preferred Alternative			
	No Build Alternative	Wiehle Avenue Extension Opening Year (2011)	Wiehle Avenue Extension (2025)	Full LPA (2025)
Metrorail O&M Cost Per Passenger Mile	\$0.41 (2011) \$0.55 (2025)	\$0.40	\$0.52	\$0.50
Goal 6: Serve Diverse Populations				
<i>Low-Income and Minority Areas Without Rail Service</i>	6	4	4	0
<i>Compliance with ADA</i>	Yes	Yes	Yes	Yes
<i>Physical Impacts to Low-Income and Minority Areas</i>	None	None	None	None

The remainder of this section describes the effectiveness of the alternatives in satisfying each of the project’s goals and objectives.

10.1.1 GOALS 1 AND 2: IMPROVE TRANSPORTATION SERVICE AND INCREASE TRANSIT RIDERSHIP

A. Provide More Frequent Service for Trips to the Core of the Region, Tysons Corner, Reston/Herndon, Dulles Airport, and Eastern Loudoun County

The measures used to evaluate how well the alternatives would provide more frequent service in the study area include peak period and off-peak period headways in minutes. Transit service headways provided in the corridor range between 5 and 30 minutes in the peak period and increase to between 30 and 60 minutes in the off-peak. The Wiehle Avenue Extension and the full LPA provide seven minute headways during the peak hour and 12 minute headways during the off-peak period. The Wiehle Avenue Extension and the full LPA generally provide higher service levels than the No Build Alternative especially in the midday and evening off-peak periods.

B. Provide Multi-Modal Access

The alternatives considered provide direct access to a number of intermodal facilities including park-and-ride, bus transit transfer centers, new rail transit stations, and airports. The full LPA maintains existing bus connections and provides new rail connections to the greatest number of these facilities. The full LPA includes 6 park-and-ride facilities, 11 new rail transit stations, and provides rail service connections to one airport. The Wiehle Avenue Extension serves a fewer number of intermodal centers including five park-and-ride facilities, five new rail transit stations, and connections to one airport. The No Build Alternative provides the fewest intermodal connections serving four park-and-ride facilities, no new rail transit stations, and provides no rail transit service connections to Dulles Airport.

C. Improve Travel Times within the Corridor and the Region

Transit travel times for several trip origin and destination pairs have been estimated for each of the alternatives as documented in Chapter 6. These origin and destination pairs include:

- § Tysons Corner and Metro Center
- § Tysons Corner and Dulles Airport
- § Reston Town Center and Union Station
- § Reston Town Center and Tysons Corner
- § Reston Town Center and Dulles Airport
- § Rosslyn and Dulles Airport
- § Herndon-Monroe and Pentagon
- § Herndon-Monroe and Tysons Corner

For all of these origin and destination (O/D) pairs, the full LPA provides shorter transit travel times compared to the No Build Alternative, with the exception of the Tysons Corner/Metro Center and Herndon-Monroe/Pentagon pairs. For the Tysons Corner/Metro Center trip the No Build Alternative provides a 37 minute travel time and the LPA provides a 38 minute travel time. For the Herndon-Monroe/Pentagon trip the No Build Alternative provides a 50 minute trip and the LPA provides a 55 minute travel time. All of the other trip origin and destination pairs result in transit travel time savings of between 5 and 53 minutes when the No Build Alternative is compared to the full LPA.

In general, the Wiehle Avenue Extension would offer less travel time savings than the full LPA, but it would still offer an improvement in transit travel times over the No Build Alternative for most O/D pairs. For trips between Wiehle Avenue and points east, the Wiehle Avenue Extension would provide similar travel times to the full LPA, because the Metrorail service would be similar in this portion of corridor. For trips with at least one end west of Wiehle Avenue, the Wiehle Avenue Extension would have greater travel times than the full LPA due to transfer requirements and decreased service frequency in the reverse peak direction. If the LPA is not implemented in its entirety in 2025, the Wiehle Avenue Extension would generally have travel times that are 5 to 10 minutes longer than the full LPA.

D. Provide Integrated, Seamless Transit Service to Tysons Corner and Other Major Activity Centers

The full LPA provides a seamless high capacity premium transit service to the Tysons Corner as well as other key activity centers such as Dulles Airport, Reston Town Center, and Herndon-Monroe. The Wiehle Avenue Extension provides service to Tysons Corner but does not serve the centers west of Wiehle Avenue with seamless service. The No Build Alternative does not provide this seamless, high level service to the activity centers in the corridor.

E. Provide Improved Transit Service in the Corridor in the Near Term

The No Build Alternative does not provide substantially improved transit service in the corridor. Wiehle Avenue Extension provides improved service through a portion of the corridor as early as 2011. The full LPA provides improved transit through the whole corridor but would not be fully complete until 2015.

F. Improve Amenities of the Existing Transit Service

The No Build Alternative does not provide significant additional transit service amenities that would not also be included in the full LPA or the Wiehle Avenue Extension alternatives. However, the Wiehle Avenue Extension and the full LPA offer several passenger amenities at station sites including advanced fare collection, simple transfers between lines, multiple door vehicle boarding from level platforms, park-and-ride lots, and kiss and ride access.

10.1.2 GOAL 3: SUPPORT FUTURE DEVELOPMENT**A. Provide Improved Accessibility to Existing and Planned Activity Centers in the Corridor and the Region**

The full LPA provides direct access to the Tysons Corner as well as other key activity centers such as Dulles Airport, Reston Town Center, and Herndon-Monroe. The Wiehle Avenue Extension provides service to the Tysons Corner but does not serve the centers west of Wiehle Avenue. The No Build Alternative generally does not provide improved access to the activity centers in the corridor.

B. Provide Transit Service that Supports and is Consistent with the Character of the Existing and Future Land Use and Development

All of the alternatives provide bus and rail transit services that are consistent with the existing land uses in the corridor. However, the No Build Alternative would be inconsistent with local comprehensive plans and regional transportation plans, which specifically identify rapid transit improvements in the Dulles Corridor as a critical element in shaping development in the corridor and meeting regional economic development goals. Only the full LPA would be consistent with future land use designations or future land development patterns west of Wiehle Avenue and provide high-quality, high-capacity transit service to Dulles International Airport.

C. Provide Stations that are Compatible with the Character of the Surrounding Neighborhoods and Encourage Transit Use

Because both the Wiehle Avenue Extension and the full LPA would be constructed primarily within existing transportation rights-of-way, direct land use conversions and conflicts with surrounding land uses would be minimal. The extension of Metrorail within existing transportation corridors would be consistent with existing and future land uses. This is also consistent with existing zoning along the proposed alignment, except in some stations where special exceptions may be required for the construction of station facilities. To encourage transit use, station facilities typically include entrance pavilions, mezzanines, platforms, parking facilities, bus bays, kiss-and-ride areas, and park-and-ride lots.

10.1.3 GOAL 4: SUPPORT ENVIRONMENTAL QUALITY**A. Contribute to the Attainment of Regional Air Quality Standards**

All the alternatives offer some reduction in vehicle emissions compared to the existing condition. However, the Wiehle Avenue Extension and the full LPA provide substantial reductions in regional Vehicle Miles Traveled (VMT) when compared to the No Build Alternative. VMT is a major indicator of the amount of total vehicle emissions that result from each of the alternatives. The full LPA results in the largest reduction of VMT, about 401.7 million miles per year in 2025. The Wiehle Avenue Extension results in a reduction of about 251.6 million miles per year in 2011 (opening year) and 153.8 million miles per year in 2025. None of the alternatives would result in NAAQS violations.

B. Minimize Negative Impacts to Traffic Patterns

The impact of each of the alternatives on traffic patterns measured in terms of intersection levels of service in the p.m. peak hour have been estimated. Intersection levels of service are used to characterize traffic operations for roadway segments and intersections. Levels of Service (LOS) range from A to F, with A representing no congestion or delay and F representing failure and extreme congestion and delay. Levels of service for major intersections in the immediate vicinity

of each of the stations for the Wiehle Avenue Extension and the full LPA have been estimated based on future traffic conditions. In the Wiehle Avenue Extension station areas, three intersections would operate at LOS F during the p.m. peak hour in 2011, and six for the Wiehle Avenue Extension in 2025. For the full LPA station areas, 16 intersections would operate at LOS F in the p.m. peak period in 2025.

C. Minimize Negative Impacts on Neighborhoods and Residential Land Uses

The No Build Alternative has no significant negative impacts on neighborhoods with regard to residential displacements, partial acquisitions of residential properties, community cohesion, or community facility impacts. Located primarily in existing transportation right-of-way, the Wiehle Avenue Extension and the full LPA also include no residential displacements or negative effects on community cohesion. However, the Wiehle Avenue Extension and the full LPA both include the partial acquisition of 11 residential properties.

D. Minimize Negative Impacts to Ecologically Sensitive Areas

Both the No Build Alternative and the Wiehle Avenue Extension have no significant negative impacts to ecologically sensitive areas such as wetlands, streams, or prime upland systems. The full LPA has no impacts to prime upland systems but has the potential to impact 5.2 acres of wetlands and 245 linear feet of streams along its alignment from Wiehle Avenue to Route 772.

E. Minimize Negative Impacts to Historic and Cultural Resources

The full LPA Alternative could potentially impact one historic/cultural resource site at Dulles Airport. No potential impacts to historic and cultural resources have been identified for the No Build or the Wiehle Avenue Extension Alternatives.

F. Minimize Negative Visual and Aesthetic Impacts

The No Build Alternative has no significant negative visual or aesthetic impacts. Both the Wiehle Avenue Extension and the full LPA would introduce new visual elements, such as Metrorail stations, pedestrian walkways, parking structures, tie-breaker stations and traction power substations, into the existing visual setting of the study area. However, due to the existing land uses and existing visual and aesthetic characteristics of the area, overall the proposed improvements and associated facilities would have a less than substantial effect on sensitive resources and viewers.

10.1.4 GOAL 5: PROVIDE COST-EFFECTIVE, ACHIEVABLE TRANSPORTATION SOLUTIONS

A. Develop Transportation Improvements that are Consistent with the Funding and Financial Capacity of the Region

The No Build Alternative minimizes the potential capital costs of the system. The Wiehle Avenue Extension has an estimated capital cost of approximately \$1.5 billion in YOE dollars. The full LPA is the highest cost alternative with capital costs of approximately \$3.5 billion in YOE dollars. It is assumed that approximately 50 percent of these costs would be funded from state and local sources.

B. Minimize Project Operating Costs

The No Build Alternative minimizes the potential incremental operating costs of the system. The Wiehle Avenue Extension includes an estimated incremental operating cost of \$47.47 million per

year in 2011 that rises to \$67.64 million per year by 2025. The full LPA is the highest cost alternative with incremental operating costs of \$117.88 per year by 2025.

C. Optimize Cost-Effectiveness

Estimates of the operating and maintenance cost per revenue mile of service, operating and maintenance cost per new trip, and operating cost per passenger mile have been identified as measures of cost effectiveness. The estimated Metrorail operating and maintenance cost per revenue mile with the Wiehle Avenue Extension in the opening Year 2011 is approximately \$8.94 per revenue mile. When Year 2025 revenue miles are considered the value is about \$11.81 per revenue mile. The full LPA in Year 2025 results in a values of \$11.69 per revenue mile. The estimated operating cost per new trip for Metrorail is lowest for the Wiehle Avenue Extension in 2011, with a value of \$5.55. This increases to \$6.68 for the Wiehle Avenue Extension in 2025. The full LPA in 2025 has the highest value of \$8.39 per new trip. The Metrorail operating costs are approximately \$0.40 per passenger mile of service for the Wiehle Avenue Extension in 2011 and about \$0.52 and \$0.50 per passenger mile for the Wiehle Avenue Extension and the full LPA in the Year 2025, respectively.

10.1.5 GOAL 6: SERVE DIVERSE POPULATIONS

A. Balance Benefits and Impacts to all Residents within the Corridor

None of the alternatives include physical impacts to low income or minority neighborhoods identified in the corridor. The Wiehle Avenue Extension would serve only one of the low income or minority neighborhoods with Metrorail service, leaving five low income or minority neighborhoods without Metrorail service. The full LPA would provide Metrorail service to all six of the identified low income and minority neighborhoods.

B. Improve Accessibility to Existing and Planned Employment Centers from Low-Income and Minority Areas

The No Build Alternative does not provide increased accessibility to any of the six low income and minority areas. The Wiehle Avenue Extension would serve one low income and minority neighborhood with Metrorail service and four additional low income and minority neighborhoods would receive improved access via new Express Bus Services connecting to the Wiehle Avenue Metro station. The full LPA would have direct Metrorail access to all six low income and minority neighborhoods. Those neighborhoods that do have access to the Metrorail system or new Express Bus Services would have improved transit connections to employment centers in the Tysons Corner area and other activity centers served by the Washington Metrorail system.

C. Provide Transportation Improvements that Comply with the Americans with Disabilities Act Standards

All alternatives include services that are in compliance with the Americans with Disabilities Act.

D. Minimize and Mitigate Negative Impacts to Low-Income and Minority Populations

None of the alternatives include physical impacts to low income or minority neighborhoods identified in the corridor.

10.2 NEW STARTS CRITERIA

This section describes the New Starts Criteria and associated evaluation measures the FTA uses to evaluate and rate fixed guideway transit projects seeking federal funding for implementation.

The New Starts program is the Federal government's primary financial resource for supporting locally-planned, implemented, and operated transit "guideway" capital investments.

Each year FTA prepares its Annual Report on New Starts for Congress as a companion document to the annual budget submitted by the President. The report documents recommendations for the allocation of funds under Section 5309 of Title 49 of the United States Code. The Transportation Efficiency Act for the 21st Century (TEA-21) requires that the annual report include the evaluation and ratings of new or extended fixed-guideway transit projects. The FTA reviews the criteria results for each candidate project and assigns a rating for each criterion. Based on criteria ratings, a candidate project receives an overall rating of either highly recommended, recommended, or not recommended.

Project sponsors are asked to provide the results on specific project measures that respond to each of the criteria. The August 2004 submittal was based on the Wiehle Avenue Extension . The measures are derived by comparing the estimated results of the Wiehle Avenue Extension to those of a Baseline Alternative. The Baseline Alternative represents a lower cost alternative with comparable service to the LPA (Build) alternative. The Baseline Alternative for this project consists of expanded Fairfax, WMATA Metrobus, and Loudoun bus services in the corridor, with service focused on new express bus service along the Dulles Access/Toll Road. The new Express Bus Service would connect the same major destinations that are served by the Wiehle Avenue Extension .

The criteria measures are described as follows:

A. Project Justification

Mobility Improvements - The estimated transit system user benefits for the candidate project compared to the Baseline Alternative expressed in terms of minutes saved per passenger mile. This criterion also considers the number of low income households within ½ mile of station sites.

Environmental Benefits - This criterion considers the potential impact on pollutants and annual energy savings for the project in comparison to the Baseline Alternative. Pollutants include Carbon Monoxide (CO), Nitrogen Oxide (NOx), Volatile Organic Compounds (VOCs), Hydrocarbons (HC), Particulate Matter (PM10), and Carbon Dioxide (CO₂).

Operating Efficiencies - This criterion includes the estimated system operating cost per passenger mile.

Cost Effectiveness - This criterion includes the estimated incremental cost per system user benefit (hour of travel time savings)

Transit-Supportive Land Use and Future Patterns - This criterion is measured based on a qualitative assessment of the project's ability to address several land use related issues including existing land use compatibility, containment of sprawl, transit supportive corridor policies, supportive zoning regulations near stations, tools to implement land use policies, and performance of land use policies.

B. Local Financial Commitment

Stability and Reliability of Capital Financing Plan - The project financial plan is reviewed including an assessment of the local financial commitment to fund the capital needs of the project.

Stability and Reliability of Operating Finance Plan - The project financial plan is reviewed including an assessment of the local financial commitment to fund the operating needs of the project.

Table 10.2-1 summarizes the quantitative measures submitted for the Wiehle Avenue Extension in August 2004.

Table 10.2-1: Summary of New Starts Quantitative Measures for the Wiehle Avenue Extension

Criteria	Measure	Results
Mobility Improvements	Total Transit System User Benefits Per Passenger Mile (in minutes)	1.89
	Number of Low Income Households within ½ Mile of Stations	170
	Number of Total Jobs within ½ Mile of Stations	100,980
Environmental Benefits	Change in Carbon Monoxide Emitted (tons per year)	-160.87
	Change in Nitrogen Oxides Emitted (tons per year)	-31.01
	Change in Volatile Organic Compounds Emitted (tons per year)	-13.98
	Change in Particulate Matter Emitted (tons per year)	-10.68
	Change in Carbon Dioxide emitted (millions of tons per year)	-5,521.07
	Energy (millions of BTUs per year)	-9,329.02
Operating Efficiencies	Incremental System Operating Cost Per Passenger Mile	\$0.005
Cost Effectiveness	Cost per Hour of User Benefits	\$21.08
	Cost per New Trip	\$24.73
Land Use (Year 2025)	Total Housing Units in Station Areas	6,943
	Total Population in Corridor	155,179
	Total Employment in Corridor	226,504
	Corridor Population as a % of Metropolitan Area	2.6%
	Corridor Employment as a % of Metropolitan Area	5.6%
	Population Density in Corridor (per square mile)	3,535
Financial Plan Information	Employment Density in Corridor (per square mile)	5,159
	Total Capital Cost (YOE \$)	\$1,521,500,000
	Proposed Federal Section 5309 New Starts Share of Capital Costs (YOE \$)	\$760,700,000
	Proposed State Sources for Capital Funding (YOE \$)	\$380,400,000
	Proposed Local Sources for Capital Funding (YOE \$)	\$380,400,000
	Estimated Annual Incremental Operating Costs - 2025 (millions of YOE\$)	\$67.6