



COMMONWEALTH of VIRGINIA

DAVID S. EKERN, P.E.
COMMISSIONER

DEPARTMENT OF TRANSPORTATION

14685 Avion Parkway
Chantilly, VA 20151
(703) 383-VDOT (8368)

March 30, 2007

Mr. Roberto Fonseca-Martinez
Division Administrator
Federal Highway Administration
Virginia Division
400 North 8th Street
Richmond, Virginia 23240

Re: Reevaluation for the Capital Beltway Study
Location: Fairfax County, Virginia
State Project Numbers: 0495-029-F29, PE101; 0495-029-F30, PE101; 0495-029-F31, PE101
Federal Project Numbers: IM-495-5(079); IM-495-5(080); IM-495-5(082)
FHWA EIS Number: FHWA-VA-EIS-04-05-F
FEIS Date: April 18, 2006
ROD Date: June 29, 2006

Dear Mr. Fonseca-Martinez:

The Virginia Department of Transportation (VDOT) conducted extensive NEPA studies and documentation for the cited project. This process concluded with FHWA's approval of the Record of Decision (ROD) on June 29, 2006. This approved the Selected Alternative, a 4-2-2-4 HOT lane configuration, for the Capital Beltway.

Consistent with the FEIS and ROD, the Capital Beltway HOT lane configuration remains essentially the same as the Selected Alternative. The HOT lanes will extend from west of the Springfield interchange near the Hemming Avenue Bridge to the Old Dominion Drive Bridge (Route 738) just south of the Georgetown Pike (Route 193). The mainline roadway consists of 12-lanes configured in the 4-2-2-4 typical section. The two inner lanes in each direction are dedicated for HOT lane traffic and are separated from the adjacent general-purpose lanes by a four-foot striped buffer. The eight general-purpose lanes (four in each direction) will be maintained.

While advancing the Selected Alternative into design, refinements have been made since the approval of the Final Environmental Impact Statement (FEIS) and ROD. These changes fall into three main categories: construction staging, typical design refinements, and design

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modifications. Construction staging includes components of the project that may not be built in the initial phase of construction but are included in the environmental document and anticipated in the future such as on-off ramps that provide direct access to the HOT lanes from select interchanges. Typical design refinements are the types of changes that are normally incorporated into projects as they move from preliminary engineering to final design. Finally, design modifications are changes to the design configuration. The resulting *Refined Selected Alternative* is described in Attachment A.

Since this reevaluation is being performed approximately nine months after the issuance of the ROD, changes to the corridor have been minimal and no new resources have been identified. No regulatory changes have occurred since the approval of the ROD that would alter the findings or validity of the ROD. Traffic volumes have been updated to a design year of 2030, reflecting a 20-year design horizon and any resulting change in impacts, specifically in the areas of air and noise, have been reviewed.

Concurrent with this re-evaluation, a detailed operational analysis of the Refined Selected Alternative is being conducted, including detailed traffic and computer simulation, which will be reviewed by VDOT and used to support requests for Interstate access changes. Notwithstanding, VDOT has reviewed the Refined Selected Alternative conceptually and consider it viable. VDOT understands that approval of this Reevaluation by FHWA represents approval of the conclusions stated below and does not constitute FHWA approval of any design exceptions that may be needed; design exceptions are being addressed on a parallel track.

The attached tables present the findings of the reevaluation (Table 1), and an impact summary (Table 2). In addition, supporting studies and documentation are attached, as appropriate.

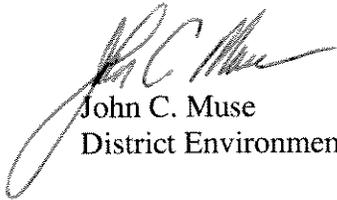
Based on the findings of the reevaluation, it is our opinion that the FEIS and ROD remain valid, and that a Supplemental DEIS or new DEIS is not warranted. The proposed changes to the project represented by the Refined Selected Alternative will not result in significant environmental impacts, let alone significant environmental impacts not already evaluated in the EIS. Further, new information or circumstances relevant to environmental concerns and bearings on the proposed action or its impacts will not result in significant environmental impacts.

The proposed modifications to the project will result in changes to the amount of Section 4(f) land used, but these changes are minor. Therefore, circulation of a separate Section 4(f) Evaluation is not required in accordance with 23 CFR 771.135(m)(3).

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Thank you for your attention to this matter. Should you have any questions, please contact Mr. James Cromwell at 804-225-3608.

Sincerely,



John C. Muse
District Environmental Manager

We concur with this written reevaluation

Mr. Roberto Fonseca-Martinez
Federal Highway Administration, Division Administrator

Date

Table 1. Issue Evaluation Checklist

Issue or Area of Concern	Method of Review	Have Impacts Changed with Refined Selected Alternative	Comment
TRANSPORTATION			
Traffic Volumes/Patterns/Time Public Transportation Highways Transportation Plan Freight	Revised traffic forecasts and refined preliminary design. Comparisons were made between the alternatives to determine changes.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Traffic forecasts were updated to the year 2030 to reflect a minimum 20-year design horizon. This update was used in the reevaluation to determine if the change in traffic forecasts would result in impacts not already addressed in the Final Environmental Impact Statement (FEIS), most notably in the areas of air and noise (see Attachment B). Refinements have also occurred to the proposed design of the highway which are outlined in Attachment A.
LAND USE			
Land Use Conversion Development Consistent with Area's Comprehensive Plan	Review of refined design, proposed right-of-way, surveyed existing right-of-way, the <i>Long Range Transportation Plan for the National Capital Region</i> , and <i>Fairfax County Comprehensive Plan</i> (2003).	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<p>Right-of-way requirements have increased due to additional right-of-way needed to construct and maintain noise barriers, new HOT connections, and a greater level of accuracy provided by the surveyed existing right-of-way.</p> <p>The proposed action remains consistent with local plans and zoning.</p>
POPULATIONS & SERVICES			
Populations Emergency Services	Review of census information, preliminary design, and location of emergency services.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Populations would not be impacted with either alternative. The implementation of the proposed project would have a positive effect on emergency services, as access would improve and delays would decrease.
RELOCATION IMPACTS			
Potential Relocations Environmental Justice Populations	Review of existing resources, census information, field review, and revised right-of-way requirements.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<p>The Selected Alternative potentially displaced 3 homes. The Refined Selected Alternative potentially displaces 8 homes. This is substantially less than the nearly 300 homes potentially displaced in the DEIS and is not significant for an 11.5 mile corridor.</p> <p>No disproportionate impacts to minority or low-income populations would occur.</p>

Issue or Area of Concern	Method of Review	Have Impacts Changed with Refined Selected Alternative	Comment
ECONOMIC IMPACTS			
Business Relocations Construction & Operations Employment	Review of refined design and revised right-of-way requirements.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<p>There are no business relocations.</p> <p>Projections for construction and operations employment created through project implementation remain valid.</p>
VISUAL & AESTHETICS			
Visual & Aesthetics	Field review and refined preliminary design.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<p>The Refined Selected Alternative is consistent with the Selected Alternative evaluated in the Final EIS. The removal of the fly-over ramp at I-66 results in a visual improvement and the changes in the Tysons Corner area introduce road connections through commercial areas. Reference Attachment A for further discussion of the design refinements.</p>
FARMLANDS			
Farmlands	Review of <i>Soil Survey of Fairfax County, Virginia</i> (USDA 1963).	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<p>There are no farmlands present in this urban corridor (as noted in the Final EIS).</p>
NOISE & VIBRATION			
Noise	Review of changes in land use since FEIS analysis, revised noise analysis based on 2030 traffic forecasts and refined preliminary design, noise memo provided by HMMH, FEIS, and <i>Capital Beltway Study Noise Technical Report</i> conducted for the FEIS.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<p>The total number of dwelling units impacted by noise decreases from 3,233 dwelling units with the Selected Alternative to 1,456 dwelling units with the Refined Selected Alternative. This represents a 55 percent decrease in the number of dwelling units impacted by noise. The number of dwelling units protected or benefited by the noise barriers deemed cost-effective and feasible by VDOT decreases accordingly, from 4,122 dwelling units with the Selected Alternative to 1,874 dwelling units with the Refined Selected Alternative. This is a 55 percent reduction, consistent with the percent decrease in noise impacts. Potential noise impacts are discussed in detail in Attachment C.</p>

Issue or Area of Concern	Method of Review	Have Impacts Changed with Refined Selected Alternative	Comment
AIR QUALITY			
Regional Compliance with the Standards Compliance with PM _{2.5} and PM ₁₀ Hot-Spot Analyses	Air Quality Analysis	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<p>An Air Quality Analysis conducted in February 2007 indicated that the Refined Selected Alternative is consistent with the project included in the CLRP and TIP.</p>
Compliance with Air Toxics Analysis		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<p>A meeting was held with the Metropolitan Washington Council of Governments (WashCOG) to determine if the proposed changes would require that the air quality conformity process be revisited. After reviewing each proposed change, it was determined by WashCOG representatives that the changes were not significant enough to alter any of the inputs into the conformity process. Documentation of this meeting is included in Appendix D.</p>
		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<p>The PM_{2.5} project level conformity determination that was prepared for the Selected Alternative remains valid, as none of the triggers that require a re-determination have come to pass [40 CFR 93.104(d)]. Specifically, the proposed changes to the Selected Alternative as represented by the Refined Selected Alternative do not represent a significant change to the concept/scope of the project; more than 3 years have not passed since the FEIS was issued; and a supplemental environmental document is not being initiated for air quality purposes.</p> <p>The qualitative mobile source air toxic (MSAT) analysis prepared for the FEIS based on 2020 traffic need not be revisited due to the update of traffic to 2030 because a MSAT analysis does not allow us to assess the effects or impact of MSATs on the public given the existing limitations in emissions modeling, dispersion modeling, and exposure modeling. A MSAT analysis does allow one to determine the relative differences that exist among alternatives under consideration in the NEPA process by examining operational factors such as daily traffic and/or VMT. However, this reevaluation has been prepared to assess the impact that design changes to the Selected Alternative will have on the environment. Because those design changes are not considered significant, it is not expected that an update of the MSAT analysis will produce any meaningful differences when comparing the Selected Alternative to the Refined Selected Alternative and therefore, will not provide any benefit to decision-making at this point in the project development process.</p> <p>Project specific air quality analysis for carbon monoxide was updated based on the revised forecasts and is included separately in the reevaluation.</p>

Issue or Area of Concern	Method of Review	Have Impacts Changed with Refined Selected Alternative	Comment
ECOSYSTEMS			
Native Wildlife Existing Vegetation Threatened & Endangered Species Critical Habitat Wildlife and Waterfowl Refuges	Field review, the <i>Natural Resources Technical Report</i> conducted for the FEIS, <i>Joint Permit Application</i> (October 2006, revised February 2007), and agency correspondence.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	There will be no additional permanent impacts with the implementation of the Revised Selected Alternative. Temporary impacts to wildlife are expected as a result of the displacement of vegetated cover within the limits of disturbance. The removal of vegetated cover would cause the migration of wildlife species, particularly edge-dwelling species, to migrate away from the project area and result in a decrease of habitat usage. Potential impacts to these resources are discussed in Attachment E. There will be no impacts to threatened and endangered species, critical habitat, or wildlife and waterfowl refuges.
WATER RESOURCES			
Surface Waters Dredging Requirements Public Water Supply	Wetland delineation, field review, existing resources, <i>Joint Permit Application</i> (October 2006, revised February 2007), agency coordination, Fairfax County Health Department, and Virginia Department of Conservation and Recreation information.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	The anticipated amount of stream impacts has decreased from 6,877 feet to 6,694 feet. Modifications during the design phase resulted in a direct decrease in the impacts to Scotts Run and its tributaries in the immediate vicinity of the Dulles Toll Road interchange. Further discussion of potential impacts can be found in Attachment E.
AQUATIC RESOURCES			
Fish Submerged Aquatic Vegetation Benthos Other Flora and Fauna	Wetland delineation, <i>Joint Permit Application</i> (October 2006, revised February 2007), <i>Natural Resources Technical Report</i> conducted for FEIS	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Impacts to aquatic species are not anticipated with the implementation of either the Selected Alternative or the Refined Selected Alternative. Further discussion of these resources can be found in Attachment E.
FLOODPLAINS			
Floodplains	FEMA floodplain mapping, Fairfax County floodplain mapping	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	The amount of anticipated floodplain impacts are expected to decrease from 10.42 acres to 5.42 acres with the implementation of the Refined Selected Alternative. A discussion of potential impacts is included in Attachment E.

Issue or Area of Concern	Method of Review	Have Impacts Changed with Refined Selected Alternative	Comment
WETLANDS			
Wetlands	Wetland delineation, <i>Joint Permit Application</i> (October 2006, revised February 2007), field review, and agency coordination	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	The amount of wetlands impacted has decreased from 3.03 acres to 2.43 acres. A detailed description of potential wetland impacts can be found in Attachment E.
HAZARDOUS WASTE SITES			
Hazardous Waste Sites	Review of <i>Hazardous Materials Technical Report</i> conducted for the FEIS	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	The Refined Selected Alternative is consistent with the Selected Alternative evaluated in the FEIS in that neither will have an impact on previously identified hazardous waste sites.
COASTAL BARRIERS & COASTAL ZONE			
Coastal Barriers & Coastal Zone	Review of Virginia's Coastal Zone Management Program	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	None of the proposed project area is within Virginia's Coastal Zone. There have been no changes to the boundaries of these resources since the approval of the Final EIS.
HISTORIC & ARCHAEOLOGICAL RESOURCES			
Architectural Resources Archaeological Resources	Agency coordination, review of existing resources, and <i>A Cultural Resources Survey of Improvements to the Capital Beltway (Route 495) in Fairfax County, Virginia.</i>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	The Refined Selected Alternative is consistent with the Selected Alternative evaluated in the FEIS in that neither alternative would affect existing architectural or archaeological sites. In addition, there has been no change in the number of architectural and archaeological resources since the completion of the Final EIS. Consistent with the FEIS, the noise barrier that currently protects Holmes Run Acres Historic District at the northeast corner of the Gallows Road interchange will be replaced as part of the project. The replacement of the noise barrier would not constitute an adverse effect on the historic district.
SECONDARY & CUMULATIVE			
Socioeconomic Impacts Natural Resource Impacts	Review of US Census Bureau and <i>Natural Resources Technical Report</i>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Socioeconomic and Natural Resource impacts associated with the Refined Selected Alternative will be consistent with those anticipated with the Selected Alternative evaluated in the FEIS.

Issue or Area of Concern	Method of Review	Have Impacts Changed with Refined Selected Alternative	Comment
CONSTRUCTION IMPACTS			
Air Quality Noise Water Quality Maintenance & Control of Traffic Health & Safety Pollution Control	Review of existing data including the <i>Joint Permit Application</i> (October 2006, revised February 2007), Air Quality Analysis, and Noise Analysis.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Construction impacts associated with the Refined Selected Alternative will be consistent with those anticipated with the Selected Alternative evaluated in the FEIS. Construction impacts will be temporary.
SECTION 4(f) EVALUATION			
Section 4(f) Evaluation	Revised Section 4(f) Evaluation and agency coordination	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	A Revised Section 4(f) evaluation was conducted for the Reevaluation. The total number of parks permanently impacted has remained the same. The five parks that will be subjected to permanent impacts as a result of the Refined Selected Alternative include Wakefield Park, Fitzhugh Park, Jefferson District Park, W& OD Railroad Regional Park, and Flag Run Park. Accotink Stream Valley Park would have a temporary occupancy during construction. A detailed description of the changes can be found in Attachment F.
PERMITS			
Permits	Agency coordination and review of the <i>Joint Permit Application</i> (October 2006, revised February 2007), <i>Natural Resources Technical Report</i> , Air Quality Analysis, Noise Analysis, and FEIS.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	There have been no regulatory changes related to project development or construction activities. No significant changes to the affected environment have occurred that warrant additional study or change the findings of the Final EIS. Those permits or compliances required for the Selected Alternative, as listed in the Final EIS, remain valid for the Refined Selected Alternative.

Table 2. Impact Summary of Selected Alternative and Refined Selected Alternative

	FEIS Selected Alternative	Refined Selected Alternative
Noise Impacts (Dwellings)	3,233	1,456
Dwellings Protected and Benefited by Noise Barriers	4,200	1,893
Homes Displaced	3	8
Businesses Displaced	0	0
Community Facilities Displaced	0	0
Carbon Monoxide (ppm) 1 hr. Range from 10 Sites 8 hr.	5.9-9.6 2.9-6.2	6.5-8.5 ¹ 3.3-5.0 ¹
Public Parks with Permanent Impacts	5	5
Parkland Required (acres)	2.5	2.40
Adverse Effects to Historic Resources	0	0
Wetlands Displaced (acres)	3.03	2.43
Impacted Length of Streams (feet)	6,877	6,694
Floodplain Encroachments (acres)	10.42	5.42
Potential Hazardous Material Sites	0	0
Threatened and Endangered Species	0	0
Length of Alternative (miles)	12.3	11.5
Right-of-Way Required (acres)	10	21.3

1. Only 8 Sites were modeled due to revised project limits

ATTACHMENT A
REFINED SELECTED ALTERNATIVE

Refined Selected Alternative

The Refined Selected Alternative is essentially the same as the Selected Alternative approved in the FEIS and ROD. The HOT lanes will extend from west of the Springfield interchange south of the Hemming Avenue Bridge to near the Old Dominion Drive Bridge (Route 738) south of the Georgetown Pike (Route 193). The mainline consists of 12-lanes configured in 4-2-2-4 typical section. The two inner lanes in each direction are dedicated for HOT lane traffic and are separated from the adjacent general-purpose lanes by a four-foot striped buffer. The eight general-purpose lanes (four in each direction) will be maintained. The typical section is consistent with the FEIS. The Refined Selected Alternative is shown on the figures included with this attachment.

The Refined Selected Alternative extends approximately 11.5 miles along the Beltway. This is approximately 0.8 miles shorter than the Selected Alternative. The change in project limits is primarily at the north end of the study area approaching the American Legion Bridge into Maryland. The limits were reduced to allow sufficient space for vehicles to enter/exit the HOT lanes and safely move from/to the appropriate lane since there are several decision points for drivers north of the project limits.

Consistent with the Selected Alternative, the HOT lanes in the Refined Selected Alternative would have direct access/egress to existing and anticipated HOV facilities at three interchanges: Braddock Road, I-66, and the Dulles Access/Toll Road.

While advancing the Selected Alternative into design, refinements have been made since the approval of the Final Environmental Impact Statement (FEIS) and ROD. These changes fall into three main categories: design modifications, typical design refinements and construction staging. Design modifications are changes to the design configuration. Typical design refinements are the types of changes that are normally incorporated into projects as they move from preliminary engineering to final design. Finally, construction staging includes components of the project that may not be built in the initial phase of construction but are included in the environmental document and anticipated in the future such as on-off ramps that provide direct access to the HOT lanes from select interchanges.

The design modifications included in the Refined Selected Alternative are the result of more detailed engineering and operational analyses. The modifications include additional or modified HOT access ramps, changes to select interchange configurations, and changes to the overall project limits. The design modifications and the reasons for each change are outlined in the attached table.

There have been additional minor design refinements typical of projects advancing from preliminary engineering to final design. These refinements are a result of detailed engineering, advanced drainage design, and additional survey data.

Finally, the Refined Selected Alternative may be built in stages. Construction staging includes components of the project that will not be built in the initial phase of construction but are included in the environmental document and are anticipated to be added to the facility in the future such as on-off ramps that provide direct access to the HOT lanes from select interchanges. Possible staged elements being considered at this time include deferring the HOT ramps at Braddock Road to/from the south until the HOT

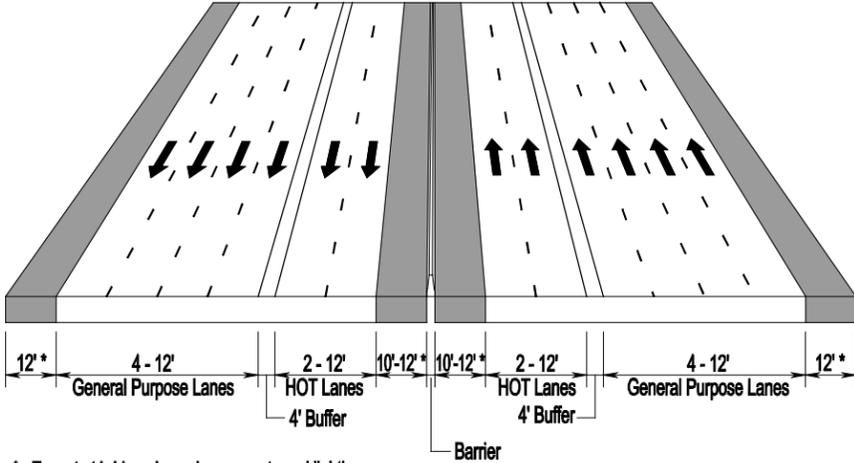
lane system is expanded, deferring the direct connection from the HOT lanes to the Jones Branch Connector, and deferring the westbound to northbound HOT ramp at the Dulles Access/Toll Road (Route 267).

**I-495 HOT Lanes
Refined Selected Alternative**

Design Modifications from Selected Alternative (listed south to north)

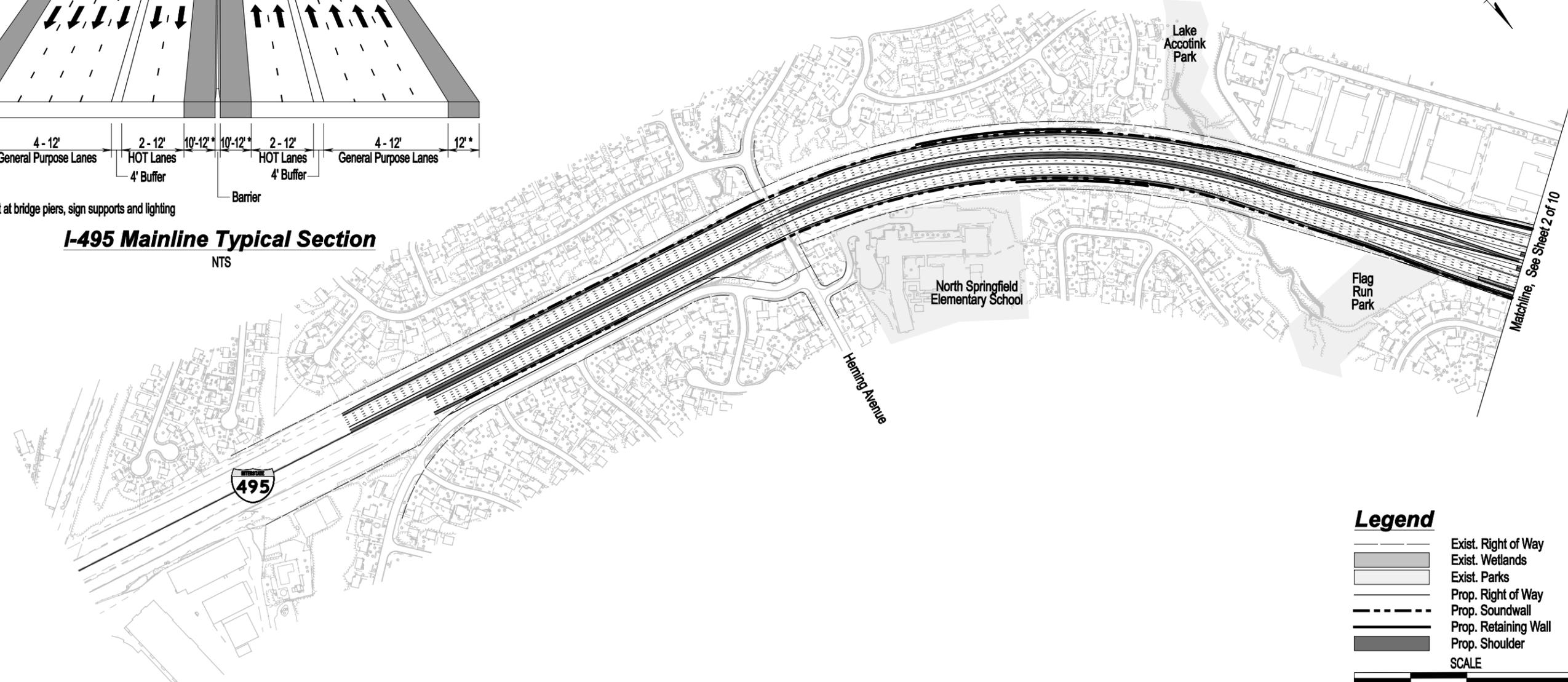
Area	Selected Alternative (FEIS)	Refined Selected Alternative	Reason for Change
Southern Project Limit	Southern limit was at approximately Hemming Avenue.	Southern limit extends approximately 2000 feet south of Hemming Avenue.	Starts transition earlier to be able to fully develop HOT lanes prior to Braddock Road interchange.
Braddock Road	HOT ramps were included to/from both north and south in the center of the partial cloverleaf interchange.	Design has been refined to provide HOT ramps on the "outside" of the loop ramps.	Refinements address traffic operational problems encountered with the original concept.
Gallows Road	No HOT ramps were included at this location.	HOT ramps added to/from the north.	Enhances local access to/from HOT lanes, including access to INOVA Fairfax Hospital. Combined with the HOT ramps to/from the south provided at Route 29, this provides full HOT access to the Fairfax/Merrifield area which could not be incorporated at the US 50 interchange.
I-66	I-495 NB to I-66 WB movement was proposed to be a flyover ramp.	I-495 NB to I-66 WB movement is provided by a two-lane loop ramp in the northeast quadrant of the interchange in the location of the existing loop ramp.	Eliminates the "third-level" bridge over the Beltway reducing visual and noise impacts as well as reducing costs.
Tysons Corner	Provided direct HOT access to Route 123 in the middle of the Route 123 interchange.	Provides HOT access to Tysons Corner area in three locations – HOT ramps to/from the south at Route 7, full HOT access in the vicinity of Route 123 to the Westpark Overpass, and full HOT access at the Jones Branch Connector.	Improves traffic operations on Route 123 as compared to the Selected Alternative and provides multiple points of HOT access to the Tysons Corner area improving access and mobility.
Dulles Toll Road	Aligned HOT lanes adjacent to the existing general purpose lanes.	Aligns HOT lanes through the center of the interchange and the HOT ramps have been adjusted accordingly.	Minimizes wetland and stream impacts while staying within the existing right-of-way.
Northern Project Limit	Northern limit was north of Route 193, Georgetown Pike.	Northern limit is approximately 3600 feet south of Georgetown Pike.	Allows sufficient space for vehicles to safely enter/exit HOT lanes in the transition area extending to the American Legion Bridge.

I-495 HOT Lanes Refined Selected Alternative



* Except at bridge piers, sign supports and lighting

I-495 Mainline Typical Section
NTS

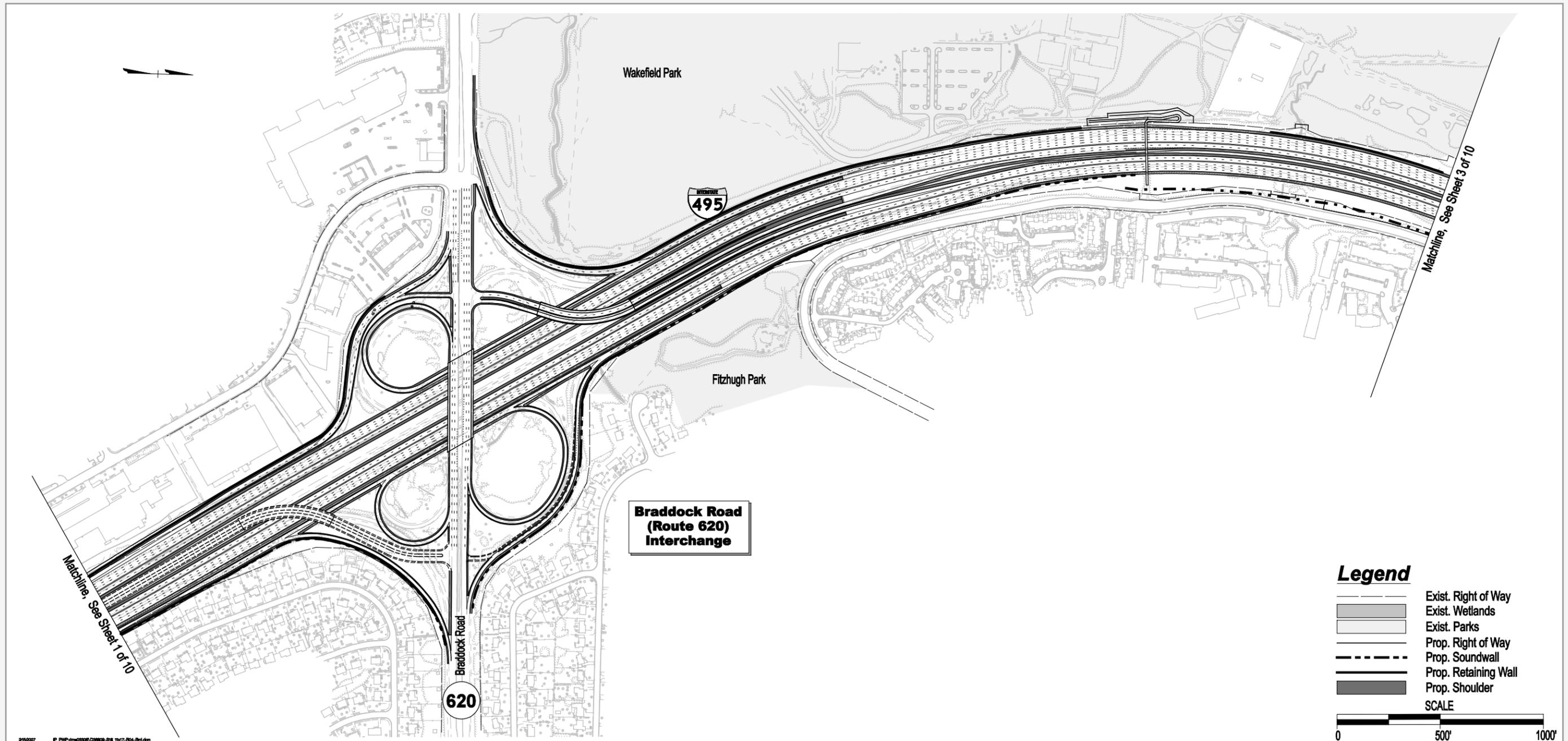


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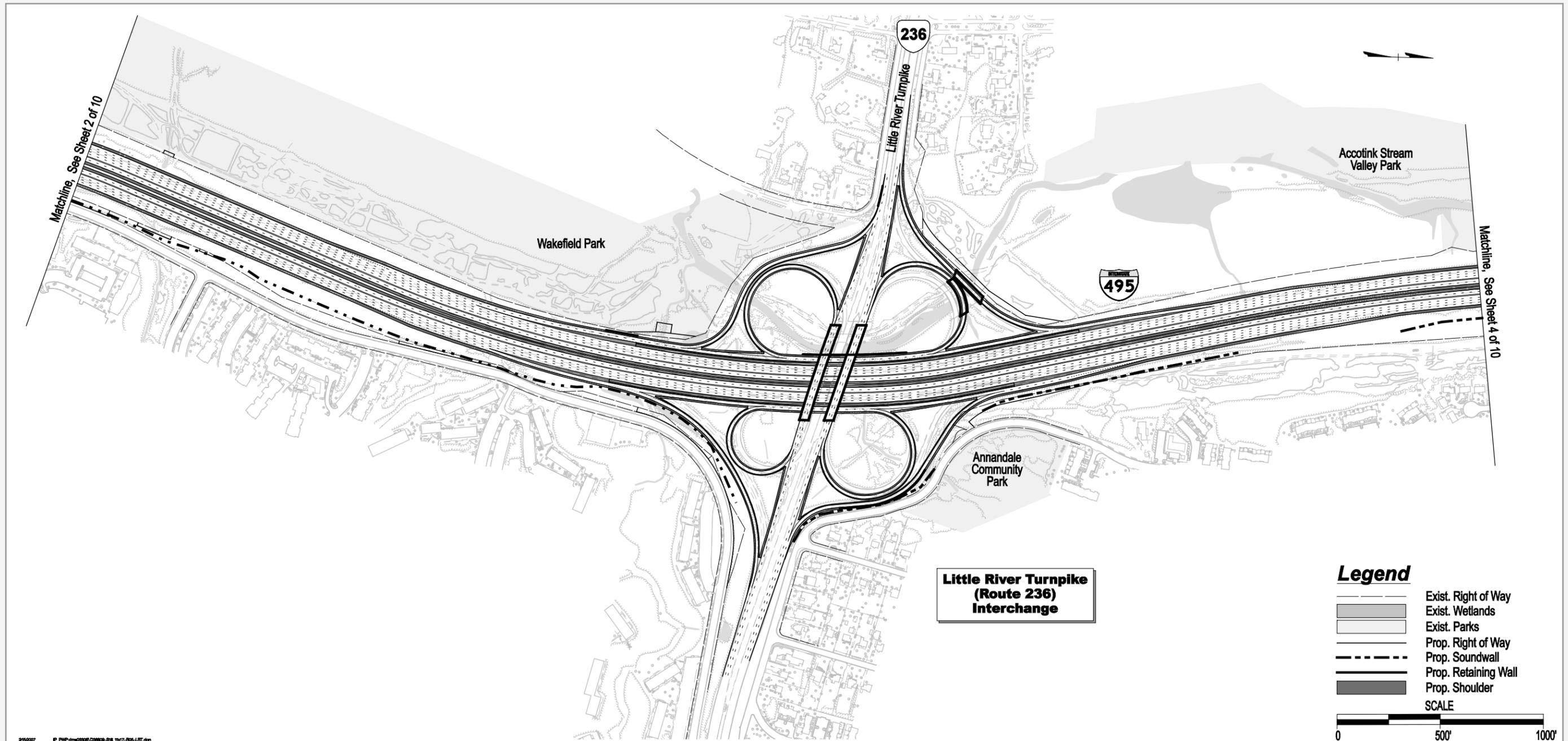
I-495 HOT Lanes Refined Selected Alternative



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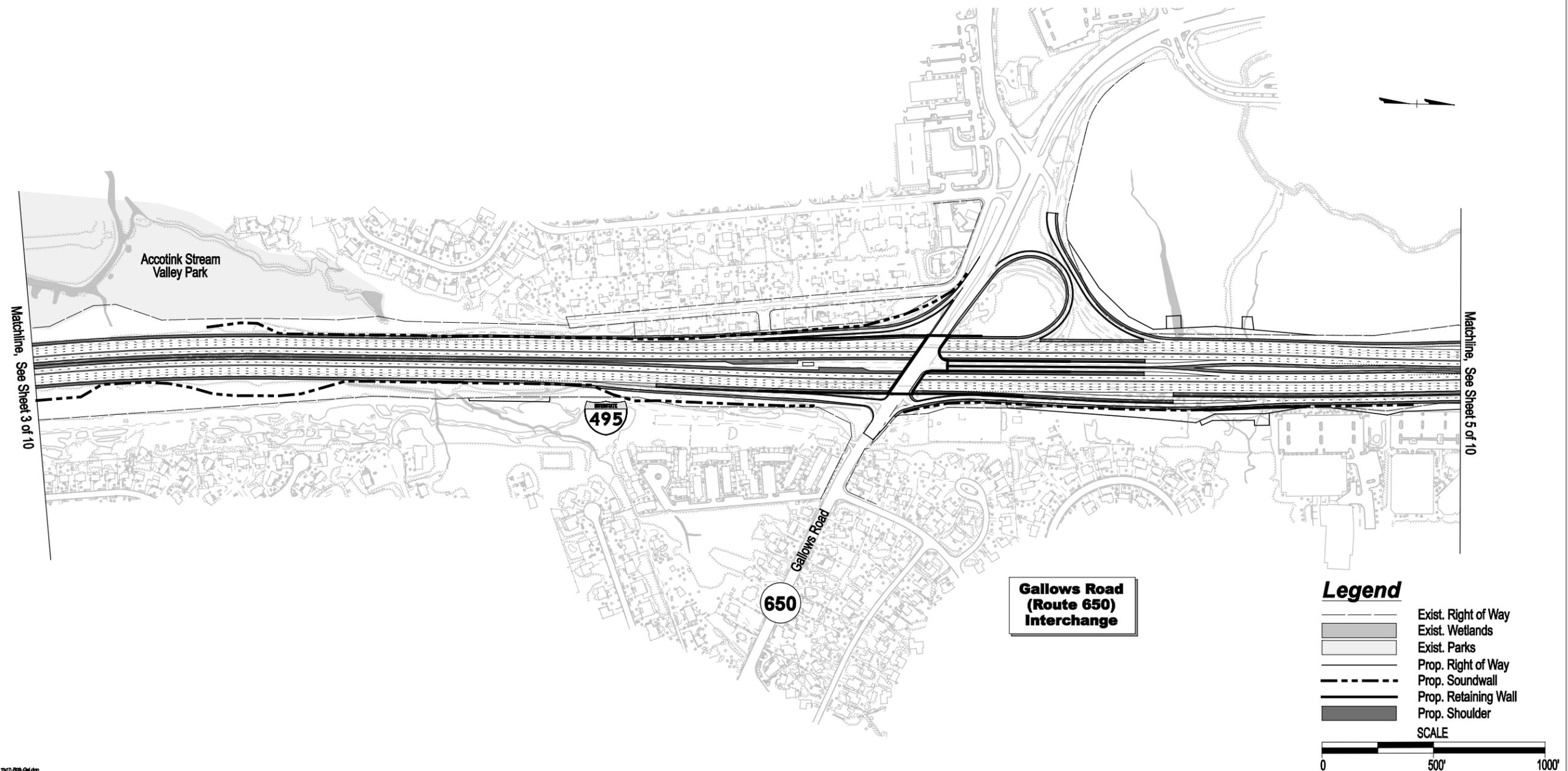
I-495 HOT Lanes Refined Selected Alternative



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I-495 HOT Lanes Refined Selected Alternative



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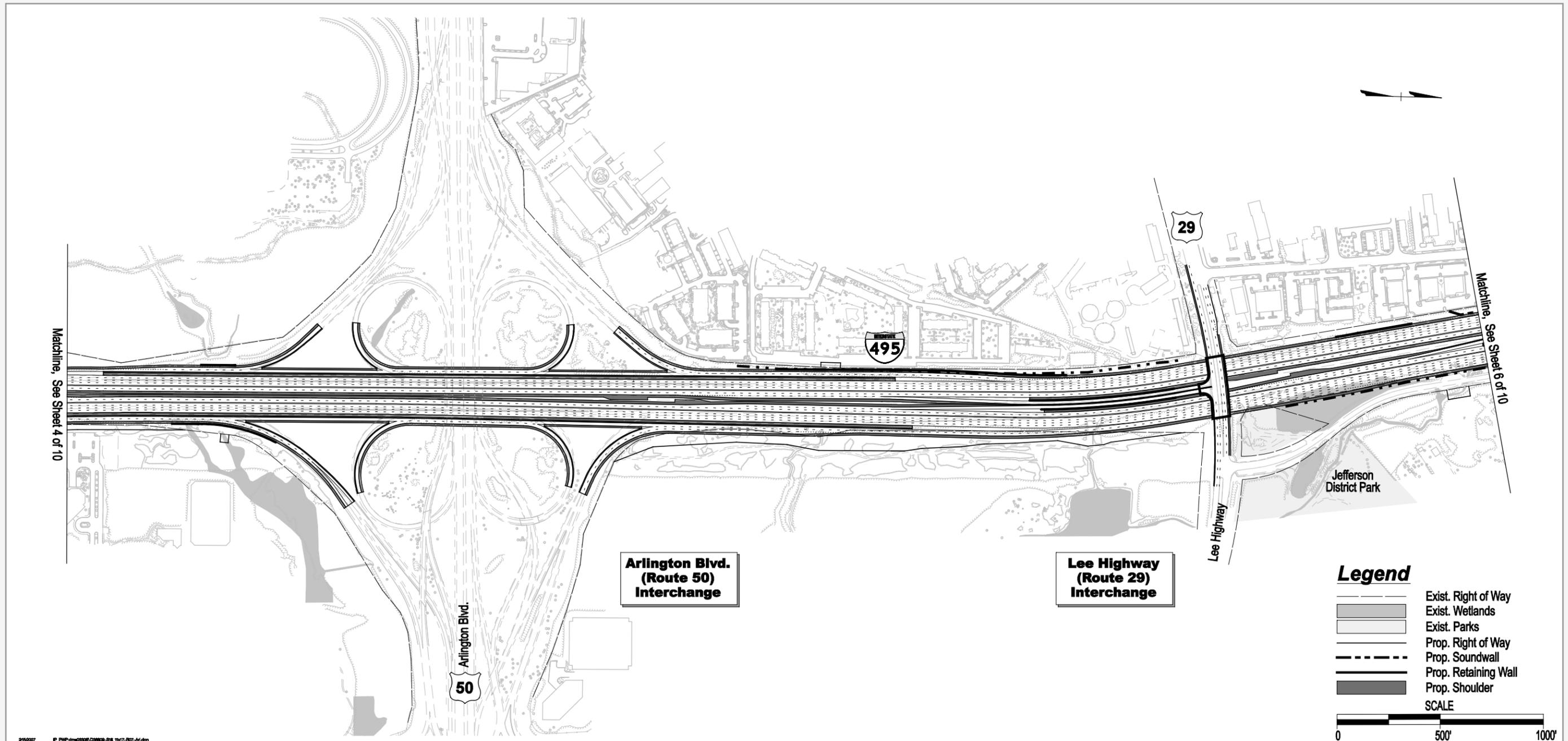
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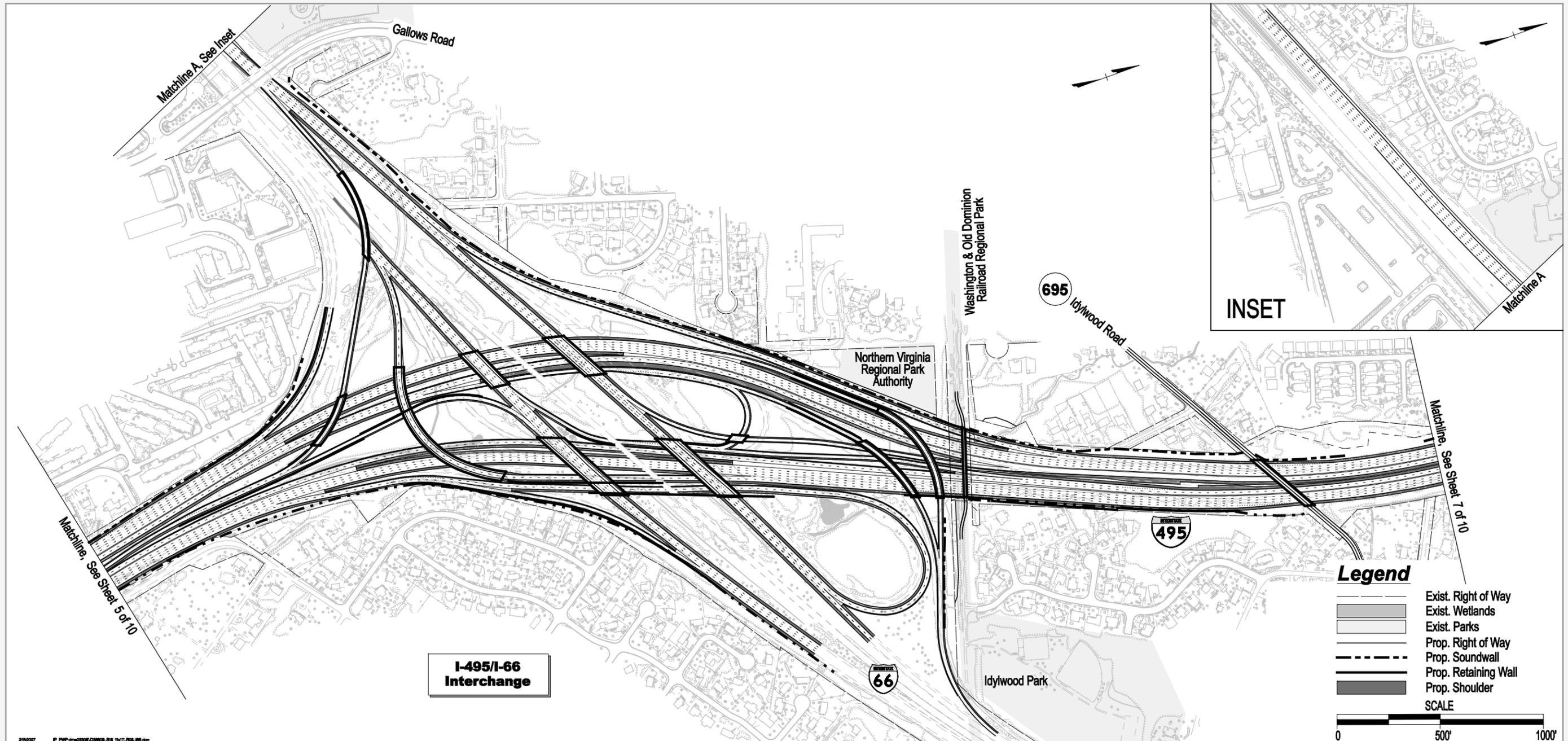
I-495 HOT Lanes Refined Selected Alternative



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I-495 HOT Lanes Refined Selected Alternative

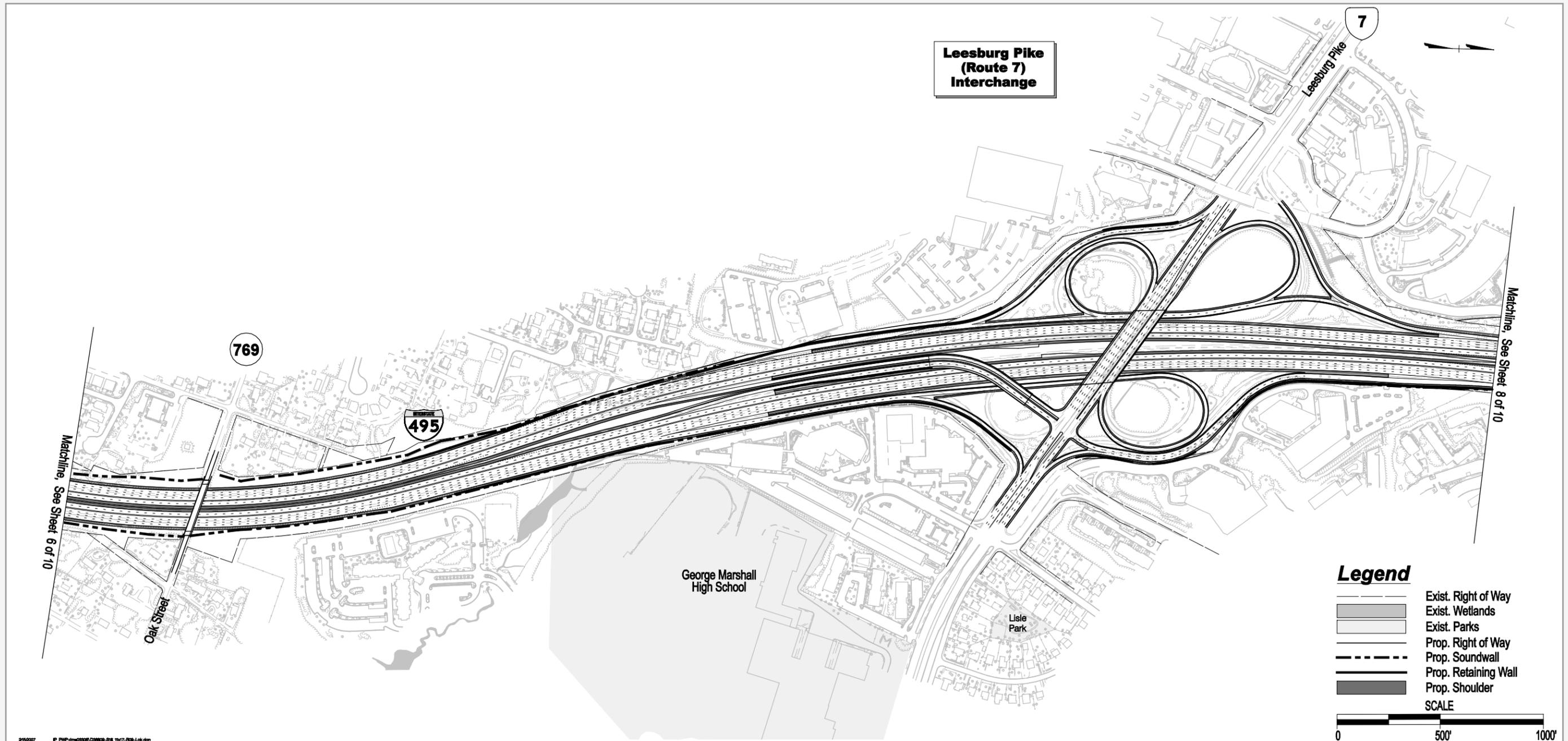


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I-495 HOT Lanes Refined Selected Alternative



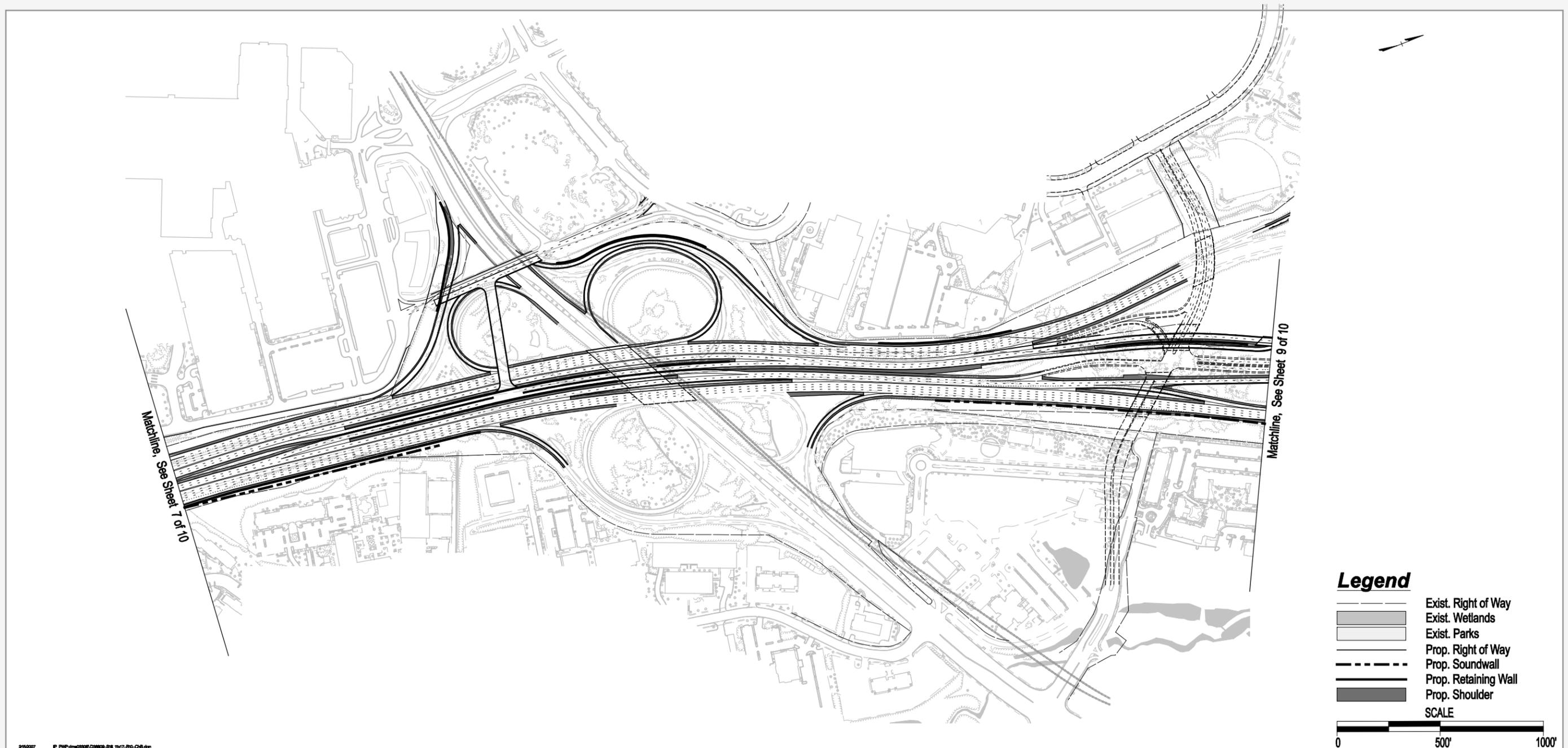
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I-495 HOT Lanes Refined Selected Alternative



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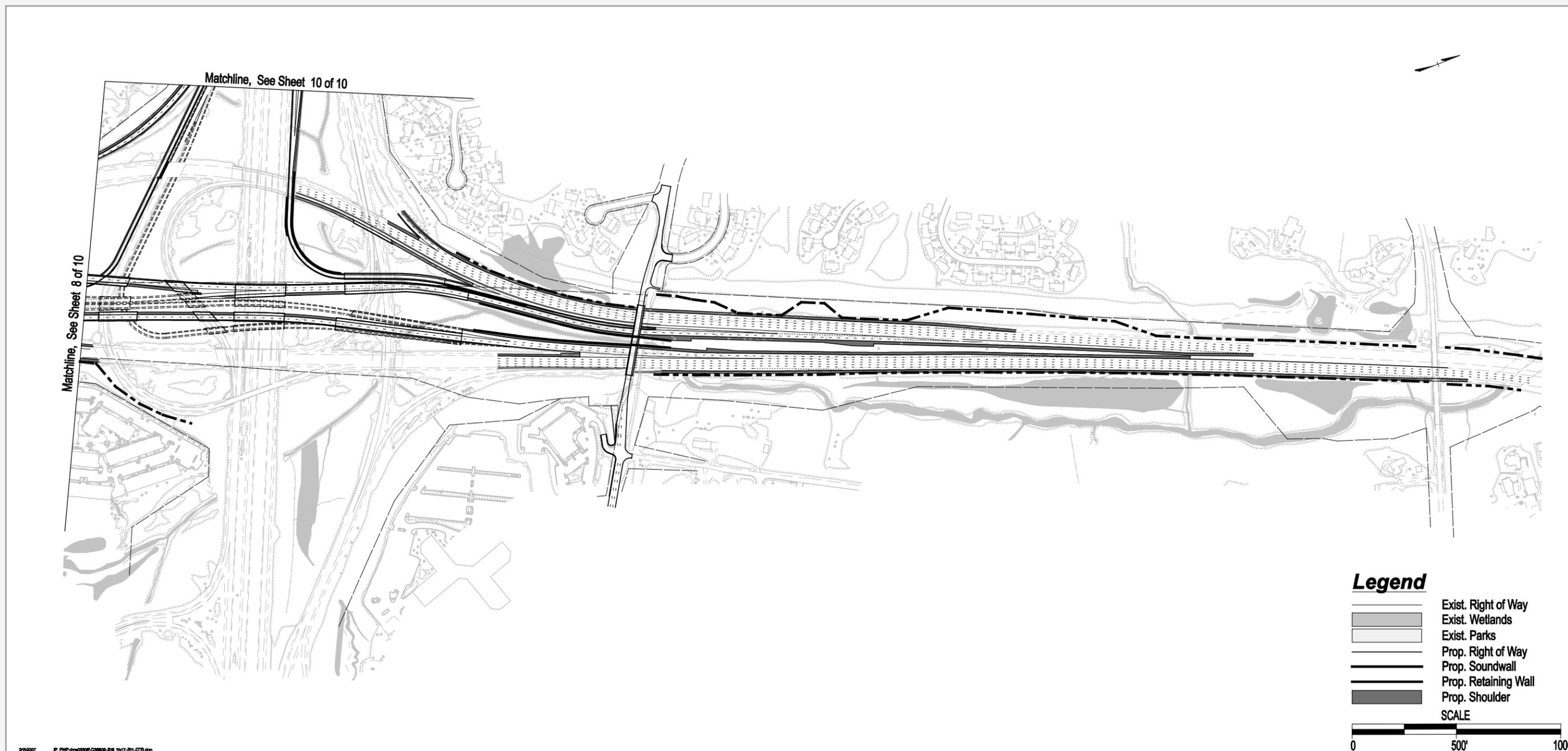
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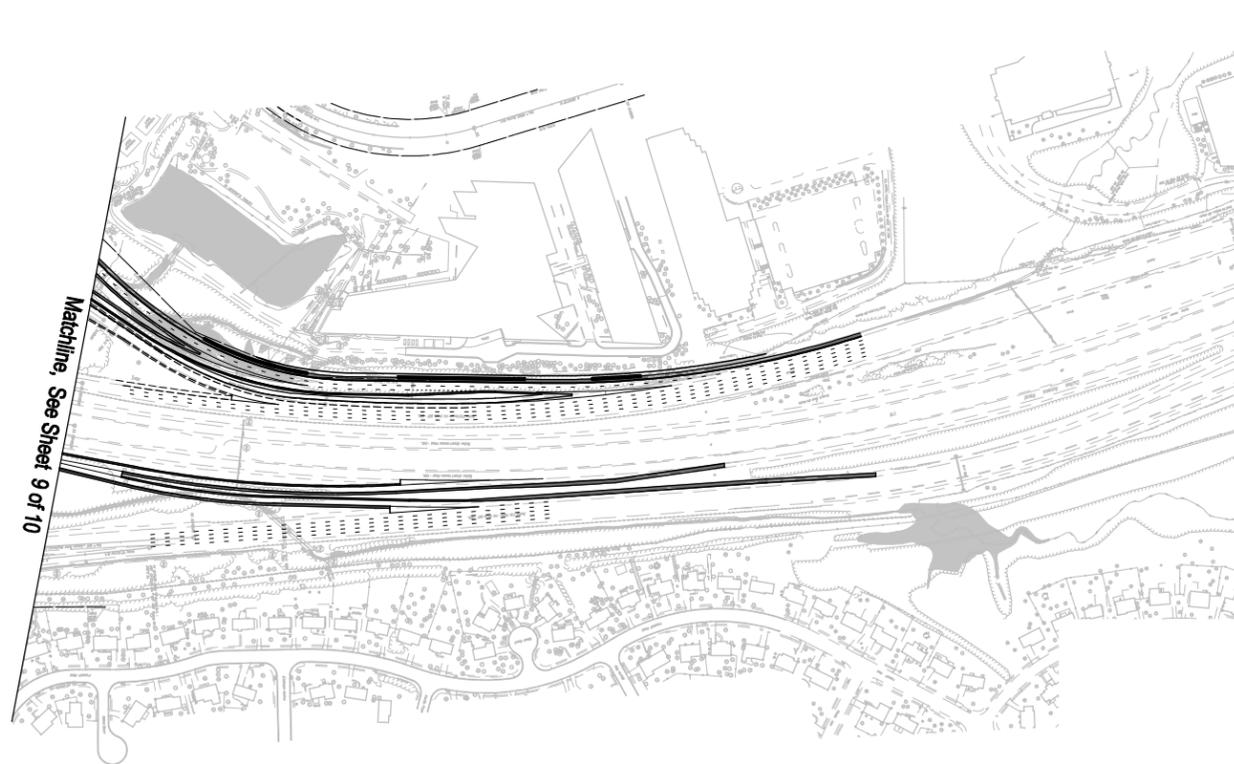
I-495 HOT Lanes Refined Selected Alternative



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I-495 HOT Lanes Refined Selected Alternative



Legend

-  Exist. Right of Way
-  Exist. Wetlands
-  Exist. Parks
-  Prop. Right of Way
-  Prop. Soundwall
-  Prop. Retaining Wall
-  Prop. Shoulder

SCALE



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ATTACHMENT B
TRAFFIC

INTRODUCTION

In accordance with the Record of Decision (ROD) signed on June 29, 2006, when final design was initiated, traffic forecasts were updated to the year 2030 to reflect a 20-year design horizon at a minimum. This update was used in the reevaluation to determine if the change in traffic forecasts would result in significant impacts not already addressed in the Final Environmental Impact Statement (FEIS), most notably in the areas of air and noise.

2030 Traffic Forecasts and Operations

The revised 2030 forecasts were based on regional forecasts for population and employment. Using these regional volumes, a project-specific traffic model was developed and calibrated in order to more accurately forecast and simulate potential general purpose and HOT lane volumes, variable tolls, and projected revenue. The model also reflected changes in land use, other projects implemented between 2020 and 2030, and the constraints of the roadway network feeding the Beltway. This model and traffic simulation will also be used to support documentation for interstate access point approval.

As anticipated in the FEIS and ROD, both population and employment are projected to increase adjacent to the Beltway and in Northern Virginia as a whole. Increasing employment in the Tysons Corner area and the extension of the forecast horizon year to 2030 did result in higher daily forecasts of travel demand for some segments of the corridor. Average daily volumes (vehicles in one direction) are projected to increase to 112,000 – 147,000 vehicles in 2030.

Peak hourly volumes (one direction) are projected to range from 7,200 – 12,700 vehicles in 2030. The smaller change in peak hour volumes along the corridor, as compared to average daily volumes, is indicative of a highly congested corridor. The capacity of the facility and connecting network limits the number of vehicles during any given hour. In addition, the project specific traffic model more accurately reflects the true lane capacity of a HOT lane facility. Therefore, the peak hour volumes will not grow but the peak period will extend and the duration of congestion will increase on the Beltway and the surrounding road network.

As noted in the FEIS and ROD, projected increases in traffic demand between 2020 and 2030 do not effect the purpose and need or scope of the project since during the DEIS process the decision was made to limit the scope of improvements to 12 lanes as well as scale back improvements to minimize adverse impacts to the natural and social environment. The FEIS documents that if the Beltway improvements were designed to address 2020 travel demand let alone 2030, the Beltway would need to be designed to accommodate 14 to 16 lanes to achieve the Level of Service D criterion recommended by AASHTO for Interstate facilities located in an urbanized area. The cost and adverse environmental impacts associated with improvements of that magnitude are not something that the public and local government are willing to bear.

Therefore, the focus of the updated traffic analysis was not on purpose and need or the scope of the improvements but rather on the potential environmental effects that are a direct result of traffic volumes, most notably in the areas of air and noise.

Air Quality Analysis

The regional transportation air quality conformity assessment included in the FEIS and ROD was based on 2010, 2020, and 2030 analysis years. Therefore, the updated traffic forecasts are not necessary to determine if air quality conformity needs to be revisited. Further, additional coordination was conducted with the Transportation Planning Board and it was determined that the changes to the Selected Alternative represented by the Refined Selected Alternative (See Attachment D) do not warrant a re-visitation of the conformity analysis.

Project-specific air quality analysis for carbon monoxide was updated based on the revised forecasts and is included separately in this reevaluation.

Noise Analysis

The noise analysis was updated based on the 2030 traffic forecasts, as well as some design refinements, and the noise barriers that were found to be feasible in the FEIS were reviewed to determine if they remain reasonable and feasible. In addition, the project area was reviewed to determine if there were any new areas that would require additional noise abatement beyond those studied in the FEIS. No new areas were identified as most areas with sensitive receptors already exceeded noise thresholds in 2020.

The design-level noise analysis also progressed the design of reasonable and feasible barriers based on more detailed noise modeling and design data. This has resulted in some changes to the preliminary length and height of walls presented in the FEIS.

The results of the noise assessment are included separately in this reevaluation (See Attachment C).

SUMMARY

Traffic forecasts were updated to the year 2030 to reflect a 20-year design horizon. The projected increases in traffic demand between 2020 and 2030 do not effect the purpose and need or scope of the project. Therefore, the focus of the updated traffic analysis was on the potential environmental effects that are a direct result of traffic volumes, most notably in the areas of air and noise.

Both air quality and noise analyses were updated based on the new 2030 traffic forecasts. The reevaluation shows that the change in traffic forecasts do not result in significant impacts let alone significant impacts not already addressed in the Final Environmental Impact Statement (FEIS), most notably in the areas of air and noise.

ATTACHMENT C
HIGHWAY NOISE DISCUSSION

INTRODUCTION

In accordance with the Record of Decision (ROD) signed on June 29, 2006, when final design was initiated, traffic forecasts were updated to the year 2030 to reflect a 20-year design horizon at a minimum. In addition, the Selected Alternative evaluated in the FEIS has been refined as design progressed. Therefore, anticipated noise impacts have been assessed by Harris Miller Miller & Hanson Inc (HMMH) for the Refined Selected Alternative with new 2030 traffic volumes. Impacts associated with the Refined Selected Alternative were compared to those associated with the Selected Alternative evaluated in the FEIS.

Differences in noise impacts are primarily a result of changes in traffic forecasts from design year 2020 with the Selected Alternative to design year 2030 with the Refined Selected Alternative. Design refinements to the I-66, Tysons Corner, and Dulles Toll Road interchanges have resulted in changes to anticipated noise impacts and proposed location and design of noise barriers. In addition, the project limits have changed between the Selected Alternative and the Refined Selected Alternative. The Refined Selected Alternative extends approximately 11.5 miles along the Beltway. This is approximately 1.1 miles shorter than the Selected Alternative at the northern terminus and approximately 0.3 mile longer than the Selected Alternative at the southern terminus. The project limits at the north end of the study area approaching the American Legion Bridge into Maryland were reduced to allow sufficient space for vehicles to enter/exit the HOT lanes and safely move from/to the appropriate lane since there are several decision points for drivers north of the project limits. This further contributes to decreases in projected noise impacts between the Selected Alternative and Refined Selected Alternative. The southern project limit was extended to start the HOT lane transition earlier to be able to fully develop the HOT lanes prior to the Braddock Road interchange. This results in the slight lengthening of proposed noise barriers on the southern end of the project.

Finally, more accurate information has been provided and a more detailed noise analysis has been conducted for the Refined Selected Alternative. Medium and heavy trucks were modeled in the HOT lanes in the FEIS for the Selected Alternative, where trucks were not modeled for the HOT lanes for the Refined Selected Alternative, as it has been determined that the HOT lanes will not be open to truck traffic. This redistributed the location as well as the time of travel of trucks along the Beltway. The combination of all of these factors has resulted in an overall decrease in noise impacts.

Background information regarding noise terminology, criteria, and a detailed discussion of methodology used for determining impacts may be found in the FEIS. In addition, Section 3.7 of the FEIS provides a description of the measurements used in determining noise impacts as well as a list of the noise monitoring locations along the corridor.

The attached memo from HMMH (March 2007) includes information on the methodology used for determining the loudest hour and assessing changes in noise impacts between the Selected Alternative and the Refined Selected Alternative as well as a detailed discussion of the proposed noise barriers. Land use data was reviewed to determine if new development occurred adjacent to the Beltway since the time the noise analysis was conducted for the Selected Alternative. A limited number of changes were identified and the analysis was adjusted accordingly. One example of this is the newly-developed

recreational facility at the Capital One campus that was included in the analysis of Barrier 12A.

Existing noise barriers were identified during a field survey of the study area and were modeled for existing conditions and the future No-Build Alternative. However, existing noise barriers were not modeled for the Selected Alternative or the Refined Selected Alternative since they would be removed under either scenario. The impact numbers reflect the removal but not the replacement of the barriers. Noise abatement measures are discussed in Section 4.7.4 of the FEIS. The same mitigation measures required for the Selected Alternative would generally be required for the Refined Selected Alternative.

SUMMARY OF NOISE BARRIER DESIGNS

The only feasible measure for mitigating noise impacts in the project corridor is to erect noise barriers. There are several existing noise barriers in the study area. However, several barriers will be replaced by barriers built as a component of the project. It is VDOT's policy to replace any existing noise barriers that are removed as a result of a widening project. The commitment to replace any existing noise barriers removed as a result of construction was made in the ROD by FHWA.

The attached memo provides a detailed discussion, by barrier, of the proposed noise barriers. Information includes the location, length, and height, number of homes protected and benefited, cost, and feasibility of each barrier under study. The memo also describes the difference between the barrier proposed with the Selected Alternative and that proposed with the Refined Selected Alternative with an explanation of the differences, as appropriate. **Table 1** presents a summary of this information for each barrier analyzed for the Selected Alternative and Refined Selected Alternative. Finally, Figures C-1A through C-1D illustrate the locations of the existing noise barriers, the proposed noise barriers associated with the Selected Alternative, and those proposed with the Refined Selected Alternative. Where existing barriers are shown contiguous to proposed barriers, the existing barriers would not be removed as a result of the construction of the project and were found to provide sufficient noise mitigation.

CHANGES IN NOISE EFFECTS

The total number of dwelling units impacted by noise decreases from 3,233 dwelling units with the Selected Alternative to 1,456 dwelling units with the Refined Selected Alternative. This represents a 55 percent decrease in the number of dwelling units impacted by noise. The number of dwelling units protected or benefited by the noise barriers deemed cost-effective and feasible by VDOT decreases accordingly, from 4,122 dwelling units with the Selected Alternative to 1,874 dwelling units with the Refined Selected Alternative. This is a 55 percent reduction, consistent with the percent decrease in noise impacts.

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MEMORANDUM

To: Vince Dolan and Brian Tolbert, Fluor Enterprises
Harriet Levine, Jacobs
From: Christopher Menge and Cary Adkins
Subject: **Revised Noise Section of I-495 Capital Beltway Environmental Reevaluation**
Reference: HMMH No. 301140
Date: March 1, 2007



Introduction

As stated in the Record of Decision (ROD), signed on June 29, 2006, traffic volumes were updated to the year 2030 to reflect a 20-year design horizon. In addition, the Selected Alternative evaluated in the FEIS has been refined as design progressed. Therefore, anticipated noise impacts have been assessed by Harris Miller Miller & Hanson, Inc. (HMMH) for the Refined Selected Alternative based on 2030 traffic volumes. Impacts associated with the Refined Selected Alternative will be compared to those associated with the Selected Alternative evaluated in the FEIS.

Differences in noise impacts are primarily a result of changes in traffic forecasts from design year 2020 with the Selected Alternative to design year 2030 with the Refined Selected Alternative. In addition, design refinements to the I-66, Tysons Corner, and Dulles Toll Road interchanges have resulted in changes to anticipated noise impacts and proposed location and design of noise barriers. Finally, more accurate information has been provided and a more detailed noise analysis has been conducted for the Refined Selected Alternative. Medium and heavy trucks were modeled in the HOT lanes in the FEIS for the Selected Alternative, where trucks were not modeled for the HOT lanes for the Refined Selected Alternative, as it has been decided that the HOT Lanes will not be open to truck traffic. The combination of all of these factors has resulted in an overall decrease in noise impacts, despite the later design year.

Differences in projected traffic

The Design Year for the traffic data developed for the Selected Alternative evaluated in the FEIS was 2020, and for the Refined Selected Alternative it is 2030. The difference in Design Year resulted in some differences in traffic projections. Other differences in projected traffic relate to the use of the HOT lanes by medium and heavy trucks. Trucks were included in the traffic on the HOT lanes in the traffic developed for the FEIS, whereas no trucks are projected to use the HOT lanes with the Refined Selected Alternative.

An important factor that affects projected noise levels is the traffic conditions that result in the loudest hour. Federal regulations and VDOT policy require that the traffic conditions to be used for a noise analysis are for the loudest hour of the day. For both alternatives, the loudest hour was determined from the available hour-by-hour traffic data by the noise analysts. On heavily-traveled commuter highways like the Capital Beltway, the loudest hour is usually not the peak

traffic hour, because during those periods, speeds are often slowed by the heavy volumes. The loudest hour for such roads is often an off-peak hour, when both the volumes and speeds are high. Percentages of trucks are also an important factor, since these loud vehicles influence the noise levels considerably. For the Selected Alternative and the Refined Selected Alternative, traffic volumes and speeds were projected for major project roadways on an hourly basis, so evaluation of the loudest hour involved relatively straightforward computations of the total noise generation from the roadway between interchanges. Different hours were found to represent the loudest hour conditions on different sections of the Beltway, so these hours were used in the noise analysis as appropriate. In the Refined Selected Alternative evaluation, the projected loudest hours in the Design Year were between 10 AM and 1 PM, most commonly the 10 AM to 11 AM hour. This period has high automobile volumes and moderate truck volumes. However, from the traffic developed for the Selected Alternative, the very high volumes of heavy trucks in the 5 AM to 6 AM hour caused this hour to represent the loudest hour for many sections of the Beltway. Projected heavy truck volumes in this hour for the Selected Alternative were roughly double the volumes projected for the loudest mid-day hours in the Refined Selected Alternative.

To determine the noise effects of the different loudest-hour traffic conditions developed for the two alternatives, HMMH examined the loudest-hour traffic for the general purpose mainline and HOT lanes for all major sections of the project, between interchanges. We then used the TNM Lookup program, a simplified, but FHWA-approved version of the Traffic Noise Model to compute overall noise levels from all lanes and directions of traffic at a hypothetical reference distance from the roadway. This calculation produces an overall reference noise level from the entire roadway as a whole, with the simplifying assumption that all roads are in the same location. This computed noise level doesn't have meaning at any particular location, but is a useful and accurate way to compare the noise-generating capability of one set of traffic conditions to that of another. This approach is also used to determine the loudest hour of the day among all of the hourly traffic data, by computing each hour's overall reference noise level for each major section of I-495. Since all roadways are placed in the same location in the computation, the loudest hour applies to both sides of the roadway for any given section; the method does not represent a bi-directional approach to selecting the loudest hour of the day.

The results of this analysis showed that the average noise generation from the Refined Selected Alternative (2030) is about 1½ dBA lower than that of the Selected Alternative (2020) evaluated in the FEIS. The table shows that the levels are reduced in all roadway sections south of Route 7, and that the reduction ranges from 0.3 dBA to 2.3 dBA.

Roadway Section	Refined Selected Alternative minus Selected Alternative Loudest-hour Leq (dBA)
South of Braddock Rd.	-1.7
Braddock Rd. to SR 236	-1.5
SR 236 to Gallows Rd.	-2.3
Gallows Rd. to US 50	-2.0
US 50 to I-66	-0.3
I-66 to SR 7	-1.7
Average difference	-1.6

The reduction in projected noise levels associated with the Refined Selected Alternative traffic has not resulted in major reductions in noise impact, however, because computed noise levels at the closest noise-sensitive land use remains higher than the FHWA/VDOT Noise Abatement Criterion under both alternatives. Since noise abatement must be considered if noise impact is projected, noise barriers were evaluated for cost-effectiveness in the same areas under both alternatives. Further, while the extent of noise impact may be somewhat less with the Refined Selected Alternative, the cost-effectiveness of noise barriers evaluated for adjacent communities is very similar, since homes that are “benefited” by a barrier receive as much weight in the cost-effectiveness evaluation as those “protected.”¹ Therefore, the differences in traffic between the two alternatives have not resulted in appreciable differences in the noise analysis.

Differences in noise barrier design

In some of the areas where no appreciable difference in the roadway design exists between the Selected and Refined Selected Alternatives, there are some notable differences in the noise barrier designs. These differences are due to the considerable differences in methodology and increased modeling precision undertaken since the ROD was issued. The level of detail in roadway geometry and topography available for the design study was much higher than that for the FEIS, by necessity. This greater level of detail was incorporated into the noise modeling for the design study to ensure that the most accurate analysis possible was conducted. This is appropriate for a design study, since the acoustical analysis of the barriers that determines height, length and location results in the construction of barriers to those specifications. By contrast, the purpose of the barrier evaluations performed for the FEIS was to develop preliminary feasibility and cost-effectiveness of noise abatement, and to assist in estimating the overall project cost. This is typical of NEPA-level noise analyses, and since several alternatives are being compared, the modeling precision and available detail is considerably less than for the design study. This lower precision usually results in conservative “over-prediction” of noise levels to ensure that no noise impact is overlooked in the environmental analysis. In addition, the conservative approach can result in “over-design” of noise barriers. FHWA Traffic Noise Model (TNM) Version 2.1 was used for the noise impact analysis and barrier modeling for both the noise studies for the Selected and Refined Selected Alternatives. Since there are slight differences in the computed noise levels between TNM Version 2.1, which was current during the FEIS, and the current Version 2.5, FHWA and VDOT guidance required that the model version not be changed for different phases of the same roadway project.

Differences in the roadway configuration

The only areas where the Refined Selected Alternative roadway configuration is appreciably different from the Selected Alternative evaluated in the FEIS are in the vicinity of the interchanges with I-66, Tysons Corner (Route 7 and Route 123) and the Dulles Toll Road.

This section describes the differences in the computed noise impact and evaluated noise barriers between that shown in the FEIS and computed for the Refined Selected Alternative design

¹ A “benefited” property is one where noise impact is not projected, but where a barrier would provide at least 5 dB of noise reduction. A “protected” property is an impacted property receiving 5 dB or more of noise reduction.

study. In addition to the changes in roadway configuration, the other differences described in the previous section also apply here.

Proposed Noise Barriers

Figures C-1A through C-1D illustrate the existing noise barriers, noise barriers proposed in the FEIS, and the noise barrier proposed with the Refined Selected Alternative. The existing noise barriers are shown in blue. In areas where the proposed noise barrier ties into existing noise barriers, the blue line is shown adjacent to the proposed barrier to indicate areas where the existing barrier remains in place.

All barrier costs are based on a unit cost of \$16 per square foot.

Barrier 5B would replace an existing noise barrier for the North Springfield Community. The barrier would be 3,698 feet in length and range in height from 10 to 26 feet. Barrier 5B would protect 93 homes affected by noise and benefit an additional 19 homes. The estimated total cost is \$869,936, or \$7,767 per protected and benefited home. Due to a change in the project limits, the barrier associated with the Refined Selected Alternative would be over 1,000 feet longer than the barrier associated with the Selected Alternative and would protect and benefit many more residences. The reason for the difference in barrier length is that the study area associated with the Refined Selected Alternative extends to the south of Heming Avenue, unlike that associated with the Selected Alternative. In the FEIS, Barrier 5B was 2,519 feet long, ranged in height from 7 to 23 feet, protected 19 homes and benefited an additional 8 homes and portions of Lake Accotink Park. The estimated total cost was \$590,000, or \$18,800 per protected and benefited home.

Barrier 5C would replace an existing noise barrier. The barrier would be 6,644 feet in length and would range in height from 4 to 30 feet. Barrier 5C would protect 158 homes currently subjected to noise impacts and would benefit an additional 20 homes. The estimated total cost is approximately \$1.48 million, or \$8,318 per protected and benefited home. Due to a change in the project limits, the barrier associated with the Refined Selected Alternative would be 1,150 feet longer than the barrier associated with the Selected Alternative and would protect and benefit many more residences. The reason for the difference in barrier length is that the study area associated with the Refined Selected Alternative extends to the south of Heming Avenue, unlike that associated with the Selected Alternative. In the FEIS, Barrier 5C was 5,494 feet long, ranged in height from 7 to 23 feet, protected 55 homes and benefited an additional 36 homes, as well as North Springfield Elementary School and portions of Flag Run Park. The estimated total cost was \$1.08 million, or \$10,130 per protected and benefited home.

Barrier 6A is not required for the Refined Selected Alternative. The more detailed noise analysis performed for the Refined Selected Alternative revealed that noise impact is not projected for any of the developed recreational areas within Wakefield Park (ball fields, tennis courts and playground). Only walking trails fairly near I-495 would be exposed to noise impact, therefore, the long length and high cost of a noise barrier is not justified. In the FEIS, Barrier 6A was 10,604 feet long, ranged in height from 10 to 30 feet, and was designed primarily for the protection of Wakefield Park and Americana Park. The estimated total cost was \$2.87 million and was not deemed cost effective by VDOT's cost effectiveness criteria.

Barrier 6B would replace two existing noise barriers and would protect 645 homes and six recreational properties currently subjected to noise exposure and benefit an additional 109 residences. The barrier would be 9,369 feet in length and range in height from 5 to 35 feet. The estimated total cost is approximately \$2.62 million, or \$3,470 per protected and benefited home. In the FEIS, Barrier 6B was 11,454 feet long, ranged in height from 7 to 30 feet, protected 663 impacted homes and benefited an additional 120 homes. The estimated total cost was \$3.42 million, or \$4,150 per protected and benefited home. The noise barrier associated with the Refined Selected Alternative would be shorter and less expensive. However, it would benefit and protect fewer homes than the barrier associated with the Selected Alternative due to more precise modeling data.

Barrier 7A would replace an existing noise barrier. The total length of the barrier would be 3,482 feet and it would range in height from 8 to 21 feet. Barrier 7A would protect 43 homes currently subjected to noise exposure and would benefit an additional seven homes. The estimated total cost is approximately \$844,800, or \$16,896 per protected and benefited home. Noise impacts are less with the Refined Selected Alternative than were anticipated for the Selected Alternative. As such, a shorter noise barrier is appropriate. In the FEIS, Barrier 7A was 7,154 feet long, ranged in height from 16 to 26 feet, protected 73 homes and benefited an additional 24 homes. The estimated total cost was \$2.42 million, or \$25,200 per protected and benefited home.

Barrier 7B would consist of three separate barriers, designated as **7B-1**, **7B-2**, and **7B-3**. These barriers would protect four recreational facilities and 131 homes currently subjected to noise exposure and would benefit an additional 32 homes. The total combined length of the barriers would be 6,009 feet and it would range in height from 5 to 24 feet. The estimated total cost is approximately \$1.46 million, or \$8,983 per protected and benefited home. Several homes on the northern side of Route 236 that would experience noise impacts were included in the FEIS. However, since the project limits changed, that area would no longer require noise barriers. In the FEIS, Barrier 7B was 7,659 feet long, ranged in height from 7 to 23 feet, protected 148 homes and benefited an additional 85 homes. The estimated total cost was \$2.32 million, or \$9,960 per protected and benefited home.

Barrier 8A would replace an existing barrier that would be removed as a result of the roadway widening. This barrier would protect 15 homes subjected to noise exposure and would benefit an additional 13 homes. Barrier 8A would be 2,304 feet in length and would range in height from 12 to 20 feet. The estimated total cost is \$574,880, or \$20,531 per protected and benefited home. The noise barrier associated with the Refined Selected Alternative is slightly longer but costs half of what the Selected Alternative would have cost. Fewer homes would be impacted with the implementation of the Refined Selected Alternative than were anticipated with the Selected Alternative. In the FEIS, Barrier 8A was 2,263 feet long, ranged in height from 23 to 36 feet, protected five homes and benefited an additional 50 homes. The estimated total cost was \$1.03 million, or \$10,000 per protected and benefited home.

Interstate 66 Interchange

Barriers 9A and 10D in the FEIS extend along I-66 west of the Beltway interchange and west of Gallows Road. In the Selected Alternative, improvements to I-66 were proposed west of

Gallows Road, but no I-66 improvements are being proposed in the Refined Selected Alternative, so no noise analysis or barriers are required west of Gallows Road.

Barrier 9B is located in the southwest quadrant of the I-66 interchange with the Beltway, and was designed in both the Selected Alternative and the Refined Selected Alternative to protect the Merrifield Village Apartments and two single-family homes along Hartland and Pleasantdale roads that would be exposed to noise impact. Noise abatement for these residential areas was found to be reasonable and feasible in both studies. Considerably less noise impact is projected at the apartments in the Refined Selected Alternative design study due mostly to the increased level of precision in the acoustical modeling of the complicated apartment complex.

In the FEIS, Barrier 9B was extended to the south by approximately 1,000 feet beyond the residential area to protect the Word of Grace Fellowship Church, which is located inside the commercial office building at 8000 Lee Highway, adjacent to the Beltway. In the FEIS study, this church was exposed to interior noise impact, with a projected loudest-hour L_{eq} of 52 dBA, interior. In the Refined Selected Alternative, the projected exterior L_{eq} at this church is less, at 73 dBA, which would result in an interior L_{eq} of 48 dBA, assuming a 25 dBA outside-to-inside noise reduction, a reasonable assumption for this type of building. Therefore, since the threshold for interior noise impact is 51 dBA L_{eq} , this church is not projected to be exposed to interior noise impact under the Refined Selected Alternative, and the southern end of Barrier 9B is terminated at the end of the impacted residential area, approximately 1,000 feet to the north. Also, Barrier 9B in the Refined Selected Alternative is approximately 500 feet shorter than the barrier associated with the Selected Alternative at its northern end. The northernmost apartment building in the complex, which is located along the I-66 EB to I-495 SB ramp, is not impacted by project-related noise and therefore does not require noise abatement. The reduction of impact in this area is partially due to the revised scope of project improvements to the I-66 ramps in the Refined Selected Alternative, and partially due to the apartment building being set well back from mainline traffic roadways.

In the FEIS, Barrier 9B was 3,100 feet long, ranged in height from 13 to 16 feet, protected² 265 dwelling units and the Word of Grace church, and benefited³ an additional 73 dwelling units. The estimated total cost of the barrier was \$790,000, or \$2,300 per protected and benefited home.

In the Refined Selected Alternative, Barrier 9B is 1,540 feet long, ranges in height from 10 to 19 feet, protects 57 dwelling units and benefits another 21 units. The total barrier cost is \$344,416, or \$4,416 per protected and benefited dwelling unit.

Barrier 9C is located along southbound I-495, extending from just south of Route 29 (Lee Highway) to just north of the interchange with Route 50 (Arlington Boulevard). In the Refined Selected Alternative, Barrier 9C is 2,164 feet long, ranges in height from 6.5 to 14 feet, protects 33 multi-family residential properties and two recreational properties currently exposed to noise

² A “protected” property is one where noise impact is projected, and where the barrier would provide 5 dB or more of noise reduction.

³ A “benefited” property is one where noise impact is *not* projected, but where the barrier for the impacted properties would also provide at least 5 dB of noise reduction. VDOT policy requires such benefited properties to be counted in the cost-effectiveness evaluation of noise barriers designed for impacted properties.

and benefits two additional recreational properties and 32 multi-family residential properties. Four second-floor balconies would not be protected by this barrier, however three of which are due to the presence of the existing barrier built by the developer that overlaps with Barrier 9C. Changes in noise barrier requirements from the FEIS analysis are due primarily to more precise information. In the FEIS, Barrier 9C was 2,790 feet long, ranged in height from 10 to 20 feet, protected 174 homes and benefited an additional 18 homes. The estimated total cost was \$690,000, or \$3,600 per protected and benefited home. For the Refined Selected Alternative, Barrier 9C is 2,164 feet long, ranges in height from 6.5 to 14 feet, protects 41 impacted homes and benefits an additional 49 homes and portions of the Jefferson Davis Park golf course. The estimated total cost is approximately \$1.17 million, or \$12,983 per protected and benefited home.

Barrier 9E is located in the southeast quadrant of the interchange, and was designed in both the Selected Alternative and the Refined Selected Alternative to protect residential and recreational land uses that would be exposed to noise impact. It replaces portions of an existing barrier that would be displaced by the roadway improvements. Noise abatement was found to be reasonable and feasible in both studies. The degree of noise impact assessed and the extent of noise barrier evaluated is somewhat less in the Refined Selected Alternative than was presented in the FEIS. Some of this difference is associated with a reduction in the length of the study area along I-66 east of the interchange, and some is due to more precise modeling of the existing noise barrier wall that extends along much of the area. In the design study it was found that no impacts occur along I-66 east of I-66 EB Sta. 140 (near Roswell Ct.), due to the protection provided by the existing noise barrier and the relatively low noise emissions from I-66 traffic. Where necessary due to the road construction, this barrier would be replaced in kind. That was assumed to be necessary from Sta. 140 to Sta. 150 (near Hillsman) so those costs were included, but it is not necessary east of Sta. 150 which is the Refined Selected Alternative project construction limit, so that portion of the existing noise barrier will remain as is.

In the FEIS, Barrier 9E was 5,445 feet long, ranged in height from 10 to 26 feet, protected 98 impacted homes and benefited an additional 75 homes and Jefferson Davis Park. The estimated total cost was \$1.53 million, or \$8,800 per protected and benefited home. For the Refined Selected Alternative, Barrier 9E is 4,840 feet long, ranges in height from 5 to 31 feet, protects 41 impacted homes and benefits an additional 49 homes and portions of the Jefferson Davis Park golf course. The estimated total cost is approximately \$1.17 million, or \$12,983 per protected and benefited home.

Barrier 10C, which includes **Barriers 10C-1, 10C-2, and 10C-3**, is located in the northwest quadrant of the I-66 interchange with the Beltway, and was designed for both the Selected Alternative and the Refined Selected Alternative to protect residential and recreational land uses that would be exposed to noise impact. It replaces and extends an existing barrier that would be displaced by the roadway improvements. Noise abatement was found to be reasonable and feasible in both studies. The degree of noise impact assessed was slightly greater in the FEIS than for the Refined Selected Alternative. In the FEIS, a barrier named 10B was designed between Barriers 10C and 10A to protect a residential complex set back from I-495 located between the Oak Street and Idylwood Road overpasses. However, in the Refined Selected Alternative design study, Barrier 10B was not needed because, in combination with the

proposed Barriers 10A and 10C, shielding from an existing noise barrier near the complex will keep future loudest-hour noise levels below the impact threshold. For the Refined Selected Alternative, Barrier 10C was extended somewhat beyond the Idylwood Road overpass to provide full protection to homes near that intersection, so it is slightly longer than what was proposed for the Selected Alternative.

In the FEIS, Barrier 10C was 5,120 feet long, ranged in height from 10 to 16 feet, and protected 48 impacted homes and portions of the Washington & Old Dominion Trail and the Iliff Nursing & Rehabilitation Center. The estimated total cost is \$1.09 million, or \$22,700 per protected home.

For the Refined Selected Alternative, Barrier 10C is 5,477 feet long, ranges in height from 11 to 19 feet, protects 27 single-family homes, benefits another 23 homes and protects portions of the same recreation areas. The estimated total cost is \$1.19 million, or \$23,881 per protected and benefited home.

Barrier 10D was not analyzed as part of the Refined Selected Alternative, as the project limits have changed.

Barrier 10G, including **Barriers 10G-1** and **10G-2**, is located in the northeast quadrant of the I-66 interchange with the Beltway, and was designed for both the Selected Alternative and the Refined Selected Alternative to protect residential land uses that would be exposed to project-related noise impact. Noise abatement was found to be reasonable and feasible in both studies. In the FEIS study, portions of Idylwood Park along I-66 were also projected to be exposed to noise impact, but in the Refined Selected Alternative design study, the frequent-use basketball, tennis and baseball areas closest to the I-66 ramps are not projected to be impacted. Part of the reason for this change is that with the Refined Selected Alternative, fewer improvements are planned to I-66 east of the Beltway interchange. Therefore, Barrier 10G extends only slightly beyond Nottingham Rd. east along the I-66 WB ramp to the Beltway, and does not continue along I-66 itself to protect the park and recreation areas as it does in the FEIS. In both studies, the northern termination of Barrier 10G is the Route 695 Idylwood Road overpass.

In the FEIS, **Barriers 10G, 10J, and 10K** were evaluated as separate barriers, even though they are adjacent to each other. In the more detailed Refined Selected Alternative design study, the proximity of the barriers to each other created an interdependence that required them to be evaluated together as a system. Therefore, for purposes of comparing the barriers in the two studies, FEIS Barriers 10G, 10J and 10K have been combined to allow a more direct comparison with the Refined Selected Alternative. Barrier 10J extends between the Idylwood Road and Oak Street overpasses, and Barrier 10K extends from Oak Street past the George C. Marshall High School athletic fields, south of the Route 7 Leesburg Pike interchange.

Barriers 10G, 10J and 10K in the FEIS were a total of 6,817 feet long, ranged in height from 10 to 26 feet, and cost a total of \$2.21 million. The barriers protected 44 single-family homes, 179 units of the Renaissance Apartments, and the athletic fields of the George C. Marshall High School, and benefited another 146 dwellings for a total cost of \$2.21 million, and cost effectiveness of \$5,990 per protected and benefited home.

Barriers 10G, 10J and 10K in the Refined Selected Alternative are a total of 6,229 feet long, range in height from 6 to 18 feet, and protect 71 dwelling units, the Renaissance Apartments' pool and tennis courts, and the George C. Marshall High School athletic fields. The barriers benefit an additional 20 residences for a total cost of approximately \$1.20 million, or \$13,189 per protected and benefited home.

Tysons Area – State Route 7 and State Route 123

Barrier 10A, including **Barriers 10A-1** and **10A-2**, is located on the west side of the Beltway in two parts extending from just south of the Oak Street overpass to south of the interchange with Route 7. An existing barrier would be replaced by a portion of Barrier 10A, which was designed in both the FEIS and the Refined Selected Alternative to protect single-family homes that would be exposed to noise impact. Noise abatement was found to be reasonable and feasible in both studies. Less noise impact is projected in the Refined Selected Alternative than was estimated in the FEIS, and therefore fewer homes are expected to be protected and benefited. In the FEIS, a barrier named 10B was designed between Barriers 10C and 10A to protect a residential complex set back from I-495 located between the Oak Street and Idylwood Road overpasses. However, in the Refined Selected Alternative design study, Barrier 10B was not needed because, in combination with the proposed Barriers 10A and 10C, shielding from an existing noise barrier near the complex will keep future loudest-hour noise levels below the impact threshold.

In the FEIS, Barrier 10A was 3,490 feet long, ranged in height from 10 to 16 feet, protected 68 homes and benefited an additional 85 homes. The total estimated cost of the barrier was \$710,000, or \$4,640 per protected and benefited home.

In the Refined Selected Alternative, Barrier 10A is 3,259 feet long, ranges in height from 6 to 27 feet, and protects all 48 impacted homes in the study area. The total cost for this barrier is \$794,512, or \$16,552 per protected home.

Barrier 10K is located on the east side of the Beltway and extends north from the Oak Street overpass to past the George C. Marshall High School athletic fields, south of the interchange with Route 7. The barrier was designed in both the FEIS and the Refined Selected Alternative to protect residential and recreational land uses that would be exposed to noise impact. Noise abatement was found to be reasonable and feasible in both studies. In addition to a few single-family residences near Oak St., the barrier protects first- and second-floor apartment balconies in the 10-story Renaissance Apartment complex and five recreational facilities, including the pool and domed tennis courts adjacent to the Renaissance Apartments, and football, soccer and baseball fields at the George C. Marshall High School.

As described above under the description for Barrier 10G, in the FEIS, Barriers 10G, 10J and 10K were evaluated as separate barriers, even though they are adjacent to each other. In the more detailed Refined Selected Alternative, the proximity of the barriers to each other created an interdependence that required them to be evaluated together as a system. Therefore, for purposes of comparing the barriers in the two studies, FEIS Barriers 10G, 10J and 10K have been combined to allow a more direct comparison with the Refined Selected Alternative. Barrier 10G extends along the I-66 WB ramp to the Beltway then south along the Beltway to the

Idylwood Road overpass. Barrier 10J extends from the Idylwood Road overpass to Oak Street. Specific costs and benefits associated with Barrier 10K are discussed above with Barrier 10G.

Barrier 11A is located on the east side of the Beltway between the interchanges with Routes 7 and 123. Barrier 11A was evaluated in both the FEIS and in the design study for the Refined Selected Alternative to protect multi-family dwelling units off Wilson Lane and Old Meadow Road. Noise impact was identified at the apartments in both studies, and noise abatement was found to be reasonable and feasible in both studies. Many more apartment units were shown as impacted, protected and benefited in the FEIS study as compared with the Refined Selected Alternative, due mostly to an increase in the precision of the analysis as described previously. In the FEIS, Barrier 11A was extended farther to the north and south than in the Refined Selected Alternative; such additional length is not needed since the adjacent land use is commercial office buildings.

In the FEIS, Barrier 11A was 3,990 feet long, 30 feet high, protected 353 apartment units and benefited an additional 379 units. The total barrier cost was \$1.88 million, with a cost of \$2,568 per protected and benefited home.

In the Refined Selected Alternative, Barrier 11A is 2,012 feet long, ranges in height from 6 to 21 feet, protects 14 first- and second-floor apartment units and benefits an additional 14 units and two swimming pools associated with the apartment complex. The total barrier cost estimate is \$451,968, or \$16,142 per protected and benefited home.

Dulles Toll Road Interchange

Barrier 12A is located along the east side of the Beltway just south of the interchange with the Dulles Toll Road. Barrier 12A was evaluated in both the FEIS and in the design study for the Refined Selected Alternative to protect multi-family dwelling units in the Gates of McLean apartments. Noise impact was identified at the apartments in both studies, and noise abatement was found to be reasonable and feasible in both studies. In the Refined Selected Alternative, a newly-developed recreational facility at the Capital One campus just south of the Gates of McLean apartments was also found to be impacted. Barrier 12A was extended to provide protection for three recreational courts (tennis, basketball and volleyball).

Higher sound levels and more impact were projected in the FEIS than in the design study due to various factors described above. Projected loudest-hour sound levels at the first-row homes in the FEIS were as high as 75 dBA, L_{eq} , whereas projected design-year levels reached only 69 dBA in the design study modeling. As a result of this, less noise impact was predicted. The barrier designed for the apartment buildings is as long in the design study as it was in the FEIS, since first-row units are projected to be impacted and require protection. With the Refined Selected Alternative, the barrier is not continued on the other side of a hill to extend along the Dulles Toll Road, as it was in the FEIS to protect eight apartment units exposed to noise from that roadway, since improvements to that section of the Dulles Toll Road are not planned for the Refined Selected Alternative and noise abatement in that area is not required.

Barrier 12A in the FEIS was 2,360 feet long, ranged in height from 16 to 39 feet, protected 379 impacted dwelling units and benefited another 47. The barrier's total was \$1.04 million, or \$2,441 per protected and benefited dwelling unit.

In the Refined Selected Alternative, Barrier 12A was divided into two barrier sections by the proposed Jones Branch Connector. Barrier 12A-1 is the southern section that protects the recreational courts; Barrier 12A-2 to the north protects the apartment complex. Barrier 12A-1 in the Refined Selected Alternative is 934 feet long, ranges from 9 to 11 feet in height, protects all three recreational courts and costs approximately \$144,000. Since it does not protect any homes, Barrier 12A-1 would not be considered cost effective. Barrier 12A-2 is 1,270 feet long, up to 19 feet in height, protects all 26 first- and second-floor patios/balconies in the Gates of McLean apartment complex that are impacted by noise from I-495, and benefits an additional 64 properties. At a unit cost of \$16 per square foot, Barrier 12A-2 would cost approximately \$305,600, or \$3,396 per protected and benefited property. Barrier 12A-2 would be considered cost effective.

Barrier 13A is no longer being considered, as it is now north of the project limits.

Barrier 13B is located along the west side of the Beltway and extends from just south of the Old Dominion Drive overpass to just north of the interchange with the Dulles Toll Road where it meets the existing noise barrier, which follows the Beltway off-ramp to the Dulles Toll Road westbound. This barrier was evaluated in both the FEIS and in the design study for Refined Selected Alternative to protect single-family homes in Timberly. In the FEIS, Barrier 13B was not found to be cost effective, but in the Refined Selected Alternative, a design was developed that is just cost effective. Due to additional widening of the Beltway to the west in the Refined Selected Alternative south of Lewinsville Road, approximately 500 feet of the northern portion of the existing barrier will have to be replaced. In the FEIS, the existing barrier was not assumed to be affected.

In the FEIS, Barrier 13B was 3,750 feet long, ranged in height from 16 to 26 feet, protected 24 single-family homes and benefited an additional 13 homes. The total barrier cost was \$1.25 million, or \$33,800 per protected and benefited home. This barrier would require third-party funding to be constructed, as it would not be cost effective.

In the Refined Selected Alternative, Barrier 13B starts approximately 500 feet farther to the south, where it replaces a portion of the existing Barrier 13C that must be removed to accommodate the Beltway widening. Different barrier termination points at the north end were evaluated, since the barrier cost-effectiveness is close to VDOT's maximum. The barrier discussed here is the longest and most protective that was found to be also cost-effective. Barrier 13B is 4,613 feet long, ranges in height from 13 to 26 feet, protects 17 single-family homes and benefits an additional 32 homes. The barrier's total cost (at \$16 per square foot) is \$1.47 million, or \$29,945 per protected and benefited home.

The portions of existing **Barrier 13C** that would be untouched by the Beltway widening were found to provide sufficient noise abatement to the homes behind it, so that no noise impact would exist in the future with the Refined Selected Alternative.

Barrier 13D is located along the east side of the Beltway just north of Lewinsville Road and the interchange with the Dulles Toll Road, and extends to the vicinity of Old Dominion Drive. This barrier was evaluated in both the FEIS and in the design study for the Refined Selected Alternative to protect single-family homes set back several hundred feet from the Beltway along Dulany Drive and Scott's Run Road. With loudest-hour L_{eq} s projected in the upper 60s dBA,

noise impact was identified at the homes in both studies, but due to the sparse density of the homes and the distance from the highway, noise abatement was not found to be cost effective in either study.

In the FEIS, Barrier 13D was 3,714 feet long, ranged in height from 13 to 30 feet, and protected 13 homes and a church. At a total cost of \$1.2 million, the barrier was not cost-effective, with a cost of \$92,308 per protected home.

In the Refined Selected Alternative, Barrier 13D is 4,069 feet long, ranges in height from 8 to 20 feet, protects 12 impacted single-family homes and benefits an additional 7 homes. At a total cost of \$864,000 and a cost per protected home of \$45,462, this barrier also does not meet VDOT's cost-effectiveness criterion of \$30,000 per home. Third-party funding of approximately \$15,000 per home would be required for this barrier to be constructed.

Barriers 13E and 14C are no longer being considered, as they are now north of the project limits.

Summary

The noise barriers associated with the Selected Alternative evaluated in the FEIS would have benefited and/or protected 4,200 dwelling units. The noise barriers associated with the Refined Selected Alternative would benefit and/or protect 1,893 dwelling units that would otherwise be exposed to highway noise impacts. The decrease in the number of dwelling units protected or benefited by the proposed noise barriers is due primarily to a decrease in the number of dwelling units impacted by noise. Since the number of impacted homes has decreased because of more accurate data and analysis, the number of dwelling units receiving or needing protection from these impacts has decreased accordingly.

Table 1 – Comparison of Noise Barriers for Selected Alternative vs. Refined Selected Alternative

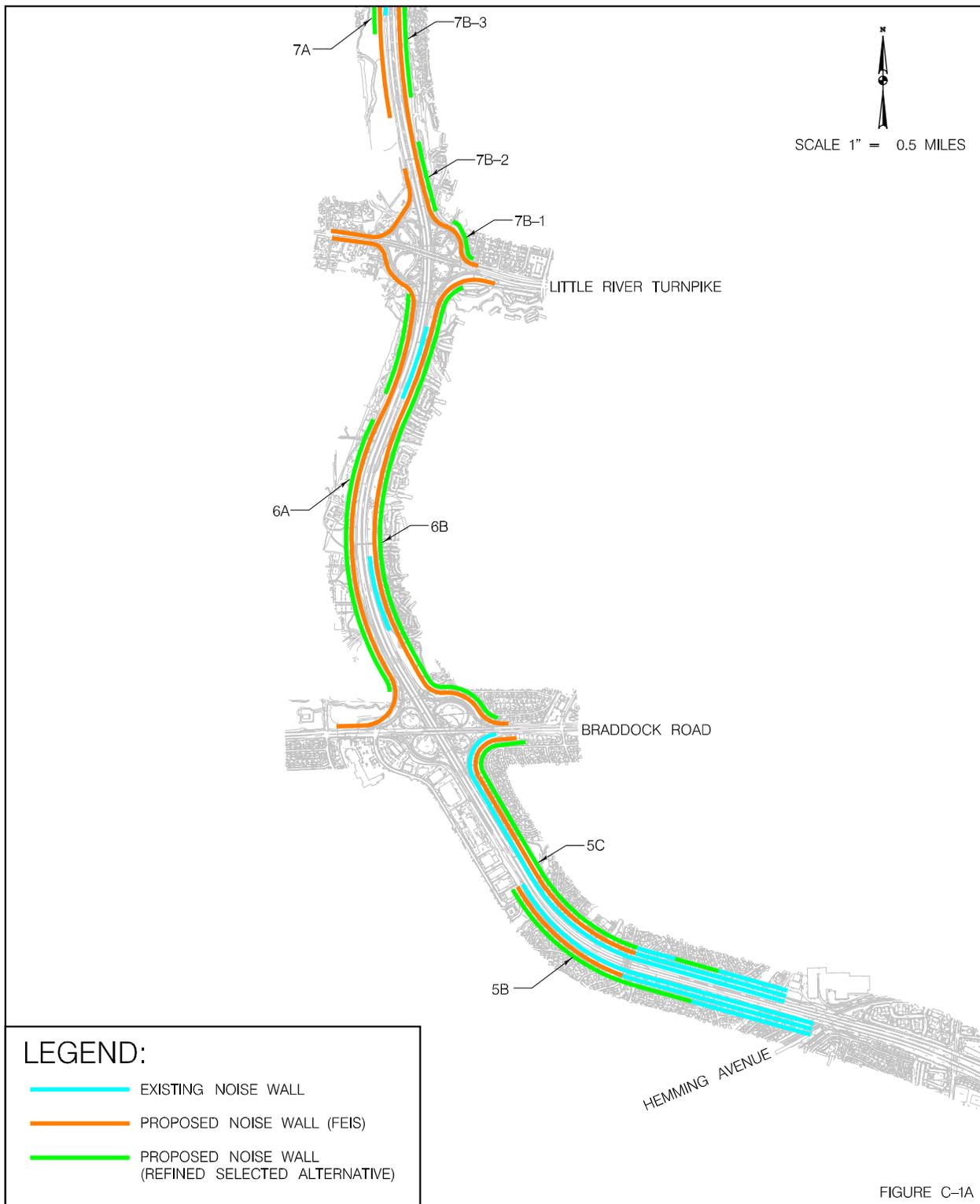
Barrier No.	Selected Alternative								Feasible ¹	Refined Selected Alternative							Notes	Feasible ¹
	Length (ft)	Barrier area (sf)	Cost (based on \$16/sf)	No. DUs Protected	No. DUs Benefited	Combined No. DUs Protected/Benefited	Cost per DU (\$)	Length (ft)		Barrier area (sf)	Cost (based on \$16/sf)	No. DUs Affected by Noise	No. DUs Protected	No. DUs Benefited	Combined No. DUs Protected/Benefited	Cost per DU (\$)		
5B	2,519	36,875	\$590,000	19	8	27	\$18,800	Yes	3,698	54,371	\$869,936	93	93	19	112	\$7,767	Longer due to extended project limits, more homes protected	Yes
5C	5,494	67,500	\$1,080,000	55	36	91	\$10,130	Yes	6,644	92,538	\$1,480,608	158	158	20	178	\$8,318	Longer due to extended project limits, more homes protected	Yes
6A	10,604	179,375	\$2,870,000	0	3	3	\$956,667	No	6,915	51,806	\$828,896	0	0	0	N/A	N/A	No noise impact in recreational areas, only trail	--
6B	11,454	213,750	\$3,420,000	663	120	783	\$4,150	Yes	9,369	163,527	\$2,616,432	654	650	109	759	\$3,470	Fewer noise impacts	Yes
7A	7,154	151,250	\$2,420,000	73	24	97	\$25,200	Yes	3,482	52,800	\$844,800	43	43	7	50	\$16,896	Fewer noise impacts	Yes
7B	7,659	145,000	\$2,320,000	148	85	233	\$9,960	Yes	6,009	91,513	\$1,464,208	132	131	32	163	\$8,983	Project limit changed	Yes
8A	2,263	64,375	\$1,030,000	5	50	55	\$10,000	Yes	2,304	35,930	\$574,880	15	15	13	28	\$20,531	Fewer homes impacted	Yes
9A	2,335	23,125	\$370,000	116	0	116	\$3,200	Yes	--	--	--	--	--	--	--	--	Project limit changed	--
9B	3,106	49,375	\$790,000	265	79	344	\$2,300	Yes	1,540	21,526	\$344,416	59	57	21	78	\$4,416	More precise data results in fewer noise impacts	Yes
9C	2,790	43,125	\$690,000	174	18	192	\$3,600	Yes	2,164	22,986	\$367,776	37	33	32	65	\$5,658	More precise data results in fewer noise impacts	Yes
9E	5,445	95,625	\$1,530,000	98	75	173	\$8,844	Yes	4,840	73,030	\$1,168,480	41	41	49	90	\$12,983	More precise data and changes in limits along I-66	Yes
10A	3,490	44,375	\$710,000	68	85	153	\$4,640	Yes	3,259	49,657	\$794,512	48	48	0	48	\$16,552	Fewer homes impacted	Yes
10B	1,150	17,500	\$280,000	20	0	20	\$14,000	Yes	--	--	--	--	--	--	--	--	Not required in conjunction with Barriers 10A, 10C and existing	--
10C	5,120	68,125	\$1,090,000	48	0	48	\$22,708	Yes	5,477	74,627	\$1,194,032	27	27	23	50	\$23,881	Includes part of Barrier 10B	Yes
10D	4,490	71,875	\$1,150,000	113	31	144	\$8,000	Yes	--	--	--	--	--	--	--	--	Project limit changed	Yes
10G	2,247	40,000	\$640,000	24	0	24	\$26,700	Yes	6,229	75,013	\$1,200,208	71	71	20	91	\$13,189	Fewer impacts projected, change in limits along I-66	Yes
10J	1,020	20,625	\$330,000	20	0	20	\$17,000	Yes	[included with Barrier 10G]							--	--	
10K	3,550	77,500	\$1,240,000	179	146	325	\$3,900	Yes	[included with Barrier 10G]							--	--	
11A	3,990	117,500	\$1,880,000	353	379	732	\$2,568	Yes	2,012	28,248	\$451,968	15	14	14	28	\$16,142	Fewer impacts projected, not needed in commercial areas	Yes
12A1	2,360	65,000	\$1,040,000	379	47	426	\$2,441	Yes	934	8,991	\$143,856	0	0	0	--	N/A	Not cost effective, requires third-party funding and VDOT/FHWA concurrence	No
12A2	[analyzed as part of 12A in FEIS]								1,270	19,100	\$305,600	34	26	64	90	\$3,396	More precise data and changes in limits along Dulles Toll Road	Yes
13A	3,300	38,125	\$610,000	14	5	19	\$32,000	No	--	--	--	--	--	--	--	--	Project limit changed	--
13B	3,750	78,125	\$1,250,000	24	13	37	\$33,800	No	4,613	91,708	\$1,467,328	17	17	32	49	\$29,945	More precise data and design changes	Yes
13C	5,240	106,875	\$1,710,000	33	43	76	\$14,600	Yes	--	--	--	--	--	--	--	--	Existing barrier provides sufficient noise abatement	--
13D	3,714	75,000	\$1,200,000	13	0	13	\$92,308	No	4,069	53,986	\$863,776	12	12	7	19	\$45,462	Not cost effective, requires third-party funding and VDOT/FHWA concurrence	No
13E	4,020	73,125	\$1,170,000	35	8	43	\$27,400	Yes	--	--	--	--	--	--	--	--	Project limit changed	--
14C	1,600	15,625	\$250,000	6	0	6	\$42,000	No	--	--	--	--	--	--	--	--	Project limit changed	--
Totals	109,864	1,978,750	\$31,660,000	2,945	1,255	4,200	\$7,538²	--	74,828	1,061,357	\$16,981,712	1,456	1,431	462	1,893	\$8,971²		

Totals for barriers deemed cost-effective and feasible:

	86,896	1,592,500	\$25,480,000	2,888	1,234	4,122	\$6,181²		62,910	946,574	\$15,145,184	1,456	1,419	455	1,874	\$8,082²		
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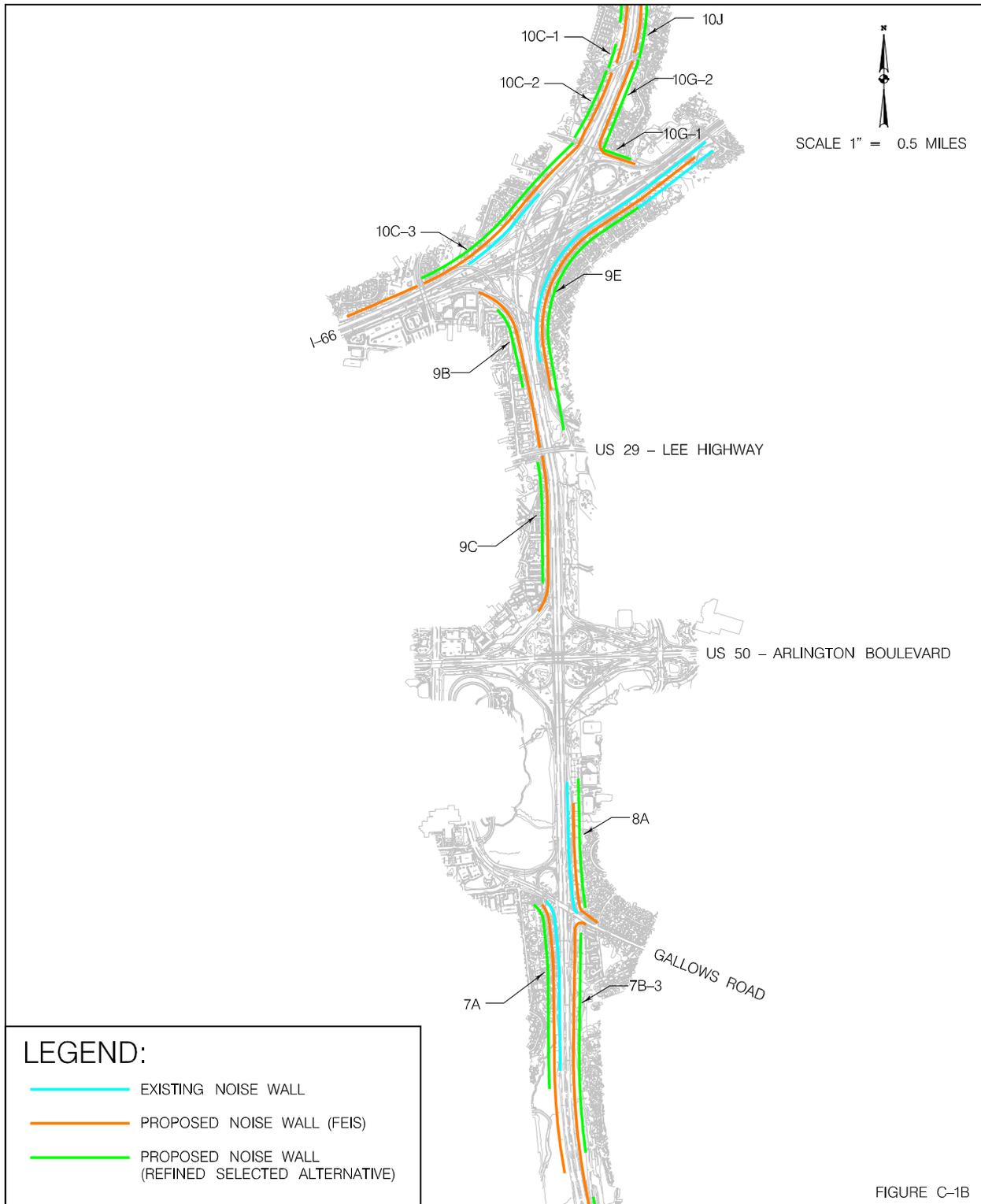
1 VDOT's policy states that a noise abatement measure will be considered cost effective if the cost of the measure per protected residential property does not exceed \$30,000. Each residential (dwelling) unit will be considered as a single residential property. Determination of feasibility is based upon this regulation.

2 Average cost per benefited/protected dwelling unit.

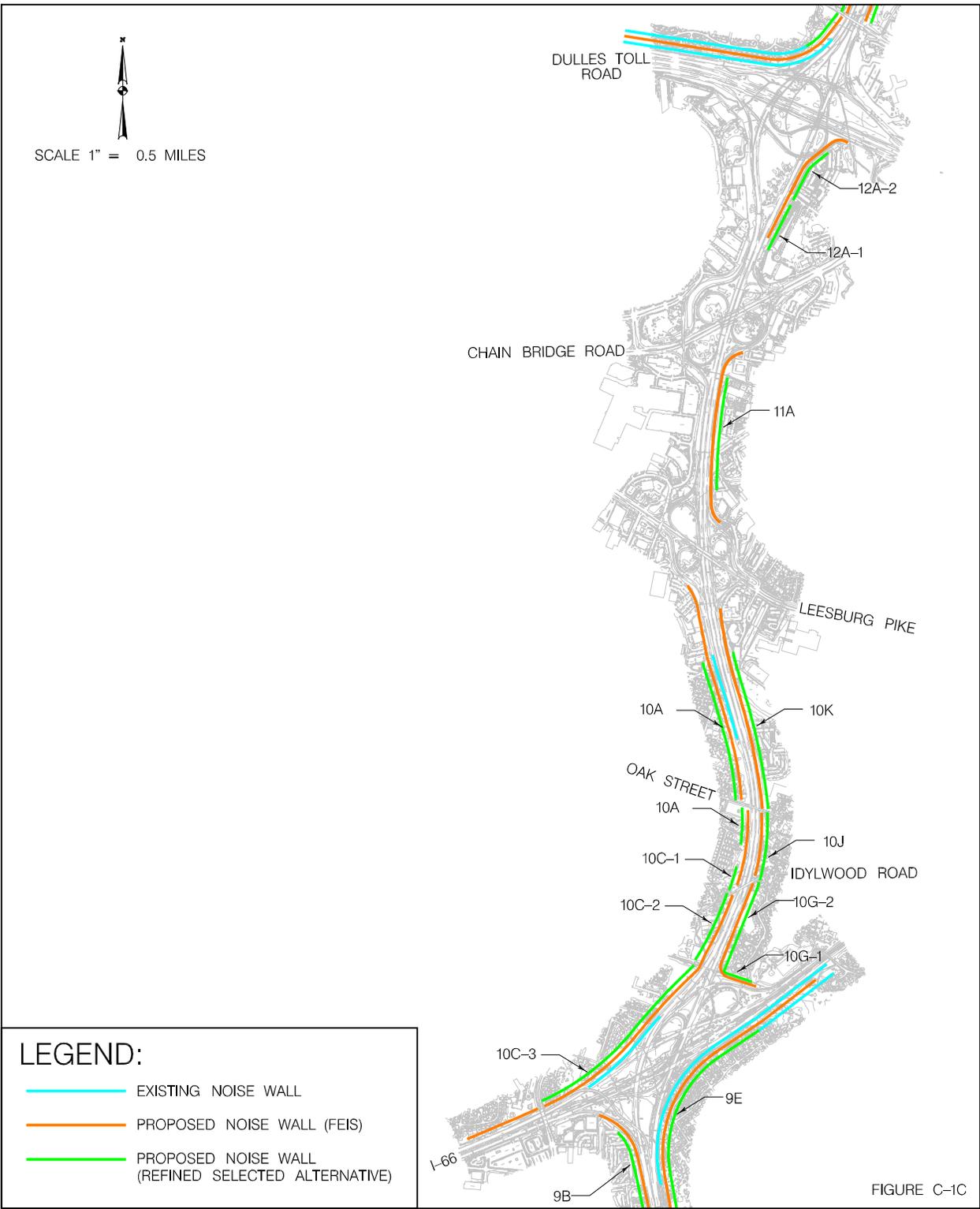


LOCATION OF POTENTIAL NOISE BARRIER AREAS
HEMMING AVENUE TO LITTLE RIVER TURNPIKE

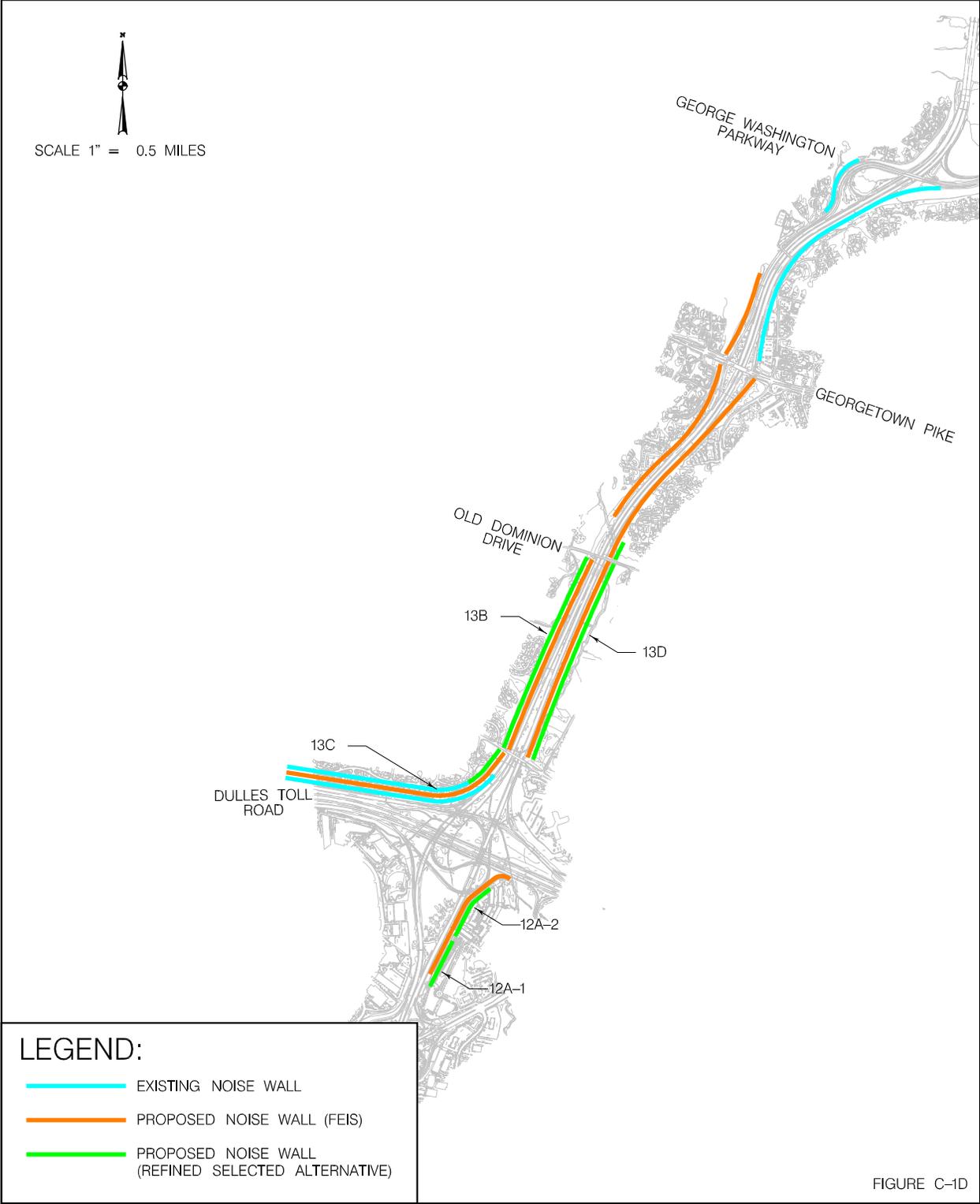
FIGURE C-1A



LOCATION OF POTENTIAL NOISE BARRIER AREAS
 GALLOWES ROAD TO I-66



LOCATION OF POTENTIAL NOISE BARRIER AREAS
 I-66 TO DULLES TOLL ROAD



LEGEND:

- EXISTING NOISE WALL
- PROPOSED NOISE WALL (FEIS)
- PROPOSED NOISE WALL (REFINED SELECTED ALTERNATIVE)

FIGURE C-1D

LOCATION OF POTENTIAL NOISE BARRIER AREAS
 DULLES TOLL ROAD TO GEORGE WASHINGTON PARKWAY

ATTACHMENT D
AIR QUALITY

Transportation Air Quality Conformity

An Air Quality Analysis conducted in February 2007 indicated that the Refined Selected Alternative is consistent with the project included in the CLRP and TIP.

A meeting was held with the Metropolitan Washington Council of Governments (WashCOG) to determine if the proposed changes would require that the air quality conformity process be revisited. After reviewing each proposed change, it was determined by WashCOG representatives that the changes were not significant enough to alter any of the inputs into the conformity process. Minutes of this meeting are attached.

The PM_{2.5} project level conformity determination that was prepared for the Selected Alternative remains valid, as none of the triggers that require a re-determination have come to pass [40 CFR 93.104(d)]. Specifically, the proposed changes to the Selected Alternative as represented by the Refined Selected Alternative do not represent a significant change to the concept/scope of the project; more than 3 years have not passed since the FEIS was issued; and a supplemental environmental document is not being initiated for air quality purposes.

Air Toxics

The qualitative mobile source air toxic (MSAT) analysis prepared for the FEIS based on 2020 traffic need not be revisited due to the update of traffic to 2030 because a MSAT analysis does not allow us to assess the effects or impact of MSATs on the public given the existing limitations in emissions modeling, dispersion modeling, and exposure modeling. A MSAT analysis does allow one to determine the relative differences that exist among alternatives under consideration in the NEPA process by examining operational factors such as daily traffic and/or VMT. However, this reevaluation has been prepared to assess the impact that design changes to the Selected Alternative will have on the environment. Because those design changes are not considered significant, it is not expected that an update of the MSAT analysis will produce any meaningful differences when comparing the Selected Alternative to the Refined Selected Alternative and therefore, will not provide any benefit to decision-making at this point in the project development process.

Mobile Source (CO) Emissions

In accordance with the Record of Decision (ROD) signed on June 29, 2006, when final design was initiated, traffic forecasts were updated to the year 2030 to reflect a 20-year design horizon. Therefore, project specific air quality analysis for carbon monoxide (CO) was updated to determine the potential effects of the Refined Selected Alternative in design year 2030 on air quality and the project's compliance with the Clean Air Act Amendments (CAAA) of 1990 (See attached memo from Straughan Environmental Services, Inc., March 2, 2007).

The Clean Air Act establishes National Ambient Air Quality Standards (NAAQS) for CO, which is 35 ppm for the 1-hour concentration and 9 ppm for the 8-hour concentration. None of the receptors modeled exceed the NAAQS for CO of 35 ppm for the 1-hour concentrations and 9 ppm for the 8-hour concentration. As a result, all receptors modeled are in attainment with NAAQS for CO. These results are consistent with those presented with the Selected Alternative.



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION

14685 Avion Parkway
Chantilly, VA 20151
(703) 383-VDOT (8368)

DAVID S. EKERN, P.E.
COMMISSIONER

To: Fluor/Transurban, Jacobs Civil, Washington Council of Governments, VDOT
(representatives as identified below)

From: Roger Boothe
Project Manager

Date: October 31, 2006

Subject: I-495 HOT Lanes
TPB Coordination Meeting – October 13, 2006

Meeting Summary

A coordination meeting was held with TPB staff on October 13, 2006. The purpose of the meeting was to present the current design for HOT lanes on I-495 as it relates to the project currently included in the CLRP and associated air quality conformity analyses.

The following people were in attendance:

Ron Kirby	TPB – Director, Department of Transportation Planning
Mike Clifford	TPB – Department of Transportation Planning
Jim Hogan	TPB – Department of Transportation Planning
Roger Boothe	VDOT – NoVA – Acting Project Manager
Kanti Srikanth	VDOT – NoVA Regional Transportation & Air Quality Liaison
Vin Vassallo	Transurban
Vince Dolan	Fluor
Harriet Levine	Jacobs

Following introductions, Vin Vassallo presented an overview of the Refined Selected Alternative. Mapping was presented showing the alternative and the group discussed the design from end to end with an emphasis on the design refinements that have taken place since the Final Environmental Impact Statement (FEIS) and Record of Decision (ROD).

The group felt that these are typical changes that occur over the course of a project as it moves from conceptual engineering to final design. Based on the information presented, TPB staff found that the design, scope and concept have not changed in any fundamental way from that which is included in the CLRP.



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION

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DAVID S. EKERN, P.E.
COMMISSIONER

The group concluded that from a transportation air quality conformity perspective the Refined Selected Alternative is consistent with the project included in the current CLRP (FY 2005) and TIP (FY 2006-2011). Therefore, the findings presented in the Record of Decision outlining compliance with transportation air quality conformity guidelines (including 8-hour ozone conformity, fine particles (PM_{2.5} direct and precursor NO_x emissions), PM_{2.5} and PM₁₀ Hot Spot Analyses, and Air Toxics) are valid and hold true for the Refined Selected Alternative.

As this, or any, project moves forward and final decisions are made on staging, design refinements and/or schedule, VDOT will coordinate with TPB and the refinements will be incorporated into future annual regional updates, as appropriate.

Sifuentes, Alvaro

From: Ron Kirby [rkirby@mwkog.org]
Sent: Wednesday, December 13, 2006 4:54 PM
To: Levine, Harriet
Subject: RE: I-495 HOT Lanes

Harriet:

As a follow-up to the OK I provided in a telephone call in late October, this looks fine.

Ronald F. Kirby
Director of Transportation Planning
Metropolitan Washington Council of Governments
777 North Capitol Street, N.E., Suite 300
Washington, DC 20002-4239
(202) 962-3310 (Direct)
(202) 962-3202 (Fax)
rkirby@mwkog.org

From: Levine, Harriet [mailto:Harriet.Levine@jacobs.com]
Sent: Tuesday, October 17, 2006 2:02 PM
To: Ron Kirby
Subject: I-495 HOT Lanes

Ron -

Thanks for taking the time to meet with us last week. It was a very good discussion and it was great to see everyone again.

I wrote a quick meeting summary and I wanted to give you a chance to look it over before I submit it to VDOT for finalization. Please let me know if you are comfortable with the way I characterized the discussion and conclusions. I didn't go point by point through the design refinements or staging but I think this memo will meet everyone's needs at this time.

Let me know if you have any questions or comments/suggestions.

Thanks,

Harriet

=00=====

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MEMORANDUM

**STRAUGHAN
ENVIRONMENTAL
SERVICES, INC.**

TO: Vince Dolan, Fluor
Harriet Levine, Jacobs
FROM: Steven Quarterman
DATE: March 2, 2007
SUBJECT: I-495 HOT Lanes – Air Quality Analysis

INTRODUCTION

Straughan Environmental Services, Inc. (SES) is determining Carbon Monoxide (CO) concentrations projected as a result of the Refined Selected Alternative for the High-Occupancy Toll (HOT) Lanes along the Capital Beltway (I-495). This analysis serves to update results provided in the *Capital Beltway Study Air Quality Technical Report*¹ (Air Quality Technical Report) and the Final Environmental Impact Statement² (FEIS).

In accordance with the Record of Decision (ROD) signed on June 29, 2006, when final design was initiated, traffic forecasts were updated to the year 2030 to reflect a 20-year design horizon. Therefore, this analysis was performed to determine the potential effects of the Refined Selected Alternative in design year 2030 on air quality and the project's compliance with the Clean Air Act Amendments (CAAA) of 1990. The Clean Air Act establishes National Ambient Air Quality Standards (NAAQS) for CO, which is 35 ppm for the 1-hour concentration and 9 ppm for the 8-hour concentration. Concentrations below the NAAQS are referred to as being in attainment and concentrations above are referred to as being in nonattainment.

METHODS

This analysis was prepared in accordance with guidance set forth by the U.S. Environmental Protection Agency (EPA), the Federal Highway Administration (FHWA), and VDOT³. Because the purpose of the analysis is to update results presented in the Air Quality Technical Report and FEIS, the assumptions and methods as presented in that study were followed to the extent practicable, as discussed under the following subheadings.

Steps taken to perform this analysis include the following:

- Obtain information on roadway characteristics of the Refined Selected Alternative, and identify air quality sensitive receptors modeled in the Air Quality Technical Report.

¹ VDOT and FHWA. 2002. *Capital Beltway Study; Air Quality Technical Report*. Richmond, VA.

² VDOT and FHWA. 2006. *Final Environmental Impact Statement Final Section 4(f) Evaluation – Capital Beltway Study*. Richmond, VA.

³ VDOT. 2006. *Consultant Guide; Air Quality Conformity Project Level Analysis*. Richmond, VA.

- Determine basic emission rates using MOBILE6⁴.
- Determine the appropriate background CO concentration measurements to use as input into EPA's CAL3QHC dispersion model.⁵
- Calculate anticipated CO concentrations using the CAL3QHC dispersion model and the emission factors developed in MOBILE6.
- Compare computed CO concentrations to the 1-hour and 8-hour NAAQS for CO to determine if any violations would occur.

Roadway Characteristics and Receptor Data

Roadway characteristics for the Refined Selected Alternative were determined from design files provided by Fluor - Transurban. In addition, traffic data used for this air quality analysis included hourly volumes for design year 2030 as developed for the Refined Selected Alternative.

Air quality receptors were selected to be consistent with those included in the Air Quality Technical Report and FEIS. The location of air quality receptors is provided in Table 1, however the exact location of each receptor described in the Air Quality Technical Report could not be determined. The technical report states:

“Although receptor sites greater than 100 feet from the edge of pavement generally have very low CO concentrations, consideration was given to all sites within 300 feet of the edge of the proposed roadway to fully assess the possible CO impact. It was assumed that CO levels would return to background levels beyond 300 feet.”

As a result, air quality receptors for this analysis were modeled on the listed properties at intervals of 10 feet for the first 10 to 100 feet from the edge of pavement, and every 50 feet from 100 to 300 feet from the edge of pavement. Receptor site selection for analyzing CO is based on where the maximum total project concentration is likely to occur and where the general public is likely to have access. For this analysis, receptors set at the specified distances that were located within the right-of-way of I-495 were removed from consideration, as the public does not have access to the right-of-way of I-495. Furthermore, receptor height was modeled at an assumed breathing height of six feet.⁶

⁴ U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. 1995. *User's Guide to CAL3QHC Version 2.0: A Modeling Methodology for Predicting Pollutant Concentrations Near Roadway Intersections*. EPA-454/R-92-006

⁵ U.S. Environmental Protection Agency. 1993. *CAL3QHC Dispersion Model*.

⁶ U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. 1995. *User's Guide to CAL3QHC Version 2.0: A Modeling Methodology for Predicting Pollutant Concentrations Near Roadway Intersections*. EPA-454/R-92-006

TABLE 1. AIR QUALITY ANALYSIS RECEPTOR SITES		
Site Number	Site Name	Location
1	North Springfield Elementary School	7602 Heming Court, Springfield
2	Fitzhugh Park	4966 American Drive, Annandale
3	Residence	3400 block Luttrell Road, Annandale
4	Stenwood Elementary School	2620 Gallows Road, Vienna
5	Residence	2500 block Roswell Court, Falls Church
6	George C. Marshall High School	7731 Leesburg Pike, Falls Church
7	The Regency Condominium	1800 Old Meadow Road, McLean
8	Residence	7700 block Lear Road, McLean
9*	Beaufort Park Community Tennis Court	900 block Helga Place, McLean
10*	Potomac Heritage Trail	At American Legion Bridge

* Receptor is beyond project limit of Refined Selected Alternative, and was not included in this analysis.

Emission Factors

EPA's MOBILE6 model is used to calculate vehicle emission rates and is used as input data for the CAL3QHC dispersion model. MOBILE6 calculates emission rates based on numerous factors, such as fuel formulation, inspection and maintenance (I/M) programs, anti-tampering programs for catalytic converters, vehicle age distributions and types, vehicle speeds, and seasonal conditions (time of year).

Emission factors were not provided in the Air Quality Technical Report. As a result, mobile source emission factors for design year 2030 were obtained from the Metropolitan Washington Council of Governments (MWCOC),⁷ which were calculated using the EPA's MOBILE6. The emission factors used as input in the CAL3QHC analysis for the Refined Selected Alternative are 4.7 gm/mi for running vehicles and 13.1 gm/mi for idling vehicles.

Background Concentrations

To calculate the total CO concentration that would occur at a particular receptor location, background CO levels and the levels directly attributable to the proposed facility must be considered and input into the CAL3QHC model. Background CO concentrations as presented in the Air Quality Technical Report were used, which were 6 and 3 ppm for the 1-hour and 8-hour concentrations, respectively.

CAL3QHC Analysis

The EPA CAL3QHC dispersion model is used to predict CO concentrations for air quality sensitive receptors. The mathematical model used to estimate future CO concentrations is the current version of EPA's CAL3QHC dispersion model, released in June 1993. The CAL3QHC dispersion model is a microcomputer-based modeling methodology developed to predict the level of CO or other inert pollutant concentrations for motor vehicles traveling near roadway intersections. CAL3QHC is a consolidation of

⁷ MWCOC. 2004. *Output_DC2030 W.rpt.*

EPA's CALINE3 line source dispersion model and an algorithm that internally estimates the length of the queues formed by idling vehicles at signalized intersections. Based on the assumption that vehicles at an intersection are either in motion or in an idling state, the program is designed to predict air pollution concentrations by combining the emissions from both moving and idling vehicles. By including emissions from idling vehicles, CAL3QHC represents a more reliable tool than CALINE3 alone for predicting CO concentrations near signalized intersections where idling vehicles interact with moving vehicles in complex configurations. Predictions of free-flow traffic conditions, using either CALINE3 or CAL3QHC, would yield equivalent results.

The CAL3QHC program requires that roadways be modeled as segments, known as links. Links can be either free-flow links (for vehicles moving at a constant velocity) or queue links (for idling vehicles). Both free-flow links and queue links are found in the project area. Links can be one of four types, based on the roadway geometry (at-grade, fill, bridge, or depressed). With the exception of ramps and other roadway overpasses, all links used in this study are at-grade links.

A free-flow link is defined as a straight segment of roadway having a constant width, height, traffic volume, speed, and vehicle emission factor. If any of these factors changes, a new link must be coded. The width of a free flow link is the roadway width plus 10 feet on each side of the roadway to account for the dispersion of the plume generated by the wake of moving vehicles. The width for each link is, therefore, equal to the shoulder-to-shoulder width plus 20 feet. The required inputs for free-flow links are the endpoints, traffic volume (vehicles/hour), the emission factor (grams/vehicle-mile), source height (feet), and mixing zone width (feet). A source height of 0 feet was assumed, as this is the height recommended for at-grade roadways.⁸

A queue link is defined as a straight segment of roadway with a constant width and emission source strength, on which vehicles are idling for a specified period of time. The width of a queue link is determined by the width of the traveled roadway only. Ten feet are not added on each side of the roadway because vehicles are not moving and no wake is generated. Required inputs for queue links are the endpoints, approach traffic volume (vehicles/hour), emission factor (g/vehicle-hr), average cycle length (seconds), average red time length (seconds), number of travel lanes, clearance lost time (seconds), source height (feet), signal type (pre-timed actuated, or semi-actuated), saturation flow rate (vehicles/hour/lane), and arrival rate (worst progression, below average progression, average progression, above average progression, or best progression). Data on average cycle length and average red time length at each intersection was provided by VDOT for existing intersections and by Fluor - Transurban for proposed intersections included with the Refined Selected Alternative. The saturation flow rate was assumed to be 1,600 vehicles/hour/lane with an average arrival rate of 2.0 seconds. In addition, a source height of 0 feet was assumed, as this is recommended for at-grade roadways.⁹

⁸ U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. 1995. *User's Guide to CAL3QHC Version 2.0: A Modeling Methodology for Predicting Pollutant Concentrations Near Roadway Intersections*. EPA-454/R-92-006

⁹ Ibid.

CAL3QHC also requires the input of additional factors. These factors are average timing (minutes), surface roughness coefficient (cm), settling velocity (cm/s), deposition velocity (cm/s), wind speed (m/s), mixing height (meters), stability class (1 to 6), and wind angle range (degrees). The values used for these factors are summarized in Table 2.

TABLE 2. DATA INPUTS	
Parameter	Description
Average Timing	60 minutes
Surface Roughness	175 cm
Settling Velocity	0 cm/s
Deposition Velocity	0 cm/s
Wind Speed ¹	1 m/s
Stability Class ¹	4 (D, which represents urban areas)
Wind Angle Range	0° to 360° in 10° increments
Mixing Height ²	1,000 ft (350m)
Source Height ²	0 ft (at grade)/15 ft (overpass)

¹ Wind speed and stability class assumptions were from the Air Quality Technical Report.
² Assumptions for mixing height and source height for at grade links were taken from EPA's *User's Guide to CAL3QHC Version 2.0* 1995.

CAL3QHC calculates the CO concentration at each receptor for a given wind direction. The Air Quality Technical Report states that wind directions were modeled nearly parallel to the roadway. In this study, the wind direction was varied through a full 360 degrees in ten-degree increments. CAL3QHC places the results for all wind directions for each receptor in a matrix, and then determines the wind direction that caused the worst CO concentration at each receptor.

Hourly traffic volumes for design year 2030 for an entire 24 hour day were used to predict CO concentrations using CAL3QHC. The maximum concentrations for each hour were analyzed, and the appropriate background concentrations were added to determine the peak 1-hour CO concentrations. The 8-hour CO concentration was determined by taking the average of the highest eight consecutive hourly CO concentrations added to the appropriate 8-hour background concentration.

The CAL3QHC input data files used to obtain the CO concentrations are included as an attachment.

RESULTS

The worst case result for each general receptor site is reported in Table 3. None of the receptors modeled exceed the NAAQS for CO of 35 ppm for the 1-hour concentrations and 9 ppm for the 8-hour concentration. As a result, all receptors modeled are in attainment with NAAQS for CO. These results are consistent with those presented with the Selected Alternative.

TABLE 3. DATA SUMMARY FOR RECEPTOR SITES.				
Site Number	Receptor Location	Time Period	Selected Alternative (FEIS/ROD) Projected CO Concentrations	Refined Selected Alternative Projected CO Concentrations
1	North Springfield Elementary School	1-hour	6.6	7.6
		8-hour	3.5	4.2
2	Fitzhugh Park	1-hour	6.9	7.6
		8-hour	3.7	4.3
3	Residence 3400 block Luttrell Road, Annandale	1-hour	7.6	8.4
		8-hour	4.5	5.0
4	Stenwood Elementary School	1-hour	6.4	7.3
		8-hour	3.3	4.0
5	Residence 2500 Block Roswell Court, Falls Church	1-hour	6.0	6.5
		8-hour	3.0	3.3
6	George C. Marshall High School	1-hour	7.0	8.5
		8-hour	3.8	4.9
7	The Regency Condominium	1-hour	6.4	8.1
		8-hour	3.3	4.6
8	Residence 7700 Block Lear Road, McLean	1-hour	5.9	6.9
		8-hour	2.9	3.8

ATTACHMENT E
NATURAL RESOURCES

SURFACE WATERS AND WETLANDS

Impacts to surface waters and wetlands have changed since the Record of Decision (ROD) was signed on June 29, 2006. These changes are a result of more accurate right-of-way information, typical design refinements as the project has advanced from conceptual engineering to final design, and modifications to the design of the Selected Alternative. This section provides a discussion of the impacts associated with the Refined Selected Alternative as compared to those associated with the Selected Alternative presented in the Final Environmental Impact Statement (FEIS). Detailed discussions regarding existing resources, regulations, and mitigation measures may be found in Section 3.9 and Section 4.10 of the FEIS, the *Natural Resources Technical Report*, and the *I-495 Capital Beltway HOT Lanes, Fairfax County, Virginia Joint Permit Application*, completed by Wetland Studies and Solutions, Inc. and submitted to the U.S. Army Corps of Engineers (COE) in October 2006, revised February 2007.

A summary of the impacts to surface waters and wetlands associated with the Selected Alternative and the Refined Selected Alternative is presented in **Table 1**.

Table 1
SUMMARY OF IMPACTS TO SURFACE WATERS AND WETLANDS

	Selected Alternative	Refined Selected Alternative
Number of Watersheds Affected	3	3
Total Stream Impacts (feet)	6,877	6,694
Total Wetland Impacts (acres)	3.03	2.43

Note: Impacts for the Selected Alternative and the Refined Selected Alternative were calculated based on the cut/fill limits as opposed to right-of-way limits to provide a more accurate impact assessment.

Surface Waters

The construction of new drainage ditches and extension of existing structures would result in the displacement of several sections of streams, as indicated in **Table 2**. These displacements would result in the loss of aquatic habitat (discussed in Section 4.12 of the FEIS, Wildlife and Habitats). Temporary siltation of streams could occur during construction, but aggressive implementation and monitoring of erosion and sediment control plans would be included in the project to minimize these impacts.

Table 2
STREAM IMPACTS BY WATERSHED

Watershed	Primary Streams Impacted	Selected Alternative Feet	Refined Selected Alternative	
			Permanent Impacts Feet	Temporary Impacts Feet
Accotink Creek	Accotink Creek and tributaries	2,181	1,286	342
Cameron Run	Holmes Run and tributaries	3,567	4,332	0
Pimmit Run	Pimmit Run and tributaries	0	0	0
Scotts Run	Scotts Run and tributaries	1,129	1,076	567
Total Impacts		6,877	6,694	909

Increases in impervious surfaces, traffic volume, and polluted runoff from road surfaces into streams and tributaries could result in impacts to water quality. Runoff amounts would be similar between the Selected Alternative and Refined Selected Alternative, as the amount of additional impervious surface is not expected to change. Pollutants

contained in runoff would include grease, oil, metal, nutrients, nitrogen, deicing salts, roadside vegetation management chemicals, and suspended solids.

The Refined Selected Alternative would permanently impact approximately 6,694 feet of streams, whereas the Selected Alternative studied in the FEIS would impact approximately 6,877 feet of streams. The amount of impacts will decrease within the Scotts Run watershed with the implementation of the Refined Selected Alternative, from 1,129 feet to 1,076 feet of permanent stream impacts. Modifications made during the design phase of the project have resulted in a decrease in the direct impacts to Scotts Run and its tributaries in the immediate vicinity of the Dulles Toll Road interchange. Impacts to Accotink Creek watershed also decreased, from 2,181 feet of impacts to 1,286 feet associated with the Refined Selected Alternative. The amount of impacts to Cameron Run watershed would increase from 3,567 feet associated with the Selected Alternative to 4,332 feet with the Refined Selected Alternative. The change in impacts to both the Accotink Creek and Cameron Run watersheds is a result of a more refined design plan.

It is expected that the quality and quantity of runoff associated with the Refined Selected Alternative will be the same as that expected with the Selected Alternative. Overall, runoff is expected to improve as a result of more effective quantity management and pollutant removal capabilities beyond what is currently occurring throughout the local watershed. Since none of the affected streams or tributaries contributes to the public water supply, the potential for human health effects from runoff is minimal.

Temporary Stream Impacts

Temporary impacts to streams were not discussed in the FEIS, as the project was in the preliminary design stages and temporary impacts were not yet determined. Temporary impacts to streams within the project area are expected during the construction phase with the implementation of the Refined Selected Alternative. As indicated in **Table 2**, temporary impacts would occur within two of the watersheds. Approximately 342 feet of Accotink Creek and its tributaries within the watershed will be temporarily impacted. Within Scotts Run Watershed, approximately 567 feet of temporary impacts are expected. All of the temporary impacts within the project area will occur for the duration of the construction phase and will be returned to preconstruction conditions upon completion of the project.

Erosion and sediment control measures will be implemented to minimize water quality impacts from increased levels of sedimentation and turbidity. Control measures may include berms, dikes, sediment basins, fiber mats, straw silt barriers, netting, mulch, temporary and permanent seeding, and other methods. To the extent possible, construction equipment will be restricted from fording and otherwise disrupting stream habitats.

Wetlands

Wetlands adjacent to the Beltway would be partially or entirely displaced by either the Selected Alternative or the Refined Selected Alternative. Temporary impacts to wetlands were not discussed in the FEIS, as the project was in the preliminary design phase and temporary impacts had not been determined. Temporary impacts have been determined for the Refined Selected Alternative and are expected during construction.

Displacements associated with the Selected Alternative would total 3.03 acres, approximately 14 percent of the total present within the Beltway right-of-way. Displacements associated with the Refined Selected Alternative would be slightly less and would total 2.43 acres, approximately 10 percent of the total. Temporary impacts associated with the Refined Selected Alternative total 0.10 acres, approximately 0.4 percent of the total present within the Beltway right-of-way. As indicated in **Table 3**, several different types of wetlands would be affected.

Table 3
SUMMARY OF WETLAND IMPACTS BY TYPE

	Total Existing Area ²	Area Impacted		
		Selected Alternative	Refined Selected Alternative	
			Permanent Impacts	Temporary Impacts
Cowardin Classification ¹	Acres	Acres	Acres	Acres
PEM	2.21	0.64	0.23	0.01
PFO	19.06	2.28	2.15	0.09
PSS	0.58	0.09	0.05	0
Total Jurisdictional Wetlands	21.85	3.01	2.43	0.10
Isolated PEM	0.02	0.02	0	0
Isolated PFO	0.65	0	0	0
Total Isolated (Non-Jurisdictional) Wetlands	0.67	0.02	0	0
Total Wetlands	22.52	3.03	2.43	0.10

¹The Cowardin classifications are: palustrine emergent (PEM) systems; palustrine forested (PFO); and palustrine scrub-shrub (PSS) systems.

²Represents all wetlands within 165 feet (50 meters) of the Beltway.

All of the impacts would occur within jurisdictional wetlands. No isolated wetlands would be affected by the implementation of the Refined Selected Alternative. The Selected Alternative was expected to impact approximately 0.02 acres of isolated wetlands. The change in impacts to isolated wetlands is a result of modifications to the design of the project.

A majority of the wetland impacts associated with the Refined Selected Alternative would occur to palustrine forested wetland systems (PFO). Approximately 2.15 acres would be impacted as a result of the implementation of this alternative, whereas the Selected Alternative would result in approximately 2.28 acres of affected PFO wetlands. Approximately 0.09 acres of PFO wetlands would be impacted temporarily during construction with the implementation of the Refined Selected Alternative. In addition, approximately 0.23 acres of palustrine emergent wetlands (PEM) and 0.05 acres of palustrine scrub-shrub wetlands (PSS) would be permanently displaced with the implementation of the Refined Selected Alternative. It was also determined that the Refined Selected Alternative would temporarily impact approximately 0.01 acres of PEM wetlands will. It was determined during the FEIS that approximately 0.64 acres of PEM wetlands and 0.09 acres of PSS wetlands would be impacted with the implementation of the Selected Alternative. The change in impacts to jurisdictional wetland systems is a result of modifications to the design of the project.

Table 4 summarizes the impacts on wetlands within particular watersheds.

The full impact to wetlands and associated stream systems and watersheds cannot be assessed merely in terms of the area of wetlands displaced by new construction, as not all wetlands are equal in their quality or ecological and social benefits they provide. Based on coordination with Virginia Department of Environmental Quality's (DEQ) Water Protection Program, the functional value assessment conducted for the FEIS would still apply to the Refined Selected Alternative. This information can be found in the *I-495 Capital Beltway HOT Lanes Joint Permit Application* (Wetland Studies and Solutions, Inc., October 4, 2006, as revised February 16, 2007).

Table 4
SUMMARY OF WETLAND IMPACTS BY WATERSHED

	Wetland Area Impacted						
	Existing Wetland Area ¹	Selected Alternative		Refined Selected Alternative			
				Permanent Impacts		Temporary Impacts	
WATERSHED	Acres	Acres	Percent	Acres	Percent	Acres	Percent
Accotink Creek	4.66	0.33	7	0.43	9	0.03	0.6
Cameron Run	6.08	1.23	21	1.22	20	0.06	1.0
Dead Run	0.47	0	0	0	0	0	0
Pimmit Run	0.6	0	0	0.01	1	0.01	1
Scotts Run	10.71	1.47	14	0.77	7	0	0
Total Impacts	22.52	3.03	13	2.43	11	0.10	0.4

¹Represents all wetlands within 165 feet (50 meters) of the Beltway.

Mitigation

Compensatory mitigation will be required for unavoidable wetland impacts that would result from the implementation of the proposed project. The State Program General Permit, as well as DEQ and Norfolk District COE policy, require that mitigation ratios follow those listed in **Table 5**. This table summarizes the estimated compensatory mitigation acreages for each wetland type. Mitigation will be required by the COE and the DEQ for impacts to jurisdictional wetlands resulting from the implementation of the Refined Selected Alternative.

Table 5
SUMMARY OF IMPACTS AND COMPENSATION REQUIREMENTS FOR WETLANDS

Cowardin Classification	Compensation Ratio	Area Impacted		Compensation Required	
		Selected Alternative	Refined Selected Alternative	Selected Alternative	Refined Selected Alternative
		Acres	Acres	Acres	Acres
Jurisdictional Wetlands					
PEM	1:1	0.64	0.23	0.96	0.23
PFO	2:1	2.28	2.15	4.56	4.30
PSS	1.5:1	0.09	0.05	0.14	0.08
Total	--	3.01	2.43	5.66	4.61
Isolated Wetlands					
Total	1:1	0.02	--	0.02	--
Total Impacts/ Compensation	--	3.03	2.43	5.68	4.61

Compensation for the impacts resulting from the implementation of the Refined Selected Alternative would need to be provided off-site due to the location of the project area within a highly developed, urbanized area within Fairfax County, as there are no feasible locations within the right-of-way for these activities and an off-site location is the only practical alternative. Pre-application meetings with Fairfax County and DEQ personnel indicated that no on-site or near-site mitigation possibilities exist at this time, as the County's ongoing watershed efforts are not yet detailed enough to identify specific mitigation sites. No on-site or near-site DEQ mitigation sites exist within the project area. However, all stream compensation will be provided with the same hydrologic unit code within Fairfax County, which would also implement a portion of the first community based watershed plan developed within Fairfax County. Mitigation measures are discussed in detail in the *I-495 Capital Beltway HOT Lanes Joint Permit Application* (Wetland Studies and Solutions, Inc., October 4, 2006, as revised February 16, 2007).

FLOODPLAINS

Potential impacts to the 100-year floodplain were assessed for the Selected Alternative and the Refined Selected Alternative in accordance with EO 11988 – “Floodplain Management”, and FHWA's Program Manual 6-7-3-2, *Location and Hydraulic Design for Encroachments on Floodplains*. The assessment included flooding risks, impacts on natural and beneficial floodplain values and measures to restore them, and the support of probable incompatible floodplain development (i.e. any development that is not consistent with a community's floodplain development plan).

Floodplain boundaries for the Selected Alternative were obtained from the National Insurance Rate Maps (FIRM) prepared by the Federal Emergency Management Agency (FEMA), as well as digital floodplain maps provided by Fairfax County. Determining floodplain impacts involved superimposing the Selected Alternative and Refined Selected Alternative on the 100-year floodplain digital mapping.

Four 100-year floodplains are located within the proposed project area, including Flag Run, Accotink Creek, Holmes Run, and Scotts Run (illustrated in Section 3.9 of the FEIS). Both the Selected Alternative and the Refined Selected Alternative would further encroach onto existing floodplains. The extent of encroachment was determined by calculating the area between the existing edge of pavement and the new cut and fill line associated with either alternative, which would provide a more conservative estimate of floodplain encroachment than increasing the new impervious surface.

Approximately 10.42 acres of floodplains would be encroached with the implementation of the Selected Alternative. All of the impacts would occur to the floodplain associated with Scotts Run, which runs adjacent to the eastern edge of the Beltway for over a mile. Most of the encroachments would be attributed to the fill outside the paved area. Bridging would not avoid encroachments where the floodplain runs parallel to the existing roadway.

Approximately 5.42 acres of floodplains would be encroached with the implementation of the Refined Selected Alternative. Approximately 4.27 acres of floodplains associated with Scotts Run would be encroached with the implementation of the Refined Selected Alternative. In addition, approximately 1.15 acres of floodplains associated with Accotink Creek would be encroached with the implementation of the Refined Selected Alternative. The changes in anticipated floodplain impacts is a result of more accurate right-of-way

information, typical design refinements as the project has advanced from conceptual engineering to final design, modifications to the design of the Selected Alternative, and more refined floodplain information.

Sections 107 and 303 of VDOT's specifications require the use of stormwater management practices to address concerns such as post-development stormflows and downstream channel capacity. These standards require that stormwater management ponds be designed to reduce stormwater flows to preconstruction conditions for up to a 10-year storm. VDOT would adhere to its specifications to prevent an increase in flooding risks associated with the proposed improvements.

During final design, a detailed hydraulic survey and study would evaluate the effect of the proposed improvements on stormwater discharge. This evaluation would ensure that no substantial increase in downstream flooding would occur. In addition, to the extent practicable, VDOT's final design will consider opportunities for retrofitting existing stormwater management facilities within the right-of-way. For these reasons, the project would have negligible impacts to natural and beneficial floodplain values.

WILDLIFE AND HABITATS

There is very little difference in the impacts to aquatic and terrestrial habitats associated with the implementation of either the Selected Alternative or the Refined Selected Alternative. Impacts associated with these resources are discussed below.

Aquatic Habitats

The displacement of sections of stream bottom with the implementation of the proposed project would result in minor losses of benthic (bottom-dwelling) organisms. The disturbance of these organisms would be temporary for culvert installations and permanent where the placement of fill is required. The water quality of streams that receive runoff from the Beltway and surrounding urban and suburban areas is already impaired, and the increase in pavement and replacement of natural stream channels with culverts or other structures has the potential to further degrade water quality and associated habitats. However, with proper stormwater controls, further degradation can be avoided or minimized. Given the lack of existing stormwater controls, it is possible that the overall water quality of receiving streams could actually improve following the installation of stormwater management facilities as part of the project.

Fish migrate to search for food and to spawn. Several streams crossed by the project, particularly Accotink Creek, may still support anadromous fishes (saltwater species that migrate to fresh water to breed), which would be of particular concern. Alewife, an anadromous fish species, has been observed within 3 miles of the project area. Highway crossings can obstruct movements of anadromous and other fishes by altering stream width, depth, velocity, and gradient, especially on smaller tributaries where culverts are used instead of bridging. Culverts will be designed such that low-flow channels can be maintained to minimize the possibilities for obstructing fish passage.

Impacts to aquatic habitats associated with the Refined Selected Alternative are expected to decrease slightly when compared to impacts associated with the Selected Alternative, primarily due to design modifications that have resulted in less stream displacements. However, impacts to aquatic species are expected to remain the same.

Terrestrial Habitats

The proposed project would not affect any significant forest resources. Any of the tree removal that would occur in order to accommodate the proposed improvements to the Beltway would occur within the future right-of-way for I-495. Since the project follows an existing major highway corridor that carries large volumes of traffic within an urbanized area, impacts to terrestrial habitat would be limited to displacements of small amounts of remaining disjunct vegetated areas. A vast majority of forest resources within the Beltway right-of-way are highly fragmented and provide little desirable wildlife habitat. Such areas harbor transient or permanent populations of small animals adapted to life in fragmented urbanized environments close to human populations. The existing Beltway already constitutes a barrier to wildlife movements and a constant threat of mortality to wildlife wandering onto the highway. The proposed widening would not substantially change that condition.

Temporary impacts to wildlife are expected as a result of the displacement of vegetated cover within the limits of disturbance. The removal of vegetated cover would cause the migration of wildlife species, particularly edge-dwelling species, to migrate away from the project area and result in a decrease of habitat usage. Construction activities may also result in incidental wildlife takings due to the operation of construction equipment. Temporary impacts resulting from slope stabilization effects could temporarily reduce wildlife usage and foraging behaviors in disturbed areas.

Invasive Species

In accordance with Executive Order 13112, Invasive Species, construction of the proposed Beltway improvements will minimize the potential for the establishment of invasive terrestrial or aquatic animal or plant species by following the VDOT Road and Bridge Specifications Manual. Activities related to establishing and maintaining the newly constructed right-of-way follow guidelines set forth in the manual under the following sections: Clearing and Grubbing (Section 301), Drainage Structures (Section 302), Earthwork (Section 303), Selective Tree Removal, Trimming, and Cleanup (Section 601), Topsoil (Section 602), Seeding (Section 603), Sodding (Section 604), Planting (Section 605), Soil Retention Covering (Section 606), Herbicide Spraying (Section 607), and Mowing (Section 608). While the right-of-way is vulnerable to the colonization of invasive plant species from adjacent properties, implementation of the stated construction specifications and special provisions will reduce the potential for the establishment and proliferation of invasive species in the right-of-way.

CONCLUSION

No significant changes in impacts to surface waters or wetlands are expected between the Selected Alternative and the Refined Selected Alternative. Any differences between the two alternatives are a result of more accurate right-of-way information for the Beltway, typical design refinements as the project has advanced from conceptual engineering to final design, and modifications to the design of the Selected Alternative. More accurate information has resulted in a more accurate limit of disturbance associated with the proposed project. It has been determined that the implementation of the Refined Selected Alternative would result in an overall decrease in impacts to

wetlands and streams within the proposed project area from those anticipated with the Selected Alternative studied in the FEIS.

The decrease in impacted streams is not expected to be substantial enough to result in a decrease in impacts to aquatic habitats. No decrease in impacts to terrestrial habitats is expected with the implementation of the Refined Selected Alternative. As a result, impacts to terrestrial and aquatic habitats are expected to remain essentially the same with either alternative.

An overall decrease in impacts to floodplains is expected within the project area. The decrease in anticipated floodplain impacts is a result of more accurate right-of-way information, typical design refinements as the project has advanced from conceptual engineering to final design, modifications to the design of the Selected Alternative, and more refined floodplain data.

Impacts associated with the Refined Selected Alternative are expected to be slightly less than those associated with the Selected Alternative. The anticipated decrease in impacts is not expected to be substantial enough to result in a substantial decrease in impacts to the aforementioned resources.

ATTACHMENT F
REVISED SECTION 4(f) EVALUATION

INTRODUCTION

The use of Section 4(f) properties have changed since the Record of Decision (ROD) was signed June 29, 2006. The changes in use are a result of detailed right-of-way information and further refinements to the design of the Selected Alternative. This Revised Section 4(f) Evaluation presents a discussion of the impacts associated with the Refined Selected Alternative. It also includes a comparison of impacts from those presented in the Final Environmental Impact Statement (FEIS)/Section 4(f) Evaluation.

The right-of-way and property boundary information presented in the Final EIS was taken from tax maps and the analysis of impacts was based on that information. As part of the ongoing design efforts, additional survey data was obtained that provided more accurate right-of-way and property information. The updated right-of-way information was used to calculate the impacts to the park properties presented in this Revised Section 4(f) Evaluation for the Refined Selected Alternative.

Background information regarding the requirements of Section 4(f) and Section 6(f) may be found in the Final EIS.

PURPOSE AND NEED FOR THE PROPOSED ACTION

A description of the purpose and need for the project may be found in the Final EIS/Section 4(f) Evaluation.

SECTION 4(f) PROPERTIES

No new Section 4(f) properties have been identified since the issuance of the ROD.

IMPACTS TO SECTION 4(f) PROPERTIES

The Selected Alternative involved the use of land from five park/recreational properties including Wakefield Park, Fitzhugh Park, Accotink Stream Valley Park, Jefferson District Park, and the Washington and Old Dominion (W&OD) Railroad Regional Park. The Refined Selected Alternative involves the use of land from four of the five parks affected by the Selected Alternative. Permanent use of Accotink Stream Valley Park has been avoided and only a short-term temporary occupancy will be required for grading on the edge of the park property. However, in addition to the parks listed above, the Refined Selected Alternative involves the use of land from Flag Run Park.

Detailed descriptions of these properties are in the Final EIS/Section 4(f) Evaluation. None of the park facilities at Fitzhugh Park, Accotink Stream Valley Park, Jefferson District Park or Flag Run Park would be displaced by the Refined Selected Alternative. The pedestrian bridge over the Beltway connecting to the trail in Wakefield Park will be reconstructed including new ramps and trail connection, consistent with the Selected Alternative. In addition, a minor segment of the Wakefield Park access road will be reconstructed. The W&OD Railroad Regional Park use by the Refined Selected Alternative is also consistent with the use in the Selected Alternative including the replacement of the bridge carrying the trail over the Beltway.

Table 1 summarizes the impacts to Section 4(f) resources for both the Selected Alternative and Refined Selected Alternative. Proximity impacts will occur, but should not result in substantial impairment of the use of any of the Section 4(f) resources.

Table 1
SUMMARY OF IMPACTS TO SECTION 4(f) PROPERTIES

Name of Section 4(f) Property	Selected Alternative (FEIS/ROD)	Refined Selected Alternative
Wakefield Park - 292.6 acres		
Right-of-Way Requirement	1.54	1.47
Loss of Park Function	No	No
Activity Areas Exposed to Noise Impact	Yes	Yes
Fitzhugh Park - 10.86 acres		
Right-of-Way Requirement	0.48	0.54
Loss of Park Function	No	No
Activity Areas Exposed to Noise Impact	Yes	Yes
Accotink Stream Valley Park - 728.7 acres		
Right-of-Way Requirement	0.30	0
Loss of Park Function	No	No
Activity Areas Exposed to Noise Impact	No	No
Jefferson District Park - 60.8 acres		
Right-of-Way Requirement	0.11	0.07
Loss of Park Function	No	No
Activity Areas Exposed to Noise Impact	No	No
W&OD Railroad Regional Park - 545.0 acres		
Right-of-Way Requirement	0.07	0.30
Loss of Park Function	No	No
Activity Areas Exposed to Noise Impact	Yes	Yes
Flag Run Park - 8.6 acres		
Right-of-Way Requirement	0	0.02
Loss of Park Function	No	No
Activity Areas Exposed to Noise Impact	No	No

As mentioned above, additional survey data was obtained that provided more accurate right-of-way and property impact information that complicates understanding of the information presented in Table 1. The updated right-of-way information was used to calculate the impacts to the park properties presented in this discussion for the Refined Selected Alternative. In addition, potential impacts associated with the Selected Alternative were recalculated based on this new survey data. **Table 2** provides a breakdown of the change in impacts differentiating between changes due to more detailed and accurate information and changes due to design modifications.

Table 2
IMPACTS TO SECTION 4(f) PROPERTIES

Name of Section 4(f) Property	FEIS Existing Right-of-Way	Surveyed Right-of-Way	
	Selected Alternative (FEIS)	Selected Alternative (FEIS)	Refined Selected Alternative
Wakefield Park – 292.6 acres	1.54	0.45	1.47
Fitzhugh Park – 10.86 acres	0.48	0.97	0.54
Accotink Stream Valley Park – 728.7 acres	0.30	0.39	0
Jefferson District Park – 60.8 acres	0.11	0.10	0.07
W&OD Railroad Regional Park – 545.0 acres	0.07	0.13	0.30
Flag Run Park – 8.6 acres	0	0	0.02
TOTAL	2.5	2.04	2.40

The 2.5 acres of impacts to Section 4(f) resources identified in the FEIS/ROD actually represents 2.04 acres of impacts when taking into account the more accurate right-of-way survey information. Using this same information, the Refined Selected Alternative will impact 2.4 acres, representing a 0.36 acre overall increase. Notwithstanding, the Section 4(f) impacts from Refined Selected Alternative will still be less than the acreage impacts that were anticipated with the Selected Alternative. The following describes the Section 4(f) resources that will be impacted permanently and/or temporarily by the Refined Selected Alternative by comparing the Selected Alternative impacts based on the more accurate right-of-way survey information to the Refined Selected Alternative impacts using the same information.

Wakefield Park

The Refined Selected Alternative would use 1.47 acres along the east and south sides of Wakefield Park (see **Figure 1**). Under the Selected Alternative, the FEIS/Section 4(f) Evaluation showed 1.54 acres would have been impacted. This converts to 0.45 acres using the more accurate right-of-way survey information. Therefore, impacts to Wakefield Park will actually increase by 1.02 acres using the more accurate right-of-way information. Notwithstanding, the total use of Wakefield Park under the Refined Selected Alternative will still be less than the use that was anticipated in the Section 4(f) Evaluation prepared for the Final EIS. The use of land in the park would consist of very narrow strips along the mainline of the Beltway and the southbound exit ramp to westbound Braddock Road. Retaining walls have been used along the ramp and mainline to minimize impacts to the park.

This area of Wakefield Park is not used for active recreation. In addition to the permanent use described above, temporary occupancy of the park would be required for the construction of a pedestrian bridge and associated ramps, the reconstruction of a minor segment of the access road, and the extension of three culverts located within the park. The replacement of the pedestrian bridge over the Beltway was included with the Selected Alternative. It was not discussed in the Section 4(f) Evaluation because it was thought that the entire construction could be accomplished within the existing right-of-way. However, in order to replace the ramp from Wakefield Park to the pedestrian bridge with a new Americans with Disabilities Act (ADA) compliant ramp, the ramp and trail connection in the park need to be reconstructed.

Consistent with the Final EIS/Section 4(f) Evaluation, minor changes in noise levels and visual quality would also occur. None of these proximity impacts would be substantial enough to impair the use of this resource.

There are no anticipated impacts to park access or available park activities during construction. However, while the new bridge and ramp are constructed there may be some temporary disruption to trail users during construction so that their safety is not compromised.

Fitzhugh Park

The Refined Selected Alternative would use 0.54 acres of land along the west side of Fitzhugh Park (see **Figure 2**). Under the Selected Alternative, the FEIS/Section 4(f) Evaluation showed 0.48 acres would have been impacted. This converts to 0.97 acres using the more accurate right-of-way survey information. Therefore, impacts to Fitzhugh Park will decrease by 0.43 acres. The use of land in this park would be in a wooded area along the western edge of the park. This area is not actively used for recreation. Retaining walls have been used along the ramp to minimize impacts to the park.

Consistent with the Final EIS/Section 4(f) Evaluation, minor changes in noise levels and visual quality would also occur. None of these proximity impacts would be substantial enough to impair the use of this resource.

There are no anticipated impacts to park access or available park activities during construction.

Accotink Stream Valley Park

Under the Refined Selected Alternative, permanent impacts to Accotink Stream Valley Park would be avoided (see **Figure 3**). Temporary occupancy would be required as a result of grading performed during construction along the southbound exit ramp to westbound Little River Turnpike. The land will be fully restored upon completion of the grading operations. Under the Selected Alternative, 0.30 acres (0.39 acres using the more accurate right-of-way survey information) would have been impacted. The area affected is not used for active recreation and is well away from the trail along Accotink Creek.

Consistent with the Final EIS/Section 4(f) Evaluation, minor changes in noise levels and visual quality would also occur. None of these proximity impacts would be substantial enough to impair the use of this resource.

There are no anticipated impacts to park access or available park activities during construction.

Jefferson District Park

The Refined Selected Alternative would use 0.07 acre of land from a disjoint portion of Jefferson District Park lying between the Beltway and Shreve Road (see **Figure 4**). The use of land in the park would consist of a strip along the northbound lanes of the Beltway. Adjacent to that strip of land, temporary occupancy of the park would be required as a result of grading performed during construction. The land will be fully restored upon completion of the grading operations. Under the Selected Alternative 0.11

acres (0.10 acres using the more accurate right-of-way survey information) would have been impacted resulting in a net decrease of 0.03 acres. The parcel of park land used by the Refined Selected Alternative has no recreational facilities or activities on it.

Consistent with the Final EIS/Section 4(f) Evaluation, minor changes in noise levels and visual quality would also occur. None of these proximity impacts would be substantial enough to impair the use of this resource.

There are no anticipated impacts to park access or available park activities during construction.

W&OD Railroad Regional Park

The Refined Selected Alternative would result in a permanent use of 0.30 acres of land from W&OD Railroad Regional Park (see **Figure 5**). Under the Selected Alternative 0.07 acres (0.13 acres using the more accurate right-of-way survey information) would have been impacted resulting in a net increase of 0.17 acres. As a result of more accurate right-of-way information, a shift in the roadway alignment, and the additional right-of-way required to construct and maintain the noise wall, the Refined Selected Alternative would increase the use of the W&OD Railroad Regional Park. The permanent use involves a disjointed parcel on the south side of the trail and west side of the Beltway.

The Refined Selected Alternative includes a replacement for the existing bridge used to carry the trail over the Beltway. This bridge does not currently meet Northern Virginia Regional Park Authority standards for width. In conjunction with the Refined Selected Alternative, this bridge will be replaced with a new bridge that improves access and meets design standards. The new bridge will be constructed before the existing bridge carrying the trail is removed in order to maintain the continuity of the trail during construction and minimize disturbance to users. While the new bridge will be constructed before the existing bridge is removed from service, there may still be some temporary disruption to trail users during construction so that their safety is not compromised.

There would be temporary occupancy of the park associated with the construction of the new replacement bridge carrying the trail over the Beltway as well as some grading along the trail inside the Beltway. The land will be fully restored once the grading is complete and the existing bridge is removed.

Consistent with the Final EIS/Section 4(f) Evaluation minor changes in noise levels and visual quality would also occur. None of these proximity impacts would be substantial enough to impair the use of this resource.

As presented in the Final EIS/Section 4(f) Evaluation, a land-swap at the location of the existing bridge will be conducted to replace the Section 6(f) properties used for the new bridge carrying the trail. In addition, the remaining impacted acreage will be replaced in accordance with the provisions of Section 6(f) that require that converted Section 6(f) land be replaced with land of equal fair market value and with reasonably equivalent usefulness, function, and location.

In order to further discuss and explain the increase in impacts to the W&OD Regional Park, a coordination meeting was held with representatives of the Northern Virginia Regional Park Authority (NVRPA) on November 1, 2006 at their headquarters building in Fairfax Station. The purpose of the meeting was to further discussion and coordination of Section 4(f) and Section 6(f) impacts and mitigation. NVRPA typically issues permanent easements even for roadway improvements. Mitigation would be for the land included in the easement. One potential replacement parcel that was discussed and is under evaluation is the small Commonwealth of Virginia parcel (approximately 0.47 acre) between the two NVRPA properties. Even with an existing utility easement on the property, it would provide access between the trail and the other park parcel making the second parcel more useful. This as well as other suggestions will be investigated further and coordination activities will continue during the design phase.

The meeting also provided an opportunity to further the discussion of the design of the replacement bridge for the trail over the Beltway. NVRPA has draft guidelines for structures. While the guidelines are not final they are used as the current best practice for design of structures along the trail. The guidelines have been updated and allow for a wider trail section to accommodate growing usage. NVRPA recommends approximately 18-20 foot minimum width, curb-to-curb. These guidelines will be used in the design of the new trail bridge over the Beltway.

NVRPA asked if the project still included a new bridge carrying the trail over I-66 as referenced in the FEIS. In the March 2002 DEIS the I-66 interchange had all the movements. As part of the configuration, I-66 was widened which resulted in impacts to the trail and Idylwood Park and the reconstruction of the Virginia Lane bridge which currently carries the trail over I-66. As part of the discussions with the NVRPA at the time, it was agreed that as part of the mitigation the project would build a new bridge carrying the trail over I-66. This is shown on the Draft Environmental Impact Statement (DEIS) maps at that time.

In the April 2006 FEIS the I-66 interchange had been reduced in size and a new configuration was proposed. The impacts to the trail in the area of Idylwood Park no longer existed. In addition, the existing Virginia Lane bridge is left in place. At this time the "new" proposed trail bridge over I-66 was taken off the drawings both in the main part of the document for the alternative and in the Section 4(f) Evaluation. However, the text was never revised and there are still references to a new trail bridge over I-66.

This appears to be a typographical error in the text of the FEIS. The Refined Selected Alternative, consistent with the Selected Alternative, does not include a new trail bridge over I-66.

Coordination activities will be concluded during the design phase including design, mitigation, and construction activities.

Flag Run Park

The Refined Selected Alternative would use 0.02 acres of land within Flag Run Park (see **Figure 6**). Use of the park is not needed due to the widening of the Beltway but instead because a permanent easement is required to provide access for maintenance of a proposed retaining and noise wall being used to minimize impacts. Impacts to Flag Run Park were not included in the FEIS/Section 4(f) Evaluation. Impacts to this park are

not included in the initial phase of construction due to the staging of the HOT ramp to/from the south. The affected area is away from any recreation areas.

Consistent with the Final EIS/Section 4(f) Evaluation, minor changes in noise levels and visual quality would also occur. None of these proximity impacts would be substantial enough to impair the use of this resource.

There are no anticipated impacts to park access or available park activities during construction.

AVOIDANCE ALTERNATIVES AND MEASURES TO MINIMIZE HARM

As compared to the Selected Alternative using the more accurate right-of-way survey information, the Refined Selected Alternative decreases impacts to Fitzhugh Park (0.43 acres) and Jefferson District Park (0.03 acres) and has avoided permanent impacts to Accotink Stream Valley Park.

Compared to the Selected Alternative analyzed in the FEIS/Section 4(f) Evaluation, the Refined Selected Alternative would decrease impacts to Wakefield Park by 0.07 acres but when you take into account the more accurate right-of-way survey information, the impacts to Wakefield Park actually represent an increase of 1.02 acres.

As compared to the Selected Alternative analyzed in the FEIS/Section 4(f) Evaluation and approved in the ROD, the Refined Selected Alternative would increase impacts to the W&OD Railroad Regional Park (+0.23 acre). This increase is the result of more accurate right-of-way information (+0.06 acre) and design modifications (+0.17 acre), most notably the need for additional land to construct and maintain the noise walls adjacent to the Beltway.

Finally, minor impacts to Flag Run Park (+0.02 acre) not included in the Selected Alternative are anticipated to result from the Refined Selected Alternative.

Therefore, because impacts were either reduced or only increased due to more accurate right-of-way information, no additional coordination with the park agencies was warranted for Fitzhugh Park, Accotink Stream Valley Park and Jefferson District Park at this time .

Avoidance alternatives and measures to minimize harm were included in the FEIS/Section 4(f) Evaluation and incorporated into the Selected Alternative and Refined Selected Alternative, as appropriate. The document also established why there were no prudent and feasible alternatives which avoided the use of the Section 4(f) properties. The following discussion will therefore focus on measures taken to avoid or minimize any additional use of the Section 4(f) resources due to the design refinements associated with the Refined Selected Alternative.

Wakefield Park

As stated above, impacts to Wakefield Park will increase with the Refined Selected Alternative when one takes into account the more accurate right-of-way survey information. Notwithstanding, the impacts to Wakefield Park resulting from the Refined Selected Alternative will be less than what was anticipated and approved for the

Selected Alternative when the FEIS/ROD was completed. This is primarily the result of a redesign of the HOT ramps at the Braddock Road interchange. Upon a more detailed traffic analysis, it was determined that the signals and ramps at the Braddock Road interchange would operate at an unacceptable level of service as configured in the Selected Alternative. Therefore, refinements were made to the interchange ramps in order to accommodate the full interchange movements as well as the HOT ramps. This new interchange configuration resulted in some additional widening along the Beltway in the vicinity of Wakefield Park in order to take the HOT ramps to/from the north up and over the southbound (Outer loop) lanes of the Beltway. Measures to minimize additional impacts to the park include retaining walls along the entire section of the park where the impact would occur. Shifts to the inside of the Beltway would not minimize impacts due to the location of Fitzhugh Park, another Section 4(f) resource, and would be difficult due to the configuration of the Beltway and adjacent interchanges.

W&OD Railroad Regional Park

The W&OD Park was acquired and developed with assistance from the federal Land & Water Conservation Fund (LWCF). In addition, the Northern Virginia Regional Park Authority owns a parcel of land on the south side of the trail and west side of the Beltway. This 2.8-acre parcel is replacement land that was approved for a previous road crossing project across the W&OD trail. As noted in the previous section the Refined Selected Alternative will replace the bridge carrying the W&OD Trail across the Beltway. The Refined Selected Alternative will require the use of 0.30 acre of parkland, an increase of 0.23 acre. This increase is the result of more accurate right-of-way information (+0.06 acre) and design modifications (+0.17 acre), most notably the need for additional land to construct and maintain the noise walls adjacent to the Beltway. This additional maintenance easement was not anticipated in the FEIS as more detailed design and constructability reviews had not taken place at that time.

The conveyance of park land at the W&OD Park will constitute a “conversion of use” under Section 6(f) of the LWCF Act. As stipulated in the ROD, impacted acreage will be replaced in accordance with the provisions of Section 6(f) that require that converted Section 6(f) land be replaced with land of equal fair market value and with reasonably equivalent usefulness, function, and location.

Flag Run Park

Similar to the discussion at Wakefield Park, the redesign of the HOT ramps at the Braddock Road interchange resulted in some additional widening along the Beltway in the vicinity of Flag Run Park in order to take the HOT ramps to/from the south up and over the northbound (Inner loop) lanes of the Beltway. The physical Beltway widening does not encroach on Flag Run Park, however, the need for additional land to construct and maintain the noise wall adjacent to the Beltway results in the need for a permanent easement. Measures to minimize additional impacts to the park include retaining walls along the entire section of the park where the easement would occur. This additional maintenance easement was not anticipated in the FEIS as more detailed design and constructability reviews had not taken place at that time.

COORDINATION

The National Park Service, Northern Virginia Regional Park Authority, Virginia Department of Recreation and Conservation, Fairfax County Park Authority, and Fairfax County School Board were consulted regarding the potential impacts to parks and recreational facilities during the development of the Final EIS. Agency comments and committed actions may be found in the Final EIS.

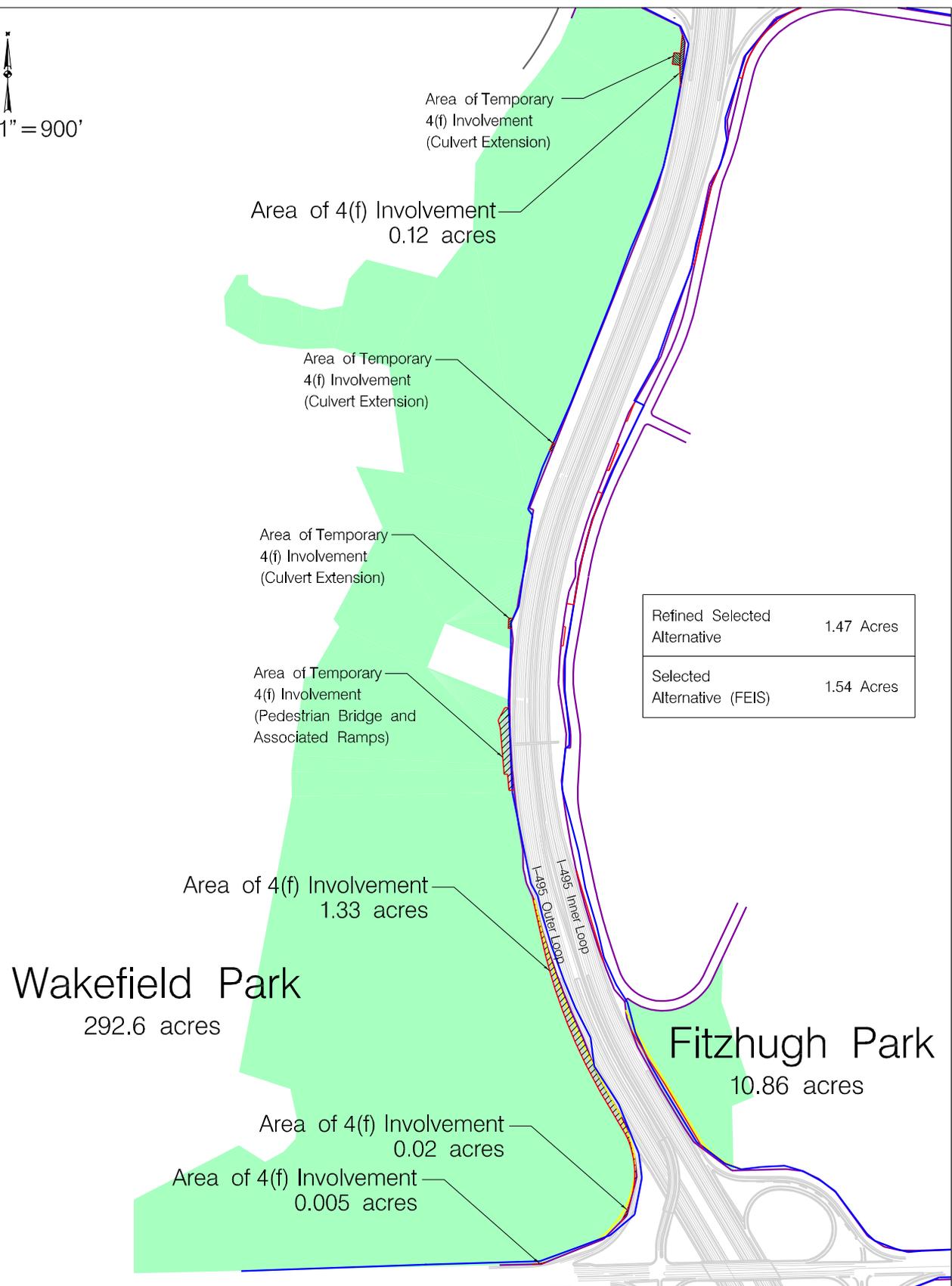
Subsequent to the issuance of the ROD, and as part of this reevaluation, additional coordination was conducted with the Northern Virginia Regional Park Authority (NVRPA). A coordination meeting was held on November 1, 2006 to discuss and explain the increase in impacts to the W&OD Regional Park, identify potential replacement 6(f) lands, and discuss mitigation and design issues (See attached meeting minutes). Coordination activities will continue during the design phase.

Additional coordination will also continue with the Fairfax County Park Authority (FCPA) during the design phase.

CONCLUSION

Design adjustments have been made to minimize the acreage of Section 4(f) property required for the Refined Selected Alternative and further measures to minimize harm will be developed in the project's final design. Coordination of all mitigation will continue with the National Park Service, Virginia Department of Conservation and Recreation, Northern Virginia Regional Park Authority, and the Fairfax County Park Authority. Based on the final Section 4(f) Evaluation, including consideration of the project's stated purpose and need, the Refined Selected Alternative remains the most feasible and prudent alternative that fully satisfies the project's purpose and needs. All possible planning measures have been incorporated into the proposed project to minimize impacts to Section 4(f) resources.

Scale 1" = 900'



Refined Selected Alternative	1.47 Acres
Selected Alternative (FEIS)	1.54 Acres

Figure 1
Wakefield Park

- Surveyed Existing ROW
- Refined Selected Alternative Proposed ROW
- FEIS Existing ROW
- Selected Alternative (FEIS) Proposed ROW

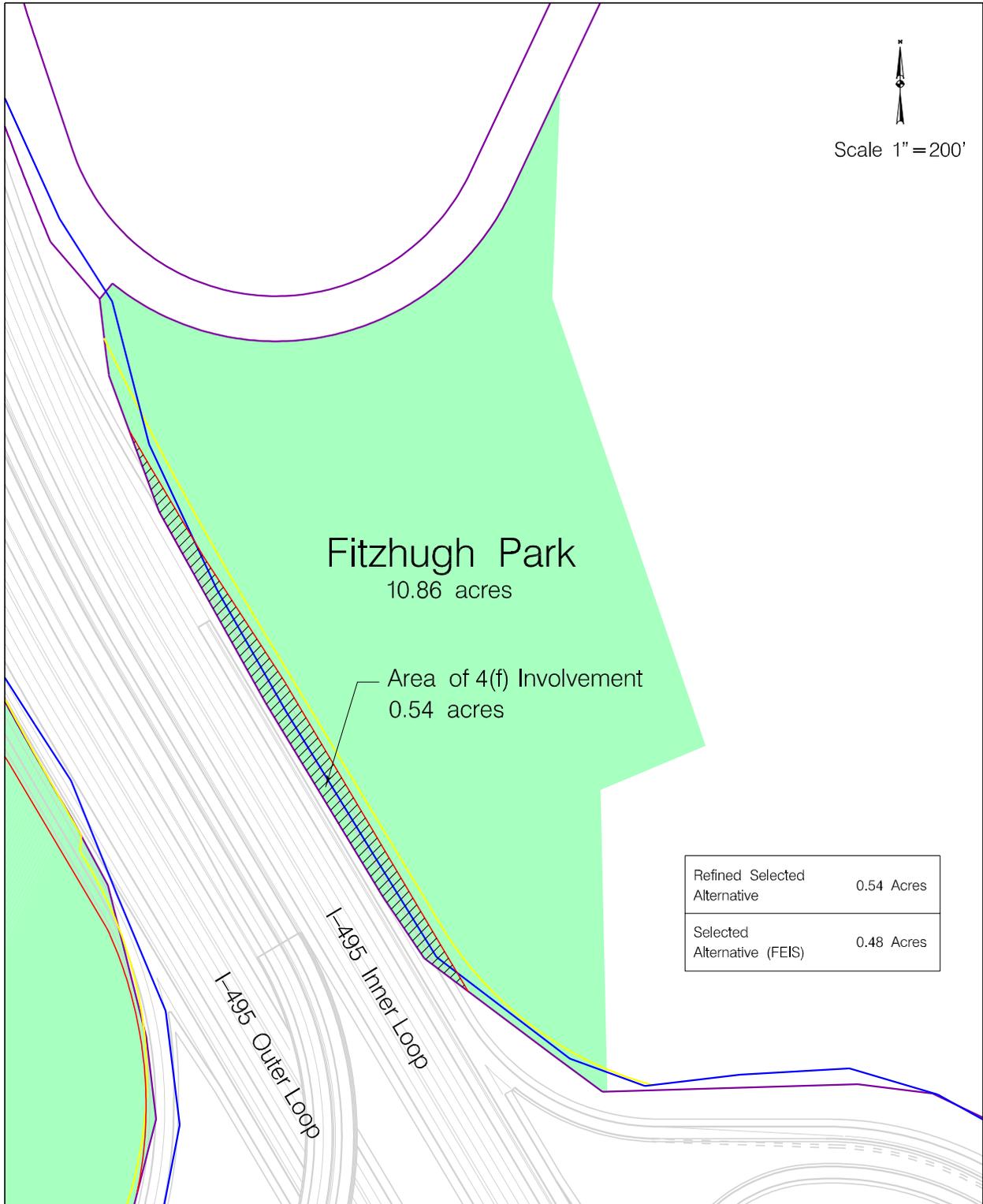


Figure 2
Fitzhugh Park

- Surveyed Existing ROW
- Refined Selected Alternative Proposed ROW
- FEIS Existing ROW
- Selected Alternative (FEIS) Proposed ROW

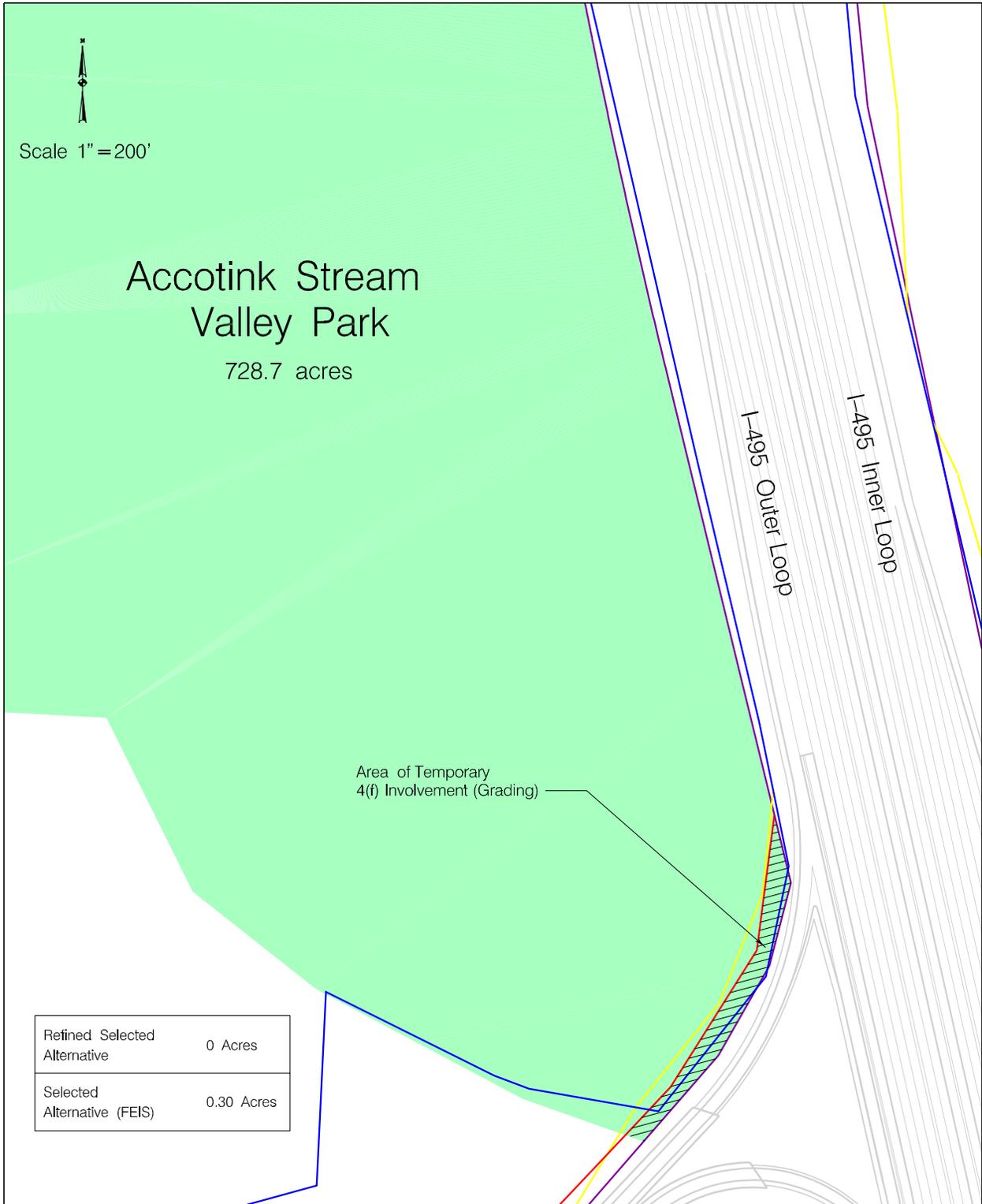


Figure 3
Accotink Stream Valley Park

- Surveyed Existing ROW
- Refined Selected Alternative Proposed ROW
- FEIS Existing ROW
- Selected Alternative (FEIS) Proposed ROW

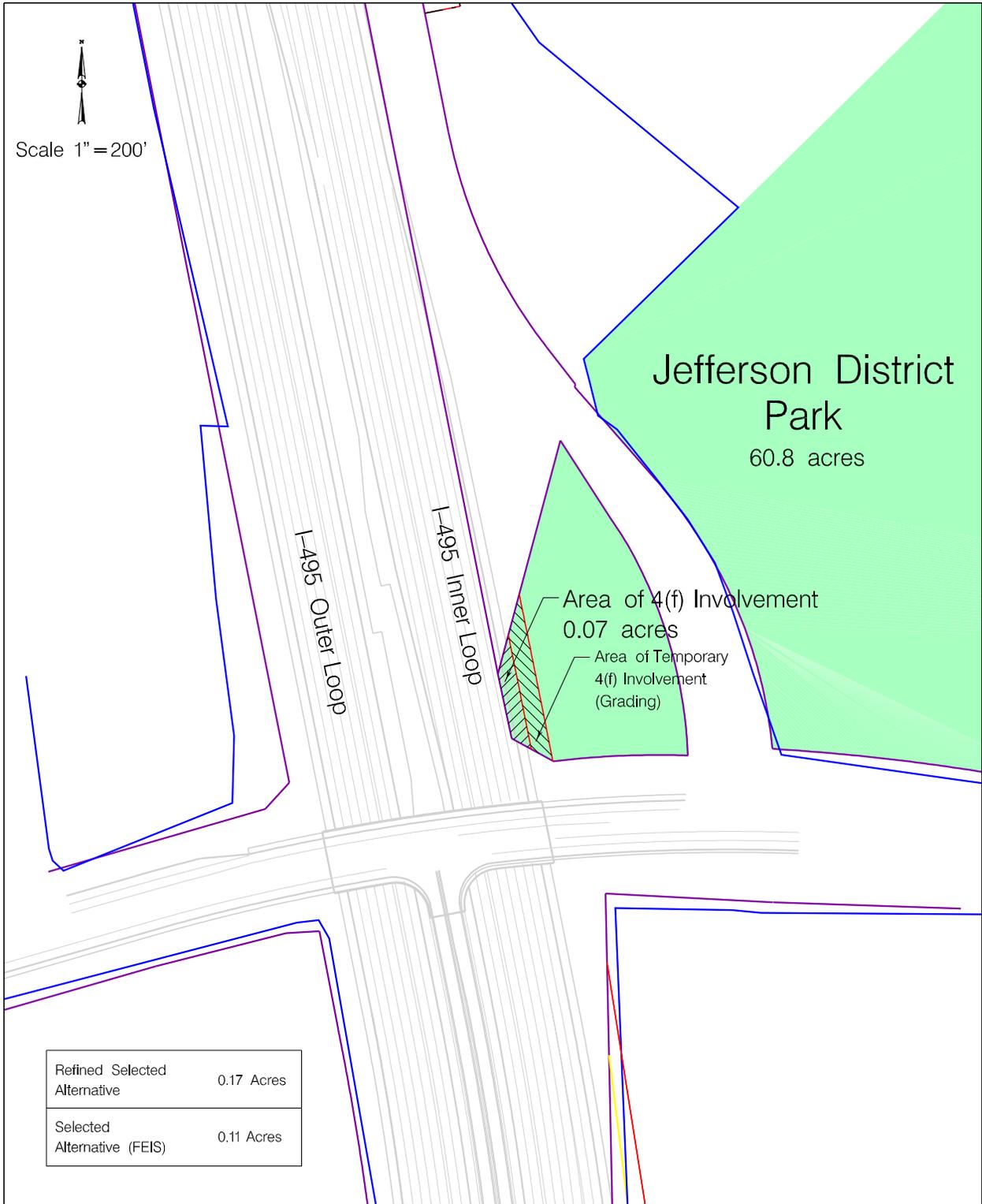


Figure 4

Jefferson District Park

- Surveyed Existing ROW
- Refined Selected Alternative Proposed ROW
- FEIS Existing ROW
- Selected Alternative (FEIS) Proposed ROW

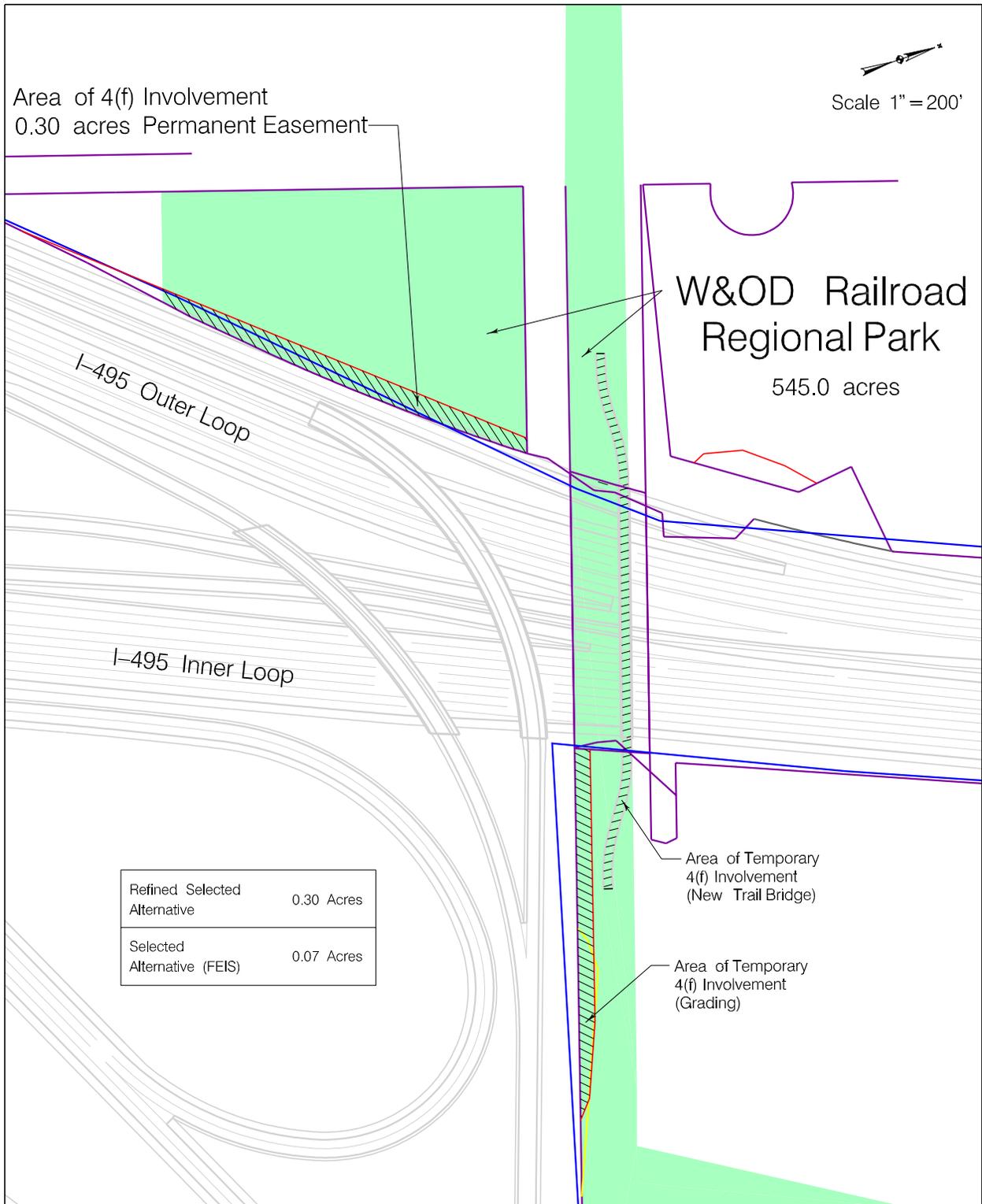


Figure 5

W&OD Railroad Regional Park

- Surveyed Existing ROW
- Refined Selected Alternative Proposed ROW
- FEIS Existing ROW
- Selected Alternative (FEIS) Proposed ROW

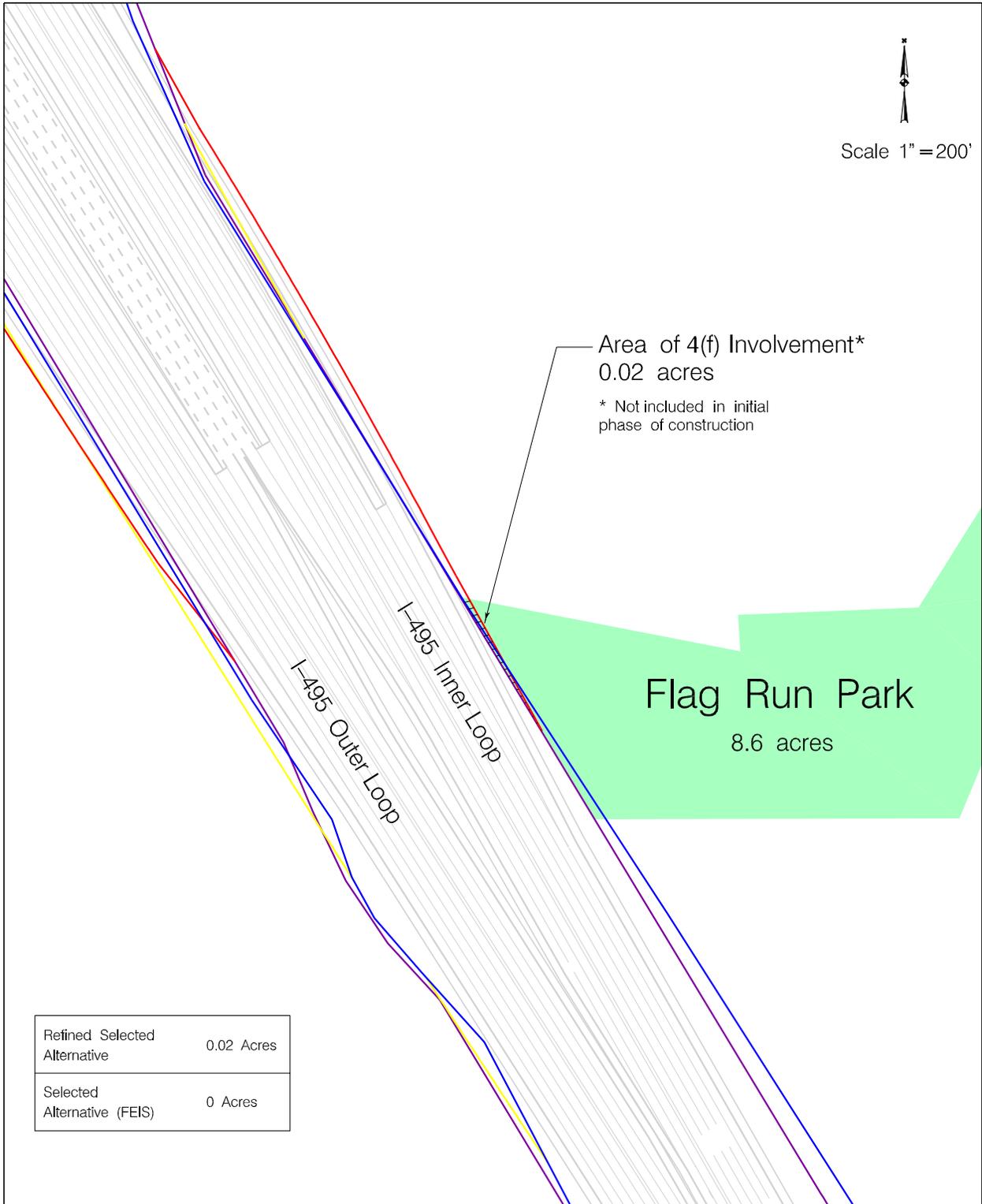
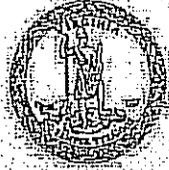


Figure 6
Flag Run Park

- Surveyed Existing ROW
- Refined Selected Alternative Proposed ROW
- FEIS Existing ROW
- Selected Alternative (FEIS) Proposed ROW



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COMMISSIONER

To: Meeting Attendees

From: Roger Boothe
Project Manager

Date: November 6, 2006

Subject: I-495 HOT Lanes
Northern Virginia Regional Park Authority
Coordination Meeting - November 1, 2006

A coordination meeting was held with representatives of the Northern Virginia Regional Park Authority (NVRPA) on November 1, 2006 at their headquarters building in Fairfax Station. The purpose of the meeting was to further discussion and coordination of Section 4(f) and Section 6(f) impacts and mitigation, specifically as it relates to the Washington and Old Dominion (W&OD) Railroad Regional Park.

The following people were in attendance:

Kate Rudacille	NVRPA – Deputy Director of Planning and Grants
Dan Iglhaut	NVRPA – Land Manager
Roger Boothe	VDOT – NoVA – Acting Project Manager
Vince Dolan	Fluor
Harriet Levine	Jacobs

Following introductions, Vince Dolan presented an overview of the Refined Selected Alternative and the PPTA approach to implementing improvements on the Beltway. Mapping was presented showing the alternative and the group discussed the design from end to end with an emphasis on the design refinements that have taken place since the Final Environmental Impact Statement (FEIS) and Record of Decision (ROD).

Harriet Levine then explained that an environmental re-evaluation was underway to assess whether any of the design refinements had resulted in changes to the environmental impacts presented in the FEIS. While there are minor changes, there does not appear to be any significant changes at this time.

One area of review is to re-assess potential impacts to Section 4(f) resources. This will be presented in a Revised Section 4(f) Evaluation. No new park or Section 4(f) resources are affected by the project. While no major design refinements have occurred in the areas adjacent to park properties, the potential impacts have changed. This is due to two primary reasons both the result of more detailed engineering as projects move from planning to design. The first is that the existing right-of-way has been established through detailed survey. The FEIS presented the existing right-of-way based on information from tax maps and



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other available sources. This is a typical level of detail during the NEPA phase of a project but is not as accurate as the detailed survey that has since been performed. As a result, even when the proposed right-of-way doesn't change, the potential impact does because of more accurate data.

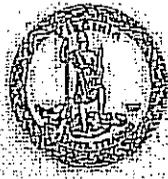
The second reason potential impacts have changed is due to a careful review of design and constructability. The FEIS showed the proposed right-of-way line immediately behind noise walls and/or retaining walls. However, in order to build those walls approximately 15 feet of additional space behind the wall is necessary for construction equipment. Therefore, the current Refined Selected Alternative shows an additional 15 feet of impact behind noise walls and retaining walls in places where it was not available based on the Selected Alternative.

Harriet reviewed the findings of the new analysis in terms of impacts to the various park properties along the corridor. Impacts to Wakefield Park and Accotink Stream Valley Park are reduced 0.57 and 0.03 acres, respectively, with the Refined Selected Alternative. Impacts to Fitzhugh Park and Jefferson District Park are increased 0.05 and 0.02 acres, respectively, with the Refined Selected Alternative. Each of these is a direct result of the more accurate existing right-of-way data.

The park with the greatest potential increase in impacts is the W&OD Regional Park due to both the more accurate existing right-of-way data as well as the need for additional space to be able to construct the proposed noise barriers. It was the potential increase in impacts that prompted this coordination meeting in order to discuss the change in impacts, opportunities for minimization (retaining walls and/or easements), and potential mitigation including replacement land. Harriet presented a map showing the potential impacts of 0.51 acres (See attached). This is a conservative estimate including all of the land needed for grading and temporary construction activities. The potential impacts are in two areas. The first impact area is adjacent to the Beltway outer loop on the approximately 2.86 acre park parcel that was acquired by NVRPA as replacement for previous park impacts from another roadway project, so the parcel is now subject to 6(f) restrictions. This impact is a result of the Beltway widening and ramp construction as well as the extra land needed to build and maintain the noise walls. The second impact area is adjacent to the trail inside the Beltway. This impact is solely for grading and no long-term permanent easement is required.

Kate Rudacille explained that the NVRPA typically issues permanent easements rather than fee dedication even for roadway improvements. Mitigation would be for the land included in the easement. She felt that one obvious replacement parcel would be the small Commonwealth of Virginia parcel (approximately 0.47 acre) between the two NVRPA properties. Even with the utility easement on the property, it would make the trail and the other park parcel contiguous, making the second parcel more useful. Kate also explained that 6(f) is not an acre-to-acre replacement but it considers value and usefulness in the assessment of appropriate replacement land.

In relation to the impact area along the outer loop of the Beltway, additional ideas for mitigation expressed by NVRPA included the undeveloped right-of-way (shown on plats as Morgan Lane) that abuts the western edge of the park and/or other options of providing access to the parcel from Sandburg Street, Iliff Drive or other local roadways. The ownership of the adjacent rights-of-way was unknown at the time of the meeting. In relation to the impact area along the trail inside the Beltway, NVRPA indicated that the



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grading on the property may not be a problem and could be beneficial if the level area along the trail could be widened so there would be more useable space for future trail widening. These suggestions will be investigated further.

Kate then gave a general overview of the approval process for Section 6(f) replacement lands. This process is coordinated with the National Park Service (NPS), the NVRPA, and the Virginia Department of Conservation and Recreation (DCR). The following is a general description of the main steps and is not intended to outline the exact approval process:

- o Environmental Assessment
- o Metes and bounds description of area of easement and replacement land
- o Appraisals and discussion of value and usefulness
- o Review by NVRPA Easements and Licenses subcommittee
- o Presentation to and approval by NVRPA Board
- o Submit to DCR with statement of justification
- o DCR review, comment, and approval
- o Submit to NPS with recommendation for approval
- o NPS approval

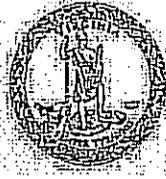
Kate indicated that this can be a time-consuming process and Vince noted that Fluor/TransUrban will do everything they can to assist with the process.

Next, the group discussed the design of the replacement bridge for the trail over the Beltway. NVRPA has draft guidelines for structures. While the guidelines are not final they are used as the current best practice for design of structures along the trail. The guidelines have been updated and allow for a wider trail section to accommodate growing usage. NVRPA would recommend approximately 18-20 foot minimum width, curb-to-curb. Kate also mentioned that AT&T runs fiber optic cables through this portion of the trail. The cables may run across the existing bridge rather than underground. The location of the fiber optics will be determined and coordination with AT&T will occur throughout design and construction.

Finally, Kate asked if the project still included the new bridge carrying the trail over I-66. The designs do not include the bridge at this time since the impacts to the W&OD trail in vicinity of I-66 were eliminated when the I-66 interchange was redesigned without all the movements. This is consistent with the design shown in the FEIS. Kate pointed out that the FEIS stated that there would be new bridges over the Beltway and I-66. Harriet will follow-up on the history of the design changes and write-up to determine the status of this bridge.

Subsequent to the meeting, the following was established:

- o In the March 2002 DEIS the I-66 interchange had all the movements. As part of the configuration, I-66 was widened which resulted in impacts to the trail and Idylwood Park and the reconstruction of the Virginia Lane bridge which currently carries the trail over I-66. As part of the discussions with the NVRPA at the time, it was agreed that as part of the



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mitigation the project would build a new bridge carrying the trail over I-66. This is clearly shown on the maps at that time.

- In the April 2006 FEIS the I-66 interchange had been reduced in size and a new configuration was proposed. The impacts to the trail in the area of Idylwood Park no longer existed. In addition, the existing Virginia Lane bridge is left in place. At this time the "new" proposed trail bridge over I-66 is taken off the drawings both in the main part of the document for the alternative and in the Section 4(f) Evaluation. However, the text was never revised and there are still references to a new trail bridge over I-66.

The meeting closed with the following action items:

- ✓ Harriet will break down the potential impact between temporary construction impacts (grading, etc.) and long-term permanent easements required for construction and maintenance.
- ✓ VDOT will continue to pursue the use of the Commonwealth of Virginia parcel for park mitigation.
- ✓ Vince will research the ownership of the Morgan Lane right-of-way and investigate other suggestions for mitigation including improved access to the park property and grading along the trail.
- ✓ Vince will provide Dan contact information so Dan can send the current NVRPA design guidelines.
- ✓ Vince will ensure that proper coordination takes place with AT&T concern fiber optics along the trail.
- ✓ Harriet will explore the current status of the potential trail bridge over I-66.

The group agreed to follow-up on these items and meet again once additional data is available.

Cc: Jackie Cromwell, VDOT
Jim Cromwell, VDOT