

# I-495 & I-270 MANAGED LANES STUDY

Montgomery and Prince George's Counties, Maryland & Fairfax County, Virginia

## DRAFT ENVIRONMENTAL IMPACT STATEMENT and DRAFT SECTION 4(f) EVALUATION

Submitted Pursuant to:  
42 U.S.C. §4332(2)(C) and 49 U.S.C. §303

By:  
U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL HIGHWAY ADMINISTRATION  
and  
MARYLAND DEPARTMENT OF TRANSPORTATION  
STATE HIGHWAY ADMINISTRATION

In Cooperation with:  
U.S. Army Corp of Engineers, National Park Service  
U.S. Environmental Protection Agency, National Capital Planning Commission,  
Maryland Department of Environment, Maryland Department of Natural Resources,  
Virginia Department of Transportation, and Maryland National Capital Park and Planning Commission

06/22/2020  
Date of Approval

6/24/2020  
Date of Approval

Tim Smith  
Tim Smith, P.E., Administrator  
Maryland Department of Transportation  
State Highway Administration

Gregory Murrill  
Gregory Murrill, Division Administrator  
Federal Highway Administration

The following persons may be contacted for additional information concerning this document:

Lisa B. Choplin, DBIA  
Maryland Department of Transportation  
State Highway Administration  
I-495 & I-270 P3 Office  
707 North Calvert Street, Mail Stop P-601  
Baltimore, MD 21202  
410- 637-3300

Mr. Jitesh Parikh  
Federal Highway Administration  
George H. Fallon Building  
31 Hopkins Plaza, Suite 1520  
Baltimore, Maryland 21201  
410-962-4440

The purpose of the I-495 & I-270 Managed Lanes Study is to develop a travel demand management solution(s) that addresses congestion, improves trip reliability on I-495 and I-270 within the Study limits, and enhances existing and planned multimodal mobility and connectivity. The specific Study scope includes: I-495 from south of the George Washington Memorial Parkway in Fairfax County, Virginia, including improvements to the American Legion Bridge over the Potomac River, to west of MD 5, and along I-270 from I-495 to north of I-370, including the East and West I-270 Spurs. This Draft Environmental Impact Statement (DEIS) presents the Study Purpose and Need, reasonable alternatives, the existing environmental conditions, and the analysis of the anticipated beneficial and adverse environmental effects of the alternatives. The DEIS provides a comparative analysis between the No Build Alternative and six Build Alternatives; the Preferred Alternative will be identified in the Final Environmental Impact Statement (FEIS). Comments on the DEIS are due by October 8, 2020 and should be sent to Lisa B. Choplin at the above address or submitted using the online comment form at [495-270-p3.com/DEIS](http://495-270-p3.com/DEIS). The Federal Highway Administration does not intend to issue a combined FEIS / Record of Decision.



# Draft Environmental Impact Statement and Draft Section 4(f) Evaluation

June 2020



U.S. Department  
of Transportation

**Federal Highway  
Administration**

**MDOT** MARYLAND DEPARTMENT OF TRANSPORTATION  
STATE HIGHWAY ADMINISTRATION



## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY .....</b>	<b>ES-1</b>
<b>1 PURPOSE AND NEED .....</b>	<b>1-1</b>
1.1 Overview of Study Corridors.....	1-1
1.2 Study Purpose and Need.....	1-4
1.3 Accommodate Existing Traffic and Long-Term Traffic Growth.....	1-4
1.3.1 Population and Employment Growth .....	1-4
1.3.2 Traffic Growth .....	1-6
1.4 Enhance Trip Reliability.....	1-7
1.5 Provide Additional Roadway Travel Choices.....	1-9
1.6 Accommodate Homeland Security .....	1-9
1.7 Improve Movement of Goods and Services.....	1-10
1.7.1 Movement of Freight Goods.....	1-10
1.7.2 Movement of Commuting Employees .....	1-11
1.8 Other Goals and Objectives .....	1-14
1.8.1 Incorporate Alternative Funding Sources to Achieve Financial Viability .....	1-14
1.8.2 Environmental Responsibility .....	1-14
<b>2 ALTERNATIVES DEVELOPMENT .....</b>	<b>2-1</b>
2.1 Overview of Alternatives Development Process .....	2-1
2.2 Screening Criteria.....	2-3
2.2.1 Engineering Considerations .....	2-3
2.2.2 Homeland Security.....	2-5
2.2.3 Movement of Goods and Services .....	2-5
2.2.4 Multimodal Connectivity.....	2-5
2.2.5 Financial Viability .....	2-6
2.2.6 Environmental.....	2-6
2.3 Regional Transportation Planning.....	2-7
2.4 Preliminary Range of Alternatives .....	2-7
2.5 Screened Alternatives .....	2-9
2.5.1 Alternatives Retained for Further Consideration .....	2-10
2.5.2 Alternatives Dropped from Further Consideration.....	2-11
2.5.3 Additional Alternatives Analysis .....	2-17
2.6 Alternatives Retained and Evaluated in this Document .....	2-24



2.6.1	Alternative 1.....	2-25
2.6.2	Alternative 8.....	2-25
2.6.3	Alternative 9.....	2-26
2.6.4	Alternative 9M .....	2-26
2.6.5	Alternative 10.....	2-29
2.6.6	Alternative 13B .....	2-29
2.6.7	Alternative 13C .....	2-30
2.7	Common Elements Among the Build Alternatives.....	2-32
2.7.1	Interchanges and Managed Lanes Access.....	2-32
2.7.2	Stormwater Management Consideration .....	2-37
2.7.3	Construction and Short-term Effects .....	2-39
2.7.4	Limits of Disturbance .....	2-40
2.7.5	Tolling.....	2-41
2.7.6	Transit-Related Elements.....	2-45
2.7.7	Pedestrian and Bicycle Considerations .....	2-47
2.7.8	Construction Phasing .....	2-47
2.8	Financial Viability .....	2-48
<b>3</b>	<b>TRANSPORTATION AND TRAFFIC .....</b>	<b>3-1</b>
3.1	Introduction .....	3-1
3.1.1	Traffic Analysis Data Collection and Modeling Methodology.....	3-1
3.1.2	Traffic Analysis Area.....	3-2
3.1.3	Traffic Modeling Assumptions .....	3-2
3.2	Existing Conditions .....	3-5
3.3	Future Traffic Conditions and Alternatives Analysis.....	3-7
3.3.1	Speed.....	3-8
3.3.2	Delay .....	3-9
3.3.3	Travel Time.....	3-10
3.3.4	Level of Service .....	3-12
3.3.5	Throughput .....	3-12
3.3.6	Local Network .....	3-13
3.3.7	Summary .....	3-16
3.4	Next Steps .....	3-16



<b>4</b>	<b>ENVIRONMENTAL RESOURCES, CONSEQUENCES &amp; MITIGATION .....</b>	<b>4-1</b>
4.1	Land Use and Zoning.....	4-4
4.1.1	Introduction and Methodology.....	4-4
4.1.2	Affected Environment.....	4-4
4.1.3	Environmental Consequences.....	4-7
4.2	Demographics .....	4-8
4.2.1	Introduction and Methodology.....	4-8
4.2.2	Affected Environment.....	4-9
4.2.3	Environmental Consequences.....	4-10
4.3	Communities & Community Facilities.....	4-11
4.3.1	Introduction and Methodology.....	4-11
4.3.2	Affected Environment.....	4-11
4.3.3	Environmental Consequences.....	4-14
4.3.4	Mitigation.....	4-18
4.4	Parks and Recreational Facilities.....	4-18
4.4.1	Introduction and Methodology.....	4-18
4.4.2	Affected Environment.....	4-18
4.4.3	Environmental Consequences.....	4-19
4.4.4	Mitigation.....	4-22
4.5	Property Acquisitions and Relocations .....	4-22
4.5.1	Introduction and Methodology.....	4-22
4.5.2	Affected Environment.....	4-22
4.5.3	Environmental Consequences.....	4-23
4.5.4	Mitigation.....	4-24
4.6	Visual and Aesthetic Resources .....	4-29
4.6.1	Introduction and Methodology.....	4-29
4.6.2	Affected Environment.....	4-29
4.6.3	Environmental Consequences.....	4-33
4.6.4	Mitigation.....	4-35
4.7	Historic Architectural and Archaeological Resources .....	4-35
4.7.1	Introduction and Methodology.....	4-35
4.7.2	Affected Environment.....	4-39
4.7.3	Environmental Consequences.....	4-44



4.7.4	Mitigation.....	4-55
4.8	Air Quality .....	4-58
4.8.1	Introduction and Methodology.....	4-58
4.8.2	Affected Environment.....	4-60
4.8.3	Environmental Consequences.....	4-61
4.8.4	Mitigation.....	4-62
4.9	Noise .....	4-63
4.9.1	Introduction and Methodology.....	4-63
4.9.2	Affected Environment.....	4-64
4.9.3	Environmental Consequences.....	4-65
4.9.4	Mitigation.....	4-66
4.9.5	Statement of Likelihood.....	4-66
4.10	Hazardous Materials .....	4-72
4.10.1	Introduction and Methodology.....	4-72
4.10.2	Affected Environment.....	4-72
4.10.3	Environmental Consequences.....	4-73
4.10.4	Mitigation.....	4-74
4.11	Topography, Geology, and Soils.....	4-75
4.11.1	Introduction and Methodology.....	4-75
4.11.2	Affected Environment.....	4-75
4.11.3	Environmental Consequences.....	4-76
4.11.4	Mitigation.....	4-77
4.12	Waters of the US and Waters of the State, Including Wetlands.....	4-77
4.12.1	Introduction and Methodology.....	4-77
4.12.2	Affected Environment.....	4-79
4.12.3	Environmental Consequences.....	4-80
4.12.4	Mitigation.....	4-83
4.13	Watersheds and Surface Water Quality .....	4-87
4.13.1	Introduction and Methodology.....	4-87
4.13.2	Affected Environment.....	4-88
4.13.3	Environmental Consequences.....	4-89
4.13.4	Mitigation.....	4-92
4.14	Groundwater Hydrology .....	4-93



4.14.1	Introduction and Methodology.....	4-93
4.14.2	Affected Environment.....	4-93
4.14.3	Environmental Consequences.....	4-94
4.14.4	Mitigation.....	4-94
4.15	Floodplains.....	4-95
4.15.1	Introduction and Methodology.....	4-95
4.15.2	Affected Environment.....	4-95
4.15.3	Environmental Consequences.....	4-96
4.15.4	Mitigation.....	4-97
4.16	Vegetation and Terrestrial Habitat .....	4-98
4.16.1	Introduction and Methodology.....	4-98
4.16.2	Affected Environment.....	4-99
4.16.3	Environmental Consequences.....	4-99
4.16.4	Mitigation.....	4-101
4.17	Terrestrial Wildlife .....	4-101
4.17.1	Introduction and Methodology.....	4-101
4.17.2	Affected Environment.....	4-102
4.17.3	Environmental Consequences.....	4-104
4.17.4	Mitigation.....	4-105
4.18	Aquatic Biota.....	4-105
4.18.1	Introduction and Methodology.....	4-105
4.18.2	Affected Environment.....	4-105
4.18.3	Environmental Consequences.....	4-107
4.18.4	Mitigation.....	4-109
4.19	Rare, Threatened, and Endangered Species .....	4-109
4.19.1	Introduction and Methodology.....	4-109
4.19.2	Affected Environment.....	4-113
4.19.3	Environmental Consequences.....	4-117
4.19.4	Mitigation.....	4-118
4.20	Unique and Sensitive Areas .....	4-118
4.20.1	Introduction and Methodology.....	4-118
4.20.2	Affected Environment.....	4-119
4.20.3	Environmental Consequences.....	4-119



4.20.4	Mitigation.....	4-120
4.21	Environmental Justice and Title VI Compliance.....	4-120
4.21.1	Introduction and Regulatory Context.....	4-120
4.21.2	Environmental Justice Analysis Methodology.....	4-122
4.21.3	Existing Conditions of Environmental Justice Populations.....	4-124
4.21.4	Public Outreach with Environmental Justice Populations.....	4-130
4.21.5	Identification of Beneficial and Adverse Effects to Environmental Justice Populations.....	4-136
4.22	Indirect and Cumulative Effects.....	4-144
4.22.1	Introduction and Methodology.....	4-144
4.22.2	Affected Environment.....	4-148
4.22.3	Environmental Consequences.....	4-153
4.23	Consequences of Construction.....	4-157
4.23.1	Visual and Aesthetic Resources.....	4-157
4.23.2	Hazardous Materials.....	4-158
4.23.3	Air Quality.....	4-158
4.23.4	Noise.....	4-159
4.24	Commitment of Resources.....	4-159
4.24.1	Irreversible and Irrecoverable Commitment of Resources.....	4-159
4.24.2	Short-Term Effects/Long-Term Effects.....	4-160
<b>5</b>	<b>DRAFT SECTION 4(F) EVALUATION.....</b>	<b>5-1</b>
5.1	Introduction.....	5-1
5.2	Use of Section 4(f) Properties.....	5-1
5.2.1	Exceptions to Section 4(f) Use.....	5-2
5.2.2	De Minimis Impact.....	5-2
5.3	Proposed Action.....	5-3
5.4	Officials with Jurisdiction.....	5-3
5.5	Section 4(f) Properties.....	5-3
5.6	Avoidance Alternatives and Analysis.....	5-12
5.7	All Possible Planning to Minimize Harm.....	5-16
5.8	Least Overall Harm.....	5-17
5.9	Coordination.....	5-18
5.10	Mitigation.....	5-20





<b>6</b>	<b>ONE FEDERAL DECISION .....</b>	<b>6-1</b>
6.1	Background .....	6-1
6.2	Agency Roles .....	6-1
6.3	Concurrence Points.....	6-2
6.4	Federal Cooperating Agencies Authorization .....	6-3
6.4.1	Ongoing Coordination with National Park Service (NPS).....	6-3
6.4.2	Ongoing Coordination with US Army Corps of Engineers (USACE) Regarding Avoidance and Minimization to Jurisdictional Features.....	6-9
6.4.3	Ongoing Coordination with US Environmental Protection Agency (EPA).....	6-9
6.4.4	Ongoing Coordination with National Capital Planning Commission (NCPC) .....	6-9
6.5	Permits, Approvals and Authorizations Required.....	6-11
<b>7</b>	<b>PUBLIC INVOLVEMENT AND AGENCY COORDINATION .....</b>	<b>7-1</b>
7.1	Introduction .....	7-1
7.2	Public Involvement.....	7-1
7.2.1	Public Workshops and Comment Periods.....	7-1
7.2.2	Public Outreach with Environmental Justice Populations .....	7-2
7.2.3	Small-Scale Meetings and Outreach Events.....	7-5
7.2.4	Public Hearings.....	7-5
7.3	Agency Coordination.....	7-6
7.3.1	Scoping Outreach .....	7-7
7.3.2	Interagency Working Group Meetings.....	7-7
7.3.3	Regulatory and Resource Agency Consultation .....	7-11
7.4	Incorporation of Public and Agency Input into the Study.....	7-12
<b>8</b>	<b>LIST OF PREPARERS .....</b>	<b>8-1</b>
<b>9</b>	<b>DISTRIBUTION LIST.....</b>	<b>9-1</b>
9.1	Federal Agencies .....	9-1
9.2	Federally Recognized Tribes .....	9-1
9.3	State of Maryland Agencies .....	9-1
9.4	Commonwealth of Virginia Agencies .....	9-2
9.5	State Recognized and Other Tribal Groups.....	9-2
9.6	County and Local Agencies .....	9-2
9.7	DEIS Availability.....	9-3
<b>10</b>	<b>REFERENCES .....</b>	<b>10-1</b>

## LIST OF TABLES

Table 1-1: Regional Population Growth.....	1-5
Table 1-2: Regional Employment Growth.....	1-6
Table 1-3: 2017 and Projected 2040 No Build TTI for Most Congested Segments in AM Peak.....	1-8
Table 1-4: 2017 and Projected 2040 No Build TTI for Most Congested Segments in PM Peak.....	1-8
Table 2-1: PRELIMINARY Effects Comparison of the Screened Alternatives ( <u>JUNE 2019 IMPACTS</u> ) and the MD 200 Diversion Alternative.....	2-23
Table 2-2: Alternatives Evaluated in the DEIS.....	2-24
Table 2-3: Summary of Effects Comparison of the Build Alternatives.....	2-31
Table 2-4: Proposed Interchange Modifications and Managed Lanes Access Locations .....	2-33
Table 2-5: Stormwater Management per Build Alternative .....	2-38
Table 2-6: Estimated Cashflows for Build Alternatives.....	2-50
Table 3-1: Existing Average Daily Traffic (ADT).....	3-6
Table 3-2: 2040 No Build Average Daily Traffic (ADT) .....	3-7
Table 3-3: 2040 Build Average Daily Traffic (ADT) .....	3-8
Table 3-4: 2040 Average Speed .....	3-8
Table 3-5: 2040 Corridor Travel Speed Results from VISSIM Model .....	3-9
Table 3-6: 2040 System-Wide Delay .....	3-10
Table 3-7: 2040 Travel Time Index (TTI).....	3-10
Table 3-8: 2040 Travel Time Index (TTI) Results for General Purpose Lanes from VISSIM Model .....	3-11
Table 3-9: 2040 Percent of Lane-Miles Operating at LOS F .....	3-12
Table 3-10: 2040 Vehicle Throughput.....	3-13
Table 3-11: 2040 Vehicle Throughput Results from VISSIM Model.....	3-14
Table 3-12: 2040 Effect on the Local Network.....	3-15
Table 3-13: 2040 Local Network Results from MWCOG Model .....	3-15
Table 4-1: Summary of Quantifiable Impacts by Alternative.....	4-3
Table 4-2: Land Use Conversion of the Build Alternatives Within the CEA Analysis Area.....	4-7
Table 4-3: Overview of Potential Impacts by CEA Analysis Area Community .....	4-14
Table 4-4: Property Relocations.....	4-16
Table 4-5: Potential Public Park Impact by Build Alternative (Acres) .....	4-20
Table 4-6: Relocation and Right-of-Way Requirements .....	4-23
Table 4-7: Full and Partial Property Acquisition by Corridor Area Between Existing Interchanges .....	4-25
Table 4-8: Section 106 Consulting Parties List .....	4-36
Table 4-9: Historic Properties within the APE.....	4-39
Table 4-10: Newly-Identified Eligible Archaeological Resources .....	4-43
Table 4-11: Historic Architectural Properties with Known Adverse Effect.....	4-44
Table 4-12: Number of Historic Properties (Historic Architectural and Archaeological Resources) .....	4-45
Table 4-13: Historic Properties Where Effects Cannot Be Fully Determined .....	4-46
Table 4-14: Archaeological Resources with a Known Adverse Effect.....	4-54
Table 4-15: Summary of Noise Sensitive Area (NSA) Impacts and .....	4-67
Table 4-16: Sites of Potential Concern Priority Summary.....	4-73
Table 4-17: Impact to Soils by Type in Acres .....	4-76
Table 4-18: Impacts to Steep Slopes and Highly Erodible Soils in Acres.....	4-77



Table 4-19: Total Number of Delineated Features ..... 4-80

Table 4-20: Summary of Impacts to USACE/MDE Wetlands and Waterways Corridor-wide ..... 4-81

Table 4-21: Summary of Delineated NPS Wetland Features and Impacts on NPS Properties ..... 4-82

Table 4-22: Comparison of a Two Managed Lane Alternative Pre-Avoidance and Minimization (A&M) ..... 4-86

Table 4-23: Waterways and Associated Floodplains within the Corridor Study Boundary ..... 4-96

Table 4-24: Impacts to FEMA 100-Year Floodplain in Acres ..... 4-97

Table 4-25: Impacts to Forests in Acres ..... 4-100

Table 4-26: Tree Canopy Cover Impacts on NPS Properties in Acres ..... 4-100

Table 4-27: Impacts to Forest Interior Dwelling Species Habitat in Acres ..... 4-104

Table 4-28: Summary of Watershed Quality Index Narrative Score Results ..... 4-106

Table 4-29: Additional Impervious Surfaces by Watershed ..... 4-108

Table 4-30: SSPRA Acreage Impacted by Build Alternative ..... 4-114

Table 4-31: RTE Plant Species in Riparian Areas of the Potomac River ..... 4-114

Table 4-32: Virginia and Maryland State Listed Species From the Potomac Gorge Known or Potentially Occurring (VDCR/NPS/MDNR) Within the Corridor Study Boundary ..... 4-116

Table 4-33: Impacts to Unique and Sensitive Areas (acres) ..... 4-120

Table 4-34: HUD 2016 Low-Income Limit for the Washington-Arlington-Alexandria, ..... 4-124

Table 4-35: Voluntary Demographic Survey Results ..... 4-129

Table 4-36: Public Involvement Efforts in or near EJ Populations ..... 4-131

Table 4-37: Right-of-Way Requirements in EJ Populations ..... 4-136

Table 4-38: Potential for Adverse Effects to Environmental Resources within EJ Populations ..... 4-142

Table 4-39: ICE Analysis Data Sources and Methodology ..... 4-147

Table 4-40: Indirect Effects in the ICE Analysis Area ..... 4-153

Table 4-41: Cumulative Effects in the ICE Analysis Area ..... 4-156

Table 5-1: Inventory of Section 4(f) Properties that Would Not Experience a Use ..... 5-8

Table 5-2: Inventory of Section 4(f) Properties with Use ..... 5-9

Table 5-3: Inventory of Properties that Qualify as Section 4(f) Exemptions ..... 5-12

Table 5-4: Section 4(f) Officials with Jurisdiction Coordination Summary ..... 5-19

Table 6-1: Potential Impacts to NPS Properties ..... 6-4

Table 6-2: Summary of NPS Wetland Impacts on NPS Properties within the Corridor Study Boundary .. 6-4

Table 6-3: NPS Historic Properties with Adverse Effect ..... 6-5

Table 6-4: Virginia and Maryland State Listed Species From the Potomac Gorge Known or Potentially Occurring (VDCR/NPS/MDNR) Within the Corridor Study Boundary ..... 6-6

Table 6-5: Tree Canopy Cover Impacts on NPS Properties in Acres ..... 6-7

Table 6-6: Summary of Minimization of Impacts to Parks Acquired ..... 6-11

Table 6-7: Likely Permits and Approvals ..... 6-12

Table 7-1: Lead, Cooperating, Participating, and Notified Agencies for the Study ..... 7-8

Table 7-2: Summary of Interagency Working Group (IAWG) Meetings ..... 7-10

## LIST OF FIGURES

Figure 1-1: I-495 & I-270 Managed Lanes Study Corridors.....	1-3
Figure 1-2: Average Annual Daily Truck Traffic.....	1-12
Figure 1-3: Residents’ Employment Commute Destinations in Montgomery and Prince George’s Counties .....	1-13
Figure 2-1: Alternatives Screening Process.....	2-1
Figure 2-2: MD 200 Diversion Alternative .....	2-20
Figure 2-3: Sample Travel Times on Dynamic Message Sign .....	2-21
Figure 2-4: Alternative 1 (No Build) Typical Sections.....	2-25
Figure 2-5: Alternative 8 Typical Sections.....	2-26
Figure 2-6: Alternative 9 Typical Sections.....	2-26
Figure 2-7: Alternative 9M Typical Sections .....	2-27
Figure 2-8: Alternative 9 Modified.....	2-28
Figure 2-9: Alternative 10 Typical Sections.....	2-29
Figure 2-10: Alternative 13B Typical Sections.....	2-30
Figure 2-11: Alternative 13C Typical Sections.....	2-30
Figure 2-12: Example Direct Access Interchange.....	2-32
Figure 2-13: Example At-Grade Access Slip Ramp Configuration .....	2-33
Figure 2-14: Proposed Managed Lanes Access Locations.....	2-36
Figure 3-1: Limits of VISSIM Model Network and Interchange Locations Included along I-495 and I-270 .... .....	3-3
Figure 4-1: Land Use within the CEA Analysis Area .....	4-5
Figure 4-2: CEA Analysis Area Land Use Composition .....	4-6
Figure 4-3: CEA Analysis Area Communities.....	4-12
Figure 4-4: Trees Framing I-495, West Side View .....	4-30
Figure 4-5: Overall View- North side Inner loop looking east at Route 29 Interchange.....	4-30
Figure 4-6: Median Plantings Separate I-495 Inner and Outer Loops at I-95 Interchange Outer Loop looking West.....	4-30
Figure 4-7: View Showing Adjacent Development and Vegetation on East side near Ritchie Marlboro Road intersection.....	4-31
Figure 4-8: Concrete Deck Bridge with Green Paint Beam on East side at Ardwick Ardmore Road intersection.....	4-31
Figure 4-9: View of Washington, DC Temple from I-495, Looking West .....	4-31
Figure 4-10: View of Bethesda Trolley Trail Crossing I-495, Looking East .....	4-32
Figure 4-11: I-270 Looking North at the MD 189 Interchange .....	4-33
Figure 4-12: I-270 Looking North at Gude Drive Bridge.....	4-33
Figure 4-13: I-270 Looking North at Wooton Parkway Bridge.....	4-33
Figure 4-14: Five-Step Avoidance and Minimization Process.....	4-85
Figure 4-15: EJ Populations in the EJ Analysis Area .....	4-126
Figure 4-16: Overall ICE Analysis Area Boundary.....	4-146
Figure 4-17: Projected Population Growth 2015 – 2040 by TAZ .....	4-151
Figure 4-18: Projected Employment Growth 2015 -2040 by TAZ.....	4-152
Figure 5-1: Inventory of Section 4(f) Property in the Corridor Study Boundary (Map 1 of 3).....	5-5

Figure 5-2: Inventory of Section 4(f) Property in the Corridor Study Boundary (Map 2 of 3).....	5-6
Figure 5-3: Inventory of Section 4(f) Property in the Corridor Study Boundary (Map 3 of 3).....	5-7
Figure 7-1: EJ Populations along the Study Corridors.....	7-3

## LIST OF APPENDICES

APPENDIX A	Purpose and Need Statement
APPENDIX B	Alternatives Technical Report
APPENDIX C	Traffic Technical Report
APPENDIX D	Environmental Resource Mapping
APPENDIX E	Community Effects Assessment/ Environmental Justice Technical Report
APPENDIX F	Draft Section 4(f) Evaluation
APPENDIX G	Cultural Resources Technical Report <ul style="list-style-type: none"> <li>Volume 1: Overview and Effects Assessment</li> <li>Volume 2: Archaeological and Historic Architectural Gap Analysis and Assessment</li> <li>Volume 3: Architectural Resources Evaluation Technical Report</li> <li>Volume 4: Phase I Archaeological Investigation</li> <li>Volume 5: Phase II Archaeological Evaluation at Sites 18PR750, 18MO749, and 18MO751 for the I-495 &amp; I-270 Managed Lanes</li> <li>Volume 6: Phase I Archaeological Survey, Intensive Phase I Archaeological Survey of 44FX0373, and Phase II Archaeological Evaluation at Sites 44FX0374, 44FX0379, 44FX0381, 44FX0389, 44FX3160, and 44FX3900 Within the George Washington Memorial Parkway for the I-495 Northern Extension (NEXT) Project and the I-495/I-270 Managed Lanes Study, Fairfax County, Virginia</li> </ul>
APPENDIX H	Draft Section 106 Programmatic Agreement
APPENDIX I	Air Quality Technical Report
APPENDIX J	Noise Analysis Technical Report
APPENDIX K	Hazardous Materials Technical Report
APPENDIX L	Natural Resources Technical Report
APPENDIX M	Avoidance, Minimization & Impacts Report (AMR)
APPENDIX N	Draft Compensatory Mitigation Plan
APPENDIX O	Indirect and Cumulative Effects Technical Report
APPENDIX P	Public Involvement & Agency Coordination Technical Report
APPENDIX Q	Conceptual Mitigation Plan
APPENDIX R	Joint Permit Application, including the following supporting documents: <ul style="list-style-type: none"> <li>1. Application</li> <li>2. Impact Plates</li> <li>3. Impact Tables</li> </ul>
APPENDIX S	Environmental Assessment Form

## ABBREVIATIONS AND ACRONYMS

AA	Alternatives Analysis
AASHTO	American Association of State Highway and Transportation Officials
AADT	Average Annual Daily Traffic
ACHP	Advisory Council on Historic Preservation
ADA	Americans with Disabilities Act
ADT	Annual Daily Traffic
APE	Area of Potential Effects
ARDS	Alternatives Retained for Detailed Study
AST	Aboveground Storage Tank
ATM	Active Traffic Management
BMP	Best Management Practice
BO	Biological Opinion
BRT	Bus Rapid Transit
CAA	Clean Air Act
CCT	Corridor Cities Transitway
C-D	Collector-Distributor
CCA	Capper-Cramton Act
CDP	Census Designated Place
CEA	Community Effects Assessment
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH <sub>4</sub>	Methane
CLRP	Constrained Long-Range Plan
CO	Carbon Monoxide
CO <sub>2</sub>	Carbon Dioxide
COMAR	Code of Maryland Regulations
CP <sub>v</sub>	Channel Protection Volume
CRZ	Critical Root Zone
CSXT	CSX Transportation
CTB	Consolidated Transportation Bonds
CWA	Clean Water Act
dB	Decibel
dBA	A-weighted Decibel
DEIS	Draft Environmental Impact Statement
DHR	Department of Historical Resources
DMS	Dynamic message signs
DSL	Dynamic speed limit
E&S	Erosion and Sediment Control
EA	Environmental Assessment
EDR	Environmental Data Resources, Inc.

EFH	Essential Fish Habitat
EIA	Energy Information Administration
EJ	Environmental Justice
EO	Executive Order
ESD	Environmental Site Design
ETC	Electronic Toll Collection
ETL	Express Toll Lane
FAQs	Frequently Asked Questions
FAST	Fixing America's Surface Transportation Act
FCDPWES	Fairfax County Department of Public Works and Environmental Services
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FFPA	Farmland Protection Policy Act
FHWA	Federal Highway Administration
FIDS	Forest Interior Dwelling Bird Species
FTA	Federal Transit Administration
FWCA	Fish and Wildlife Coordination Act
GDP	Gross Domestic Product
GHG	Greenhouse Gases
GI	Green Infrastructure
GIA	Green Infrastructure Assessment
GIS	Geographic Information System
GP	General Purpose
GWMP	George Washington Memorial Parkway
HCS	Highway Capacity Software
HFC	Hydrofluorocarbons
HOT	High-occupancy Toll
HOV	High-occupancy Vehicle
HUD	Housing and Urban Development
IAWG	Interagency Working Group
IBI	Indices of Biological Integrity
ICC	Intercounty Connector
ICE	Indirect and Cumulative Effects
ICM	Innovative Congestion Management
IPaC	Information Planning and Consultation
IRVM	Integrated Roadside Vegetation Management
JBA	Joint Base Andrews
LF	Linear Feet
LOD	Limits of Disturbance
LOS	Level of Service
LUST	Leaking Underground Storage Tank

MARC	Maryland Area Regional Commuter
MBSS	Maryland Biological Stream Survey
MCDEP	Montgomery County Department of Environmental Protection
MDE	Maryland Department of the Environment
MDL	Maryland Department of Labor
MDNR	Maryland Department of Natural Resources
MDOT SHA	Maryland Department of Transportation State Highway Administration
MDP	Maryland Department of Planning
MDTA	Maryland Transportation Authority
MGS	Maryland Geological Survey
MHT	Maryland Historical Trust
M-NCPPC	Maryland-National Capital Park and Planning Commission
MOU	Memorandum of Understanding
MP	Master Plan
MSATs	Mobile Source Air Toxics
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSTM	Maryland Statewide Transportation Model
MTA	Maryland Transit Administration
MWCOG	Metropolitan Washington Council of Governments
N <sub>2</sub> O	Nitrous Oxide
NAAQS	National Air Quality Standards
NAC	Noise Abatement Criteria
NB	Northbound
NCHRP	National Cooperative Highway Research Program
NCPC	National Capital Planning Commission
NCRTPB	National Capital Region Transportation Planning Board
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NLEB	Northern Long-eared Bat
NMFS	National Marine Fisheries Service
NO <sub>2</sub>	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPL	National Priorities List
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSA	Noise-sensitive Area
NWI	National Wetlands Inventory
O <sub>3</sub>	Ozone
OFD	One Federal Decision



OHW	Ordinary High Water
OMB	Office of Management and Budget
OWJ	Officials with Jurisdiction
P3	Public-Private Partnership
PA	Programmatic Agreement
Pb	Lead
PCB	Polychlorinated Biphenyl
PECs	Potential Environmental Concerns
PEM	Palustrine Emergent
PFO	Palustrine Forested
PGDoE	Prince George's County Department of the Environment
PM	Particulate Matter
PSI	Preliminary Site Investigations
PSS	Palustrine Scrub-shrub
PTI	Planning Time Index
Q <sub>p</sub>	Quantity Management
QW	Queue Warning
RBP	Rapid Bioassessment Protocol
Re <sub>v</sub>	Recharge Volume
RFP	Request for Proposals
ROD	Record of Decision
ROW	Right-of-way
RTE	Rare, Threatened, and Endangered
SB	Southbound
SDWA	Safe Drinking Water Act
SF	Square Feet
SGCN	Species of Greatest Conservation Need
SO <sub>2</sub>	Sulfur Dioxide
SPA	Special Protection Area
SPUI	Single Point Urban Interchange
SSPRA	Sensitive Species Project Review Areas
SVP	Stream Valley Park
SWM	Stormwater Management
TAZ	Traffic Analysis Zone
TDM	Transportation Demand Management
TEA	Targeted Ecological Area
TFAD	Travel Forecasting and Analysis Division
TIP	Transportation Improvement Program
TMDL	Total Maximum Daily Loads
TNM	Traffic Noise Model
TPB	Transportation Planning Board

TSM	Transportation System Management
TTI	Travel Time Index
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USDA BARC	United States Department of Agriculture Beltsville Agricultural Research Center
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	Underground Storage Tank
VAC	Code of Virginia
VDACS	Virginia Department of Agriculture and Consumer Services
VDCR	Virginia Department of Conservation and Recreation
VDCR-DNH	Virginia Department of Conservation and Recreation- National Heritage
VDEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Game and Inland Fisheries
VDH	Virginia Department of Health
VDOF	Virginia Department of Forestry
VDOT	Virginia Department of Transportation
VMRC	Virginia Marine Resources Commission
VWPP	Virginia Water Protection Permit
VMT	Vehicle Miles Traveled
WHS	Wildlife and Heritage Service
WMATA	Washington Metropolitan Area Transit Authority
WQV	Water Quality Volume