

TABLE OF CONTENTS

1.0	Project Purpose and Need	1-1
1.1	Introduction	1-1
1.2	Project Background.....	1-1
1.3	Project Purpose and Need.....	1-3
2.0	Alternatives Considered	2-1
2.1	Local Planning Process	2-1
2.2	Screening Process	2-3
2.2.1	Alternatives Identified During the EIS Scoping Process.....	2-3
2.2.2	Screening and Alternatives Refinement.....	2-5
2.2.3	Alternatives Identified After the EIS Scoping Process	2-9
2.3	No Build Alternative.....	2-11
2.4	Build Alternatives	2-15
2.4.1	Build Alternative A	2-18
2.4.2	Build Alternative B	2-22
2.4.3	B-CSX Design Option.....	2-26
2.4.4	Build Alternative D	2-31
2.4.5	Alternative Construction Staging Scenarios.....	2-37
2.5	Evaluation of Alternatives	2-37
2.5.1	Methodology	2-37
2.5.2	Environmental Consequences	2-37
2.5.3	Support for Project Purpose and Need	2-47
3.0	ENVIRONMENTAL CONSEQUENCES.....	3-1
3.1	Introduction	3-1
3.1.1	Resources Evaluated	3-1
3.1.2	Impacts Summary.....	3-1
3.2	Transportation	3-11
3.2.1	Methodology	3-11
3.2.2	Affected Environment	3-12
3.2.3	Environmental Consequences	3-17
3.2.4	Mitigation	3-19
3.3	Land Acquisitions and Displacements.....	3-19
3.3.1	Methodology	3-19
3.3.2	Affected Environment	3-19
3.3.3	Environmental Consequences	3-22
3.3.4	Mitigation	3-24
3.4	Land Use and Zoning.....	3-24
3.4.1	Methodology	3-24
3.4.2	Affected Environment	3-25
3.4.3	Environmental Consequences	3-29
3.4.4	Mitigation	3-31
3.5	Consistency with Local Plans	3-31
3.5.1	Methodology	3-31
3.5.2	Affected Environment	3-31
3.5.3	Environmental Consequences	3-35
3.5.4	Mitigation	3-38
3.6	Neighborhoods, Demographics, and Community Resources	3-38
3.6.1	Methodology	3-38
3.6.2	Affected Environment	3-38
3.6.3	Environmental Consequences	3-40

3.6.4	Mitigation	3-41
3.7	Environmental Justice	3-41
3.7.1	Methodology	3-41
3.7.2	Affected Environment	3-42
3.7.3	Environmental Consequences	3-46
3.7.4	Mitigation	3-52
3.8	Visual Resources	3-52
3.8.1	Methodology	3-53
3.8.2	Affected Environment	3-54
3.8.3	Environmental Consequences	3-63
3.8.4	Mitigation	3-108
3.9	Cultural Resources.....	3-118
3.9.1	Methodology	3-118
3.9.2	Affected Environment	3-121
3.9.3	Environmental Consequences	3-128
3.9.4	Mitigation	3-145
3.10	Parklands	3-146
3.10.1	Methodology	3-146
3.10.2	Affected Environment	3-146
3.10.3	Environmental Consequences	3-149
3.10.4	Mitigation Measures	3-151
3.11	Air Quality.....	3-153
3.11.1	Methodology	3-153
3.11.2	Affected Environment	3-153
3.11.3	Environmental Consequences	3-153
3.11.4	Mitigation Measures	3-154
3.12	Noise & Vibration	3-155
3.12.1	Methodology	3-155
3.12.2	Affected Environment	3-157
3.12.3	Environmental Consequences	3-158
3.12.4	Mitigation Measures	3-163
3.13	Water Quality	3-164
3.13.1	Methodology	3-164
3.13.2	Affected Environment	3-164
3.13.3	Environmental Consequences	3-165
3.13.4	Mitigation	3-166
3.14	Waters of the United States (Wetlands)	3-166
3.14.1	Methodology	3-166
3.14.2	Affected Environment	3-167
3.14.3	Environmental Consequences	3-168
3.14.4	Mitigation	3-174
3.15	Floodplains.....	3-174
3.15.1	Methodology	3-174
3.15.2	Affected Environment	3-174
3.15.3	Environmental Consequences	3-176
3.15.4	Mitigation	3-178
3.16	Navigable Waterways and Coastal Zones.....	3-178
3.16.1	Methodology	3-178
3.16.2	Affected Environment	3-179
3.16.3	Environmental Consequences	3-179
3.16.4	Mitigation	3-181
3.17	Wild and Scenic Rivers	3-181
3.18	Ecosystems and Endangered Species	3-181

3.18.1	Methodology	3-182
3.18.2	Affected Environment	3-182
3.18.3	Environmental Consequences	3-184
3.18.4	Mitigation Measures	3-185
3.19	Sustainability	3-186
3.19.1	Methodology	3-186
3.19.2	Affected Environment	3-186
3.19.3	Environmental Consequences	3-186
3.19.4	Mitigation	3-186
3.20	Hazardous and Contaminated Materials	3-187
3.20.1	Methodology	3-187
3.20.2	Affected Environment	3-188
3.20.3	Environmental Consequences	3-190
3.20.4	Mitigation	3-190
3.21	Safety and Security	3-191
3.21.1	Methodology	3-191
3.21.2	Affected Environment	3-191
3.21.3	Environmental Consequences	3-192
3.21.4	Mitigation	3-193
3.22	Utilities	3-193
3.22.1	Methodology	3-193
3.22.2	Affected Environment	3-193
3.22.3	Environmental Consequences	3-193
3.22.4	Mitigation	3-194
3.23	Secondary and Cumulative Effects.....	3-194
3.23.1	Methodology	3-194
3.23.2	Potential Sources of Effects	3-195
3.23.3	Secondary Effects	3-196
3.23.4	Cumulative Effects.....	3-197
3.24	Construction Impacts	3-199
3.24.1	Methodology	3-199
3.24.2	Affected Environment	3-199
3.24.3	Environmental Consequences	3-199
3.24.4	Mitigation	3-227
4.0	PUBLIC AND AGENCY INVOLVEMENT.....	4-1
4.1	Agency Coordination.....	4-1
4.1.1	Lead and Cooperating Agencies	4-1
4.1.2	Participating Agencies	4-2
4.1.3	Agency Consultation.....	4-2
4.1.4	Agency Scoping Meeting.....	4-2
4.1.5	Additional Agency Outreach and Briefings.....	4-2
4.2	Public Involvement.....	4-3
4.2.1	Public Scoping Meetings	4-3
4.2.2	Public Meeting – Project Alternatives.....	4-4
4.2.3	Public Meeting – Environmental Effects.....	4-4
4.2.4	Draft EIS Public Comment Period and Public Hearing	4-4
4.2.5	On-Going Public Outreach Activities and Information Exchange	4-5
4.3	Other Outreach and Coordination.....	4-5
4.3.1	Section 106 Cultural Resources Consulting Parties Meetings	4-5
4.3.2	Potomac Yard Metrorail Implementation Work Group (PYMIG)	4-6
4.3.3	Presentations at Neighborhoods and Civic Association Meetings.....	4-6
4.3.4	CSX Transportation	4-6

5.0	Project Costs and Funding	5-1
5.1	Capital Cost and Funding Strategy	5-1
5.1.1	Capital Cost Estimate	5-1
5.1.2	Capital Funding Sources	5-3
5.1.3	Other Potential Federal Capital Funding Sources	5-3
5.1.4	Other Potential State Capital Funding Sources	5-4
5.2	Operating and Maintenance Cost and Funding Strategy	5-4
5.2.1	Operating Costs	5-4
5.2.2	Operating Funding Sources	5-4

LIST OF FIGURES

Figure 1-1:	Project Study Area	1-2
Figure 2-1:	Alternatives Identified During EIS Scoping	2-4
Figure 2-2:	Refinement of Alternatives	2-5
Figure 2-3:	Initial Screening Process Results	2-7
Figure 2-4:	Technically Feasible Station Location Zones	2-8
Figure 2-5:	Additional Alternatives Identified After EIS Scoping	2-10
Figure 2-6:	No Build Street Network and Crystal City/Potomac Yard Transitway	2-13
Figure 2-7:	Build Alternatives	2-16
Figure 2-8:	Build Alternative A Plan View	2-18
Figure 2-9:	Build Alternative A Cross Sections and Longitudinal Section	2-19
Figure 2-10:	Build Alternative A Construction Staging and Access Options	2-21
Figure 2-11:	Build Alternative B Plan View	2-22
Figure 2-12:	Build Alternative B Cross Sections and Longitudinal Section	2-23
Figure 2-13:	Build Alternative B Construction Staging and Access Options	2-25
Figure 2-14:	B-CSX Design Option Plan View	2-27
Figure 2-15:	B-CSX Design Option Cross Sections and Longitudinal Section	2-28
Figure 2-16:	B-CSX Design Option (North) Construction Staging and Access	2-29
Figure 2-17:	B-CSX Design Option (South) Construction Staging and Access	2-30
Figure 2-18:	Build Alternative D Plan View (1 of 2)	2-31
Figure 2-19:	Build Alternative D Plan View (2 of 2)	2-32
Figure 2-20:	Build Alternative D Cross Sections and Longitudinal Section	2-33
Figure 2-21:	Build Alternative D (North) Construction Staging and Access	2-35
Figure 2-22:	Build Alternative D (South) Construction Staging and Access	2-36
Figure 3-1:	Opening Year 2016 Key Transportation Facilities	3-13
Figure 3-2:	Bike and Pedestrian Facilities	3-14
Figure 3-3:	Opening Year 2016 Bus Services	3-15
Figure 3-4:	2040 Bus Services	3-16
Figure 3-5:	Permanent Property Impacts of Build Alternatives	3-20
Figure 3-6:	Opening Year 2016 Land Use	3-26
Figure 3-7:	Existing Zoning	3-28
Figure 3-8:	Land Use Plans and Other Local Plans	3-34
Figure 3-9:	Neighborhoods and Community Resources	3-39
Figure 3-10:	Minority Populations	3-44
Figure 3-11:	Low-Income Populations	3-45
Figure 3-12:	Viewshed Locations by Build Alternative	3-55
Figure 3-13:	Viewshed 1 – George Washington Memorial Parkway (North Study Area), North of Four Mile Run, Looking Southeast	3-56
Figure 3-14:	Viewshed 2 – George Washington Memorial Parkway (North Study Area), South of Four Mile Run, Looking Southeast	3-57
Figure 3-15:	Viewshed 2a – George Washington Memorial Parkway (North Study Area), South of Four Mile Run, Looking Southeast (B-CSX Analysis Only)	3-57

Figure 3-16: Viewshed 3 – George Washington Memorial Parkway (Middle Study Area), Looking South	3-58
Figure 3-17: Viewshed 4 – George Washington Memorial Parkway (Middle Study Area), Mount Vernon Trail, Looking West.....	3-58
Figure 3-18: Viewshed 5 – George Washington Memorial Parkway (South Study Area), Looking South	3-59
Figure 3-19: Viewshed 6 – George Washington Memorial Parkway (South Study Area), Looking West.....	3-59
Figure 3-20: Viewshed 7 – Potomac Greens, Looking West	3-60
Figure 3-21: Viewshed 8 – Potomac Greens Park	3-61
Figure 3-22: Viewshed 9 – Potomac Yard, looking Northeast at East Glebe Road and Potomac Avenue	3-62
Figure 3-23: Viewshed 9 – Potomac Yard, looking Southeast at East Glebe Road and Potomac Avenue	3-62
Figure 3-24: No Build Alternative Viewshed 1 Elements	3-64
Figure 3-25: No Build Alternative Viewshed 2 Elements	3-65
Figure 3-26: No Build Alternative Viewshed 3 Elements	3-66
Figure 3-27: No Build Alternative Viewshed 4 Elements	3-67
Figure 3-28: No Build Alternative Viewshed 5 Elements	3-68
Figure 3-29: No Build Alternative Viewshed 6 Elements	3-69
Figure 3-30: No Build Alternative Viewshed 7 Elements	3-70
Figure 3-31: No Build Alternative Viewshed 8 Elements	3-71
Figure 3-32: No Build Alternative Viewshed 9 Elements, Looking Southeast.....	3-72
Figure 3-33: No Build Alternative Viewshed 9 Elements, Looking Northeast	3-73
Figure 3-34: Build Alternative A Viewshed 1 Elements	3-75
Figure 3-35: Build Alternative A Viewshed 2 Elements	3-76
Figure 3-36: Build Alternative A Viewshed 3 Elements	3-77
Figure 3-37: Build Alternative A Viewshed 4 Elements	3-78
Figure 3-38: Build Alternative A Viewshed 5 Elements	3-79
Figure 3-39: Build Alternative A Viewshed 6 Elements	3-80
Figure 3-40: Build Alternative A Viewshed 7 Elements	3-81
Figure 3-41: Build Alternative A Viewshed 8 Elements	3-82
Figure 3-42: Build Alternative A Viewshed 9 Elements	3-83
Figure 3-43: Build Alternative B Viewshed 1 Elements	3-86
Figure 3-44: Build Alternative B Viewshed 2 Elements	3-87
Figure 3-45: Build Alternative B Viewshed 3 Elements	3-88
Figure 3-46: Build Alternative B Viewshed 4 Elements	3-89
Figure 3-47: Build Alternative B Viewshed 5 Elements	3-90
Figure 3-48: Build Alternative B Viewshed 6 Elements	3-91
Figure 3-49: Build Alternative B Viewshed 7 Elements	3-92
Figure 3-50: Build Alternative B Viewshed 8 Elements	3-93
Figure 3-51: Build Alternative B Viewshed 9 Elements	3-94
Figure 3-52: B-CSX Design Option Viewshed 1 Elements	3-97
Figure 3-53: B-CSX Design Option Viewshed 2 Elements	3-98
Figure 3-54: B-CSX Design Option Viewshed 2a Elements	3-99
Figure 3-55: B-CSX Design Option Viewshed 3 Elements	3-100
Figure 3-56: B-CSX Design Option Viewshed 4 Elements	3-101
Figure 3-57: B-CSX Design Option Viewshed 5 Elements	3-102
Figure 3-58: B-CSX Design Option Viewshed 6 Elements	3-103
Figure 3-59: B-CSX Design Option Viewshed 7 Elements	3-104
Figure 3-60: B-CSX Design Option Viewshed 8 Elements	3-105
Figure 3-61: B-CSX Design Option Viewshed 9 Elements	3-106
Figure 3-62: Build Alternative D Viewshed 1 Elements	3-109
Figure 3-63: Build Alternative D Viewshed 2 Elements	3-110
Figure 3-64: Build Alternative D Viewshed 3 Elements	3-111
Figure 3-65: Build Alternative D Viewshed 4 Elements	3-112
Figure 3-66: Build Alternative D Viewshed 5 Elements	3-113
Figure 3-67: Build Alternative D Viewshed 6 Elements	3-114

Figure 3-68: Build Alternative D Viewshed 7 Elements	3-115
Figure 3-69: Build Alternative D Viewshed 8 Elements	3-116
Figure 3-70: Build Alternative D Viewshed 9 Elements	3-117
Figure 3-71: Areas of Potential Effects (APEs)	3-120
Figure 3-72: Historic Architectural Resources	3-122
Figure 3-73: Build Alternative A Impacts to Historic Architectural Resources	3-130
Figure 3-74: Build Alternative B Impacts to Historic Architectural Resources	3-135
Figure 3-75: B-CSX Design Option Impacts to Historic Architectural Resources	3-140
Figure 3-76: Build Alternative D Impacts to Historic Architectural Resources	3-142
Figure 3-77: Opening Year 2016 Parklands	3-148
Figure 3-78: Build Alternatives and Parklands	3-150
Figure 3-79: Noise Monitoring Stations	3-156
Figure 3-80: Noise Impacts	3-160
Figure 3-81: Vibration Impacts	3-161
Figure 3-82: Waters of the United States Including Wetlands	3-169
Figure 3-83: Alternatives A and B Permanent Impacts on NPS and USACE Wetland Areas	3-171
Figure 3-84: B-CSX Design Option Permanent Impacts on NPS and USACE WOUS and Wetland Areas	3-172
Figure 3-85: Alternative D Permanent Impacts on NPS and USACE WOUS and Wetland Areas	3-173
Figure 3-86: Build Alternatives and Floodplains	3-175
Figure 3-87: Wetlands and Resource Protection Areas	3-180
Figure 3-88: Study Area Habitats	3-183
Figure 3-89: Potential and Former Recognized Environmental Condition Sites (RECs)	3-189
Figure 3-90: Build Alternatives	3-201
Figure 3-91: Build Alternative A Construction Access Options	3-202
Figure 3-92: Build Alternative B Construction Access Options	3-203
Figure 3-93: B-CSX Design Option (North) Construction Staging and Access	3-204
Figure 3-94: B-CSX Design Option (South) Construction Staging and Access	3-205
Figure 3-95: Build Alternative D (North) Construction Staging and Access	3-206
Figure 3-96: Build Alternative D (South) Construction Staging and Access	3-207
Figure 3-97: Temporary Property Impacts	3-212

LIST OF TABLES

Table 2-1: Projects Included in No Build Alternative	2-12
Table 2-2: No Build Alternative Bus Service	2-14
Table 2-3: Build Alternatives Characteristics Summary	2-17
Table 2-4: Evaluation of Alternatives	2-38
Table 2-5: Support for Project Purpose and Need	2-48
Table 3-1: Summary of Impacts ¹	3-2
Table 3-2: Forecast Potomac Yard Metrorail Station Ridership	3-18
Table 3-3: Potential Permanent Land or Right-of-Way Acquisition	3-23
Table 3-4: Potential Property Impacts to the Greens Scenic Area Easement	3-23
Table 3-5: Potential Displacements of Residences, Businesses, and Buildings	3-24
Table 3-6: Summary of City of Alexandria Coordinated Development Districts (CDDs)	3-27
Table 3-7: Summary of Local Plans	3-32
Table 3-8: Consistency with Local Plans by Alternative	3-35
Table 3-9: Existing Community Facilities	3-40
Table 3-10: Minority Population Summary Table	3-43
Table 3-11: Potomac Yard Analysis Area Hispanic Population (All Races)	3-43
Table 3-12: Census Tracts below AMI (\$64,400)	3-43
Table 3-13: Potential Adverse Impacts by Alternative	3-46
Table 3-14: Permanent Parkland Impacts by Alternative	3-51
Table 3-15: Visual Characteristic Evaluation Scoring	3-54
Table 3-16: Existing Visual Character, Quality and Visual Sensitivity	3-54

Table 3-17: No Build Alternative Visual Character and Quality.....	3-63
Table 3-18: Build Alternative A Anticipated Visual Impacts.....	3-74
Table 3-19: Anticipated Visual Impacts of Build Alternative B.....	3-84
Table 3-20: Anticipated Visual Impacts of B-CSX Design Option.....	3-95
Table 3-21: Anticipated Visual Impacts of Build Alternative D.....	3-107
Table 3-22: Listed or Potentially Eligible Historic Architectural Resources in the APE.....	3-121
Table 3-23: MVMH and GWMP Comparison Summary.....	3-123
Table 3-24: Archaeological Resources in the APE.....	3-128
Table 3-25: Temporary Construction Areas on and Permanent Land Transfers from Historic Architectural Resources.....	3-129
Table 3-26: Parklands, Recreation Areas, and Open Spaces.....	3-147
Table 3-27: Parkland Property Acquisitions.....	3-149
Table 3-28: 2016 Opening Year Regional Average Weekday VMT.....	3-154
Table 3-29: Noise Monitoring Sites.....	3-155
Table 3-30: FTA Land Use Categories and Noise Metrics.....	3-157
Table 3-31: Predicted Noise Levels at Representative Receptors Compared to FTA Criteria for Impacts.....	3-159
Table 3-32: Predicted Maximum Noise Levels from Metrorail Pass-bys at Representative Receptors Compared to WMATA Criteria for Impacts.....	3-159
Table 3-33: Net New Impervious Surface.....	3-165
Table 3-34: USACE and NPS Wetlands and Waters of the U.S.....	3-168
Table 3-35: Permanent Impacts to NPS and USACE Regulated Wetlands.....	3-168
Table 3-36: Permanent Wetland and WOUS Impacts (USACE Regulated).....	3-170
Table 3-37: Permanent Floodplain Impacts.....	3-176
Table 3-38: Permanent Floodplain Impacts (NPS Parkland and Greens Scenic Area Easement).....	3-176
Table 3-39: Permanent Resource Protection Area Impacts.....	3-179
Table 3-40: Federally listed and State listed Species.....	3-184
Table 3-41: Permanent Wetland, Riverine, and Upland Habitat Impacts (Study Area).....	3-184
Table 3-42: Permanent Wetland, Riverine, and Upland Habitat Impacts (NPS Parkland and Greens Scenic Area Easement).....	3-185
Table 3-43: Potomac Yard Remedial Investigations and Reports.....	3-188
Table 3-44: Estimated Development Levels for Horizon Year 2040.....	3-195
Table 3-45: Potential Construction Impacts to the Greens Scenic Area Easement.....	3-211
Table 3-46: Acreage of Temporary Construction Impacts to Parklands.....	3-216
Table 3-47: Temporary Impacts to USACE and NPS Regulated Wetlands.....	3-221
Table 3-48: Temporary 100-Year and 500-Year Floodplain Impacts.....	3-223
Table 3-49: Temporary 100-Year and 500-Year Floodplain Impacts (NPS Parkland and Greens Scenic Area Easement).....	3-224
Table 3-50: Temporary Construction Impacts to Resource Protection Areas.....	3-224
Table 3-51: Temporary Wetland, Riverine, and Upland Habitat Impacts.....	3-225
Table 4-1: Agency Outreach Meetings.....	4-3
Table 5-1: Capital Cost Estimate: Station Cost Ranges by Alternative (\$millions, \$2016).....	5-2

APPENDICES

APPENDIX A	List of Preparers
APPENDIX B	List of Co-operating and Participating Agencies
APPENDIX C	References
APPENDIX D	Section 4(f) Evaluation
APPENDIX E	Section 6(f) Evaluation
APPENDIX F	Section 106
APPENDIX G	Greens Scenic Area Easement
APPENDIX H	Agency Co-ordination
APPENDIX I	List of Recipients

VOLUME II: TECHNICAL APPENDICES

See compact disk in back cover