



Exhibit D

ADEIS Chapter #4.11 – Wetlands

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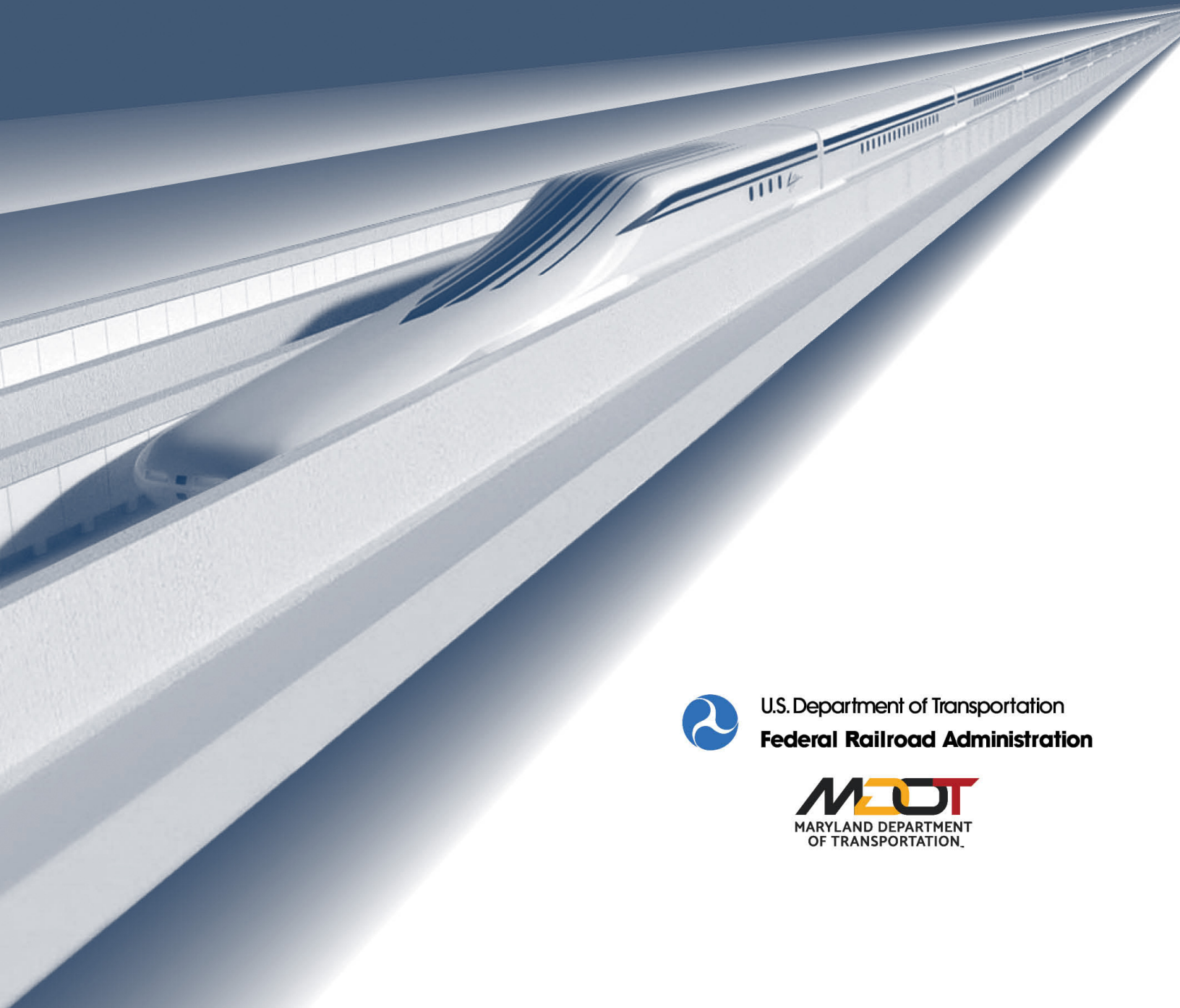
Appendix D.7D.3 Environmental Consequences

Section 4.11

Wetlands and Waterways

BALTIMORE-WASHINGTON SUPERCONDUCTING MAGLEV PROJECT

DRAFT ENVIRONMENTAL IMPACT STATEMENT AND
SECTION 4(f) EVALUATION



U.S. Department of Transportation
Federal Railroad Administration



4.11 Wetlands and Waterways

4.11.1 Introduction

This section evaluates the existing Waters of the U.S. and other jurisdictional¹ systems that could be affected by the Superconducting Magnetic Levitation Project (SCMAGLEV Project). This section also identifies and evaluates impacts on select notable wetlands and Nontidal Wetlands of Special State Concern. Additional details related to these resources can be found in Appendix D.7 Natural Environment Technical Report (NETR).

4.11.2 Regulatory Context and Methodology

4.11.2.1 Regulatory Context

In accordance with the National Environmental Policy Act (NEPA), 42 U.S.C. § 4321 et seq., the Council on Environmental Quality (CEQ) regulations, 40 C.F.R. Parts 1500 - 1508, and the Federal Rail Administration's (FRA) Procedures for Considering Environmental Impacts, 64 Fed. Reg. 28545 (May 26, 1999) FRA assessed impacts to Waters of the U.S. Jurisdictional waters are regulated by the U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (USEPA) under Section 404 of the Clean Water Act (CWA), and the Rivers and Harbors Act. In Maryland and Washington, D.C., the Maryland Department of the Environment (MDE) and the D.C. Department of Energy and Environment (DOEE), respectively, jointly administer this program with the USACE.

MDE also regulates activities within waters of the State, which includes altering tidal or nontidal wetlands, the 25-foot nontidal wetland buffer, and certain designated high-quality wetlands called Nontidal Wetlands of Special State Concern (NTWSSC). A NTWSSC is one with unique ecological value, often those in which rare, threatened or endangered (RTE) species or a unique habitat may be present. MDE regulates activities in these wetlands, including a 100-foot buffer, to protect these wetlands from the impacts of development. Impacts to tidal wetlands require a tidal license issued by the Maryland Board of Public Works (BPW). The DOEE also regulates activities within waters of the District, including wetlands, in accordance with the District's Water Pollution Control Act, D.C. Official Code §§ 8-103.01, et seq.

Additional regulations include, but are not limited to:

- The Navigable Waters Protection Rule: Definition of "Waters of the United States" (85 Fed. Reg. 22250, April 21, 2020) (effective June 22, 2020)
- Code of Maryland Regulations (COMAR) Title 26, Subtitle 23 Nontidal Wetlands, Subtitle 24 Tidal Wetlands, and Subtitle 17 Section 04 Construction on Nontidal Waters and Floodplains;

¹ State-regulated and/or District-regulated waters

- COMAR Title 26, Subtitle 23, Section 6, Wetlands of Special State Concern;
- National Park Service (NPS) Director's Order 77-1 Wetland Protection;
- Executive Order 11990, Protection of Wetlands (42 Fed. Reg. 26961, May 24, 1977);
- U.S. Department of Transportation Order 5660.1A, Preservation of the Nation's Wetlands

4.11.2.2 Methodology

The FRA conducted a qualitative analysis of resources within the SCMAGLEV Project Affected Environment, identifying the presence of wetlands and waterways. FRA defined the geographic limits of the SCMAGLEV Project Affected Environment for wetland and waterways analyses as the proposed SCMAGLEV Project impact area plus an additional 30-foot buffer. The SGMAGLEV Project impact area includes the limits of operational/physical disturbance, as well as the construction related impact area, which includes additional areas of temporary disturbance required for construction activities. These impact areas comprise the overall limit of disturbance (LOD) of the SCMAGLEV Project Build Alternatives. The LOD includes all surface and subsurface elements. As noted, the SCMAGLEV Project Affected Environment for wetland and waterways includes an additional 30-foot buffer around the LOD. This buffer was included so field investigations would capture areas of potentially regulated 25-foot wetland buffers and notable landscape features adjacent to the LOD.

Wetlands and other waters of the U.S. defined in the 33 CFR Part 328 and identified using the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0)*, and National Park Service (NPS) methodologies and policies have been identified within the SCMAGLEV Project Affected Environment. FRA obtained the location, extent, and defining characteristics of wetlands and waterways from multiple sources, including field-based delineations and observations, available published mapping, and aerial imagery. Between July 2018 and July 2020, FRA conducted field delineations specifically within the areas of proposed surface disturbance of the SCMAGLEV Project Affected Environment, which includes the 30-foot buffer around the LOD. Investigations were conducted for areas where property access was available, which accounted for approximately 70 percent of the total field investigation area. In areas of proposed surface disturbance where property access was not available, as well as for areas of proposed subsurface disturbance, FRA used existing published information from the Maryland Department of Natural Resources (MDNR) wetland mapping, U.S. Fish and Wildlife Services (USFWS) National Wetland Inventory (NWI), MDE stream mapping, and the U.S. Geological Survey (USGS) National Hydrologic Data (NHD) to approximate the boundaries of wetlands and waterways within the SCMAGLEV Project Affected Environment that were not field investigated. The location of wetlands and waterways identified and considered in this analysis are illustrated in Appendix B.3 Natural Resource Map Atlas.

FRA identified both potential direct and indirect effects from the SCMAGLEV Project to resources within the SCMAGLEV Project Affected Environment. FRA conducted a

quantitative analysis for resources proposed within the LOD for areas of surface disturbance only (which includes areas of tunnel portals, cut and cover areas, elevated viaduct, and above ground ancillary facilities, stations, and trainset maintenance facilities [TMF]) and construction-related surface disturbance (e.g. laydown areas, etc.), as coordination with USACE, MDE, and DOEE indicated that resources located under proposed deep tunnel areas would not be considered an impact in the permitting process. Impacts are described as both permanent and temporary. Although systems tunneled under may not be considered an impact requiring mitigation, work proposed “in, on, over, or under” a tidal system will be regulated and subject to Maryland BPW authorization. All tidal systems were evaluated based on the State Tidal Boundaries and corresponding designated use classes.

FRA has applied an exception to the methodology presented above for calculating wetland and waterway impacts to the proposed long-term construction laydown area near MD 200 and I-95. FRA did not conduct field delineations at this site; therefore, published information and recent aerial imagery were reviewed to identify wetlands and waterways. Published data indicated approximately 21 acres of wetlands and 10,500 linear feet of waterways are located at the site; however, aerial imagery indicates that recent clearing and development of the site has occurred that may have impacted the amount and quality of these resources. If the site is used during construction, the Project Sponsor will conduct delineations to confirm the locations of remaining features and ensure that they are avoided. No impacts to waterways are anticipated at this site; therefore, while the site’s wetlands and waterways (as shown in published data) are included in totals presented for the SCMAGLEV Project Affected Environment, the site was excluded from the quantitative impact analyses.

For evaluating the presence of and potential effects to NTWSSC as a result of the SCMAGLEV Project, FRA utilized published mapping from MDNR, which generally includes a larger identified NTWSSC boundary as compared with associated field-delineated wetlands; therefore, FRA is presenting the most conservative evaluation of potential effects to NTWSSC. The FRA used this approach because NTWSSC boundaries must be confirmed by the agencies upon review of field conditions. FRA illustrates both MDNR NTWSSC boundaries and associated field-delineated wetland boundaries in Appendix B.3 Natural Resource Map Atlas.

4.11.3 SCMAGLEV Project Affected Environment

Wetlands and waterways occur throughout the SCMAGLEV Project Affected Environment, with larger and more notable systems occurring on undeveloped lands on the Beltsville Agricultural Research Center (BARC) property, Patuxent Research Refuge (PRR) property, and NPS property adjacent to the Baltimore-Washington Parkway (BWP). Other concentrations of wetlands and waterways are located at National Aeronautics and Space Administration (NASA) Goddard Space Flight Center (GSFC), on City of Greenbelt properties, on Washington Suburban Sanitary Commission (WSSC) property, on Fort George G. Meade property, at county parks and open spaces (Springfield and Maryland City Parks, and Tipton Airport), on National Security

Administration (NSA) property, and on D.C.-owned land on several parcels identified northeast of the BWP/MD 198 interchange and currently leased to the Maryland Department of Juvenile Services. These surface water systems represent individual and interconnected wetland and waterway complexes that ultimately convey hydrologic flow to and through major regional stream systems, including the Anacostia River, Patuxent River, Little Patuxent River, Patapsco River, and Baltimore Harbor.

The following subsections describe wetlands and waterways, including notable systems, that occur in the SCMAGLEV Project Affected Environment. A broader discussion of these resources in the context of watersheds, other water resources, and aquatic habitats is provided in Section 4.10 Water Resources and Section 4.12 Ecological Resources. The location of wetlands and waterways identified are illustrated in Appendix B.3. **Table 4.11-1** provides a summary of existing wetland and waterways within the SCMAGLEV Affected Environment.

Table 4.11-1: Affected Environment Wetlands and Waterways Summary

Build Alternative	Wetlands* (acres)	Wetlands designated as NTWSSC** (acres)	Waterways* (linear feet)
J-01	83	12	37,371
J-02	69	30	41,859
J-03	62	19	40,910
J-04	82	12	38,348
J-05	68	30	42,837
J-06	61	19	41,887
J1-01	89	7	38,363
J1-02	67	23	40,077
J1-03	58	9	39,256
J1-04	89	7	39,341
J1-05	66	23	41,054
J1-06	57	9	40,234

* All Build Alternative alignments include the long-term laydown area near MD 200 and I-95, which accounts for over 21 acres of wetlands and 10,500 linear feet of waterways, as identified through published data. No vegetated tidal wetlands are present within the Affected Environment. Waterways represent all systems, both tidal and nontidal crossed by the SCMAGLEV Project.

**NTWSSC acreages are not in addition to the wetland acreage presented, but are a separate analysis of impacts based on state-published boundaries, not field-delineated boundaries.

FRA initiated coordination with the USACE and MDE in 2018 for the SCMAGLEV Project and this coordination is currently ongoing. On September 6, 2018, representatives from multiple state, Federal and county agencies and departments, the Project Sponsor and design engineers, and MTA, FRA, and NEPA team members

conducted a field review of several of the planned surface disturbance locations for proposed alignment and ancillary features. Meeting minutes from this field walk are included in Appendix D.7 NETR agency correspondence. In July of 2019 a pre-application meeting was held specifically with the MDE and USACE. Major waterways and wetland complexes were visited and reviewed. In November 2020 an additional field walk was held with the USEPA, USACE, MDE, and the U.S. Department of Agriculture/Beltsville Agricultural Research Center (BARC) to review and discuss the proposed TMF locations and facilitate the agency reviews. Pending a formal jurisdictional determination for the SCMAGLEV Project in coordination with the USACE, all aquatic resources delineated in the field and described herein are assumed to be jurisdictional.

4.11.3.1 Wetlands

FRA identified extensive wetlands within the SCMAGLEV Project Affected Environment, ranging from 61 to 89 acres depending upon the Build Alternative, including approximately 21 acres of wetlands (identified via published data) associated specifically with the proposed long-term construction laydown area near MD 200 and I-95. All wetlands identified are nontidal palustrine systems and are classified into four types: PEM – palustrine emergent; PSS – palustrine scrub-shrub; PFO – palustrine forested; and PUB – palustrine unconsolidated bottom (pond-like).² Most wetlands that FRA identified are classified as PFO and are located predominantly on many of the Federal and county lands noted above. Many of these wetland systems are associated with and located within the floodplain of a perennial waterway. FRA identified smaller, more fragmented and sometimes more disturbed wetlands influenced by urbanization closer to Baltimore City, within existing roadway infrastructure and utility easements, and between residential neighborhoods. It is anticipated that the majority of wetlands present would be regulated under both USACE and MDE jurisdiction, however this jurisdictional designation has not been coordinated and defined by the agencies. No vegetated tidal wetlands were identified within the SCMAGLEV Project Affected Environment. Open water tidal systems are present within the Affected Environment, and discussed in the following waterways section.

Of those wetlands noted above, FRA identified wetlands classified as NTWSSCs based on MDNR mapping, located along three major waterways and their tributaries within the SCMAGLEV Project Affected Environment, including Beaverdam Creek, Beck Branch, and the Patuxent River (Appendix B.3 Map Sheets 5 and 6). As shown in **Table 4.11-1**, NTWSSC range from seven acres to as much as 30 acres of the total wetland acreage identified per Build Alternative. In coordination with MDNR, FRA determined that these NTWSSCs provide habitat for RTE odonate (a dragonfly or damselfly), fish, and plant species.

FRA identified several notable wetland systems that should be avoided if possible and may require special protection if they cannot be avoided. FRA identified these systems based on their classification, location within the SCMAGLEV Project Affected

² Cowardin et al. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. Prepared for the USFWS.

Environment and possible connection to larger natural systems/habitat, presence of a high-quality resource, and/or through agency coordination. FRA identified the following important wetland systems:

- NTWSSC located within riparian buffers of waterways noted above and supporting RTE species.
- Vernal pools, spring-fed wetland complexes, and forest-stream complexes containing RTE plants identified by the USFWS at PRR.
- High-quality wetlands located north of the Patuxent River west of the BWP, requested by the USACE to be avoided.
- A bald cypress swamp located on BARC and NPS property east of the BWP.

4.11.3.2 Waterways

FRA identified tidal and nontidal waterways within the SCMAGLEV Project Affected Environment. Waterway classifications include perennial (groundwater flows year-round), intermittent (groundwater flows at some point during the year), and ephemeral (does not intersect groundwater at any time of the year) systems. With new ruling in 2020 on the definition of Waters of the U.S., ephemeral features that contain water only in direct response to rainfall or snowmelt are no longer considered jurisdictional resources. Therefore, ephemeral waters delineated during field investigations may no longer need representation on SCMAGLEV documentation and mapping, pending confirmation from the USACE.

As previously identified in Section 4.10 Water Resources, waterways are also given designated Use classes by MDE, identifying the state's goals for water quality. FRA identified all nontidal waterways within the SCMAGLEV Project Affected Environment as Use I (water contact recreation and protection of nontidal warmwater aquatic life) or Use I-P (water contact recreation, protection of aquatic life, and public water supply). FRA identified the tidal systems within the SCMAGLEV Project Affected Environment as Use II (water contact recreation and support of estuarine and marine aquatic life).

Greater than 37,000 linear feet of waterway crossings are located within the SCMAGLEV Project Affected Environment, increasing up to approximately 43,000 linear feet depending upon the Build Alternative. All Build Alternatives include the long-term laydown area near MD 200 and I-95, which includes 10,500 linear feet of waterway; however, the presence of these waterways is based on published data and has not been field verified. Several waterways within the SCMAGLEV Project Affected Environment are notable for their position as headwater or first order tributaries, significant riparian habitat supporting potential RTE species, associated with NTWSSC, or designation as a state Scenic River (also detailed in Section 4.10 Water Resources). FRA identified the presence of several important waterways in the SCMAGLEV Project Affected Environment including the following:

- Headwaters of Beaverdam Creek

- Headwaters of Little Patuxent River
- Headwaters for a tributary known to support sensitive species and habitats at the north end of PRR property
- Beck Branch, bounded by NTWSSC
- Beaverdam Creek, bounded by NTWSSC
- Patuxent River, State Scenic and Wild River, bounded by NTWSSC
- Little Patuxent River, upstream of NTWSSC
- Four tidal waterways: Anacostia River (a State Scenic and Wild River); tributary to Anacostia River Middle Branch Patapsco River; and Gwynns Falls

4.11.4 Environmental Consequences

FRA evaluated potential impacts to wetlands and waterways associated with the No Build Alternative and the Build Alternatives. FRA considered direct and indirect, permanent and temporary impacts associated with the Build Alternatives, as well as the short-term construction effects. FRA considers direct impacts that will result from new permanent structures and operations to be permanent impacts. FRA considers direct impacts that will result from areas of anticipated temporary disturbances associated with construction activities to be temporary impacts, with some resulting in short-term effects and others in long-term effects. FRA presents a breakdown of anticipated permanent and temporary impacts for each Build Alternative, including station and trainset maintenance facility (TMF) options, in Appendix D.7 NETR impact summary tables. However, a determination on temporary impacts will have to be finalized through further agency coordination and final design. All impacts present totals rounded to the nearest whole number. All impacts to wetlands and waterways should be considered estimates as they use a combination of published information and field investigations subject to further review and jurisdictional determination by the regulatory agencies.

Coordination with the regulatory agencies for submission of a Joint Federal/State Application for the Alteration of Any Floodplain, Waterway, Tidal or Nontidal Wetland in Maryland (JPA), is currently ongoing and anticipated to coincide with release of this document. The SCMAGLEV Project will trigger an individual permit with the USACE and MDE through the Section 404(b)(1) process and will be thoroughly evaluated to determine compliance with all provisions of those guidelines. Submission of an application for a tidal wetlands license will be required through the BPW, as the agency regulates all tidal systems “in, over, or under” project activities. Tidal system impacts are not anticipated to require tidal mitigation. Coordination with the USACE has also been initiated in accordance with Section 10 of the Rivers and Harbors Act for bridging over or tunneling under navigable waters and Section 408 review under Section 14 of the Rivers and Harbors Act for the proposed tunneling under the Anacostia River Federal Navigation Channel and levee system located in the area of the Bladensburg Waterfront Park. Additionally, the SCMAGLEV Project Sponsor must submit a Statement of Findings per DO 77-1 and DO-77-2 to the NPS for impacts to any wetland and floodplain located on NPS property.

Coordination with the Critical Area Commission would also be required as noted in Section 4.10 Water Resources, to address impacts to wetlands and waterways within the Chesapeake Bay Critical Area (Critical Area) should final review of permit materials indicate wetland impacts in these areas. At this time there are no wetlands identified where proposed surface disturbance will occur within the Critical Area. Additional compensation/ mitigation may be required for impacts to wetlands that fall within this boundary.

4.11.4.1 No Build Alternative

Under the No Build Alternative, the SCMAGLEV Project would not be built and therefore no impacts related to the construction or operation of the SCMAGLEV Project will occur. However, other planned and funded transportation projects will continue to be implemented in the area and could result in effects to wetlands and waterways such as filling wetlands, crossing or culverting waterways, and increasing stormwater runoff to these systems as a result of roadway expansions.

4.11.4.2 Build Alternatives

FRA evaluated the potential for effects to wetlands and waterways located within the SCMAGLEV Project Affected Environment. FRA has considered all areas of surface disturbance to be a direct impact to wetlands and waterways. In coordination with the USACE and MDE, FRA learned that a deep tunnel under wetlands and waterways will not result in impacts that will require permitting through their agencies; therefore, no calculated impacts are attributed in these areas. The following section provides both a qualitative and quantitative analysis of impacts. Impact calculations include wetlands and waterways located within the footprint of the LOD for all proposed surface disturbance. As clarified in the methodology section, quantitative analyses do not include published resources at the proposed long-term construction laydown area near MD 200 and I-95. Wetland and waterway impacts as a result of the SCMAGLEV Project would include the following types of resource disturbance:

- Complete or partial fill of a wetland system and disconnection and/or fill within a waterway as a result of placement of permanent structures such as viaduct piers or other standing structures including maintenance of way (MOW) facilities, fresh air/emergency egress (FA/EE) facilities, TMFs, or stations.
- Conversion of wetland type (e.g. removal of vegetation from a PFO wetland resulting in a PEM wetland due to disturbance during construction and/or the systems location under elevated viaduct).
- Relocation of waterways or creation of culverted systems, while maintaining hydrologic connection.

Impact calculations also include areas that will require temporary cut/cover for tunnel construction. Impacts have not been calculated for wetland boundaries that may either extend beyond the LOD or be directly connected hydrologically if they are beyond the

LOD. FRA recognizes that significant minimization and mitigation efforts would be required to ensure that the impacts identified within the LOD do not also directly or indirectly affect those adjacent systems through potential dewatering from loss of groundwater supply and/or hydrologic connections; alterations in habitat which may introduce invasive species and competition for food and protection; and visual/human intrinsic value that may be placed upon these natural areas. Impacts are presented in **Table 4.11-2** and **Table 4.11-3** below, with additional qualitative analyses and impact summary tables included in Appendix D.7 NETR.

Summary of Build Alternative impacts:

- Build Alternatives J-02, J-03, J-06, and J1-03 would result in the greatest linear feet of waterway impact. Build Alternative J-04 would result in the least waterway impact.
- Four Build Alternatives associated with the MD 198 TMF would result in the greatest acreage of wetland impact, just less than two times the permanent wetland impacts as compared to the other eight Build Alternatives.
- Build Alternatives that include the BARC Airstrip TMF option would result in more than two times the permanent NTWSSC impacts as compared to the other eight Build Alternatives.
- Build Alternatives J1-03 and J1-06 would result in the least permanent wetland impact and among the lowest permanent NTWSSC impacts.

Wetlands

Direct wetland impacts would occur at locations of proposed surface disturbances, where existing wetland vegetation would be removed, soils altered/removed, and/or sources of hydrology disrupted. **Table 4.11-2** provides a summary of direct permanent wetland impacts by wetland classification and for NTWSSC associated with each Build Alternative. Refer to Appendix D.7 NETR for a breakdown of anticipated permanent and temporary wetland impacts for each Build Alternative, including station and TMF options, as well as a breakdown of NTWSSC total impacts.

Table 4.11-2: Permanent Wetland Impact Summary

Build Alternative	Acres of Permanent Impact by Wetland Type*				Total Wetland Impact (acres) Classified as NTWSSC**	Total Wetland Buffer Impact (acres)***
	PUB	PEM	PFO	TOTAL		
J-01	1	7	37	45	6	20
J-02	1	2	22	26	19	37
J-03	1	3	18	22	9	21
J-04	1	7	37	45	6	20
J-05	1	2	22	25	19	37

Build Alternative	Acres of Permanent Impact by Wetland Type*				Total Wetland Impact (acres) Classified as NTWSSC**	Total Wetland Buffer Impact (acres)***
	PUB	PEM	PFO	TOTAL		
J-06	1	3	18	22	9	21
J1-01	<1	8	43	51	4	23
J1-02	<1	3	24	27	14	39
J1-03	<1	3	20	23	5	24
J1-04	0	8	43	51	4	23
J1-05	0	3	24	27	14	39
J1-06	0	3	20	23	5	24

*All Build Alternative impact calculations exclude published wetland data associated with the long-term construction laydown area near MD 200 and I-95 (approximately 21 acres of primarily PUB and PFO wetlands). No vegetated tidal wetlands will be impacted.

** NTWSSC acreage is calculated separately from the total acreage, based on state-published boundaries, not field-delineated boundaries.

***Wetland buffer impacts include the 100-foot buffer required for NTWSSC.

Removal or fill within wetlands would result in an immediate and permanent removal of habitat, potential hydrologic disconnection, and alter the functions and values of the systems. The functions and values that may be altered include:

- A direct removal or change in habitat which may indirectly affect the species relying on the wetland for food, water, protection, and breeding.
- A direct removal or change in hydrologic functions may include a reduction in water storage capacity which may indirectly affect both surface water hydrology downstream and groundwater recharge and supply. This may also affect flooding patterns, and the ability to slow down flow velocities.
- A direct removal or fill within wetlands can directly affect the landscape's capacity to trap and filter sediments and pollutants, which may indirectly affect water quality.

Wetlands that would only experience a temporary conversion of cover type (e.g. PFO wetland converted to PEM or PSS wetland) would not lose total function and value to the environment, but they would be altered. A forested wetland habitat that is cleared for construction may have the ability to regenerate or be restored with plantings, but the length of time it will take to become reforested may result in indirect changes in habitat and species dynamics noted above. This may occur at locations of viaduct, where permanent maintenance access is not required under the viaduct and a natural system is able to be reestablished, or at a location of temporary clearing just for construction activities. FRA has determined that a conversion of wetland type will have both direct and indirect effects. For example, the effects of tree removal from a PFO wetland or its buffer may result in increased ground saturation affecting site hydrology, as well as increased sunlight to the wetland resulting in the potential introduction of invasive vegetation. These direct habitat changes lead to indirect effects to terrestrial and

aquatic species. FRA provides additional detail regarding potential habitat effects in Section 4.12 Ecological Resources.

Permanent structures and construction activities outside of wetlands but within wetland buffers can also indirectly affect wetlands. Wetland buffers are critical to the function of wetland systems. Changes to upstream hydrology from new impervious surface can indirectly affect wetland hydrology for downstream receiving wetlands.

The following subsections describe the wetland impacts of the alignments, stations, and TMFs. Due to the expanse of wetland impacts located on Federal properties, FRA also provided a breakdown of impacts per Federal lands, as well as state, county and local land (Appendix D.7 NETR). Impacts do not represent a comprehensive list of impacts broken down per all properties impacted by the SCMAGLEV Project, but rather the more prominent areas of natural systems traversed.

Alignments

Impacts to wetlands for the alignments would result in similar amount of permanent acreage, with only two acres differentiating the alignments associated with Build Alternatives J-01 through J-06 (11 acres) versus alignments associated with Build Alternatives J1-01 through J1-06 (13 acres). Of the total permanent impacts, FRA estimates that the Build Alternatives J alignments would permanently impact approximately six acres of NTWSSC surrounding Beck Branch, Beaverdam Creek, and Patuxent River. By comparison, the Build Alternatives J1 alignments would permanently impact approximately three to four acres of NTWSSC surrounding Beck Branch and Beaverdam Creek. Therefore, the Build Alternatives J1 alignments would have less permanent impact to NTWSSC.

The total LOD for the viaduct is included in the calculations of permanent wetland impacts to present the most conservative estimation. Through final design and engineering, and continued coordination with the agencies, FRA will account for areas located underneath of the viaduct where wetland functions and values may be retained. In most locations, shading of wetlands underneath of the viaduct is not anticipated to diminish the functions of the wetland or its ability to regenerate. Areas calculated as permanent PEM wetland impacts have the potential to be reduced to temporary impacts. For other wetland types, conversion of vegetation type would be considered a permanent impact. Refer to Appendix D.7 NETR for a comparison of the permanent, as well as temporary, impacts of the alignments.

FRA has considered important wetland systems present in the SCMAGLEV Project Affected Environment within their design and has modified design plans to the extent feasible. For example, impact to the high quality PFO wetland located just north of the Patuxent River west of the BWP was specifically minimized by placement of bridge piers for Build Alternatives J1 alignments, outside of this wetland with elevated viaduct spanning above. The unavoidable portion of this wetland within the LOD would require vegetation removal and temporary disturbance during construction, but with appropriate BMPs and continued ESD techniques it would not lose important wetland functions.

Similarly, FRA has considered the more extensive wetland systems present, largely located around the major waterways and present NTWSSC. In these areas, FRA has proposed extended elevated guideway sections, with longer spans between piers in order to minimize ground disturbance. Refer to the minimization and mitigation section below for additional details.

Stations

FRA found no wetland impacts or NTWSSC impacts associated with the Mount Vernon Square East, BWI Marshall Airport, and Camden Yards Stations. The Cherry Hill Station would impact less than one acre of wetland and would result in no impacts to NTWSSC.

Trainset Maintenance Facilities (TMFs)

The MD 198 TMF would impact the most acres of wetland among the three TMF options, with total permanent impacts of 33 acres with Build Alternatives J-01 through J-06 or 38 acres with Build Alternatives J1-01 through J1-06. The direct and permanent wetland impacts as a result of this TMF would significantly alter habitat, including sensitive species habitat and RTE species, water quality, flood storage, and drainage patterns of the Little Patuxent River Watershed, as previously detailed in Section 4.10 Water Resources.

The BARC Airstrip TMF would result in 13 to 14 acres of permanent wetland impacts, which includes the most permanent NTWSSC impacts (11 to 12 acres). BARC West would result in 10 acres of permanent wetland impact, which includes two to three acres of permanent NTWSSC impacts. While the MD 198 TMF option has by far the greatest wetland impact (33 to 38 acres), it would impact no more than one acre of NTWSSC.

All TMF options would directly and permanently impact wetland systems located within Tier II and Stronghold Watersheds. Fill within these wetlands in order to construct the TMF buildings and tracks would result in a direct loss of these wetlands and would permanently alter the existing natural environment and valuable functions provided by wetlands as noted previously. During final design of the TMF locations, ESD would be utilized to intermix natural systems to the area, for example, stormwater management swales that would provide conveyance of hydrology and attenuation of stormwater runoff, with the goal to restore lost functions for both water quantity and water quality for the surrounding landscape.

Waterways

Direct waterway impacts will occur at locations of proposed surface disturbances, where waterway geomorphology, flow, or water quality will be altered. Greater detail regarding water quality impacts is discussed in Section 4.10 Water Resources.

Table 4.11-3 provides a summary of direct permanent nontidal waterway impacts by waterway classification associated with each Build Alternative. Refer to Appendix D.7 NETR for temporary impacts. With final design, all efforts will be made to span

waterways underneath of viaducts by placing the support piers outside of the waterway banks. For the purpose of this analysis, though, the viaduct was counted as a permanent impact. Although ephemeral waterways are treated separately dependent upon the regulatory authority, FRA has included ephemeral waterways in this analysis. Tidal waterways are not located within areas of proposed SCMAGLEV surface disturbance but are crossed underneath by proposed deep tunnel. **Table 4.11-4** provides a summary of tidal waterways crossed.

Table 4.11-3: Permanent Nontidal Waterway Impact Summary

Build Alternative	Linear Feet of Impact by Waterway Type*			
	Ephemeral	Intermittent	Perennial	TOTAL
J-01	1,224	5,296	3,741	10,261
J-02	1,418	5,649	5,557	12,624
J-03	1,549	5,385	5,962	12,896
J-04	1,224	5,296	3,426	9,946
J-05	1,418	5,649	5,243	12,310
J-06	1,549	5,385	5,647	12,581
J1-01	814	4,526	6,669	12,009
J1-02	893	3,487	7,728	12,108
J1-03	852	3,617	8,189	12,659
J1-04	814	4,526	6,354	11,694
J1-05	893	3,487	7,414	11,794
J1-06	852	3,617	7,875	12,344

* All Build Alternative impact calculations exclude published waterway data associated with the long-term construction laydown area near MD 200 and I-95.

Table 4.11-4: Tidal Waterway Impact Summary

Summary of LOD Crossings Under Tidal Portions of Anacostia River, Unnamed Tributary to the Anacostia River, Gwynns Falls, and Middle Branch Patapsco River						
Build Alternative	Alignment*		Camden Station*		Total*	
	LF	SF	LF	SF	LF	SF
J-01	146	15,251	0	0	146	15,251
J-02	146	15,251	0	0	146	15,251
J-03	146	15,251	0	0	146	15,251
J-04	146	15,251	1,105	50,839	1,251	66,090
J-05	146	15,251	1,105	50,839	1,251	66,090
J-06	146	15,251	1,105	50,839	1,251	66,090
J1-01	142	15,406	0	0	142	15,406

Summary of LOD Crossings Under Tidal Portions of Anacostia River, Unnamed Tributary to the Anacostia River, Gwynns Falls, and Middle Branch Patapsco River						
Build Alternative	Alignment*		Camden Station*		Total*	
	LF	SF	LF	SF	LF	SF
J1-02	142	15,406	0	0	142	15,406
J1-03	142	15,406	0	0	142	15,406
J1-04	142	15,406	1,105	50,839	1,247	66,245
J1-05	142	15,406	1,105	50,839	1,247	66,245
J1-06	142	15,406	1,105	50,839	1,247	66,245

The Patapsco River is crossed by deep tunnel just south of I-895 and east of Route 295. This area is included within the scanned areas of the 1972 State Tidal Waterways and adjacent land therefore considered within the Chesapeake Bay Critical Area; however it is identified as a Use I water and a tidally influenced, riverine, deep water system (R1UBV) by MDE. Because this particular location would require coordination with the regulatory agencies to determine its final jurisdiction, it has not been included within either Table 4.11-3 as a nontidal waterway impacted by surface features, or Table 4.11-4 as a tidal waterway crossed beneath by deep tunnel. Approximately 9,575 square feet of this system falls within the SCMAGLEV Project LOD.

The Build Alternatives would require the relocations, culverting, or fill within waterways at various locations within the SCMAGLEV Affected Environment for ancillary facilities along the alignments, TMF options, and at the Cherry Hill Station. FRA assumes the following as a result of surface disturbance:

- FRA recognizes that waterway channel formations are variable, depending on changes in flow and underlying geology. The addition of SCMAGLEV Project runoff from structures into waterway channels could cause direct impacts to the channel with additional changes in flow, bank or in-channel erosion, sand and gravel bar creation and shifting, and scouring.
- Waterway relocations will be a direct temporary impact with potential for long-term effects noted above. Waterway relocation design would attempt to mimic the appropriate waterway dimensions, materials, and volume capacity. Additional factors such as waterway length, soils, and surrounding land uses could affect the success of a given relocation.
- FRA would consider construction of culverts to maintain hydrologic connections in locations of proposed permanent surface disturbance where fill would be required. This loss of natural substrate for the waterway would affect the temperature and composition of species able to function with these new conditions.

FRA evaluated the effects to waterways not only for the direct impacts that will result from the SCMAGLEV Project, but the indirect effects that other project actions will have

on waterways. Many waterways in the LOD are buffered by forest, which will be removed by the SCMAGLEV Project. As previously described, many of the waterways identified within the SCMAGLEV Project Affected Environment consist of interconnected wetland and waterway complexes that ultimately convey hydrologic flow to and through major regional stream systems. The greatest loss of forested stream buffers are associated with these major waterways, identified in proposed areas of elevated viaduct and surface ancillary features. Acreage of forest impacts is included in the following Section 4.12 Ecological Resources. The loss of forest along waterways will directly affect water temperature regimes and in-stream/floodplain vegetation composition. Although the viaduct would provide or replace shading to portions of stream, the full benefit of forest shading would not be achieved. Additional indirect effects of potential changes to water temperature and vegetation changes would affect aquatic organisms and water quality, wildlife habitat and corridors, flood control and reducing the effects of nutrient runoff into waters. Changes to flooding regimes of waterways could affect the forest buffers and could potentially influence the species present that are adapted to life along waterways.

The following subsections identify and compare the waterway impacts among the alignments, stations, and TMFs (refer to Appendix D.7 NETR impact summary tables for additional breakdown of waterway impacts).

Alignments

The alignments would result in similar amounts of permanent impacts. The alignments associated with Build Alternatives J-01 through J-06 would permanently impact between approximately 7,600 and 7,800 linear feet of waterways. The alignments associated with Build Alternatives J1-01 through J1-06 would permanently impact between approximately 7,000 and 7,400 linear feet of waterways. Likely the most notable difference in impacts results from the Build Alternatives J alignments being elevated over the Little Patuxent River and the Build Alternatives J1 alignments tunneling under. Additionally, only the Build Alternatives J alignments have the potential to impact important headwaters identified by USFWS on PRR.

The additional length of elevated viaduct associated with the alignments of Build Alternatives J-01 through J-06, does not significantly increase proposed waterway impacts compared with the alignments of Build Alternatives J1-01 through J1-06. This is in part due to the sinuosity of the waterways within the SCMAGLEV Affected Environment. For example, several tributaries paralleling the BWP and alignment associated with Build Alternatives J1-01 through J1-06 require multiple crossings of the same waterway, which increases the risk of both direct and indirect waterway impacts. These occurrences would be considered during final planning and design to avoid instream impacts by spanning systems and use of temporary stream crossings to the extent possible during construction. Further design techniques and BMPs to minimize impacts is discussed in later sections.

Two tidal waterways are traversed through deep tunnel by alignments associated with all Build Alternatives, the Anacostia River and an unnamed tributary to the Anacostia.

The top of the SCMAGLEV tunnel would be approximately 75 feet below the surface elevation of the Anacostia River. Although historic records of the Anacostia show it to have been as deep as 40 feet in this area near Bladensburg, it is currently thought to be as shallow as three feet at the Bladensburg Waterfront Park³; therefore, the tunnel would be well below this resource.

As noted previously, coordination would be required with the regulatory agencies to determine the jurisdiction and classification of the Patapsco River at the location it is crossed by any alignment, just south of I-895. The proposed top of tunnel beneath the surface elevation of the Patapsco River would be approximately 78 feet. This is also anticipated to be well below the depth of the Patapsco River, although further ground investigations would need to be conducted to provide official depths of the rivers.

It is not anticipated that these waterways will be impacted by the SCMAGLEV Project tunnel, as they are in deep areas below the surface at these locations. However, tunneling under these systems will require coordination with the USACE and MDE Tidal Wetlands Division and the BPW for the waterway crossings illustrated in **Table 4.11-4** and potentially for the approximate 9,575 square feet of the Patapsco River tunneled under by all Build Alternatives.

Stations

There are no waterway impacts at the Mount Vernon Square East Station or BWI Marshall Airport Stations. Deep tunnel proposed for Build Alternatives J-04 through J-06 and J1-04 through J1-06 associated with the Camden Yards Station (illustrated in **Table 4.11-4**) will cross under the Gwynns Falls at its confluence with the Middle Branch of the Patapsco River and three small “fingers” of the Middle Branch. Depth to the top of tunnel below these tidal systems is approximately 40 to 60 feet below the water surface. The Cherry Hill Station would permanently impact approximately 315 linear feet of nontidal waterways.

Trainset Maintenance Facilities (TMFs)

The MD 198 TMF would permanently impact over 2,300 linear feet of waterways for Build Alternatives J-01 and J-04 and over 4,700 linear feet of waterways for Build Alternatives J1-01 and J1-04. The difference in this approximate doubling of impact would result from the MD 198 connecting tracks from any Build Alternatives J1 alignments through a long portal area just below the surface and at-grade, which would traverse the Little Patuxent River and its tributaries.

The BARC Airstrip TMF and BARC West TMF would similarly result in approximately 4,500 to 5,000 linear feet of permanent impacts to waterways. The BARC Airstrip TMF would impact important headwaters of Beaverdam Creek, and the BARC West TMF would impact Beaverdam Creek and its tributaries. The impacts to these waterways

³ <https://www.anacostiaaws.org/our-watershed/aws-faqs.html>

located largely on BARC and NPS properties have been provided in additional detail in sections 4.10 and 4.12. No tidal waterways would be impacted by any TMF.

4.11.4.3 Short-term Construction Effects

Wetlands

Construction of viaduct and other surface features will require temporary access roads for equipment and materials. Use of these roads could require crossing of wetlands and their buffers and removal of wetland vegetation. These actions would result in temporary direct impacts, dependent upon the needs of the contractor, the type of access road necessary, and the ability for selective removal of vegetation. Impacts could result from matting over wetlands for construction vehicles to traverse the site which has the potential to compact wetland vegetation and soils. However, removal of construction equipment and matting would allow the area to regenerate.

As previously noted, additional temporary impacts (a decrease of proposed permanent impacts) to wetlands could occur in locations where proposed viaduct will span aerially over existing PEM wetland, although FRA has identified this as a very small amount of the overall wetland impacts as a result of the SCMAGLEV Project (note: placement of viaduct piers will be considered a permanent impact). The total estimated PEM wetlands that will be aerially spanned for Build Alternatives J-01 through J-06 is one acre and less than 0.1 acre for Build Alternatives J1-01 through J1-06. Estimated temporary impacts to wetlands are included in Appendix D.7 NETR impact summary tables.

Dewatering may be required during construction of subsurface features, to remove any accumulated water within areas of excavation. As noted in Section 4.10, this action may affect the availability of groundwater, which in turn may effect the groundwaters ability to support sustained hydrology to adjacent wetlands. The Project Sponsor will determine the most appropriate means of dewatering, either excluding the groundwater from reaching the work area or pumping it out. The length of time that dewatering would be required may dictate proposed measures to mitigate for potential impacts.

The improper disposal of excavated material from tunnel construction would also have the potential to affect wetlands if the excavated materials were placed within wetlands or in un-stabilized areas where they could be washed into existing wetlands. FRA expects that compliance with any USACE CWA Section 404 permit and implementation of all BMPs would reduce or avoid this potential.

Waterways

FRA has identified short-term construction impacts that may occur within waterways as a result of the Build Alternatives. Short-term temporary effects would occur as a result of temporary waterway crossings, which could utilize existing fords if possible and small bridges that span a waterway from bank to bank. Larger instream construction activities may require instream diversions, use of cofferdams, pump-arounds, or other BMPs to minimize the effects to the waterway during construction of surface features. In

addition, pumping or washing operations would be necessary for tunnel construction. All these potential short-term construction effects could result in sedimentation or increased turbidity within the waterways. Effects of tunneling could cause the disposal of excavated materials into waterways, as stated previously for wetland effects. Refer to Appendix D.7 NETR impact summary tables for a breakdown of estimated temporary waterway impacts.

4.11.5 Potential Minimization and Mitigation Strategies

The Project Sponsor will avoid and minimize impacts to wetlands and waterways to the maximum extent practicable, not only for short-term construction activities, but also for long-term operational effects on the resources. For impacts that cannot be avoided, the following measures would be considered to minimize and mitigate potential impacts.

4.11.5.1 Minimization

FRA has considered the vast expanse of wetlands and waterways throughout the SCMAGLEV Protect Affected Environment, most notably in areas of proposed surface features located on several Federal and county properties. Alignment shifts were considered as feasible during early design phases and supplemented with design measures such as increased elevated span lengths and pier construction techniques to allow for avoidance of instream piers to large waterways to the extent possible.

Spanning large systems, such as the Patuxent River, may not be feasible, specifically for the alignments associated with Build Alternatives J1-01 through J1-06, due to the bend in the river. An alternative option would be to use a “straddle bent,” which is often used when crossing a skewed surface feature or constraint. This allows for an extension of the superstructure without extending the impact of the pier to the surface below. The Project Sponsor will consider additional minimization, and mitigation measures as it advances its engineering design.

In addition to the high-level design minimization measures noted above, the Project Sponsor has minimized and avoided impacts at the following noted sensitive areas:

- Wetland, stream, and riparian buffers located immediately north of Veterans Highway. The design is avoiding all direct impacts to these systems by shifting the proposed FA/EE north and proposing access to the area from Riverdale Road instead of Veterans Highway.
- High-quality wetlands located within Maryland City Park north of the Patuxent River, west of the BWP. The design is avoiding direct placement of piers within this system.
- High-quality wetlands that support rare species located in the Harman’s area of Baltimore County. The design is avoiding above ground impacts by shifting the proposed FA/EE farther north in the commercial/developed area.

- Floodplain and wetlands located along the northern boundary of the Patapsco River, south of I-895. The design is avoiding above ground impacts by shifting the proposed FA/EE farther east in the commercial/developed area.

The Project Sponsor will continue to identify design opportunities to avoid and minimize impacts to wetlands and waterways, with removing viaduct pier locations from these resources as a priority strategy. This may include spanning as many resources as feasible. Impacts to wetlands and waterways for any Build Alternative would likely occur along the Patuxent River and Beaverdam Creek and their associated tributaries, wetlands (including NTWSSC), forests, and floodplains. Because resources along these waterways would be impacted, the Project Sponsor will implement BMPs during construction, in addition to complying with MDE, USACE, and NPS regulations. The Project Sponsor will also develop and implement restoration efforts in these areas in coordination with the USFWS.

The Project Sponsor will avoid and minimize short-term construction effects mainly using site BMPs required through existing agency coordination and future permitting process with the state and Federal agencies including the USACE, MDE, NPS, USFWS, and MDNR, as well as in accordance with county/local authorities. These BMPs can include:

- Same-day stabilization measures as feasible for any earth disturbing activities.
- Use of appropriate erosion and sediment control BMPs.
- Compliance with MDNR Time-of-Year restrictions for all work that occurs within waterways. All waterways within the proposed Build Alternatives area of surface disturbance are classified as Use I or Use I-P waters, which MDNR suggested should avoid work within the channel between February 15 and June 15, inclusive, during any year.
- Use of temporary bridge crossings over smaller waterways. Where practicable, bridge crossings will be installed perpendicular to the waterway. If a bridge cannot be installed without impact to the waterway, a diversion will be set up and the site dewatered.
- Proposed low-water fords for crossing small streams will be limited to areas where the streambed has a firm bottom and/or stable material, and where fish passage is less of a concern. These measures will require coordination with the MDE to maintain in accordance with their “no work in the wet” policy for all stream activities which includes mechanized equipment crossing of streams.
- If instream work cannot be avoided the use of cofferdams will be evaluated. This is a system in which a watertight enclosure can be pumped dry to allow construction work to happen below the waterline, while the remainder of the waterway can flow freely to allow fish passage.
- Placement of ground protection matting over wetland and wetland buffers.

- Vegetation clearing required for construction activities will attempt to fell trees away from streams or wetlands to prevent organic debris from entering the wetland or waterway, as well as avoid rutting and soil disturbance.

If the long-term construction laydown area near MD 200 and I-95 is used during construction, the Project Sponsor will refine site development design after conducting wetland and waterway delineations. With consideration of ESD and planning to strategically locate entrances, storage, and other site uses, and with implementation of onsite BMPs, the Project Sponsor will avoid all permanent impacts to these resources.

4.11.5.2 Mitigation

All Build Alternatives would result in wetland and waterway impacts and would require a permit under Section 404 of the CWA. Mitigation for wetland loss may include a combination of onsite and offsite wetland mitigation. As per NPS regulations, any impacts to wetlands on NPS property will also require a Statement of Findings. The NPS will be consulted on proposed methods of mitigation on NPS lands.

Additional field surveys and agency coordination is required within areas of NTWSSC to receive final concurrence on delineation of boundaries. This final determination will support final design efforts to avoid and minimize impacts to these systems. For impacts to NTWSSC, additional protections, such as 100-foot buffers would be required. NTWSSC also receive higher mitigation ratios than other nontidal wetlands.

At PRR, the Project Sponsor will coordinate with USFWS to finalize delineations of vernal pools and other sensitive wetlands to establish, as feasible, protective buffer zones for resources within and adjacent to the LOD.

The Project Sponsor is currently pursuing possible mitigation strategies to satisfy anticipated compensatory mitigation that will be required for impacts to wetland and waterways. The USACE has a hierarchical preference for wetland mitigations: purchase of wetland credits from an approved mitigation bank; in-kind mitigation (i.e. restored PFO for impacted PFO); and out-of-kind mitigation. Mitigation is always preferred within the same watershed as the impact occurs, if possible. Coordination with the USACE and MDE is ongoing, and additional detail on mitigation proposed is anticipated prior to completion of a Final Environmental Impact Statement. Additional mitigation strategies that would be considered during final design and construction planning may include:

- Onsite re-establishment of wetland habitat, where feasible
- Onsite re-establishment of forested wetland habitat, where feasible, including planting of trees of appropriate mature height under the guideway to provide contiguous canopy while maintaining the 13-foot clearance beneath the structure
- Offsite wetland mitigation, whether through banking or permittee-created wetlands within the watersheds
- Onsite and offsite restoration of degraded stream reaches associated with the major river systems

- Coordination with MDE and USFWS to determine compensatory mitigation value and restoration opportunities for unavoidable impacts to NTWSSC and other high-value wetlands and waterways at PRR
- Coordination with MDNR and county and local municipalities to identify wetland and waterway restoration priorities
- Purchasing of intact wetland complexes for placement in perpetual easement
- Invasive species management of onsite and adjacent habitats
- Funding ecological research and restoration at PRR and BARC
- Dam removal per USACE Regulatory Guidance Letter (September 25, 2018)

Additional information on these strategies can be found in Appendix D.7 NETR.

Scenic and Wild Rivers

Due to the visual setting differences proposed to the Patuxent River, FRA recognizes that avoidance and minimization of the surrounding environment would be required, and FRA would continue through final design to make determinations of bridge pier locations, and the potential to restore resources lost in and around the river following construction. Aesthetic treatments of these areas would also be required and directly coordinated with the MDNR and adjacent property owners including the U.S. Fish and Wildlife Service (USFWS) and the National Park Service (NPS).

Appendix D.7D WETLANDS AND WATERWAYS

D.7D.1 Introduction

This section evaluates the existing Waters of the U.S. and other jurisdictional³¹ systems that could be affected by the SCMAGLEV Project. This section also identifies and evaluates impacts on select notable wetlands and Nontidal Wetlands of Special State Concern.

D.7D.2 Regulatory Context and Methodology

D.7D.2.1 Regulatory Context

In accordance with the National Environmental Policy Act (NEPA), 42 U.S.C. § 4321 et seq., the Council on Environmental Quality (CEQ) regulations, 40 C.F.R. Parts 1500 - 1508, and the FRA Procedures for Considering Environmental Impacts, 64 Fed. Reg. 28545 (May 26, 1999) FRA assessed impacts to Waters of the U.S. Jurisdictional waters are regulated by the U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (USEPA) under Section 404 of the Clean Water Act (CWA), and the Rivers and Harbors Act. In Maryland and Washington, D.C., the Maryland Department of the Environment (MDE) and the D.C. Department of Energy and Environment (DOEE), respectively, jointly administer this program with the USACE.

MDE also regulates activities within waters of the State, which includes altering tidal or nontidal wetlands, the 25-foot nontidal wetland buffer, and certain designated high-quality wetlands called Nontidal Wetlands of Special State Concern (NTWSSC). A NTWSSC is one with unique ecological value, often those in which rare, threatened or endangered (RTE) species or exemplary or specialized wetland habitat types occur. In coordination with MDNR regarding protected species and ecological value, MDE maintains mapping of designated NTWSSCs, per COMAR Sec. 26.23.06.01, and regulates activities in these wetlands, including a 100-foot buffer, to protect these wetlands from the impacts of development. Impacts to tidal wetlands require a tidal

³¹ State-regulated and/or District-regulated waters

license issued by the Maryland Board of Public Works (BPW). The DOEE also regulates activities within waters of the District, including wetlands, in accordance with the District's Water Pollution Control Act, D.C. Official Code §§ 8-103.01, et seq.

With the majority of the SCMAGLEV Project occurring within Maryland, it is worth noting that in Maryland, USACE jurisdiction over waters of the U.S. and MDE jurisdiction over waters of the State generally overlap, with a few notable distinctions. USACE and MDE typically take jurisdiction over intermittent and perennial waterways; however, only USACE may take jurisdiction over ephemeral waterways. USACE and MDE typically take jurisdiction over wetlands that meet all three wetland indicators (i.e., wetland hydrology, hydrophytic vegetation, and hydric soils); however, only MDE regulates impacts to isolated wetlands and wetland buffers.

Additional regulations include, but are not limited to:

- The Navigable Waters Protection Rule: Definition of “Waters of the United States” (85 Fed. Reg. 22250, April 21, 2020) (effective June 22, 2020)
- Code of Maryland Regulations (COMAR) Title 26, Subtitle 23 Nontidal Wetlands, Subtitle 24 Tidal Wetlands, and Subtitle 17 Section 04 Construction on Nontidal Waters and Floodplains;
- COMAR Title 26, Subtitle 23, Section 6, Wetlands of Special State Concern;
- National Park Service (NPS) Director's Order 77-1 Wetland Protection;
- Executive Order 11990, Protection of Wetlands (42 Fed. Reg. 26961, May 24, 1977);
- U.S. Department of Transportation Order 5660.1A, Preservation of the Nation's Wetlands

D.7D.2.2 Methodology

The FRA conducted a qualitative analysis of resources within the SCMAGLEV Project Affected Environment, identifying the presence of wetlands and waterways.

Wetlands include “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.” Wetlands and other waters of the U.S. defined in the 33 CFR Part 328 and identified using the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0)*, and National Park Service (NPS) methodologies and policies have been identified within the SCMAGLEV Affected Environment.

FRA defined the geographic limits of the SCMAGLEV Project Affected Environment for wetland and waterways analyses as the proposed SCMAGLEV Project impact area plus

an additional 30-foot buffer. The SGMAGLEV Project impact area includes the limits of operational/physical disturbance, as well as the construction related impact area, which includes additional areas of temporary disturbance required for construction activities. These impact areas comprise the overall limit of disturbance (LOD) of the SCMAGLEV Project Build Alternatives. The LOD includes all surface and subsurface elements. As noted, the SCMAGLEV Project Affected Environment for wetland and waterways includes an additional 30-foot buffer around the LOD. This buffer was included so field investigations would capture areas of potentially regulated 25-foot wetland buffers and notable landscape features adjacent to the LOD.

FRA obtained the location, extent, and defining characteristics of wetlands and waterways from multiple sources, including field-based delineations and observations, available published mapping, and aerial imagery. Between July 2018 and July 2020, FRA conducted field delineations specifically within the areas of proposed surface disturbance of the SCMAGLEV Project Affected Environment, which includes the 30-foot buffer around the LOD. Investigations were conducted for areas where property access was available, which accounted for approximately 70 percent of the total field investigation area. In areas of proposed surface disturbance where property access was not available, as well as for areas of proposed subsurface disturbance, FRA used existing published information from the Maryland Department of Natural Resources (MDNR) wetland mapping, U.S. Fish and Wildlife Services (USFWS) National Wetland Inventory (NWI), MDE stream mapping, and the U.S. Geological Survey (USGS) National Hydrologic Data (NHD) to approximate the boundaries of wetlands and waterways within the SCMAGLEV Project Affected Environment that were not field investigated.

For field-investigated areas, FRA performed wetland delineations in accordance with the USACE *Wetland Delineation Manual (Environmental Laboratory, 1987)* and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0)* (USACE, 2010), *Regional Guidance Letter No. 05-05: Ordinary High-Water Mark Identification* (USACE 2005), and applicable supplements, court rulings, and federal/state policies. For field delineations on NPS property, FRA followed NPS DO 77-1 Section 4.1.2. The USACE and NPS delineation procedures require assessing the presence and extent of three wetland parameters: wetland hydrology, hydrophytic vegetation, and hydric soils.

At the Patuxent Research Refuge (PRR), coordination with USFWS staff revealed the potential for encountering unexploded ordnance (UXO)³² during soil investigations. As a result, field investigation methods were modified to delineate wetlands based on hydrophytic vegetation and surficial indicators of hydrology, in conjunction with topographic characteristics, to identify geomorphic position. It is the intent that after sample plot locations have been swept for UXO and cleared for soil disturbance, these

³² UXO are explosive weapons (bombs, bullets, shells, grenades, land mines, navel mines, etc.) that did not explode when they were deployed and still pose a risk of detonation, potentially many decades after they were used or discarded.

systems would require evaluation of soils to confirm delineated wetlands. The location of wetlands and waterways identified and considered in this analysis are illustrated in Attachment E Wetland Location Maps.

In accordance with the *Highway Methodology Workbook Supplement: Wetland Functions and Values, a Descriptive Approach*,³³FRA completed a wetland functions and values assessment for all field-delineated wetlands measuring greater than one-half acre within the SCMAGLEV Project Affected Environment. This methodology is used to assess the following 13 wetland functions and values to aid in evaluating impacts and mitigation options.

- Groundwater Recharge/Discharge
- Floodflow Alteration
- Fish and Shellfish Habitat
- Sediment/Toxicant Retention
- Nutrient Removal
- Production Export
- Sediment/Shoreline Stabilization
- Wildlife Habitat
- Recreation
- Educational/Scientific Value
- Uniqueness/Heritage
- Visual Quality/Aesthetics
- Endangered Species Habitat

FRA identified both potential direct and indirect effects from the SCMAGLEV Project to resources within the SCMAGLEV Project Affected Environment. FRA conducted a quantitative analysis for resources proposed within the LOD for areas of surface disturbance only (which includes areas of tunnel portals, cut and cover areas, elevated viaduct, and above ground ancillary facilities, stations, and TMF) and construction-related surface disturbance (e.g. laydown areas, etc.), as coordination with USACE, MDE, and DOEE indicated permits that resources located under proposed deep tunnel areas would not be considered an impact in the permitting process. Impacts are described as both permanent and temporary. Although systems tunneled under may not be considered an impact, work proposed “in, on, over, or under” a tidal system will be regulated and subject to Maryland Board of Public Works authorization. All tidal

³³ USACE New England District. 1999. *Highway Methodology Workbook Supplement: Wetland Functions and Values, a Descriptive Approach*.

systems were evaluated based on the State Tidal Boundaries and corresponding designated use classes.

FRA has applied an exception to the methodology presented above for calculating wetland and waterway impacts to the proposed long-term construction laydown area near MD 200 and I-95. FRA did not conduct field delineations at this site; therefore, published information, described above, was used to identify wetlands and waterways. Published data indicated approximately 21 acres of wetlands and 10,500 linear feet of waterways located at the site; however, aerial imagery indicates extensive site clearing and development of the site has occurred that has impacted the amount and quality of these resources. If the site is used during construction, the Project Sponsor will conduct delineations to confirm the locations of remaining jurisdictional features and ensure that they are avoided. No impacts to wetlands and waterways are anticipated at this site; therefore, while the site's wetlands and waterways (as shown in published data) are included in totals presented for the SCMAGLEV Project Affected Environment, the site was excluded from the quantitative impact analyses.

For evaluating the presence of and potential effects to NTWSSC as a result of the SCMAGLEV Project, FRA utilized published mapping from MDNR, which generally includes a larger identified NTWSSC boundary as compared with associated field-delineated wetlands; therefore, FRA is presenting the most conservative evaluation of potential effects to NTWSSC. The FRA used this approach because NTWSSC boundaries must be confirmed by the agencies upon review of field conditions. FRA illustrates both MDNR NTWSSC boundaries and associated field-delineated wetland boundaries in Attachment E.1 Wetland Location Maps. Refer to Section D.7E.2.4 for further discussion regarding discrepancies between published data and field-delineated boundaries.

USACE and MDE determine jurisdiction based on wetland delineation data and field reviews and require documentation of impacts in a Joint Federal/State Application for the Alteration of Any Floodplain, Waterway, Tidal or Nontidal Wetland in Maryland (often referred to as a Joint Permit Application, or JPA). Additionally, NPS requires all wetland systems on NPS property to be characterized using the Cowardin classification system³⁴ and all impacts to wetlands documented in a Wetland Statement of Findings (SOF) under Directors Order (DO) 77-1. With selection of a Preferred Alternative, the Project Sponsor will prepare a JPA and SOF.

D.7D.2.3 SCMAGLEV Project Affected Environment

Wetlands and waterways occur throughout the SCMAGLEV Project Affected Environment, with larger and more notable systems occurring on undeveloped lands on the BARC property, PRR property, and NPS property adjacent to the BWP. Other concentrations of wetlands and waterways are located at National Aeronautics and

³⁴ Cowardin, et al. 1979 and FGDC (2013).

Space Administration (NASA) Goddard Space Flight Center (GSFC), on City of Greenbelt properties, on Washington Suburban Sanitary Commission (WSSC) property, on Fort George G. Meade property, at county parks and open spaces (Springfield and Maryland City Parks, and Tipton Airport), on National Security Administration (NSA) property, and on D.C.-owned land on several parcels identified northeast of the BWP/MD 198 interchange and currently leased to the Maryland Department of Juvenile Services. These surface water systems represent individual and interconnected wetland and waterway complexes that ultimately convey hydrologic flow to and through major regional stream systems, including the Anacostia River, Patuxent River, Little Patuxent River, Patapsco River, and Baltimore Harbor.

The following subsections describe wetlands and waterways, including notable systems, that occur in the SCMAGLEV Project Affected Environment. A broader discussion of these resources in the context of watersheds, other water resources, and aquatic habitats is provided in Section D.7D Water Resources and Section D.7F Ecological Resources. Attachment E provides exhibits identifying the location of wetlands and waterways and summary tables characterizing all field-delineated systems.

Table D.7-12 provides a summary of existing wetland and waterways within the SCMAGLEV Affected Environment.

Table D.7-12: Affected Environment Wetlands and Waterways Summary

Build Alternative	Wetlands* (acres)	Wetlands designated as NTWSSC**(acres)	Waterways*** (linear feet)
J-01	83	12	37,371
J-02	69	30	41,859
J-03	62	19	40,910
J-04	82	12	38,348
J-05	68	30	42,837
J-06	61	19	41,887
J1-01	89	7	38,363
J1-02	67	23	40,077
J1-03	58	9	39,256
J1-04	89	7	39,341
J1-05	66	23	41,054
J1-06	57	9	40,234

* All Build Alternative alignments include the long-term laydown area near MD 200 and I-95, which accounts for over 21 acres of wetlands and 10,500 linear feet of waterways, all identified through published data. No tidal vegetated wetlands are present within the Affected Environment. Waterways represent all systems, both tidal and nontidal crossed by the SCMAGLEV Project.

**NTWSSC acreages are not in addition to the wetland acreage presented but are a separate analysis of impacts based on state-published boundaries, not field-delineated boundaries.

FRA initiated coordination with the USACE and MDE in 2018 for the SCMAGLEV Project and this coordination is currently ongoing. On September 6, 2018, representatives from multiple state, Federal and county agencies and departments, the Project Sponsor and design engineers, and MTA, FRA, and NEPA team members conducted a field review of several of the planned surface disturbance locations for proposed alignment and ancillary features. Meeting minutes from this field walk are included in Attachment A. In July of 2019, a pre-application meeting was held specifically with the MDE and USACE. Major waterways and wetland complexes were visited and reviewed. In November 2020 an additional field walk was held with the USEPA, USACE, MDE, and USDA/BARC to review and discuss the proposed TMF locations and facilitate the agency reviews. Pending a formal jurisdictional determination for the SCMAGLEV Project in coordination with USACE, all aquatic resources delineated in the field and described herein are assumed to be jurisdictional.

D.7D.2.4 Wetlands

FRA identified extensive wetlands within the SCMAGLEV Project Affected Environment, ranging from 61 to 89 acres depending upon Build Alternative, with approximately 21 acres of wetlands (identified via published data) associated specifically with the proposed long-term construction laydown area near MD 200 and I-95.³⁵ All wetlands identified are nontidal palustrine systems and are classified into four types: PEM – palustrine emergent; PSS – palustrine scrub-shrub; PFO – palustrine forested; and PUB – palustrine unconsolidated bottom (pond-like).³⁶ Most wetlands that FRA identified are classified as PFO and are located predominantly on many of the Federal and county lands noted above. Many of these wetland systems are associated with and located within the floodplain of a perennial waterway. FRA identified smaller, more fragmented and sometimes more disturbed wetlands influenced by urbanization closer to Baltimore City, within existing roadway infrastructure and utility easements, and between residential neighborhoods. It is anticipated that the majority of wetlands present would be regulated under both USACE and MDE jurisdiction, however this jurisdictional designation has not been coordinated and defined by the agencies. No vegetated tidal wetlands were identified within the SCMAGLEV Project Affected Environment. Open water tidal systems are present within the Affected Environment and discussed in the following waterways section.

Of those wetlands noted above, FRA identified wetlands classified as NTWSSCs based on MDNR mapping, located along three major waterways and their tributaries within the SCMAGLEV Project Affected Environment, including Beaverdam Creek, Beck Branch, and the Patuxent River (Attachment E.1 Wetland Location Maps, Sheets 5 and 6). As shown in **Table D.7-12**, NTWSSC range from seven acres to as much as 30 acres of

³⁵ Of the approximately 21 acres of wetland, published data shows two PEM wetlands (totaling less than an acre), 15 PUB wetlands (totaling nearly seven acres), and one PFO wetland (totaling over 13 acres). Most of these systems appear to be no longer present based on recent aerial imagery.

³⁶ Cowardin et al. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. Prepared for the USFWS.

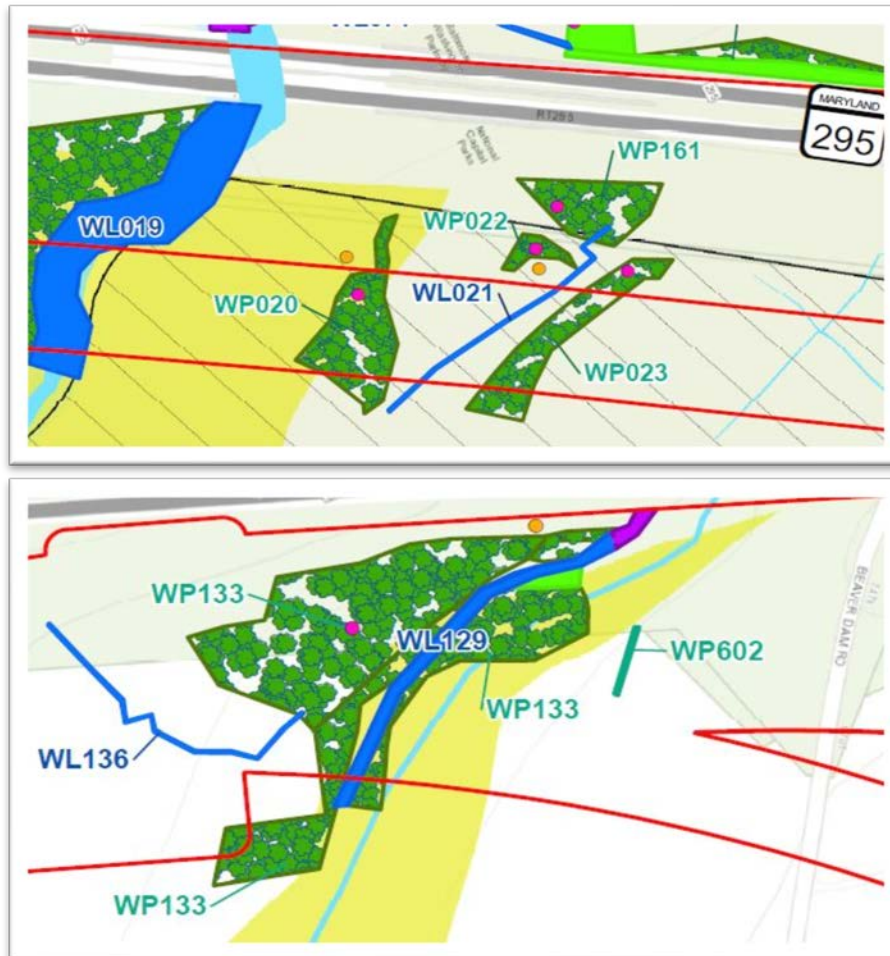
the total wetland acreage identified per Build Alternative. In coordination with MDNR, FRA determined that these NTWSSCs provide habitat for RTE odonate (a dragonfly or damselfly), fish, and plant species. As mentioned above, field-delineations within the footprint of state-mapped NTWSSCs generally resulted in a smaller, more defined wetland boundaries, with some exceptions where the delineated boundaries extend beyond the published data. Examples are provided in **Figure D.7-15**. In all cases, coordination with both MDNR and MDE to confirm the field-verified extents of NTWSSCs is required, which will subsequently allow for proper determination of regulated wetlands and 100-foot buffers. The agencies determinations would be based on a combination of factors, including protection of sensitive species and jurisdictional wetland boundaries. No vegetated tidal wetlands were identified within the SCMAGLEV Project Affected Environment. MDNR and MDE NWI mapping of published wetlands identifies one E2EM1P (estuarine intertidal emergent persistent vegetated irregularly flooded) system located along/within the Gwynns Falls confluence with Middle Branch, just north of the laydown area. This is immediately adjacent to the SCMAGLEV Project LOD proposed deep tunnel extending to the Camden Yards Station, therefore adjacent to Build Alternatives J-04 through J-06 and J1-04 through J1-06. This area is not considered an impact as it is just outside of the LOD and located adjacent to deep tunnel.

FRA identified several notable wetland systems within the SCMAGLEV Project Affected Environment that should be avoided if possible and may require special protection if they cannot be avoided. FRA identified these systems based on their classification, location within the SCMAGLEV Project Affected Environment and possible connection to larger natural systems/habitat, presence of a high-quality resource, and/or through agency coordination. FRA identified the following important wetland systems:

- NTWSSCs and associated field-delineated wetland and waterway complexes located within riparian buffers of Beaverdam Creek, Beck Branch, and Patuxent River (**Figure D.7-15**, top figure). These wetlands are identified by MDNR as supporting RTE species.
- Vernal pools, spring-fed wetland complexes, and forest-stream complexes containing RTE plants identified by the USFWS at PRR.
- High-quality wetlands located north of the Patuxent River west of the BWP, requested by the USACE to be avoided. Wetland WP070 (shown on Sheet 11 of the Attachment E.1 Wetland Location Maps and in **Figure D.7-16**) is located in the wooded buffer between the Maryland City Park athletic fields and the BWP and exhibits low invasive species presence and notable wetland plant diversity.
- A bald cypress swamp identified as Wetland WP133 (shown on Attachment E.1 Wetland Location Maps, Sheet 4; in **Figure D.7-15**, bottom figure; and in **Figure D.7-17**) located on BARC and NPS property east of the BWP. During the July 2019 site visits, MDE identified this wetland as having unique character, and USACE (not present at this wetland review) requested visiting the site during the next round of agency site visits. In subsequent coordination, MDE requested

efforts to determine if the bald cypress stand was planted or occurred naturally. Native bald cypress swamps in Maryland garner special protection and attention from the agencies.

Figure D.7-15: Comparison of NTWSSC and Field-Delineated Boundaries



These figures provide details from the Attachment E.1 Wetland Location Maps, showing mapped NTWSSCs in yellow and field delineated wetlands in dark green. In the top figure (Attachment E.1 Map Sheet 11), only a small portion of Wetland WP020 is delineated within the NTWSSC boundary. In the bottom figure (Attachment E.1 Map Sheet 4), Wetland WP133 is delineated partially within the NTWSSC boundary but overall is larger than the footprint of the NTWSSC within the SCMAGLEV

Figure D-7-16: Wetland WP070



Figure D.7-17: Wetland WP133 Bald Cypress Swamp



Commonly identified indicators of hydrology and wetland vegetation identified during field investigations is provided in **Table D.7-13**. The most common indicator of a hydric soil found in field delineated wetlands was a “depleted matrix,” which refers to the colors created in the soil where there is a restriction of oxygen and reduced iron.

Table D.7-13: Common Hydrology and Vegetation

Hydrology Indicators Present	Wetland Vegetation Present
high water table	red maple (<i>Acer rubrum</i>)
surface water	black tupelo (<i>Nyssa sylvatica</i>)
saturation	sweetgum (<i>Liquidambar styraciflua</i>)
drainage patterns	northern spicebush (<i>Lindera benzoin</i>)
geomorphic positioning	sweet wood-reed (<i>Cinna arundinacea</i>)
water-stained leaves	Japanese stiltgrass (<i>Microstegium vineminum</i>)
drainage patterns	horsebrier or greenbrier (<i>Smilax rotundifolia</i>)

FRA field delineated 26 wetlands measuring greater than a half-acre within the SCMAGLEV Project Affected Environment. These systems and their principal functions and values are summarized in **Table D.7-14**. The most common principal functions and values include: floodflow alteration, sediment/toxicant retention, and wildlife habitat. FRA identified those systems associated with NTWSSCs as having the value of “endangered species habitat” because they potentially support RTE species.

Table D.7-14: Wetland Functions and Values

Wetland ID	Principal Functions and Values
WP031	Floodflow Alteration, Sediment/Toxicant Retention, Wildlife Habitat
WP066	Floodflow Alteration, Sediment/Toxicant Retention, Wildlife Habitat
WP068	Floodflow Alteration, Sediment/Toxicant Retention, Nutrient Removal, Wildlife Habitat, Endangered Species Habitat
WP070	Floodflow Alteration, Nutrient Removal, Wildlife Habitat
WP084	Floodflow Alteration
WP098	Floodflow Alteration, Sediment/Shoreline Stabilization, Uniqueness/Heritage
WP107	Floodflow Alteration, Wildlife Habitat, Educational/Scientific Value
WP108	Floodflow Alteration, Sediment/Toxicant Retention, Sediment/Shoreline Stabilization, Wildlife Habitat
WP115	Floodflow Alteration, Sediment/Toxicant Retention, Nutrient Removal
WP128	Groundwater Recharge/Discharge, Floodflow Alteration, Sediment/Toxicant Retention, Wildlife Habitat, Endangered Species Habitat
WP133	Groundwater Recharge/Discharge, Floodflow Alteration, Sediment/Toxicant Retention, Wildlife Habitat
WP143	Floodflow Alteration, Fish and Shellfish Habitat, Sediment/Toxicant Retention, Wildlife Habitat
WP144	Groundwater Recharge/Discharge, Nutrient Removal, Wildlife Habitat

Wetland ID	Principal Functions and Values
WP169	Floodflow Alteration, Sediment/Toxicant Retention, Nutrient Removal
WP170	Groundwater Recharge/Discharge, Floodflow Alteration, Sediment/Toxicant Retention, Nutrient Removal
WP203	Floodflow Alteration, Sediment/Toxicant Retention, Nutrient Removal
WP212	Floodflow Alteration, Sediment/Toxicant Retention, Nutrient Removal, Wildlife Habitat
WP221	Sediment/Toxicant Retention, Nutrient Removal, Wildlife Habitat
WP227	Sediment/Toxicant Retention, Nutrient Removal, Wildlife Habitat
WP231	Sediment/Toxicant Retention, Nutrient Removal, Wildlife Habitat
WP234	Sediment/Toxicant Retention, Nutrient Removal, Wildlife Habitat
WP239	Floodflow Alteration, Sediment/Toxicant Retention, Nutrient Removal, Wildlife Habitat
WP300	Floodflow Alteration, Wildlife Habitat, Endangered Species Habitat
WP306	Groundwater Recharge/Discharge, Floodflow Alteration, Wildlife Habitat
WP407	Sediment/Toxicant Retention, Wildlife Habitat, Endangered Species Habitat
WP414	Sediment/Toxicant Retention, Nutrient Removal, Wildlife Habitat

At the long-term construction laydown area near MD 200 and I-95, aerial imagery suggests that resources appear to have been removed or minimized and wet signatures (indicative of potential persistently wet conditions) and channelized drainage patterns are present. Based on published information from previous regional transportation projects, several wetlands associated with this area are characterized as abandoned wash ponds that were created during prior mining activities. They were documented as being dominated by invasive common reed (*Phragmites australis*) and identified by regulatory agencies as having low habitat value and little to no sediment retention or flood storage function. However, two RTE species associated with water resources were also noted at this site (see Section D.7F Ecological Resources for further details).

D.7D.2.5 Waterways

FRA identified tidal and nontidal waterways within the SCMAGLEV Project Affected Environment. Waterway classifications include perennial (groundwater flows year-round), intermittent (groundwater flows at some point during the year), and ephemeral (does not intersect groundwater at any time of the year) systems. With new ruling in 2020 on the definition of Waters of the U.S., ephemeral features that contain water only indirect response to rainfall or snowmelt are no longer considered jurisdictional resources. Therefore, ephemeral waters delineated during field investigations may no longer need representation on SCMAGLEV documentation and mapping, pending confirmation from the USACE. As previously identified in Section D.7D Water Resources, waterways are also given designated Use classes by MDE, identifying the state’s goals for water quality. FRA identified all nontidal waterways within the SCMAGLEV Project Affected Environment as:

- Use I (water contact recreation and protection of nontidal warmwater aquatic life)

- Use I-P (water contact recreation, protection of aquatic life, and public water supply)
- Use II (water contact recreation and support of estuarine and marine aquatic life) for tidal systems within the SCMAGLEV Project Affected Environment. Tidal waterways crossed with deep tunnel are classified as E1UBL (estuarine subtidal unconsolidated bottom permanently flooded) and R1UBV (tidally influenced riverine deepwater habitat, permanently flooded).

Digital files for the project currently illustrate a boundary that encroaches slightly into the Middle Branch of the Patapsco River for a proposed construction laydown area. The Affected Environment has included this acreage. This analysis assumes this to be inconsistencies in graphic/digital line work, and the Project Sponsor will not encroach upon tidal open water wetland in this area. All staging would be on land.

Greater than 37,000 linear feet of waterway crossings are located within the SCMAGLEV Project Affected Environment, increasing up to approximately 43,000 linear feet depending upon Build Alternative. All Build Alternatives include the long-term laydown area near MD 200 and I-95, which includes 10,500 linear feet of waterway; however, the presence of these waterways is based on published data requiring field verification. Several waterways within the SCMAGLEV Project Affected Environment are notable for their position as headwater or first order tributaries, significant riparian habitat supporting potential RTE species, associated with NTWSSC, or designation as a state Scenic River (also detailed in Section D.7D Water Resources). FRA identified the presence of several important waterways in the SCMAGLEV Project Affected Environment including the following:

- Headwaters of Beaverdam Creek
- Headwaters of Little Patuxent River
- Headwaters for a tributary known to support sensitive species and habitats at the north end of PRR property
- Beck Branch, bounded by NTWSSC
- Beaverdam Creek, bounded by NTWSSC
- Patuxent River, State Scenic and Wild River, bounded by NTWSSC
- Little Patuxent River, upstream of NTWSSC
- Four tidal waterways: Anacostia River (a State Scenic and Wild River); tributary to Anacostia River, Middle Branch Patapsco River, and Gwynns Falls

Also at PRR, the aquatic systems within the Baltimore Gas and Electric (BGE) right-of-way (ROW) within the SCMAGLEV Project Affected Environment form the headwaters of Welsh's Run, which according the PRR staff is "considered one of the most diverse Maryland streams feeding to the Patuxent River" (Site Walk Meeting Minutes from November 2018; see Attachment A).

D.7D.3 Environmental Consequences

FRA evaluated potential impacts to wetlands and waterways associated with the No Build Alternative and the Build Alternatives. FRA considered direct and indirect, permanent and temporary impacts associated with the Build Alternatives, as well as the short-term construction effects. FRA considers direct impacts that will result from new permanent structures and operations to be permanent impacts. FRA considers direct impacts that will result from areas of anticipated temporary disturbances associated with construction activities to be temporary impacts, with some resulting in short-term effects and others in long-term effects. FRA presents a breakdown of anticipated permanent and temporary impacts for each Build Alternative, including station and TMF options. However, a determination on temporary impacts will have to be finalized through further agency coordination and final design. All impacts present totals rounded to the nearest whole number. All impacts to wetlands and waterways should be considered estimates as they use a combination of published information and field investigations subject to further review and jurisdictional determination by the regulatory agencies.

Coordination with the regulatory agencies for submission of a Joint Federal/State Application for the Alteration of Any Floodplain, Waterway, Tidal or Nontidal Wetland in Maryland (JPA), is currently ongoing and anticipated to coincide with release of this document. The Project will trigger an individual permit with the USACE and MDE through the Section 404(b)(1) process and will be thoroughly evaluated to determine compliance with all provisions of those guidelines. Coordination with the DOEE will occur as relevant per impacts to wetlands and waterways located within Washington D.C. Submission of an application for a tidal wetlands license will be required through the BPW, as the agency regulates all tidal systems “in, over, or under” project activities. No tidal systems are anticipated to result in an impact that would require tidal mitigation. Coordination with the USACE has also been initiated in accordance with Section 10 of the Rivers and Harbors Act for bridging over or tunneling under navigable waters and Section 408 review under Section 14 of the Rivers and Harbors Act for the proposed tunneling under the Anacostia River Federal Navigation Channel and levee system located in the area of the Bladensburg Waterfront Park. Additionally, the SCMAGLEV Project must submit a Statement of Findings per DO 77-1 and DO-77-2 would be required for impact to any wetland and floodplain located on NPS property.

Coordination with the Critical Area Commission would also be required as noted in Section D.7D Water Resources, to address impacts to wetlands and waterways within the Chesapeake Bay Critical Area (Critical Area) should final review of permit materials indicate wetland impacts in these areas. At this time there are no wetlands identified where proposed surface disturbance will occur within the Critical Area. Additional compensation/mitigation may be required for impacts to wetlands that fall within this boundary.

D.7D.3.1 No Build Alternative

Under the No Build Alternative, the Project will not be built and therefore no impacts related to the construction or operation of the SCMAGLEV Project will occur. However, other planned and funded transportation projects will continue to be implemented in the area and could result in effects to wetlands and waterways such as filling wetlands, crossing or culverting waterways, and increasing stormwater runoff to these systems as a result of roadway expansions.

D.7D.3.2 Build Alternatives

FRA evaluated the potential for effects to wetlands and waterways located within the SCMAGLEV Project Affected Environment. FRA has considered all areas of surface disturbance to be a direct impact to wetlands and waterways. In coordination with the USACE and MDE, FRA learned that a deep tunnel under wetlands and waterways will not result in impacts that will require permitting through their agencies; therefore, no calculated impacts are attributed in these areas. The following section provides both a qualitative and quantitative analysis of impacts. Impact calculations include wetlands and waterways located within the footprint of the LOD for all proposed surface disturbance. As clarified in the methodology section, quantitative analyses do not include published resources at the proposed long-term construction laydown area near MD 200 and I-95. Wetland and waterway impacts as a result of the SCMAGLEV Project would include the following types of resource disturbance:

- Complete or partial fill of a wetland system and disconnection and/or fill within a waterway as a result of placement of permanent structures such as viaduct piers or other standing structures including maintenance of way (MOW) facilities, fresh air/emergency egress (FA/EE) facilities, TMFs, or stations.
- Conversion of wetland type (e.g. removal of vegetation from a PFO wetland resulting in a PEM wetland due to disturbance during construction and/or the systems location under elevated viaduct).
- Relocation of waterways or creation of culverted systems, while maintaining hydrologic connection.

Impact calculations also include areas that will require temporary cut/cover for tunnel construction. Impacts have not been calculated for wetland boundaries that may either extend beyond the LOD or be directly connected hydrologically if they are beyond the LOD. FRA recognizes that significant minimization and mitigation efforts would be required to ensure that the impacts identified within the LOD do not also directly or indirectly affect those adjacent systems through potential dewatering from loss of groundwater supply and/or hydrologic connections; alterations in habitat which may introduce invasive species and competition for food and protection; and visual/human intrinsic value that may be placed upon these natural areas. Typically, a greater number of systems and more finely defined boundaries of published systems are found during field investigations than are presented in published data; therefore, areas of published

data only may under-represent the area/linear feet of systems w/in the LOD. Wetland impacts are presented in **Tables D.7-15** through **D.7-21**. Waterway impacts are presented in **Tables D.7-22** through **D.7-26**.

Summary of Build Alternative impacts:

- Build Alternatives J-02, J-03, J-06, and J1-03 would result in the greatest linear feet of waterway impact. Build Alternative J-04 would result in the least waterway impact.
- Build Alternatives J-01, J-04, J1-01, J1-04, associated with the MD 198 TMF, would result in the greatest acreage of wetland impact, just less than two times the permanent wetland impacts as compared to the other eight Build Alternatives.
- Build Alternatives J-02, J-05, J1-02, and J1-05, associated with the BARC Airstrip TMF option, would result in more than two times the permanent NTWSSC impacts as compared to the other eight Build Alternatives.
- Build Alternatives J1-03 and J1-06 would result in the least permanent wetland impact and among the lowest permanent NTWSSC impacts.

Wetlands

Direct wetland impacts would occur at locations of proposed surface disturbances, where existing wetland vegetation would be removed, soils altered/removed, and/or sources of hydrology disrupted. Refer to **Table D.7-15** for a breakdown of anticipated permanent and temporary wetland impacts for each Build Alternative, including station and TMF options. The table provides acres of temporary and permanent wetland impacts by Build Alternative resulting from all types of surface disturbance, including short-term, construction-related activities. All Build Alternative impact calculations exclude published wetland data associated with the long-term construction laydown area near MD 200 and I-95 (approximately 21 acres of primarily PUB and PFO wetlands). There are no wetland impacts associated with the Mount Vernon Square East, BWI Marshall Airport, or Camden Yards Stations. **Table D.7-16** provides a summary of direct permanent wetland impacts by wetland classification and for NTWSSC associated with each Build Alternative. **Table D.7-17** provides a breakdown of NTWSSC total impacts.

Table D.7-15: Acres of Permanent and Temporary Impacts on Wetlands

Build Alternative	Alignment		Stations		TMF						Build Alternatives Total Permanent Acres of Impact
			Cherry Hill		BARC Airstrip		BARC West		MD 198		
	P	T	P	T	P	T	P	T	P	T	
J-01	11	6	<1	<1	-	-	-	-	33	<1	45
J-02	11	6	<1	<1	14	2	-	-	-	-	26
J-03	11	6	<1	<1	-	-	10	1	-	-	22
J-04	11	6	-	-	-	-	-	-	33	<1	45
J-05	11	6	-	-	14	2	-	-	-	-	25
J-06	11	6	-	-	-	-	10	1	-	-	22
J1-01	13	2	<1	<1	-	-	-	-	38	1	51
J1-02	13	4	<1	<1	13	3	-	-	-	-	27
J1-03	13	3	<1	<1	-	-	10	1	-	-	23
J1-04	13	2	-	-	-	-	-	-	38	1	51
J1-05	13	4	-	-	13	3	-	-	-	-	27
J1-06	13	3	-	-	-	-	10	1	-	-	23

Table D.7-16: Permanent Wetland Impact Summary

Build Alternative	Acres of Permanent Impact by Wetland Type				Total Wetland Impact (acres) Classified as NTWSSC*	Total Wetland Buffer Impact (acres)
	PUB	PEM	PFO	TOTAL**		
J-01	1	7	37	45	6	
J-02	1	2	22	26	19	
J-03	1	3	18	22	9	
J-04	1	7	37	45	6	
J-05	1	2	22	25	19	
J-06	1	3	18	22	9	
J1-01	<1	8	43	51	4	
J1-02	<1	3	24	27	14	
J1-03	<1	3	20	23	5	
J1-04	0	8	43	51	4	
J1-05	0	3	24	27	14	
J1-06	0	3	20	23	5	

* NTWSSC acreage is calculated separately from the total acreage, based on state-published boundaries, not field-delineated boundaries

Table D.7-17: Permanent and Temporary Impacts on NTWSSC (Acres)

Build Alternative	Alignment		TMF						Build Alternatives Total Permanent Acres of Impact
			BARC Airstrip		BARC WEST		MD 198		
	P	T	P	T	P	T	P	T	
J-01	6	2	-	-	-	-	<1	0	6
J-02	6	1	12	1	-	-	-	-	19
J-03	6	2	-	-	3	1	-	-	9
J-04	6	2	-	-	-	-	<1	0	6
J-05	6	1	12	1	-	-	-	-	19
J-06	6	2	-	-	3	1	-	-	9
J1-01	4	1	-	-	-	-	1	0	4
J1-02	3	2	11	2	-	-	-	-	14
J1-03	3	<1	-	-	2	1	-	-	5
J1-04	4	1	-	-	-	-	1	0	4
J1-05	3	2	11	2	-	-	-	-	14
J1-06	3	<1	-	-	2	1	-	-	5

Removal or fill within wetlands would result in an immediate and permanent removal of habitat, potential hydrologic disconnection, and alter the functions and values of the systems. The functions and values that may be altered include:

- A direct removal or change in habitat which may indirectly affect the species relying on the wetland for food, water, protection, and breeding.
- A direct removal or change in hydrologic functions may include a reduction in water storage capacity which may indirectly affect both surface water hydrology downstream and groundwater recharge and supply. This may also affect flooding patterns, and the ability to slow down flow velocities.
- A direct removal or fill within wetlands can directly affect the landscape’s capacity to trap and filter sediments and pollutants, which may indirectly affect water quality.

Wetlands that would only experience a temporary conversion of cover type (e.g. PFO wetland converted to PEM or PSS wetland) would not lose total function and value to the environment, but they would be altered. A forested wetland habitat that is cleared for construction may have the ability to regenerate or be restored with plantings, but the length of time it will take to become reforested may result in indirect changes in habitat and species dynamics noted above. This may occur at locations of viaduct, where permanent maintenance access is not required under the viaduct and a natural system is able to be reestablished, or at a location of temporary clearing just for construction activities. FRA has determined that a conversion of wetland type will have both direct and indirect effects. For example, the effects of tree removal from a PFO wetland or its

buffer may result in increased ground saturation affecting site hydrology, as well as increased sunlight to the wetland resulting in the potential introduction of invasive vegetation. These direct habitat changes lead to indirect effects to terrestrial and aquatic species. FRA provides additional detail regarding potential habitat effects in Section D.7F Ecological Resources.

Permanent structures and construction activities outside of wetlands but within wetland buffers can also indirectly affect wetlands. Wetland buffers are critical to the function of wetland systems. Changes to upstream hydrology from new impervious surface can indirectly affect wetland hydrology for downstream receiving wetlands.

The following subsections describe the wetland impacts of the alignments, stations, and TMFs. Due to the expanse of wetland impacts located on Federal properties, FRA also provided a breakdown of impacts per Federal lands in **Tables D.7-18** and **D.7-19**, as well as state, county and local land in **Tables D.7-20** and **D.7-21**. Impacts do not represent a comprehensive list of impacts broken down per all properties impacted by the project, but rather the more prominent areas of natural systems traversed. Only Build Alternatives J-01 through J-06 alignments would result in NTWSSC impacts on PRR property. Only Build Alternatives J-01 through J-06 alignments would result in wetland impacts on Washington Suburban Sanitary Commission (WSSC) property. Only Build Alternatives J1-01 through J1-06 alignments would result in wetland impacts on City of Greenbelt and MNCPPC properties.

Table D.7-18: Wetland Impact Summary on Federal Properties (Acres)

Build Alternative	NPS	NASA*	BARC	Secret Service	PRR**	NSA/Ft. Meade	US General Services	FDA	USACE
J-01	5	1	1	<1	2	1	17	0	0
J-02	5	1	16	<1	2	1	2	0	0
J-03	5	1	9	<1	2	1	2	<1	3
J-04	5	1	1	<1	2	1	17	0	0
J-05	5	1	16	<1	2	1	2	0	0
J-06	5	1	9	<1	2	1	2	<1	3
J1-01	10	0	2	0	0	<1	15	0	<1
J1-02	8	<1	14	<1	0	<1	0	0	<1
J1-03	7	0	6	0	0	<1	0	<1	3
J1-04	10	0	2	0	0	<1	15	0	<1
J1-05	8	<1	14	<1	0	<1	0	0	<1
J1-06	7	0	6	0	0	<1	0	<1	3

*Calculations noted under NASA for Build Alternatives J-02, J-05, J1-02 and J1-05 include approximately 0.02 acres of wetland impact existing on NASA leased property owned by BARC.

**Only Build Alternatives J-01 through J-06 alignments would result in wetland impacts on PRR property.

Table D.7-19: NTWSSC Impact Summary on Federal Properties (Acres)

Build Alternative	NPS	BARC	PRR
J-01	4	1	1
J-02	4	14	1
J-03	4	4	1
J-04	4	1	1
J-05	4	14	1
J-06	4	4	1
J1-01	3	2	0
J1-02	4	12	0
J1-03	3	2	0
J1-04	3	2	0
J1-05	4	12	0
J1-06	3	2	0

Table D.7-20: Wetland Impact Summary on Local Properties (Acres)

Build Alternative	Anne Arundel County	City of Greenbelt	MNCPPC	WSSC
J-01	17	0	0	3
J-02	0	0	0	3
J-03	0	0	0	3
J-04	17	0	0	3
J-05	0	0	0	3
J-06	0	0	0	3
J1-01	18	7	2	0
J1-02	1	8	2	0
J1-03	1	7	2	0
J1-04	18	7	2	0
J1-05	1	8	2	0
J1-06	1	7	2	0

Table D.7-21: NTWSSC Impact Summary on Local Properties (Acres)

Build Alternative	City of Greenbelt	WSSC
J-01	0	2
J-02	0	2
J-03	0	2
J-04	0	2
J-05	0	2
J-06	0	2
J1-01	3	0
J1-02	4	0
J1-03	3	0
J1-04	3	0
J1-05	4	0
J1-06	3	0

Alignments

Impacts to wetlands for the alignments would result in similar amount of permanent acreage, with only two acres differentiating the alignments associated with Build Alternatives J-01 through J-06 (11 acres) versus alignments associated with Build Alternatives J1-01 through J1-06 (13 acres). Of the total permanent impacts, FRA estimates that the Build Alternatives J alignments would permanently impact approximately six acres of NTWSSC surrounding Beck Branch (including the bald cypress swamp, Wetland WP133), Beaverdam Creek, and Patuxent River. By comparison, the Build Alternatives J1 alignments would permanently impact approximately three to four acres of NTWSSC surrounding Beck Branch and Beaverdam Creek. Therefore, the Build Alternatives J1 alignments would have less permanent impact to NTWSSC.

The total LOD for the viaduct is included in the calculations of permanent wetland impacts to present the most conservative estimation. Through final design and engineering, and continued coordination with the agencies, FRA will account for areas located underneath of the viaduct where wetland functions and values may be retained. In most locations, shading of wetlands underneath of the viaduct is not anticipated to diminish the functions of the wetland or its ability to regenerate. Areas calculated as permanent PEM wetland impacts have the potential to be reduced to temporary impacts. For other wetland types, conversion of vegetation type would be considered a permanent impact.

FRA has considered important wetland systems present in the SCMAGLEV Project Affected Environment within their design and has modified design plans to the extent feasible. For example, impact to the high quality PFO wetland located just north of the Patuxent River west of the BWP was specifically minimized by placement of bridge piers for Build Alternative J1 alignments, outside of this wetland with elevated viaduct spanning above. The unavoidable portion of this wetland within the LOD would require

vegetation removal and temporary disturbance during construction, but with appropriate BMPs and continued ESD techniques it would not lose important wetland functions.

Similarly, FRA has considered the more extensive wetland systems present, largely located around the major waterways and present NTWSSC. In these areas, FRA has proposed extended elevated guideway sections, with longer spans between piers in order to minimize ground disturbance. Refer to the minimization and mitigation section below for additional details.

Stations

FRA found no wetland impacts or NTWSSC impacts associated with the Mount Vernon Square East, BWI Marshall Airport, and Camden Yards Stations. The Cherry Hill Station would impact less than one acre of wetland and would result in no impacts to NTWSSC.

Trainset Maintenance Facilities (TMFs)

The MD 198 TMF would impact the most acres of wetland among the three TMF options, with total permanent impacts of 33 acres with Build Alternatives J-01 through J-06 or 38 acres with Build Alternatives J1-01 through J1-06. The direct and permanent wetland impacts as a result of this TMF would significantly alter habitat, including sensitive species habitat and RTE species, water quality, flood storage, and drainage patterns of the Little Patuxent River Watershed, as previously detailed in Section D.7D Water Resources.

The BARC Airstrip TMF would result in 13 to 14 acres of permanent wetland impacts, which includes the most permanent NTWSSC impacts (11 to 12 acres). BARC West would result in 10 acres of permanent wetland impact, which includes two to three acres of permanent NTWSSC impacts. While the MD 198 TMF option has by far the greatest wetland impact (33 to 38 acres), it would impact no more than one acre of NTWSSC.

All TMF options will directly and permanently impact significant wetland systems located within Tier II and Stronghold Watersheds. Fill within these wetlands in order to construct the TMF buildings and tracks would result in a direct loss of these wetlands and would permanently alter the existing natural environment and valuable functions provided by wetlands as noted previously. During final design of the TMF locations, ESD would be utilized to intermix natural systems to the area, for example, stormwater management swales that would provide conveyance of hydrology and attenuation of stormwater runoff, with the goal to restore lost functions for both water quantity and water quality for the surrounding landscape.

Waterways

Direct waterway impacts will occur at locations of proposed surface disturbances, where waterway geomorphology, flow, or water quality will be altered. Greater detail regarding water quality impacts is discussed in Section D.7D Water Resources.

Table D.7-22 provides a breakdown of anticipated permanent and temporary nontidal waterway impacts for each Build Alternative, including station and TMF options. The table provides linear feet of temporary and permanent waterway impacts by Build Alternative resulting from all types of surface disturbance, including short-term, construction-related activities. All Build Alternative impact calculations exclude published waterway data associated with the long-term construction laydown area near MD 200 and I-95 (approximately 10,500 linear feet of perennial and intermittent waterways). There are no waterway impacts associated with the Mount Vernon Square East, BWI Marshall Airport, or Camden Yards Stations. **Table D.7-23** provides a summary of direct permanent nontidal waterway impacts by waterway classification associated with each Build Alternative. Tidal waterways are not located within areas of proposed SCMAGLEV surface disturbance but are crossed underneath by proposed deep tunnel. **Table D.7-24** provides a summary of tidal waterways crossed.

Table D.7-22: Acres of Permanent and Temporary Impacts on Nontidal Waterways

Build Alternative	Alignment		Stations		TMF						Build Alternatives Total Permanent Linear Feet of Impact
			Cherry Hill		BARC Airstrip		BARC WEST		MD 198		
	P	T	P	T	P	T	P	T	P	T	
J-01	7,623	3,076	315	241					2,324	24	10,261
J-02	7,721	3,127	315	241	4,589	1,160					12,624
J-03	7,799	3,156	315	241			4,782	229			12,896
J-04	7,569	3,076							2,378	24	9,947
J-05	7,721	3,127			4,589	1,160					12,310
J-06	7,799	3,156					4,782	229			12,582
J1-01	6,981	1,314	315	241					4,714	231	12,009
J1-02	7,375	2,147	315	241	4,419	1,448					12,108
J1-03	7,323	1,728	315	241			5,021	371			12,659
J1-04	6,981	1,314							4,714	231	11,694
J1-05	7,375	2,147			4,419	1,448					11,794
J1-06	7,323	1,728					5,021	371			12,344

Table D.7-23: Permanent Nontidal Waterway Impact Summary

Build Alternative	Linear Feet of Impact by Waterway Type*			
	Ephemeral	Intermittent	Perennial	TOTAL
J-01	1,224	5,296	3,741	10,261
J-02	1,418	5,649	5,557	12,624
J-03	1,549	5,385	5,962	12,896
J-04	1,224	5,296	3,426	9,946
J-05	1,418	5,649	5,243	12,310
J-06	1,549	5,385	5,647	12,581

Build Alternative	Linear Feet of Impact by Waterway Type*			
	Ephemeral	Intermittent	Perennial	TOTAL
J1-01	814	4,526	6,669	12,009
J1-02	893	3,487	7,728	12,108
J1-03	852	3,617	8,189	12,659
J1-04	814	4,526	6,354	11,694
J1-05	893	3,487	7,414	11,794
J1-06	852	3,617	7,875	12,344

Table D.7-24: Tidal Waterway Impact Summary

Summary of LOD Crossings Under Tidal Portions of Anacostia River, Unnamed Tributary to the Anacostia River, Gwynns Falls, and Middle Branch Patapsco River						
Build Alternative	Alignment*		Camden Station*		Total*	
	LF	SF	LF	SF	LF	SF
J-01	146	15,251	0	0	146	15,251
J-02	146	15,251	0	0	146	15,251
J-03	146	15,251	0	0	146	15,251
J-04	146	15,251	1,105	50,839	1,251	66,090
J-05	146	15,251	1,105	50,839	1,251	66,090
J-06	146	15,251	1,105	50,839	1,251	66,090
J1-01	142	15,406	0	0	142	15,406
J1-02	142	15,406	0	0	142	15,406
J1-03	142	15,406	0	0	142	15,406
J1-04	142	15,406	1,105	50,839	1,247	66,245
J1-05	142	15,406	1,105	50,839	1,247	66,245
J1-06	142	15,406	1,105	50,839	1,247	66,245

The Patapsco River is crossed by deep tunnel just south of I-895 and east of Route 295. This area is included within the scanned areas of the 1972 State Tidal Waterways and adjacent land therefore considered within the Chesapeake Bay Critical Area; however it is identified as a Use I water and a tidally influenced, riverine, deep water system (R1UBV) by MDE. Because this particular location would require coordination with the regulatory agencies to determine its final jurisdiction, it has not been included within either **Table D.7-22** as a nontidal waterway impacted by surface features, or **Table D.7-23** as a tidal waterway crossed beneath by deep tunnel. Approximately 9,575 square feet of this system falls within the SCMAGLEV Project LOD.

FRA also provided a breakdown of impacts per Federal lands in **Table D.7-25** as well as state, county and local land in **Table D.7-26**. With final design, all efforts will be made to span waterways underneath of viaducts by placing the support piers outside of

the waterway banks. For the purpose of this analysis, though, the viaduct was counted as a permanent impact. Although ephemeral waterways are treated separately dependent upon the regulatory authority, FRA has included ephemeral waterways in this analysis. Due to the use of published data and that ephemeral channels are a published resource; FRA has assumed that additional systems (largely ephemeral) may be present within the overall Affected Environment than what is illustrated in **Table D.7-12**.

Table D.7-25: Waterway Impacts on Federal Properties (Linear Feet)

Build Alternative	NPS	NASA*	BARC	Secret Service	PRR	NSA/ Ft. Meade	US General Services	FDA	USACE
J-01	4,602	1,532	1,018	281	1,388	239	1,244	0	0
J-02	4,292	3,874	3,925	497	1,388	239	145	0	0
J-03	4,446	1,532	3,848	393	1,388	239	145	218	1,574
J-04	4,602	1,532	1,018	281	1,388	239	1,244	0	0
J-05	4,292	3,874	3,925	497	1,388	239	145	0	0
J-06	4,446	1,532	3,848	393	1,388	239	145	218	1,574
J1-01	5,848	0	1,413	0	0	52	1,099	0	65
J1-02	4,742	2,343	3,522	105	0	52	0	0	0
J1-03	4,336	0	3,791	0	0	52	0	221	1,679
J1-04	5,848	0	1,413	0	0	52	1,099	0	65
J1-05	4,742	2,343	3,522	105	0	52	0	0	0
J1-06	4,336	0	3,791	0	0	52	0	221	1,679

*Calculations noted under NASA for Build Alternatives J-02, J-05, J1-02 and J1-05 include approximately 2,342 linear feet of waterway impact existing on NASA leased property owned by BARC.

Table D.7-26: Waterway Impacts on Local Properties (Linear Feet)

Build Alternative	Anne Arundel County	City of Greenbelt	WSSC
J-01	271	0	634
J-02	0	0	634
J-03	0	0	634
J-04	271	0	634
J-05	0	0	634
J-06	0	0	634
J1-01	1,518	1,742	262
J1-02	1,235	2,029	337
J1-03	1,235	1,533	337
J1-04	1,518	1,742	262
J1-05	1,235	2,029	337
J1-06	1,235	1,533	337

The Build Alternatives would require the relocations, culverting, or fill within waterways at various locations within the SCMAGLEV Affected Environment for ancillary facilities along the alignments, TMF options, and at the Cherry Hill Station. FRA assumes the following as a result of surface disturbance:

- FRA recognizes that waterway channel formations are variable, depending on changes in flow and underlying geology. The addition of SCMAGLEV Project runoff from structures into waterway channels could cause direct impacts to the channel with additional changes in flow, bank or in-channel erosion, sand and gravel bar creation and shifting, and scouring.
- Waterway relocations will be a direct temporary impact with potential for long-term effects noted above. Waterway relocation design would attempt to mimic the appropriate waterway dimensions, materials, and volume capacity. Additional factors such as waterway length, soils, and surrounding land uses could affect the success of a given relocation.
- FRA would consider construction of culverts to maintain hydrologic connections in locations of proposed permanent surface disturbance where fill would be required. This loss of natural substrate for the waterway would affect the temperature and composition of species able to function with these new conditions.

FRA evaluated the effects to waterways not only for the direct impacts that will result from the SCMAGLEV Project, but the indirect effects that other Project actions will have on waterways. Many waterways in the LOD are buffered by forest, which will be removed by the Project. As previously described, many of the waterways identified within the SCMAGLEV Project Affected Environment consist of interconnected wetland and waterway complexes that ultimately convey hydrologic flow to and through major regional stream systems. The greatest loss of forested stream buffers are associated with these major waterways, identified in proposed areas of elevated viaduct and surface ancillary features. Acreage of forest impacts is included in the following Section D.7F Ecological Resources.

- The loss of forest along waterways will directly affect water temperature regimes and in-stream/floodplain vegetation composition. Although the viaduct would provide or replace shading to portions of stream, the full benefit of forest shading would not be achieved.
- Potential changes to water temperature and vegetation changes would affect aquatic organisms and water quality, wildlife habitat and corridors, flood control and reducing the effects of nutrient runoff into waters. Changes to flooding regimes of waterways could affect the forest buffers and could potentially influence the species present that are adapted to life along waterways.
- With loss of forest buffers is the potential for greater stream bank erosion, which can result from an increase in stream velocities. These velocities may increase due to the increase in impervious surfaces and runoff reaching the streams more rapidly. The erosion can in turn can increase pollutants and phosphorus

downstream. Additional effects to potential important habitat for aquatic species as a result of erosion is addressed in Section D.7F Ecological Resources.

The following subsections identify and compare the waterway impacts among the alignments, stations, and TMFs.

Alignments

The alignments would result in similar amounts of permanent impacts. The alignments associated with Build Alternatives J-01 through J-06 would permanently impact between approximately 7,600 and 7,800 linear feet of waterways. The alignments associated with Build Alternatives J1-01 through J1-06 would permanently impact between approximately 7,000 and 7,400 linear feet of waterways. Likely the most notable difference in impacts results from the Build Alternatives J alignments being elevated over the Little Patuxent River and the Build Alternatives J1 alignments tunneling under. Additionally, only the Build Alternatives J alignments have the potential to impact important headwaters identified by USFWS on PRR.

The additional length of elevated viaduct associated with the alignments of Build Alternatives J-01 through J-06, does not significantly increase proposed waterway impacts compared with the alignments of Build Alternatives J1-01 through J1-06. This is in part due to the sinuosity of the waterways within the SCMAGLEV Affected Environment. For example, several tributaries paralleling the BWP and alignment associated with Build Alternatives J1-01 through J1-06 require multiple crossings of the same waterway, which increases the risk of both direct and indirect waterway impacts. These occurrences would be considered during final planning and design to avoid instream impacts by spanning systems and use of temporary stream crossings to the extent possible during construction. Further design techniques and BMPs to minimize impacts is discussed in later sections.

Two tidal waterways are traversed through deep tunnel by alignments associated with all Build Alternatives, the Anacostia River and an unnamed tributary to the Anacostia. The top of the SCMAGLEV tunnel would be approximately 75 feet below the surface elevation of the Anacostia River. Although historic records of the Anacostia show it to have been as deep as 40 feet in this area near Bladensburg, it is currently thought to be as shallow as three feet at the Bladensburg Waterfront Park³⁷, therefore the tunnel would be of significant depth below this resource.

As noted previously, coordination would be required with the regulatory agencies to determine the jurisdiction and classification of the Patapsco River at the location it is crossed by any alignment, just south of I-895. The proposed top of tunnel beneath the surface elevation of the Patapsco River would be approximately 78 feet. This is also anticipated to be significantly below the depth of the Patapsco River, although further ground investigations would need to be conducted to provide official depths of the rivers.

³⁷ <https://www.anacostiaaws.org/our-watershed/aws-faqs.html>

It is not anticipated that these waterways will be impacted by the SCMAGLEV Project tunnel, as they are in deep areas below the surface at these locations. However, tunneling under these systems will require coordination with the USACE and MDE Tidal Wetlands Division and the BPW for the waterway crossings illustrated in Table 4.11-4 and potentially for the approximate 9,575 square feet of the Patapsco River tunneled under by all Build Alternatives.

Stations

There are no waterway impacts at the Mount Vernon Square East Station or BWI Marshall Airport Stations. Deep tunnel proposed for Build Alternatives J-04 through J-06 and J1-04 through J1-06 associated with the Camden Yards Station (illustrated in Table 4.11-4) will cross under the Gwynns Falls at its confluence with the Middle Branch of the Patapsco River and three small “fingers” of the Middle Branch. Depth to the top of tunnel below these tidal systems is approximately 40 to 60 feet below the water surface. The Cherry Hill Station would permanently impact approximately 315 linear feet of nontidal waterways.

Trainset Maintenance Facilities (TMFs)

The MD 198 TMF would permanently impact over 2,300 linear feet of waterways for Build Alternatives J-01 and J-04 and over 4,700 linear feet of waterways for Build Alternatives J1-01 and J1-04. The difference in this approximate doubling of impact would result from the MD 198 connecting tracks from any Build Alternatives J1 alignments through a long portal area just below the surface and at-grade, which would traverse the Little Patuxent River and its tributaries.

The BARC Airstrip TMF and BARC West TMF would similarly result in approximately 4,500 to 5,000 linear feet of permanent impacts to waterways. The BARC Airstrip TMF would impact important headwaters of Beaverdam Creek, and the BARC West TMF would impact Beaverdam Creek and its tributaries. The impacts to these waterways located largely on BARC and NPS properties have been provided in additional detail in Sections D.7D Water Resources and Section D.7F Ecological Resources. No tidal waterways would be impacted by any TMF.

D.7D.3.3 Short-term Construction Effects

D.7D.3.3.1 Wetlands

Construction of viaduct and other surface features will require temporary access roads for equipment and materials. Use of these roads could require crossing of wetlands and their buffers and removal of wetland vegetation. These actions would result in temporary direct impacts, dependent upon the needs of the contractor, the type of access road necessary, and the ability for selective removal of vegetation. Impacts could result from matting over wetlands for construction vehicles to traverse the site which has the potential to compact wetland vegetation and soils. However, removal of construction equipment and matting would allow the area to regenerate.

As previously noted, additional temporary impacts (a decrease of proposed permanent impacts) to wetlands could occur in locations where proposed viaduct will span aerially over existing PEM wetland, although FRA has identified this as a very small amount of the overall wetland impacts as a result of the SCMAGLEV Project (note: placement of viaduct piers will be considered a permanent impact). The total estimated PEM wetlands that will be aerially spanned for Build Alternatives J-01 through J-06 is one acre and less than 0.1 acre for Build Alternatives J1-01 through J1-06. Estimated temporary impacts to wetlands are included in **Table D.7-15**.

Dewatering may be required during construction of subsurface features, to remove any accumulated water within areas of excavation. As noted in Section D.7D Water Resources, this action may affect the availability of groundwater, which in turn may affect the groundwaters ability to support sustained hydrology to adjacent wetlands. The Project Sponsor will determine the most appropriate means of dewatering, either excluding the groundwater from reaching the work area or pumping it out. The length of time that dewatering would be required may dictate proposed measures to mitigate for potential impacts.

The improper disposal of excavated material from tunnel construction would also have the potential to affect wetlands if the excavated materials were placed within wetlands or in un-stabilized areas where they could be washed into existing wetlands. FRA expects that compliance with any USACE CWA Section 404 permit and implementation of all BMPs would reduce or avoid this potential.

D.7D.3.3.2 Waterways

FRA has identified short-term construction impacts that may occur within waterways as a result of the Build Alternatives. Short-term temporary effects would occur as a result of temporary waterway crossings, which could utilize existing fords if possible and small bridges that span a waterway from bank to bank. Larger instream construction activities may require instream diversions, use of cofferdams, pump-arounds, or other BMPs to minimize the effects to the waterway during construction of surface features. In addition, pumping or washing operations would be necessary for tunnel construction. All these potential short-term construction effects could result in sedimentation or increased turbidity within the waterways. Effects of tunneling could cause the disposal of excavated materials into waterways, as stated previously for wetland effects. Refer to **Table D.7-21** for a breakdown of estimated temporary waterway impacts.

D.7D.4 Potential Minimization and Mitigation Strategies

The Project Sponsor will avoid and minimize impacts to wetlands and waterways to the maximum extent practicable, not only for short-term construction activities, but also for long-term operational effects on the resources. For impacts that cannot be avoided, the following measures would be considered to minimize and mitigate potential impacts.

D.7D.4.1 Minimization

FRA has considered the vast expanse of wetlands and waterways throughout the SCMAGLEV Protect Affected Environment, most notably in areas of proposed surface features located on several Federal and county properties. Alignment shifts were considered as feasible during early design phases and supplemented with design measures such as increased elevated span lengths and pier construction techniques to allow for avoidance of instream piers to large waterways to the extent possible.

Spanning large systems, such as the Patuxent River, may not be feasible, specifically for the alignments associated with Build Alternatives J1-01 through J1-06, due to the bend in the river. An alternative option would be to use a “straddle bent,” which is often used when crossing a skewed surface feature or constraint. This allows for an extension of the superstructure without extending the impact of the pier to the surface below. The Project Sponsor will consider additional minimization, and mitigation measures as it advances its engineering design.

In addition to the high-level design minimization measures noted above, the Project Sponsor has minimized and avoided impacts at the following noted sensitive areas:

- Wetland, stream, and riparian buffers located immediately north of Veterans Highway. The design is avoiding all direct impacts to these systems by shifting the proposed FA/EE north and proposing access to the area from Riverdale Road instead of Veterans Highway.
- High-quality wetlands located within Maryland City Park north of the Patuxent River, west of the BWP. The design is avoiding direct placement of piers within this system.
- High-quality wetlands that support rare species located in the Harman’s area of Baltimore County. The design is avoiding above ground impacts by shifting the proposed FA/EE farther north in the commercial/developed area.
- Floodplain and wetlands located along the northern boundary of the Patapsco River, south of I-895. The design is avoiding above ground impacts by shifting the proposed FA/EE farther east in the commercial/developed area.

The Project Sponsor will continue to identify design opportunities to avoid and minimize impacts to wetlands and waterways, with removing viaduct pier locations from these resources as a priority strategy. This may include spanning as many resources as feasible. Impacts to wetlands and waterways for any Build Alternative would likely occur along the Patuxent River and Beaverdam Creek and their associated tributaries, wetlands (including NTWSSC), forests, and floodplains. MDE has indicated that the Patuxent River floodplain wetlands east (NTWSSC) and west of the BWP would need a more detailed delineation to determine wetland impacts. FRA and MDE identified these wetlands as exhibiting upland inclusions. Upon determination of a preferred alternative, therefore, MDE recommends refining the delineation to site viaduct piers to avoid wetlands to the extent practicable. Because resources along these waterways would be impacted, the Project Sponsor will implement BMPs during construction, in addition to

complying with MDE, USACE, and NPS regulations. The Project Sponsor will also develop and implement restoration efforts in these areas in coordination with the USFWS.

The Project Sponsor will avoid and minimize short-term construction effects mainly using site BMPs required through existing agency coordination and future permitting process with the state and Federal agencies including the USACE, MDE, NPS, USFWS, and MDNR, as well as in accordance with county/local authorities. These BMPs can include:

- Same-day stabilization measures as feasible for any earth disturbing activities.
- Use of appropriate erosion and sediment control BMPs.
- Compliance with MDNR Time-of-Year restrictions for all work that occurs within waterways. All waterways within the proposed Build Alternatives area of surface disturbance are classified as Use I or Use I-P waters, which MDNR suggested should avoid work within the channel between February 15 and June 15, inclusive, during any year.
- Use of temporary bridge crossings over smaller waterways. Where practicable, bridge crossings will be installed perpendicular to the waterway. If a bridge cannot be installed without impact to the waterway, a diversion will be set up and the site dewatered.
- Proposed low-water fords for crossing small streams will be limited to areas where the streambed has a firm bottom and/or stable material, and where fish passage is less of a concern. These measures will require coordination with the MDE to maintain in accordance with their “no work in the wet” policy for all stream activities which includes mechanized equipment crossing of streams.
- If instream work cannot be avoided the use of cofferdams will be evaluated. This is a system in which a watertight enclosure can be pumped dry to allow construction work to happen below the waterline, while the remainder of the waterway can flow freely to allow fish passage.
- Placement of ground protection matting over wetland and wetland buffers.
- Vegetation clearing required for construction activities will attempt to fell trees away from streams or wetlands to prevent organic debris from entering the wetland or waterway, as well as avoid rutting and soil disturbance.

If the long-term construction laydown area near MD 200 and I-95 is used during construction, the Project Sponsor will refine site development design after conducting wetland and waterway delineations. With consideration of ESD and planning to strategically locate entrances, storage, and other site uses, and with implementation of onsite BMPs, the Project Sponsor will avoid all permanent impacts to these resources.

D.7D.4.2 Mitigation

All Build Alternatives would result in wetland and waterway impacts and would require a permit under Section 404 of the CWA. Mitigation for wetland loss may include a combination of onsite and offsite wetland mitigation. USACE requires no-net-loss of wetlands and a replacement of lost or degraded wetland functions and values. As per NPS regulations, any impacts will also require a Statement of Findings. The NPS will be consulted on proposed methods of mitigation on NPS lands.

Additional field surveys and agency coordination is required within areas of NTWSSC to receive final concurrence on delineation of boundaries. This final determination will support final design efforts to avoid and minimize impacts to these systems. Clearing of vegetation, filling, excavation, flooding, or draining within a NTWSSC or the expanded 100-foot wetland buffer require a permit with a stringent review process. To qualify for a permit, ground and surface water must be protected, as well as the character of the wetland. If a permit is granted to impact the wetland, mitigation will be required, and the mitigation area may be greater than the area impacted. For impacts to NTWSSC, additional protections, such as 100-foot buffers would be required. NTWSSC also receive higher mitigation ratios than other nontidal wetlands.

At PRR, the Project Sponsor will coordinate with USFWS to finalize delineations of vernal pools and other sensitive wetlands to establish, as feasible, protective buffer zones for resources within and adjacent to the LOD.

The Project Sponsor is currently pursuing possible mitigation strategies to satisfy anticipated compensatory mitigation that will be required for potentially significant impacts to wetland and waterways. Coordination with the USACE and MDE and corroborating agencies and stakeholders is ongoing, and additional detail on mitigation proposed is anticipated prior to completion of a Final Environmental Impact Statement.

The USACE has a hierarchal preference for wetland mitigation requirements to first seek an approved wetland mitigation bank with available wetland credits to purchase. If this option is not feasible due to credit availability, or unallowable bank service areas, the second preference is for mitigation to be provided “in-kind.” This means that impacts to a PFO would be mitigated with restored PFO, ideally within the same watershed.

The Project Sponsor will submit a Phase I Mitigation Plan, developed and prepared during the permitting process, that identifies the proposed mitigation selected, whether it is determined to be an on-site or off-site mitigation project, payment towards credits into an approved Wetland Mitigation Bank, or a combination of methods.

A mitigation bank is a site, or a suite of sites, where resources (e.g., wetlands, streams, riparian areas) are restored, established, enhanced, and/or preserved for the purpose of providing compensatory mitigation for authorized impacts. In general, a mitigation bank sells compensatory mitigation credits to permittees whose obligation to provide compensatory mitigation is then transferred to the mitigation bank sponsor. The operation and use of a mitigation bank are governed by a mitigation banking instrument,

which is a legal document for the establishment, operation, and use of a mitigation bank.

To compensate for permanent non-tidal wetland impacts, wetland replacement ratios are used to determine the amount of mitigation required. The MDE regulates the conversion of forested to emergent wetlands at a mitigation ratio of 1:1, meaning for every acre of PFO wetland being flush cut and converted to PEM, one acre of wetland must be created, restored or enhanced. Although these impacts do not result in a loss of wetland acreage, they do result in a loss of forested wetland functions. For impacts where permanent emergent wetlands will be lost due to the regulated activity, again a mitigation ratio of 1:1 is required. A higher acreage replacement ratio is utilized when using a bank for mitigation, however. A mitigation ratio of 1.5:1 would be required for any non-tidal wetland impacts, which includes conversion of forested wetland to emergent wetland. All ratios are subject to coordination with the MDE and as noted above are likely to be higher for impact to NTWSSC.

Stream restoration and mitigation will also be required. Compensatory mitigation aims to provide restoration of waters by improving the physical, chemical and biological processes of the waterway. Stream restoration may also be satisfied through payment of credits into an existing mitigation bank, as coordinated and approved by the agencies.

Tidal mitigation must be connected to existing tidal wetlands or tidal waterways. Tidal wetland impacts requiring approval through the Board of Public Works (BPW) may require mitigation; there is no minimum threshold set. As no vegetated tidal wetland systems are anticipated to be impacted by the SCMAGLEV Project, and tidal open waters will be crossed under by deep tunnel, it will require a Tidal Wetland License through the BPW, but is not anticipated to require mitigation, however this would be coordinated directly with the regulatory agencies.

As stated above, wetland mitigation requires development of Phase I Mitigation Plan followed by Phase II Mitigation Plans (concept and final plans, respectively) that may be a combination of wetland creation, restoration, enhancement, and preservation, and/or bank credit purchase, while concurrently incorporating mitigation for impacts to other sensitive habitats. These plans are reviewed and approved by USACE and MDE, in collaboration with Federal and state resource agencies and other stakeholders.

Additional mitigation strategies that would be considered during final design and construction planning may include:

- Onsite re-establishment of wetland habitat, where feasible
- Onsite re-establishment of forested wetland habitat, where feasible, including planting of trees of appropriate mature height under the guideway to provide contiguous canopy while maintaining the 13-foot clearance beneath the structure
- Offsite wetland mitigation, whether through banking or permittee-created wetlands within the watersheds

- Onsite and offsite restoration of degraded stream reaches associated with the major river systems
- Coordination with MDE and USFWS to determine compensatory mitigation value and restoration opportunities for unavoidable impacts to NTWSSC and other high-value wetlands and waterways at PRR
- Coordination with MDNR and county and local municipalities to identify wetland and waterway restoration priorities
- Purchasing of intact wetland complexes for placement in perpetual easement
- Invasive species management of onsite and adjacent habitats
- Funding ecological research and restoration at PRR and BARC

Dam removal for “the removal of obsolete dams and other obsolete in-stream structures can be an effective approach to restoring river and stream structure, functions, and dynamics.”³⁸

Appendix D.7E ECOLOGICAL RESOURCES

D.7E.1 Introduction

This section describes the regulatory context and methodology the FRA used to evaluate the Superconducting Magnetic Levitation Project (SCMAGLEV Project) effects to ecological resources and minimization and mitigation measures that would reduce impacts to these resources. This study of ecological resources includes an analysis of the relationships between living things and their environment. FRA has included the following dominant resources in this analysis:

- **Forest** – As defined by the Maryland Department of Natural Resources (MDNR), a forest is “a biological community dominated by trees and other woody plants covering a land area of 10,000 square feet or greater.”³⁹
- **Forest Interior Dwelling Species (FIDS) Habitat** – Habitat supporting bird species that depend upon large, contiguous forested habitat to successfully breed and produce sustainable populations.
- **Terrestrial and Aquatic Wildlife** – Animal species living on land and species living in waters.
- **Rare, Threatened, or Endangered (RTE) Species** – Plant and animal species that may be the rarest or the most in need of conservation (at the Federal and/or state level), which are provided a designated status under the Endangered

³⁸ USACE. September 25, 2018. Regulatory Guidance Letter No18-01.

³⁹ Maryland Department of Natural Resources (MDNR). 1997. *State Forest Conservation Technical Manual*, Maryland Department of Natural Resources, Third Edition, 1997.