



DRAFT COMPENSATORY MITIGATION PLAN

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U.S. Department of Transportation
Federal Highway Administration

and



MARYLAND DEPARTMENT OF TRANSPORTATION

STATE HIGHWAY ADMINISTRATION

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1 EXECUTIVE SUMMARY

The I-495 & I-270 Managed Lanes Study (MLS) is evaluating potential transportation improvements to portions of the I-495 and I-270 corridors in Montgomery and Prince George's County, Maryland, and Fairfax County, Virginia (**Figure 1-1**). The MLS identified six Build Alternatives (Alternative 8, 9, 9M, 10, 13B, and 13C) as potential transportation improvements in the DEIS. The No-Build Alternative (Alternative 1) and a one lane alternative (Alternative 5), which do not meet the purpose and need, were retained in the DEIS for comparison purposes but are not potential transportation improvements. Each Build Alternative would result in unavoidable impacts to regulated resources and require permits from the US Army Corps of Engineers (USACE), Maryland Department of Environment (MDE), and Virginia Department of Environmental Quality (VDEQ). This Draft Compensatory Mitigation Plan (Draft CMP) presents the compensatory mitigation approach for all of the DEIS Build Alternatives, and includes Phase I Mitigation Design Plans for permittee-responsible mitigation. Phase II Mitigation Design Plans will be developed for approved sites and included in the Final Compensatory Mitigation Plan (Final CMP).

Impacts were analyzed for each DEIS Build Alternative by resource type and watershed. In Maryland, DEIS Build Alternative impacts range from 16.08 to 16.52 acres of wetlands, and 151,880 to 153,635 linear feet of streams. Each alternative would permanently impact 1.48 acres of Palustrine Open Waters (POWs). These impacts occur in the following three federal HUC-8 watersheds: Middle Potomac-Anacostia-Occoquan, Middle Potomac-Catoctin, and Patuxent. In Virginia, each DEIS Build Alternative would impact a total of 0.05 acres of wetland and 3,349 linear feet of streams in the Middle Potomac-Catoctin watershed. Mitigation is required by the USACE, MDE and VDEQ for these unavoidable impacts to compensate for lost function and value, and to comply with the "no net loss" policy.

Wetland mitigation requirements in Maryland and Virginia were developed using standard practices of MDE and VDEQ, respectively. In Maryland, mitigation requirements vary due to differences in the DEIS Build Alternatives, ranging from 29.34 to 30.09 acres of wetland mitigation, and 99,456 to 100,982 linear feet of stream mitigation. Impacts not requiring mitigation range between 52,424 and 52,653 linear feet of existing bridge/culvert stream impacts, and 0.43 acres of POWs that will retain their function and value for all of the alternatives. In Virginia, the mitigation requirement for each DEIS Build Alternative is 0.10 acres of wetland mitigation and 729 linear feet of riverine mitigation. Several mitigation opportunities were explored including on-site mitigation for open channels, mitigation banking, in-lieu fee programs, and off-site permittee-responsible mitigation on public and private lands. Permittee-responsible mitigation sites were chosen for the Draft CMP based on their potential for functional uplift, watershed improvements, construction feasibility, proximity to the study area, mitigation credits, and replacement of lost functions and values resulting from roadway improvements.

In Maryland, proposed on-site stream mitigation credit for open channels that will remain or be relocated following construction ranges between 59,837 to 60,486 linear feet, resulting in a remaining off-site stream mitigation requirement of 39,619 to 40,496 linear feet. To ensure the compensatory mitigation package compensates for any of the DEIS Build Alternatives, the highest potential off-site mitigation requirement was selected to determine the off-site, permittee-responsible mitigation need. The highest potential off-site mitigation requirement in Maryland is referred to as the "MLS mitigation requirement" in this report, and includes 30.09 acres of wetland mitigation credits and 40,496 linear feet of stream mitigation credits.

The proposed permittee-responsible off-site mitigation in Maryland consists of 14 mitigation sites, including a total of 80.05 acres of potential wetland mitigation credits and 79,446 linear feet of potential stream mitigation credits. Phase I Mitigation Design Plans have been developed for each of the proposed sites and are included in **Appendices K and L**. Coordination with regulatory agencies and landowners is ongoing and will continue throughout the development of the Final CMP until concurrence on proposed mitigation is obtained. Phase II Mitigation Design Plans will be developed for sites approved by the agencies and included in the Final CMP. The 12 fundamental components of the Federal Mitigation Rule are discussed in **Section 6.3**, and will be developed in more detail in the Final CMP.

The Virginia mitigation requirement of 0.10 wetland mitigation credits and 729 riverine mitigation credits will be met by purchasing bank credits. Several mitigation banks sites were identified in the USACE's Regulatory In-Lieu Fee and Banking Information Tracking System (RIBITS) database that appear to have enough credits to meet these requirements. Bank credit purchases will be described in the Final CMP.

The MLS mitigation requirement in Maryland is summarized in **Tables 1-1 and 1-2**, and the Virginia credit requirements are summarized in **Table 1-3**. Summary tables for each of the DEIS Build Alternative impacts, impacts not requiring mitigation, proposed on-site stream mitigation, and off-site mitigation requirements are included in **Appendix A**.

Table 1-1: Maryland Wetland Mitigation Summary

Watershed	MLS Mitigation Requirement (ac)	Proposed Mitigation Sites	Proposed Mitigation Credit (AC)
Middle Potomac-Anacostia-Occoquan	18.53	4	50.70
Middle Potomac-Catoctin	2.51	4	20.17
Patuxent	9.05	1	9.18
Total	30.09	9	80.05

Table 1-2: Maryland Stream Mitigation Summary

Watershed	MLS Mitigation Requirement (LF)	Proposed Mitigation Sites	Proposed Mitigation Credit (LF)
Middle Potomac-Anacostia-Occoquan	20,045	7	42,321
Middle Potomac-Catoctin	15,134	5	18,412
Patuxent	5,317	2	18,713
Total	40,496	14	79,446

Table 1-3: Virginia Mitigation Summary

Watershed	Resource Type	Impacts	Credit Requirement	Proposed Bank Credits
Middle Potomac-Catoctin	Wetlands (AC)	0.05	0.10	0.10
	Waterways (LF)	3,349	729	729

Draft CMP Table Color Codes





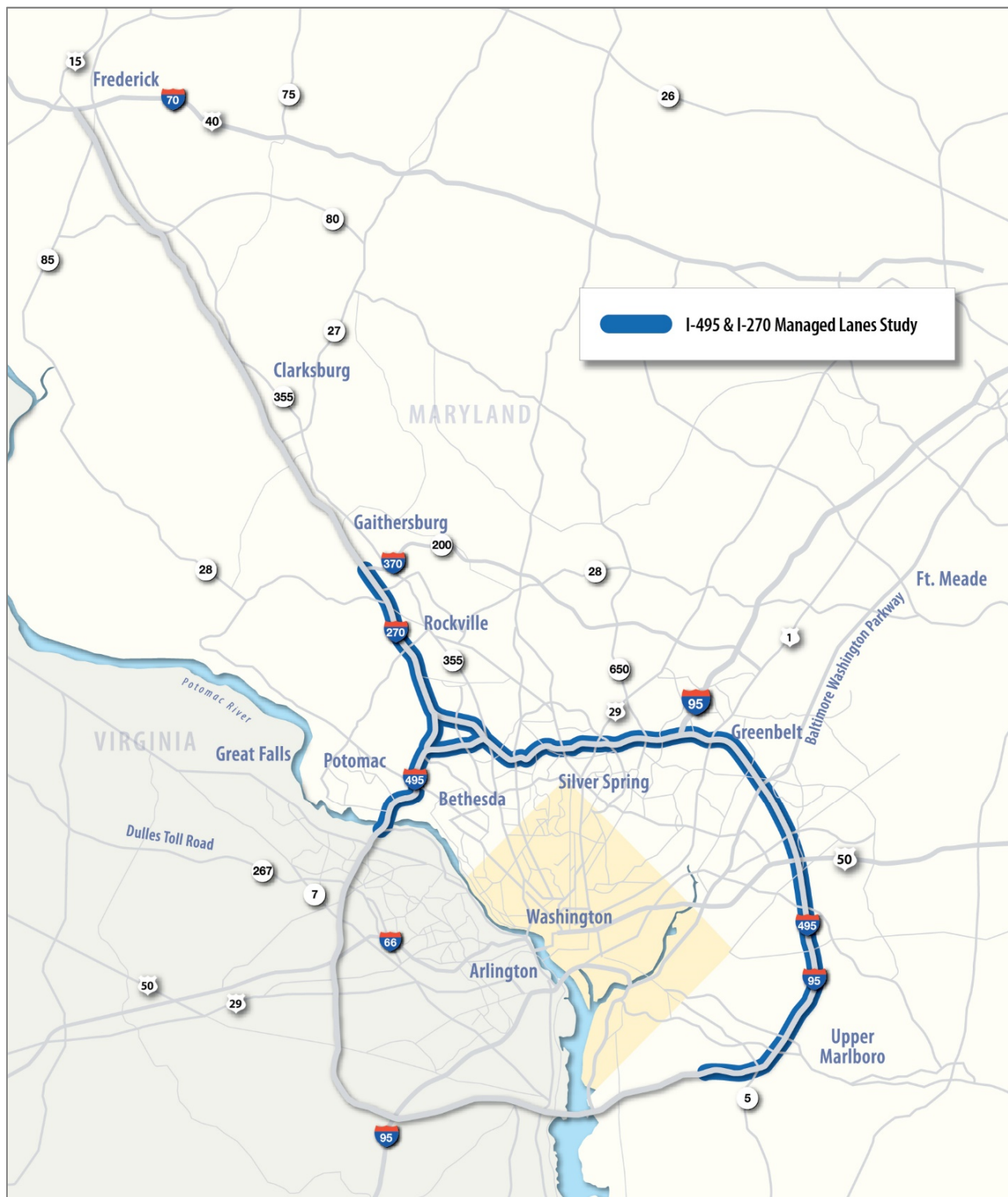
Color	Description
	Existing Features & Impacts
	Mitigation Requirements
	On-Site Mitigation
	Off-Site Mitigation

Figure 1-1: MLS Corridor



2 INTRODUCTION

The Federal Highway Administration (FHWA), as the Lead Federal Agency, and the Maryland Department of Transportation State Highway Administration (MDOT SHA), as the Local Project Sponsor, are preparing an Environmental Impact Statement (EIS) in accordance with the National Environmental Policy Act (NEPA) for the I-495 & I-270 Managed Lanes Study (MLS). The purpose of the MLS is to develop a travel demand management solution(s) that addresses congestion and improves trip reliability on I-495 and I-270 within the study limits and enhances existing and planned multimodal mobility and connectivity. Efforts have been made throughout the planning process to avoid and minimize impacts to wetlands and waterways to the greatest extent practicable, while still achieving the goals of the MLS. Detailed information on avoidance and minimization of impacts for the MLS are included in the *Avoidance, Minimization, and Impacts Report* (AMR). Despite these efforts, impacts to streams and wetlands are unavoidable due to the extensive network of features that are located adjacent to and flow beneath the existing roadway.

As part of the MLS, six DEIS Build Alternatives (alternatives 8, 9, 9M, 10, 13B, and 13C) and one No-Build Alternative (alternative 5), are proposed. All of the DEIS Build Alternatives would result in unavoidable impacts to natural resources regulated by the USACE under Section 404 of the Clean Water Act, MDE under the Maryland Nontidal Wetlands Protection Act, and VDEQ under the Code of Virginia (VAC 62.1-44.15). The USACE Baltimore District will regulate Waters of the US within Virginia that are typically regulated by the Norfolk District. Permits will be required from the USACE, MDE and VDEQ for unavoidable impacts to regulated resources. For further information on the permits and DEIS Build Alternatives see the *Natural Resources Technical Report* (NRTR), and the *Alternatives Technical Report*.

The purpose of the Draft CMP is to present the mitigation approach for impacts associated with any of the DEIS Build Alternatives. The report begins with a summary of the existing conditions and impacts, followed by the mitigation requirements and the different types of proposed mitigation, including on-site mitigation, mitigation banking, and off-site permittee responsible mitigation on private and public lands. The report concludes with a discussion of the proposed permittee-responsible mitigation sites.

3 EXISTING CONDITIONS & IMPACTS

3.1 HUC-8 Watersheds

The MLS corridor is located within the following three federal HUC-8 watersheds: Middle Potomac-Anacostia-Occoquan, Middle Potomac-Catoctin, and Patuxent (See **Figure 5-1**). The Middle Potomac-Anacostia-Occoquan watershed drains approximately 1,276 square miles in Maryland and Virginia. The watershed drains to the Potomac River from the western boarder of Washington D.C. south to Potomac Heights, Maryland. The smaller MDNR 12-digit watersheds within the Middle Potomac-Anacostia-Occoquan that overlap with the MLS corridor include Rock Creek, Sligo Creek, Northwest Branch, Paint Branch, Little Paint Branch, Northeast Branch, Upper Beaverdam Creek, and Upper Henson Creek watersheds. Most of these watersheds are highly developed with fair to poor stream conditions, with the exception of the upper sections of Rock Creek, Northwest Branch, and Paint Branch in Montgomery County. Degraded streams in the lower watersheds in Montgomery County and throughout Prince George's County exhibit fair to poor fish and benthic macroinvertebrate communities, limited instream

habitat, poor water quality due to a lack or absence of stormwater treatment, moderate to severe bank erosion, insufficient riparian buffers and numerous fish blockages created by dams and old sanitary sewer pipes. The Upper Paint Branch is one of the least densely developed watersheds in the Anacostia drainage (Galli et al., 2010) and is renowned for its self-sustaining brown trout populations (MCDEP, 1999) and relatively un-impacted aquatic communities.

The Middle Potomac-Catoctin watershed drains approximately 1,227 square miles in Maryland and Virginia. The watershed drains to the Potomac River from Harpers Ferry, MD east to Washington D.C. The smaller watersheds within the Middle Potomac-Catoctin that overlap with the MLS corridor include Fairfax County Middle Potomac, Potomac River/Rock Run, Cabin John Creek, Watts Branch, and Muddy Branch. The dominant land use in the Fairfax County Middle Potomac consists of residential, open space/parks/recreational areas, road right-of-ways, and commercial. The 2008 Fairfax County Middle Potomac Watersheds Management Plan describes the majority of the in-stream habitat quality in the watershed as Fair with inadequate riparian buffers that are less than 100 feet wide or with non-native, non-diversified, or insufficient vegetation. In Maryland, most of the watersheds are highly degraded with several developed areas including the Potomac Village, City of Rockville, and City of Gaithersburg. Degraded streams in the Maryland watersheds exhibit highly eroded banks, over-widened stream channels, piped/straightened channels, limited instream habitat, insufficient riparian buffer, inorganic pollutants, and fair to poor biological communities.

The Patuxent watershed consists of 868 square miles in Maryland that drain to the Patuxent River from Lisbon southeast to the Chesapeake Bay. The smaller MDNR 12-digit watersheds within the Patuxent that overlap with the MLS corridor include Bald Hill Branch, Lower Southwest Branch, and Upper Southwest Branch. Most of these watersheds are moderately to highly developed with degraded streams that generally have poor fish and benthic communities, limited instream habitat, and numerous fish blockages. The northern portion of the Upper Southwest Branch watershed near MD 214 has the least degraded biological conditions and a fish community rating of Good (MDNR, 2003) and the mainstem of Bald Hill Branch was designated as Tier II (High Quality) waters in 2007, based on baseline data collected by MBSS in 1997.

One of the goals of the MLS mitigation package is to improve upon the ecological functions in these watersheds with a focus on the impaired conditions and needs that have been described above. For further details on existing watershed conditions see the *MLS Natural Resources Technical Report (NRTR)*.

3.2 Existing Wetlands and Waterways

A total of 438 nontidal wetlands and 1,037 waterway features were delineated within the corridor study boundary¹. One Traditional Navigable Waterway (TNW), the Potomac River, was identified within the corridor study boundary. All other perennial waters are classified as tributaries to the Potomac or Patuxent Rivers. The total number of features delineated by classification are provided in **Table 3-1** below.

¹ The corridor study boundary is a 48-mile-long and approximately 600-foot-wide area along the centerlines of I-495 and I-270, spanning two states and three counties. Corridor study boundary limits are displayed on the MLS JPA Impact Plates.

Detailed information on these features and their impacts can be found in the *MLS Wetland Delineation Memorandum* and *Natural Resources Technical Report (NRTR)*.

Table 3-1: Total Delineated Features

Features		
Wetlands	Total Number	Acres
Palustrine Emergent (PEM)	134	13.56
Palustrine Forested (PFO)	283	56.72
Palustrine Scrub-Shrub (PSS)	21	2.98
Total	438	73.26
Waterways	Total Number	Linear Feet
Ephemeral	143	18,508
Intermittent	441	82,947
Perennial	453	139,879
Palustrine Open Water (POW)	12	2.85 AC
Total	1,037	241,334

3.3 Impact Summary

The DEIS Build Alternatives would impact USACE, MDE, and VDEQ regulated nontidal emergent, scrub-shrub, and forested wetlands, in addition to regulated Waters of the US other than wetlands. Unavoidable impacts associated with each DEIS Build Alternative have been calculated and described in the NRTR and AMR, and are based on the design details described therein. Regulatory jurisdiction under the CWA of 1972 differs from the Maryland Nontidal Wetlands Protection Act jurisdiction (COMAR 26.23.01), resulting in slightly different MDE and USACE impact quantities. To simplify reporting and ensure the mitigation requirement represents the total mitigation need for each agency, the highest impact quantity in each watershed and by each impact type was used to determine compensatory mitigation requirements. For example, if the MDE jurisdictional stream impact in the Patuxent watershed was greater than the USACE jurisdictional stream impact in the Patuxent watershed, the MDE impacts were used.

In Maryland, the permanent impacts for the DEIS Build Alternatives range from 16.08 to 16.52 acres of wetlands, and 151,880 to 153,635 linear feet of streams. Each of the DEIS Build Alternatives would permanently impact a total of 1.48 acres of POWs in Maryland. These impacts occur in the following three federal HUC-8 watersheds: Middle Potomac-Anacostia-Occoquan, Middle Potomac-Catoctin, and Patuxent. In Virginia, each of the DEIS Build Alternatives would impact a total of 0.05 acres of wetland and 3,349 linear feet of stream in the Middle Potomac-Catoctin watershed. Wetland and waterway impacts for each DEIS Build Alternative are displayed by state, HUC-8 watershed and resource type in **Appendix A**. Detailed information on avoidance and minimization of impacts is included in the *Avoidance, Minimization, and Impacts Report (AMR)*.

3.4 Function & Value Impacts

Ecological functions and values lost due to the proposed impacts would vary based on several factors including the location, size, and quality of the existing resource and the level of disturbance. All wetlands and waterways that would be impacted by the DEIS Build Alternatives provide some level of ecological

function. Qualitative functions and values were assessed for each resource and reviewed by participating and concurring agencies, including USACE, MDE, U.S. Fish and Wildlife Service (USFWS), Maryland National Capital Park and Planning Commission (M-NCPPC), and Maryland Department of Natural Resource (DNR), and revised in some cases based on agency input.

Wetland functions and values were assessed using the USACE New England Method as presented in *The Highway Methodology Workbook Supplement – Wetland Functions and Values; A Descriptive Approach* (USACE, 1999). Wetland functions and values that would be lost due to the proposed roadway improvements would include the following: groundwater recharge/discharge, floodflow alteration, fish habitat, sediment/toxicant retention, nutrient removal, sediment stabilization, wildlife habitat, recreation, education/scientific value, uniqueness/heritage, and/or visual quality/aesthetics. Potentially impacted wetlands range from low quality wetlands with very limited ecological functions to high quality wetlands with numerous ecological functions. For example, highly-disturbed, small wetlands with extensive invasive plant species were considered to have a low function and value, while large floodplain or seep wetlands with diverse native vegetation were considered to have a high function and value.

Stream functions and values that would be lost by the proposed roadway improvements were determined based on several factors including the type of impact, size of the channel, bed and bank stability, floodplain connection, channel form and substrate, degree of channel alteration, in-stream habitat, watershed imperviousness, and riparian buffer conditions. The proposed impacted streams range from poor quality channels with low functions and values to good quality channels that provide high functions and values. Many of the channels along the study corridor were altered in the past by the construction of the highway and surrounding development in the watershed that have resulted in highly-degraded streams; however, some high-quality channels in certain locations remain and continue to provide numerous ecological functions. Streams that had a low function and value included channels that were highly unstable, disconnected from the floodplain, concrete or rip-rap lined, piped, straightened, or significantly altered by some other type of human disturbance. Thomas Branch is an example of a stream within the corridor that has a low function and value due to the majority of the channel being altered by prior relocations, concrete trapezoidal channels, rip-rap, sheet pile walls, and surrounding residential development. These conditions have created a highly unstable channel that provides limited functions and poor in-stream habitat. Streams with a high function and value included minimally altered channels with a floodplain connection, diverse in-stream habitat, stable geometry, and expansive forested buffers. Paint Branch is an example of a stream within the corridor that has a high function and value due to its diverse in-stream habitat, good water quality, relatively stable bed and banks, and intact forested buffer.

4 MITIGATION REQUIREMENTS

4.1 Determination of Mitigation Requirements

Compensatory mitigation for wetland and waterway impacts are determined based on a combination of factors including the function, value, and size of the resource. In Maryland, these mitigation requirements may be adjusted at the discretion of the USACE or MDE. Traditionally, wetland mitigation requirements under Section 404 are determined by the ratio of wetland acres replaced to wetland acres lost. Wetland mitigation requirements for the DEIS Build Alternatives in Maryland have been calculated based on MDE's standard replacement to impact ratios of 1:1 replacement for emergent nontidal wetland (PEM) impacts

and 2:1 replacement to impact for forested (PFO) and scrub-shrub (PSS) nontidal wetland impacts. The agencies also require stream mitigation for permanent impacts where functions and values have been lost. Stream mitigation requirements for the DEIS Build Alternatives in Maryland were calculated per linear foot based on a 1:1 replacement to impact ratio. Stream mitigation requirements may also be adjusted by the agencies depending on the type of impact and proposed mitigation.

Waterway impacts in Maryland that would not require mitigation include portions of streams flowing through existing culverts and under existing bridges, and POWs that would remain or be modified. These resources would retain their function and value following construction completion and would therefore not require mitigation. The length of the existing culvert or width of the bridge to remain or to be replaced would be used to determine the linear footage of stream impact that would not require mitigation. The existing area of the POW to remain would be used to determine the acres of POW impact that would not require mitigation. Mitigation would be required for POWs that would be permanently removed. POW removals would be mitigated off-site based on a 1:1 replacement to impact ratio as PEM wetland mitigation.

In Virginia, wetland mitigation for the DEIS Build Alternatives is proposed based on the following VDEQ replacement ratios.

- 2:1 – Replacement to impact for forested wetlands
- 1.5:1 – Replacement to impact for scrub-shrub wetlands
- 1:1 – Replacement to impact for emergent wetlands

Stream mitigation requirements for the DEIS Build Alternatives in Virginia are based on the Unified Stream Methodology (USM), which is an accepted method used by the USACE's regulatory program and VDEQ's Virginia Water Protection Permit (VWPP) Program. USM Stream Assessment Forms were used to calculate mitigation requirements for each impacted stream based on a combination of factors including the existing conditions of the channel (condition, buffers, instream habitat & channel alteration), the length of the reach being impacted, and the type of impact (severe, significant, moderate or negligible). The stream mitigation requirement for each impacted feature is calculated by using the following formula:

$$\text{Required Mitigation (LF)} = \text{RCI} \times \text{LF} \times \text{IF}$$

RCI = Reach Condition Index

LF = Impact Linear Footage

IF = Impact Factor

For additional information on the USM, see *"Unified Stream Methodology for Use in Virginia"*, January, 2007.

4.2 Mitigation Requirements Summary

In Maryland, mitigation requirements range between 29.34 and 30.09 acres of wetland mitigation credit, and 99,456 and 100,982 linear feet of stream mitigation credit depending the DEIS Build Alternative. Impacts not requiring mitigation range between 52,424 and 52,653 linear feet of existing bridged/culverted stream impacts and 0.43 acres of POWs that will remain for all alternatives. Wetland and stream mitigation requirements in Maryland are summarized for each DEIS Build Alternative by federal HUC-8 watershed in **Appendix A**. Detailed information on the existing bridged/culverted stream

impacts that do not require mitigation are included in **Appendix B**. One POW (feature 8D) at station 1338+00 in the Middle Potomac-Anacostia-Occoquan watershed will remain for all of the DEIS Build Alternatives and not require mitigation. Locations of the existing bridges, culverts, and POW can be identified with stationing included on the MLS Joint Permit Application (JPA) Impact Plates.

In Virginia, the mitigation requirement for each DEIS Build Alternative is 0.10 acres of wetland mitigation and 729 linear feet of riverine mitigation in the Middle Potomac-Catoctin watershed. The wetland and riverine mitigation requirements in Virginia are summarized in **Tables 4-1** and **4-2**. USM Stream Assessment and Wetland Determination Forms are included in **Appendix C** for each proposed wetland and waterway impact in Virginia.

Table 4-1: Virginia Wetland Impacts & Required Mitigation

Watershed	Impact Type	Impact (AC)	Replacement Ratio	Mitigation Requirement (AC)
Middle Potomac-Catoctin	PFO	0.05	2:1	0.10
Total		0.05		0.10

Table 4-2: Virginia Waterway Impacts & Required Mitigation

Watershed	Resource Name	Impact Type	Reach Condition Index (RCI)	Impact (LF)	Impact Factor Type	Impact Factor (IF)	Mitigation Requirement (LF)
Middle Potomac-Catoctin	22AAA	Perennial	0.82	339	Access	0.0	0
	22AAA_C	Perennial	0.80	491	Existing Culvert	0.0	0
	22SS	Perennial	1.15	97	Access	0.0	0
	22UU	Intermittent	0.74	543	Roadway	1.0	402
	22VV	Ephemeral	0.75	371	Staging	1.0	279
	22WW/22XX	Ephemeral	0.75	64	Roadway	1.0	48
	22WW_C	Intermittent	0.80	272	Existing Culvert	0.0	0
	22ZZ	Perennial	0.96	97	Access	0.0	0
	22ZZ_C	Perennial	0.80	1,075	Existing Culvert	0.0	0
Total				3,349			729

Mitigation Requirement (LF) = RCI X LF X IF

5 MITIGATION APPROACH

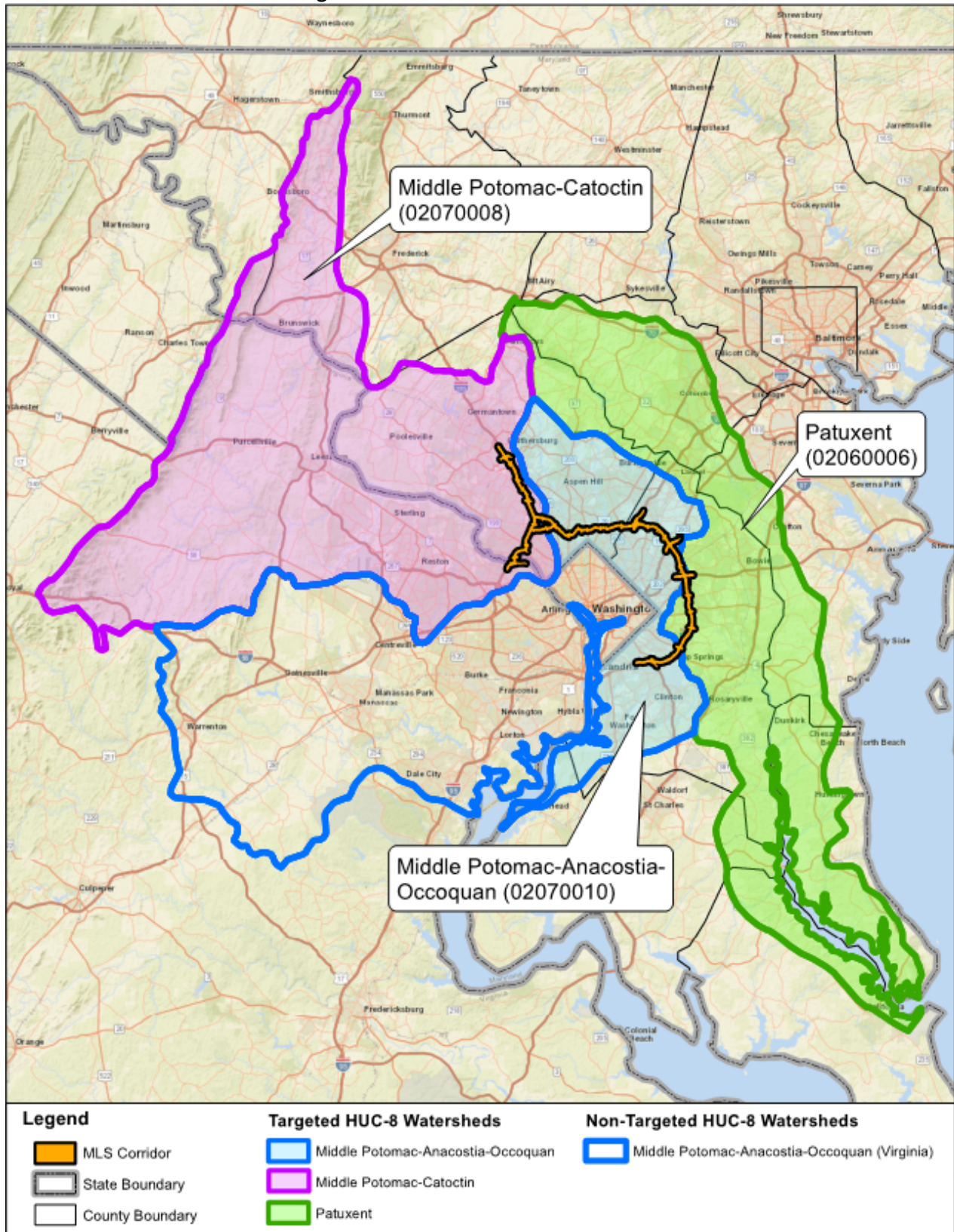
Mitigation opportunities were targeted within the three federal HUC-8 watersheds that would be impacted by the DEIS Build Alternatives (**Figure 5-1**). These targeted watersheds include the Middle Potomac-Anacostia-Occoquan (02070010), Middle Potomac-Catoctin (02070008), and Patuxent (02060006). The first step in pursuing mitigation for potential impacts resulting from the DEIS Build

Alternatives began with identifying potential on-site mitigation for waterways that would fully or partially retain their function and value following construction completion (i.e. channel relocations or channels to remain). On-site wetland mitigation was not proposed due to concerns with the potential failure of replacing functions and values adjacent to the proposed roadway expansion. Once on-site mitigation was determined, off-site mitigation options were pursued by state and watershed, based on the Federal Mitigation Rule hierarchy, beginning with mitigation banking and in-lieu fee programs, and followed by permittee-responsible mitigation. Available mitigation bank credits were identified in Virginia that could compensate for the proposed Virginia impacts; however, no mitigation bank credits or in-lieu fee programs were identified in Maryland. Two mitigation banks were identified in the USACE's RIBITS database in the Patuxent watershed in Maryland, however credits from these banks cannot be applied to MLS impacts because the MLS is located outside of each bank's service area. Due to the lack of in-lieu fee programs and mitigation bank credits in Maryland, permittee-responsible mitigation was pursued for the remaining mitigation requirements. A two-tiered approach was used to identify potential permittee-responsible mitigation that included a traditional mitigation site search on public lands and a Request for Proposals (RFP) on private lands.

The following is a list of the potential mitigation types that were investigated for the DEIS Build Alternatives:

- On-site Stream Mitigation
- Off-site Mitigation
 - Mitigation Banking & In-lieu Fee Programs
 - Traditional Mitigation Site Search on Public Lands
 - Request for Proposals (RFP) on Private Lands

Figure 5-1: Federal HUC-8 Watersheds



5.1 On-site Stream Mitigation

On-site mitigation is proposed for streams in Maryland that would fully or partially retain their function and value following construction completion. Proposed on-site stream mitigation includes open channels that would remain in place or be relocated within close proximity to their original location. Channels to remain in place consist of existing channels within the limits of disturbance (LOD) where no roadway fill or infrastructure is proposed. Impacts to these channels may be designated as temporary during the final design stages.

On-site mitigation credit for channel relocations and channels to remain was determined based on the functional value of the channel prior to construction and the proposed length of the channel after construction completion. Existing channel functional values range from high to low depending on the quality of the channel and the functions the channel provides. Full on-site mitigation credit (1:1 replacement to impact ratio) is proposed for channels with a low functional value, such as streams that are highly unstable, disconnected from the floodplain, concrete or rip-rap lined, straightened, or have been significantly altered in the past. These channels are anticipated to retain their limited functional value following construction completion and will therefore be mitigated entirely on-site. Partial credit (0.5:1 replacement to impact ratio) is proposed for channels with a medium functional value including streams that have been partially altered by the surrounding highway and developments, yet still retain some functions and values. These streams are anticipated to partially retain their function and value following construction and will therefore receive one-half the linear footage credit of the proposed channel. On-site mitigation credit is not proposed for channels with a high functional value. These high-quality channels include minimally altered streams that are connected to surrounding floodplains/wetlands and large perennial channels that provide significant functions and values. Channels with a high functional value are anticipated to be degraded as a result of construction and have significantly lower function and value following construction and would therefore require full off-site mitigation. See **Table 5-1** for a summary of the proposed on-site stream mitigation credit ratios.

Table 5-1: On-site Stream Mitigation Credits

Existing Channel Functional Value	Proposed On-Site Credit Ratios (Replacement to impact)
High	0:1
Medium	0.5:1
Low	1:1

5.1.1 Proposed On-site Stream Mitigation

In Maryland, on-site stream mitigation opportunities range from 59,837 to 60,486 linear feet depending on the DEIS Build Alternative. Proposed on-site stream mitigation and remaining mitigation requirements are summarized for each DEIS Build Alternative by HUC-8 watershed in **Appendix A**. Detailed tables of on-site stream replacements for each DEIS Build Alternative, including feature names, HUC-8 watersheds, stationing, type, and linear footage can be found in **Appendix D**. The approximate location of each on-site replacement can be determined via stationing included on the MLS JPA Impact Plates.

5.2 Off-Site Mitigation Requirement

In Maryland, off-site mitigation requirements vary depending on the DEIS Build Alternative impacts and proposed on-site stream mitigation. Impacts range from 16.08 to 16.52 acres of wetlands, and 151,880 to 153,635 linear feet of streams. Each alternative would impact 1.48 acres of POWs. Impacts not requiring mitigation range between 52,424 and 52,653 linear feet of existing bridged/culverted stream impacts and 0.43 acres of POWs that will remain for all alternatives. Mitigation requirements in Maryland range from 29.34 to 30.09 acres of wetland mitigation credit and 99,456 to 100,982 linear feet of stream mitigation credit. Proposed on-site stream mitigation ranges from 59,837 to 60,486 linear feet, resulting in an off-site stream mitigation requirement ranging from 39,619 to 40,496 linear feet. The DEIS Build Alternative impact and mitigation requirement ranges are displayed by HUC-8 watershed in **Tables 5-2 and 5-3**. Impacts and mitigation requirements in the Patuxent watershed are identical for all of the DEIS Build Alternatives. Tables showing each of the DEIS Build Alternative impacts and mitigation requirements are included in **Appendix A**.

Table 5-2: Maryland Wetland Mitigation - DEIS Build Alternative Ranges

Watershed	Wetland Impacts (AC)	POW Impacts (AC)	Off-Site Mitigation Requirement (AC)
Middle Potomac-Anacostia-Occoquan	9.85 - 10.11	0.79*	18.01 - 18.53
Middle Potomac-Catoctin	1.56 - 1.77	0.00	2.23 - 2.51
Patuxent	4.64	0.69	9.05
Total	16.08 - 16.52	1.48	29.34 - 30.09

*0.43 acres of POW in the Middle Potomac-Anacostia-Occoquan watershed will remain following construction and are therefore not included in the mitigation requirement.

Table 5-3: Maryland Stream Mitigation - DEIS Build Alternative Ranges

Watershed	Stream Impacts (LF)	Impacts Not Requiring Mitigation (LF)	Total Mitigation Requirement (LF)	Proposed On-Site Stream Mitigation (LF)	Off-Site Mitigation Requirement (LF)
Middle Potomac-Anacostia-Occoquan	95,673 - 96,554	32,716 - 32,915	62,957 - 63,639	43,234 - 43,594	19,723 - 20,045
Middle Potomac-Catoctin	33,474 - 34,348	11,032 - 11,062	22,442 - 23,286	7,801 - 8,152	14,579 - 15,134
Patuxent	22,733	8,676	14,057	8,740	5,317
Total	151,880 - 153,635	52,424 - 52,653	99,456 - 100,982	59,837 - 60,486	39,619 - 40,496

To ensure the compensatory mitigation package compensates for any of the DEIS Build Alternatives, the off-site mitigation requirement with the highest values was selected to determine the goals of the off-site, permittee-responsible mitigation. The highest off-site mitigation requirement in Maryland is referred to as the “MLS mitigation requirement” in this report, and includes 30.09 acres of wetland mitigation credits and 40,496 linear feet of stream mitigation credits. The MLS mitigation requirement is summarized by HUC-8 watershed in **Table 5-4**.

Table 5-4: MLS Mitigation Requirement

Watershed	Off-Site Wetland Mitigation Requirement (AC)			Off-Site Stream Mitigation Requirement (LF)
	PEM	PSS/PFO	Total	
Middle Potomac-Anacostia-Occoquan	2.41	16.12	18.53	20,045
Middle Potomac-Catoctin	1.03	1.48	2.51	15,134
Patuxent	1.61	7.44	9.05	5,317
Total	5.05*	25.04	30.09	40,496

* 1.05 acres of POW impacts included in PEM wetland mitigation requirement.

5.3 Mitigation Banking & In-Lieu Fee Programs

5.3.1 Availability

Mitigation banking and in-lieu fee programs were pursued in Maryland and Virginia to compensate for unavoidable impacts from the DEIS Build Alternatives. The following agencies and mitigation banking organizations were consulted: US Environmental Protection Agency (EPA), USACE, Ecotone, Inc., Montgomery County Department of Environmental Protection (MCDEP), Prince George’s County Department of Environmental Resources (PGDER), and M-NCPPC. Based on this research and coordination, there are no available mitigation bank credits or in-lieu fee programs in Maryland that could be applied to the MLS impacts, and therefore permittee-responsible mitigation would be required. Two mitigation banks were identified in the USACE’s RIBITS database in the Patuxent watershed in Maryland, however credits from these banks were not pursued due to their service areas being located outside the MLS corridor.

In Virginia, five potential mitigation banking sites were identified in the USACE’s RIBITS database within the Middle Potomac-Catoctin watershed on December 12, 2019. A total of 47,080 linear feet of stream mitigation credits and 2.26 acres of wetland mitigation credits are available from these banks. The available mitigation banking credits exceed the 0.10 wetland credits and 729 stream credits required for any of the DEIS Build Alternatives. The five mitigation banks identified within the Middle Potomac-Catoctin watershed in Virginia are summarized in **Table 5-5**.

Table 5-5: Potential Virginia Mitigation Banking Sites

Mitigation Banking Site	Mitigation Permit Number	Riverine Mitigation Credits Available (LF)	Wetland Mitigation Credits Available (AC)
Northern Virginia Stream	NAO-2007-3620	44,557	0
Rock Hedge	NAO-2008-2553	1,734	0.45
Pipken Site	NAO-2008-0713	621	0
Howyers Branch	NAO-2006-9613	111	1.81
South Fork Catoctin Site	NAO-2008-1969	57	0
Total		47,080	2.26

5.3.2 Proposed Mitigation Banking

Privately owned mitigation banks would be used to fulfill all mitigation requirements in Virginia. The mitigation requirement of 0.10 wetland mitigation credits and 729 riverine mitigation credits would be met by purchasing bank credits. MDOT SHA will negotiate with the banker to identify credits, confirm credit use with the USACE, and purchase credits to be included in the Final CMP.

5.4 Permittee-Responsible Mitigation

A two-tiered approach was used to identify potential permittee-responsible mitigation sites for the remaining off-site mitigation requirements in Maryland that included a traditional mitigation site search on public lands and a Request for Proposals (RFP) on private lands. The site selection process and results of the two approaches are discussed in the following sections.

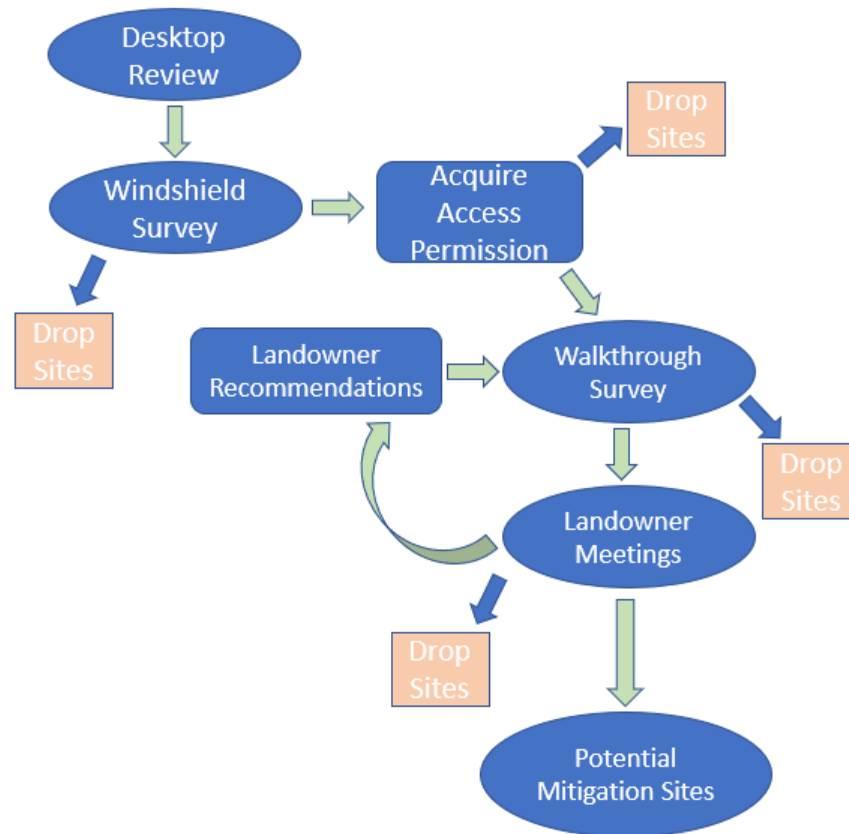
5.4.1 Traditional Mitigation Site Search on Public Lands

5.4.1.1 Site Search

The traditional mitigation site search focused on potential stream, wetland and fish passage mitigation sites on public lands within the three targeted HUC-8 watersheds. The traditional mitigation site search process occurred in the following five stages.

1. Desktop Review
2. Windshield Survey
3. Walkthrough Survey
4. Landowner Meetings
5. Potential Mitigation Site Selection

The process for the traditional mitigation site search and selection is illustrated in **Figure 5-2**. A more detailed discussion on each of the five stages of the process follows.

Figure 5-2: Traditional Mitigation Site Selection ProcessStage 1 – Desktop Review

The first stage of the traditional mitigation site selection process consisted of a desktop review of the MDOT SHA Environmental Program Division's (EPD) Master Site Selection geodatabase, which includes a compiled database of sites identified in the Water Resources Registry (WRR), state-wide TMDL program, and numerous watershed assessments, along with sites submitted by consultants identified through GIS analysis and from previous site searches and outreach coordination. All sites within the database were evaluated in accordance with the draft 2015 MDOT/SHA Site Selection Process Document. A list of potential fish passage sites located within MDOT SHA right-of-way (ROW) was also compiled from the Chesapeake Fish Passage Prioritization (CFPP) and North Atlantic Aquatic Connectivity Collaborative (NAACC) databases.

Stage 2 – Windshield Survey

A windshield survey was conducted for all wetland and stream sites identified in the desktop review. The windshield survey for stream and wetland sites consisted of reviewing sites on public land from the road ROW to determine their feasibility and potential for ecological uplift. Sites with constructability or feasibility constraints (i.e. steep slopes, utilities, limited access, private properties, etc.) and/or had limited potential for ecological uplift (i.e. stable conditions, ephemeral channels, high position in landscape, existing restoration, etc.) were removed from consideration. A windshield survey was not conducted for

fish passage sites due to their location within the state road ROW that allowed for direct access to the sites for a walkthrough survey.

Stage 3 – Walkthrough Survey

Permission to access all sites retained from the windshield survey was then requested from public landowners for a more detailed walkthrough survey. All sites that were granted access were rated by a team of environmental scientists and water resource engineers using MDOT SHA's Mitigation Field Assessment Forms. A similar assessment form was created for potential fish passage sites that includes criteria referenced from the NAACC and CFPP databases. All of the site assessment forms provide a quantitative means to assess and rank a site's mitigation potential based on feasibility, potential for ecological uplift, and associated construction impacts. The following criteria were rated in the site assessment form based on the mitigation type proposed at each site. A detailed explanation of each criterion rating can be found in **Appendix E**.

Wetland Site Criteria

- | | |
|--|--|
| 1. Percentage of hydric soils | 6. Vegetation cover type |
| 2. Hydrology connection to stream/wetlands | 7. Land use |
| 3. Evidence of flooding | 8. Contiguous wetland/upland habitat value |
| 4. Geomorphic position | 9. Ease of access |
| 5. Estimated cut to wetland hydrology | 10. Presence of utilities |

Stream Site Criteria

- | | |
|---|------------------------------------|
| 1. Percentage of bank erosion | 6. Vegetation cover type |
| 2. Degree of channel incision | 7. Land Use |
| 3. Existing floodplain access | 8. Opportunity for Ecological Lift |
| 4. Opportunity for floodplain development | 9. Ease of Access |
| 5. Drainage Area Evaluation | 10. Presence of utilities |

Fish Passage Site Criteria

- | | |
|---|---------------------------|
| 1. Functional upstream network | 5. Fish habitat diversity |
| 2. Number of downstream fish blockages | 6. Fish blockage height |
| 3. NAACC diadromous fish HUC 12 watershed score | 7. Adjacent land use |
| 4. Percentage of upstream impervious surface | 8. Ease of construction |
| | 9. Ease of Access |
| | 10. Presence of utilities |

Each criterion was scored on a scale from 1-10, with 1 representing the lowest rating and 10 representing the highest rating. The scores for each criterion were then combined for a total score for each site out of 100. The potential acreage or linear feet of mitigation credit was also estimated for each site and included on the site assessment form. Photographs were taken at representative locations of the sites. Upon

completion of the field site assessments, the results from all the sites were compared to identify sites with the greatest potential for overall ecological uplift and construction feasibility. Sites that had limited potential for ecological uplift, mitigation credit, or construction feasibility were removed from consideration. Other criteria considered in the site selection included the proximity of the site to the proposed impacts, potential mitigation credits, long-term sustainability of the site, and their potential for replacement of functions and values lost by the proposed roadway improvements.

Stage 4 – Landowner Meetings

Meetings were held with public landowners to discuss sites with the greatest mitigation potential that were identified during the walkthrough survey. Landowners either agreed with the proposed site, requested the site be removed, or were unfamiliar with the site and requested a follow-up field meeting to review the site. Sites recommended for removal by the landowner were dropped from the Potential Mitigation Site List. Most landowners provided additional mitigation site recommendations located on their properties at these meetings. Sites provided by the landowners were evaluated with the same walkthrough survey procedures as the sites originally identified.

Stage 5 – Potential Mitigation Site Selection

Sites with the greatest mitigation potential that received preliminary approval from the landowners were included in the Potential Mitigation Site List that would be presented to the agencies.

5.4.1.2 Results

A total of 15 wetland sites and 74 stream sites were identified in the desktop review and investigated during the windshield survey. A total of 47 fish passage sites were identified in the desktop review and later investigated during the walkthrough survey. Windshield survey results eliminated 11 wetland sites and 14 stream sites, and added one wetland site and three stream sites. Wetland sites were removed following the windshield survey for a variety of reasons including: high position in the landscape, extensive forest or high-quality wetlands, conflicts with existing land use, lack of potential hydrology, and locations on private properties. Stream sites were removed from further investigations following the windshield survey due to the following reasons: absence of an existing channel, stable channel conditions, ephemeral channels, prior stream restoration, and access or restoration required on private properties. Sites that were added during the windshield survey included unstable channels and open floodplain areas on public land located directly upstream or downstream of MDOT SHA database sites.

The initial walkthrough survey included a total of five wetland sites, 63 stream sites and 47 fish passage sites. Initial walkthrough survey results eliminated three wetland sites, 56 stream sites, and all 47 fish passage sites. Wetland sites removed following the initial walkthrough survey included sites with limited credit potential and those located in existing high-quality wetlands. Stream sites that were removed from further investigation following the initial walkthrough survey included sites with limited potential for ecological uplift and long-term sustainability, land use conflicts, limited credit potential, existing stream restoration, existing stable conditions, high-risk due to large watershed size, access challenges due to steep slopes, and sites with high quality natural resources such as mature forest, wetlands of special state concern, or forest conservation easements. All of the fish passage sites were removed following the initial walkthrough survey due to the following reasons: absence of fish blockage, limited upstream credit potential, access/restoration required on private properties, or access challenges due to steep slopes.

Meetings with public land owners, including DNR, BARC, M-NCPPC Montgomery and Prince George's Counties, and MDOT SHA, were held to discuss good potential sites retained from the walkthrough survey. A total of four wetland sites, 42 stream sites and three fish passage sites were recommended by landowners or agencies and added to the walkthrough survey. One wetland site and six stream sites were removed from the potential mitigation site list at the request of the landowner due to existing or proposed stream restoration at the site, potential impacts to natural resources, or land use conflicts. Sites recommended by landowners were either retained or removed following the final walkthrough survey. Sites were removed for the following reasons: limited potential for ecological lift and long-term sustainability, limited credit potential, absence of an existing channel, ephemeral nature of the channel, and access constraints. The final walkthrough survey resulted in the removal of two wetland sites, 36 stream sites, and two fish passage sites.

Four wetland sites, 12 stream sites, and one fish passage site were identified in the traditional mitigation site search on public lands that were included in the Potential Mitigation Site List.

Results from the traditional mitigation site search on public lands are summarized in **Table 5-6**. A vicinity map and detailed site list of all the potential public mitigation sites that were investigated in the windshield and walkthrough surveys is included in **Appendix F**. The site list includes general information on sites including the property owner, location, length, field assessment score and reason for removing or retaining sites. Assessment forms for all of the walkthrough sites, which includes criteria rankings, site photographs, and maps, are included in **Appendix E**; and public landowner meeting minutes can be found in **Appendix G**. A vicinity map and list of sites with the greatest mitigation potential that were presented to the agencies is included in **Appendix H**.

Table 5-6: Traditional Mitigation Site Search Results

Watershed	Mitigation Type		Windshield Survey			Walkthrough Survey			Potential Sites
			Initial Sites	Removed Sites	Added Sites	Initial Sites	Removed Sites	Added Sites	
Middle Potomac-Anacostia-Occoquan	Wetland	Number	6	6	0	0	0	2	1
		AC	75.01	75.01	0	0	0	36.11	29.32
	Stream	Number	49	9	0	40	38	33	6
		LF	136,636	19,353	0	117,283	112,275	76,149	21,331
	Fish Passage	Number	NA	NA	NA	1	1	3	1
Middle Potomac-Catoctin	Wetland	Number	9	5	1	5	3	2	3
		AC	81.22	47.90	8.54	41.86	20.10	23.24	32.63
	Stream	Number	16	4	2	14	10	9	5
		LF	48,907	14,783	6,285	40,409	25,755	12,557	13,816
	Fish Passage	Number	NA	NA	NA	5	5	0	0
Patuxent	Wetland	Number	0	0	0	0	0	0	0
		AC	0	0	0	0	0	0	0
	Stream	Number	9	1	1	9	8	0	1
		LF	25,010	1,030	4,260	28,240	21,498	0	6,742
	Fish Passage	Number	NA	NA	NA	41	41	0	0

5.4.2 Request for Proposals (RFP) on Private Lands

5.4.2.1 Summary

MDOT SHA issued a Request for Proposals (RFP) for full delivery services to provide permittee-responsible stream and wetland mitigation credits on private lands to mitigate for unavoidable impacts associated with the DEIS Build Alternatives. The awarded providers are responsible for accomplishing mitigation through resource agency-approved mitigation practices including, but not limited to: stream restoration and wetland restoration, creation, and enhancement services. Providers are responsible for site selection, land acquisition, survey, design, agency mitigation site approval, permitting support, construction, monitoring and adaptive management, as well as any other services required to deliver successful mitigation to MDOT SHA to ensure USACE and MDE permit compliance.

The solicitation process was designed to leverage the growing natural resource credit market by requesting full delivery of mitigation credits from providers under a permittee-provided mitigation framework. MDOT SHA issued the request to provide mitigation credits on private property, which required Phase I Mitigation Plans along with other supporting documents as the response to the RFP. The providers were required to demonstrate that they possessed the financial, technical and administrative qualifications necessary to complete their projects and meet the MDE and USACE mitigation requirements. If it was determined that the provider did not possess these qualifications, or the proposed site did not meet the technical requirements, the site was removed from consideration.

The provider is responsible for submitting stream and wetland mitigation credits in two stages. The first stage, Preliminary Design and Preconstruction Services, includes all activities required to secure a MDE Phase II Mitigation Plan approval and a USACE Final Mitigation Plan approval. Stage 2, Credit Delivery Services, includes Final Design, right-of-way certification, construction and monitoring/maintenance of mitigation credits and will conclude with USACE and MDE determination of site success and release from monitoring/maintenance requirements.

MDOT SHA developed the RFP to allow for concise review of multiple sites from a single provider as well as single sites from multiple providers. For example, if a provider proposed two independent sites and MDOT SHA accepted both sites, the provider would enter into two stand-alone contracts with MDOT SHA. MDOT SHA reserves the right to enter into contracts with any provider deemed qualified and whose proposal are most advantageous to the State. MDOT SHA made multiple awards to secure the palustrine emergent (PEM), palustrine forested (PFO) / palustrine scrub-shrub (PSS), and stream mitigation credits for the DEIS Build Alternatives and entered into multiple contracts on a mitigation site basis with providers to achieve the desired mitigation credits requested through the RFP.

5.4.2.2 Results

The RFP was advertised on April 16, 2019 and responses from the proposers were due on July 17, 2019. A total of six combined stream/wetland mitigation sites were chosen by MDOT SHA based on the administrative qualifications. A summary of the proposed RFP mitigation site credits is displayed by HUC-8 watershed in **Table 5-7**. A vicinity map and list of the potential private and public sites is included in **Appendix H**.

Table 5-7: Potential RFP Mitigation Sites

Watershed	Sites	Proposed Wetland Credit (AC)	Proposed Stream Credit (LF)
Middle Potomac-Anacostia-Occoquan	3	47.20	29,120
Middle Potomac-Catoctin	2	9.92	11,776
Patuxent	1	9.18	11,971
Total	6	66.30	52,867

5.4.3 Agency Meetings

Field meetings were conducted with MDE, USACE, DNR, USFWS, EPA and the potential mitigation site landowners in November and December of 2019 to review public and private sites included in the Potential Mitigation Site Vicinity Map and List in **Appendix H**. A total of 18 mitigation sites were reviewed with the agencies, including eight stream/wetland sites, eight stream sites, one wetland site, and one fish passage site. One site (RFP-6) that was originally removed from consideration prior to the agency meetings was added to the Potential Mitigation Site List and Map after further negotiations with the landowner and will be presented to the agencies in the near future. Meetings entailed walking the mitigation sites and discussing existing site conditions, site constructability, functional uplift potential, site constraints, and conceptual designs. Meeting minutes and attendee lists for each of the field meetings are included in **Appendix I**.

Following completion of the field reviews, a meeting was held with the USACE and MDE on January 10, 2020 to discuss all of the potential mitigation sites that were reviewed in the field and determine which sites had the greatest mitigation potential that should be included in the Phase I Mitigation Site List. Based on agency and landowner feedback, sites were revised, retained, or removed from consideration. Sites were removed due to limited functional uplift potential, site constraints, or lack of mitigation credit need in the watershed. Results from the meeting are included in the meeting minutes in **Appendix I** and documented in the “status” column of the Potential Mitigation Site List in **Appendix H**. Retained sites are included in the Phase I Mitigation Site List in **Section 6.2**.

6 PERMITTEE-RESPONSIBLE MITIGATION PACKAGE

6.1 MLS Mitigation Requirement

The off-site mitigation requirement with the greatest values, also referred to as the “MLS mitigation requirement”, was used to determine the goals of the permittee-responsible mitigation package. The MLS mitigation requirement includes 30.09 acres of wetland mitigation credits and 40,496 linear feet of stream mitigation credits, and is summarized by HUC-8 watershed in **Table 6-1**.

Table 6-1: MLS Mitigation Requirement

Watershed	Off-Site Wetland Mitigation Requirement (AC)			Off-Site Stream Mitigation Requirement (LF)
	PEM	PSS/PFO	Total	
Middle Potomac-Anacostia-Occoquan	2.41	16.12	18.53	20,045
Middle Potomac-Catoctin	1.03	1.48	2.51	15,134
Patuxent	1.61	7.44	9.05	5,317
Total	5.05*	25.04	30.09	40,496

* 1.05 acres of POW impacts included in PEM wetland mitigation requirement.

6.2 Phase I Mitigation Sites

MDOT SHA has identified 14 permittee-responsible, Phase I mitigation sites that are included in this Draft CMP. Sites with the greatest mitigation potential from the traditional mitigation site search on public lands and the RFP on private lands were selected. These sites have the potential to provide 80.05 acres of wetland credit, and 79,446 linear feet of stream mitigation credit. These credits far exceed the MLS mitigation requirement, and generally exceed the mitigation requirements for each watershed and type of resource. Excess credit potential has been included in the Draft CMP because of the preliminary nature, and limited investigations that have been completed for each site. It is possible that one or more sites could be removed due to a fatal flaw, and the potential credits ultimately negotiated with the resource agencies could be fewer than originally anticipated. As fatal flaws are uncovered, landowner coordination continues, and credits are negotiated, MDOT SHA will coordinate closely with the agencies to refine the mitigation package with the goal of providing a Final CMP that includes the sites that best compensate for the project impacts.

Phase I mitigation sites are listed in **Table 6-2**, and a vicinity map of the proposed sites is included in **Appendix J**. Phase I Mitigation Design Plans are presented in **Appendices K and L**.

Table 6-2: Phase I Mitigation Sites

Watershed	Site ID	Site Name	Mitigation Type & Credit Ratios	Proposed Wetland Credit (AC)	Proposed Stream Credit (LF)
Middle Potomac-Anacostia-Occoquan	AN-1	Crabbs Branch	Stream Restoration (1:1) Wetland Creation (1:1) Wetland Enhancement (4:1)	3.50	4,276
	AN-3	Pebblestone Dr. Tributary	Stream Restoration (1:1)	0.00	2,162
	AN-6	Paint Branch Fish Passage	Fish Passage Full Restoration (1:1) Full blockage removal (10:1) Partial blockage removal (20:1)	0.00	5,258
	AN-7	Paint Branch South Farm Tributaries	Stream Restoration & Fish Passage (1:1)	0.00	1,401
	RFP-1	Indian Creek and Tributaries at Konterra	Stream Restoration (1:1) Wetland Restoration/Creation (1:1) Wetland Enhancement (2:1) Wetland Buffer Enhancement (15:1)	31.00	26,475
	RFP-5	Henson Creek	Stream Restoration (1:1 & 2:1) Wetland Restoration/Creation (1:1) Wetland Enhancement (1.5:1) Wetland Preservation (10:1) Wetland Buffer Enhancement (15:1) Wetland Buffer Preservation (20:1) Upland Preservation (20:1)	5.85	1,091
	RFP-6	Mill Swamp Creek	Stream Restoration (1:1 & 2:1) Wetland Creation (1:1) Wetland Enhancement (1.5:1) Wetland Preservation (10:1) Wetland Buffer Enhancement (15:1) Wetland Buffer Preservation (20:1) Upland & Upland Buffer Preservation (20:1)	10.35	1,658
Total				50.70	42,321
Middle Potomac-Catoctin	CA-2	Lower Magruder Branch	Stream Restoration (1:1) Wetland Creation (1:1) Wetland Enhancement (4:1)	7.98	2,934
	CA-3	Upper Magruder Branch	Stream Restoration (1:1) Wetland Creation (1:1) Wetland Enhancement (4:1)	2.27	1,053
	CA-5	Seneca Creek Tributary	Stream Restoration (1:1)	0.00	2,649
	RFP-2	Cabin Branch	Stream Restoration (1:1) Wetland Restoration (1:1) Wetland Buffer Enhancement (15:1)	4.81	6,680

Watershed	Site ID	Site Name	Mitigation Type & Credit Ratios	Proposed Wetland Credit (AC)	Proposed Stream Credit (LF)
	RFP-3	Tuscarora Creek	Stream Restoration (1:1) Wetland Restoration (1:1) Wetland Preservation (10:1) Wetland Buffer Enhancement (15:1) Wetland Buffer Preservation (20:1)	5.11	5,096
Total				20.17	18,412
Patuxent	PA-1	Back Branch	Stream Restoration (1:1)	0.00	6,742
	RFP-4	Cabin Branch	Stream Restoration (1:1 & 2:1) Wetland Enhancement (5:1) Wetland Creation (1:1) Wetland Preservation (10:1) Wetland Buffer Enhancement (15:1)	9.18	11,971
Total				9.18	18,713
Total				80.05	79,446

When considering the mitigation need by impact type in each watershed, the selected sites meet or exceed the requirement in all cases. See **Tables 6-3** and **6-4**. for summaries of the MLS mitigation requirement and proposed mitigation by HUC-8 watershed.

Table 6-3: Phase I Wetland Mitigation Summary

Watershed	MLS Mitigation Requirement (ac)	Proposed Mitigation Sites	Proposed Mitigation Credit (AC)
Middle Potomac-Anacostia-Occoquan	18.53	4	50.70
Middle Potomac-Catoctin	2.51	4	20.17
Patuxent	9.05	1	9.18
Total	30.09	9	80.05

Table 6-4: Phase I Stream Mitigation Summary

Watershed	MLS Mitigation Requirement (LF)	Proposed Mitigation Sites	Proposed Mitigation Credit (LF)
Middle Potomac-Anacostia-Occoquan	20,045	7	42,321
Middle Potomac-Catoctin	15,134	5	18,412
Patuxent	5,317	2	18,713
Total	40,496	14	79,446

6.3 Twelve Mitigation Plan Components

In accordance with 33 CFR parts 325 and 332, and 40 CFR part 230 of the Federal Compensatory Mitigation Rule, the following section discusses the universal fundamental components that apply to all of the Phase I mitigation sites. Site-specific fundamental components (objectives, baseline information, determination of credits, mitigation work plan, maintenance plan, and monitoring requirements) will be discussed in further detail in the Phase II Mitigation Design Plans that will be developed with the Final CMP.

1. Project Objectives

Project objectives for the proposed mitigation sites are briefly discussed in the Phase I Mitigation Design Plans in **Appendices K and L**. Project objectives are site-specific and will be further developed for each site in the Phase II Mitigation Design Plans.

2. Site Selection

Site selection for public mitigation sites was based on the traditional mitigation site search that is discussed in **Section 5.4.1**. The private mitigation sites were selected based on MDOT SHA's RFP process that is discussed in **Section 5.4.2**.

3. Site Protection Instrument

All mitigation sites, with the exception of M-NCPPC sites, will be protected by conservation easements to ensure conservation in perpetuity. The latest version of MDOT SHA's "Grant of Mitigation Easement" is proposed as the instrument that will ensure conservation of the mitigation site. This instrument has been accepted by USACE and MDE to preserve other mitigation sites. Upon construction completion, non-M-NCPPC mitigation sites, including 25-foot wetland buffers, will be placed under covenants and restrictions to protect the sites in perpetuity.

M-NCPPC Montgomery County mitigation sites are typically already considered protected by park policies and M-NCPPC does not encumber properties with deed restrictions on parkland mitigation sites. M-NCPPC mitigation sites will be protected in accordance with M-NCPPC Montgomery County's integrated natural resource management plan, Natural Resource Management Plan for Natural Areas in M-NCPPC Parkland in Montgomery County, Maryland. This plan published in February 2013 requires preservation and conservation of natural areas and wetlands like the proposed mitigation sites.

The proposed mitigation sites would be considered environmentally sensitive areas in the Natural Resource Management Plan for Natural Areas in M-NCPPC Parkland in Montgomery County, Maryland and are protected park resources. The following goals, visions and legal protection are identified in the plan.

- M-NCPPC Montgomery County Mission: Protect and interpret our valuable natural and cultural resources; balance the demand for recreation with the need for conservation; offer a variety of enjoyable recreational activities that encourage healthy lifestyles; and provide clean, safe, and accessible places for leisure-time activities.
- Goal 11 of the Vision 2030 Strategic Plan: Inventory, conserve, and enhance ecologically healthy and biologically diverse natural areas with a focus on Park Best Natural Areas,

Biodiversity Areas, and Environmentally Sensitive Areas as defined in the Land Preservation, Parks, and Recreation Plan (M-NCPPC, 2005).

- Environmental Guidelines for Management and Development in Montgomery County Parks: "...the Montgomery County General Plan and local area master plans articulate County-wide and planning area-wide goals, objectives, principles, and policies to protect sensitive areas from the adverse effects of development, as required by the Annotated Code of Maryland Article 66B...

4. Baseline Information

Preliminary baseline information for each mitigation site is included in the Phase I Mitigation Design Plans in **Appendices K** and **L**. Further detailed information, including wetland delineations, surveys, groundwater well data, etc. will be collected for each of the sites during the development of the Phase II Mitigation Design Plans.

5. Determination of Credits

A detailed explanation of the mitigation credit requirements is included in **Section 4** and **5.2**. Mitigation credits provided by each of the proposed mitigation sites are summarized in **Section 6.2** and discussed in the Phase I Mitigation Design Plans in **Appendices K** and **L**. Mitigation credits provided are site-specific and will be further developed for each site in the Phase II Mitigation Design Plans.

6. Mitigation Work Plan

The Phase I Mitigation Design Plans for each site are included in **Appendices K** and **L**. The geographical boundaries, construction methods, construction access, timing and sequence of construction, groundwater well data, access to hydrology/water source, planting specifications, elevations, and erosion and sediment control measures will be included the Phase II Mitigation Design Plans.

7. Maintenance Plan

Following construction, the public mitigation sites will be placed in MDOT SHA's monitoring program and the private mitigation sites will be monitored separately by the RFP providers. All mitigation sites will be subject to regular inspections to determine the progress and continued viability of the project. The post-monitoring period for each of the sites will be coordinated with the agencies and determined during the development of the Phase II Mitigation Design Plans. If remediation action is needed during or after the post-monitoring period, MDOT SHA will be responsible for preparing a remediation plan for the public sites and the RFP contractor will be responsible for preparing a remediation plan for the private sites that will be submitted for agency approval.

8. Performance Standards

Each mitigation site will have ecologically-based performance standards that are tied to site-specific objectives and values that will be developed during the Phase II Mitigation Design Plans. Performance standards for all of the wetland mitigation sites will be in accordance with the *Performance Standards and Monitoring Protocol for Permittee-responsible Nontidal Wetland Mitigation Sites in Maryland*, April 20, 2018.

9. Monitoring Requirements

Mitigation sites will be monitored for up to ten years. If MDE and the USACE determines that the site is successful prior to year 10, monitoring may be abbreviated. If it is determined that the site is not meeting the performance standards during the monitoring period, an adaptive management plan will be developed, and remedial action will occur to ensure the success of the site. Specific monitoring requirements will be negotiated with the agencies and determined for each mitigation site during the development of the Phase II Mitigation Design Plans. All wetland sites will be evaluated in accordance with the *Performance Standards and Monitoring Protocol for Permittee-responsible Nontidal Wetland Mitigation Sites*, April 20, 2018.

10. Long-term Management Plan

Covenants and Restrictions will be placed on each of the mitigation sites, with the exception of the M-NCPPC sites, to protect the sites in perpetuity. MDOT SHA will be the responsible party for the long-term management of all the sites. Following the completion of monitoring, each site will be visited annually to assess the site's condition as it relates to invasive species presence, trespassing, vandalism, nuisance wildlife, erosion, and hydrology.

11. Adaptive Management Plan

The Adaptive Management Plan for all mitigation sites will include monitoring the site, analyzing the site for success and having contingencies in place for changes in site conditions to address deficiencies or changes in management strategies and objectives. If deficiencies are found, remedial action will occur, and additional monitoring will take place to ensure success. If the mitigation goals of the site are not being met, an Adaptive Management Plan will be developed to assess and remediate the problem. Depending on the problem, the plan could include various assessments such as:

- Adjustment of monitoring schedule based on site conditions,
- Additional hydrologic monitoring,
- Hydrologic adjustment,
- Invasive species treatment recommendations,
- Vegetation protective measures,
- Supplemental plantings,
- Soil amendments, and
- Animal control/protection (beaver/deer/Canada goose, etc.).

Once a site is assessed, the monitoring team will coordinate the findings with the designers and MDOT SHA and recommendations will be developed. The agencies will be informed of the assessment findings and the recommendations. If needed, an interagency meeting will be conducted with the regulatory agencies, landowners, and MDOT SHA to determine the best course of action.

12. Financial Assurance

MDOT SHA will be responsible for monitoring and any necessary remedial actions for the public mitigation sites. Private mitigation site monitoring will be funded by MDOT SHA; however, the awarded RFP contractors will be responsible for monitoring and any required remedial actions. On an annual basis MDOT SHA reviews its need for funding and includes costs associated with monitoring,

management and remediation. The site's monitoring, maintenance, and management will be included in the annual review.

6.4 Preliminary MHT & USFWS Investigations

A preliminary review of the Maryland Historical Trust (MHT) and U.S. Fish and Wildlife Service (USFWS) online databases was completed for the Phase I mitigation sites to identify potential cultural, historical, or rare, threatened, or endangered (RTE) species records. The purpose of the preliminary review was to determine the likely need for future cultural and/or RTE investigations associated with the proposed sites. The preliminary review did not include site visits or coordination with any agencies. Based on the preliminary review, the majority of the Phase I mitigation sites will require further cultural resource investigations as part of the detailed investigations that will occur during development of the Phase II Mitigation Design Plans. The northern long-eared bat and several migratory bird species were identified in the USFWS IPaC results for the majority of the sites, however records of these species within the study areas has not yet been confirmed. Further coordination with USFWS, DNR and MHT will also take place during the development of the Phase II Mitigation Design Plans. The results from the preliminary review are summarized for each site in **Table M-1** in **Appendix M**.

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