



# APPENDIX G MONITORING AND PERFORMANCE STANDARDS

Compensatory Mitigation Special Conditions

13. MDTA must provide all compensatory mitigation that is required by the Corps for permanent impacts to waters of the United States, including jurisdictional wetlands must be provided at the locations depicted on the enclosed map entitled 'Figure 3: Proposed Mitigation Sites' dated September 2018 and in accordance with Compensatory Mitigation Plans dated September 2018.
14. MDTA must submit a draft declaration of restrictive covenants (DRC) for each mitigation site to Mr. Steve Elinsky of this office within 90 days prior to the start of construction for the respective mitigation site.
15. MDTA must submit a completed fully executed DRC for each site to Mr. Steve Elinsky of this office prior to the start of construction.
16. The construction of the compensatory mitigation required at MD7 in Charlestown must be completed no later than February 1, 2021. All other required mitigation must be completed prior to the expiration of this authorization.
17. No in-stream work will be conducted within Carsins Run or its tributaries associated with the project from March 1 through June 15, inclusive, of any year.
18. No in-stream work will be conducted within an unnamed tributary to the Northeast River or its tributaries associated with the project from March 1 through June 15, inclusive, of any year.
19. The mitigation construction and plantings must be completed by the end of construction of the highway improvements. The mitigation sites must be monitored for a period of 10 years. Monitoring must commence during the first spring season following completion of construction and planting of the wetland mitigation sites.
20. Reporting and Performance Standards: All required documentation, including monitoring reports and as-built surveys shall be submitted electronically to the Corps ([steve.elinsky@usace.army.mil](mailto:steve.elinsky@usace.army.mil)). Monitoring reports must be submitted by December 31 of the year following completion of the mitigation site and then on years 3, 5, 7, and 10. The following standards will be used to assess project success and must be achieved each monitoring year:
  - Wetland Area(s):
    - **Wetland Vegetation Dominance:** Wetland vegetation dominance, defined as a vegetation community where more than 50% of all dominant plant species across all strata are rated obligate ("OBL"), facultative wet ("FACW"), or



facultative ("FAC"), using the vegetation sampling procedures as described in the appropriate regional supplement to the Corps of Engineers Wetland Delineation Manual, must be achieved; and

• **Aerial Cover Vegetative Standards:**

- By the end of monitoring year one, a minimum of 50% of the mitigation site shall be vegetated (either by planted or volunteer plants) by native (FAC or wetter) species.
- By the end of monitoring year two, a minimum of 60% of the mitigation site shall be vegetated (either by planted or volunteer plants) by native (FAC or wetter) species.
- By the end of monitoring year three, a minimum of 70% of the mitigation site shall be vegetated (either by planted or volunteer plants) by native (FAC or wetter) species.
- By the end of monitoring year five and each monitoring year thereafter, a minimum of 85% of the mitigation site shall be vegetated (either by planted or volunteer plants) by native (FAC or wetter) species.
- Volunteer species should support functions consistent with the project design goals.

- **Invasive Species:** The goal of any mitigation site is to have no invasive species. However, if invasive species are present, no more than 10% of relative plant cover<sup>1</sup> over the entire site shall be made up by non-native or invasive species, with no individual colony greater than or equal to 5% of relative plant cover. No more than 5% of relative plant cover over the entire site shall be made up of *Phragmites australis*<sup>2</sup>, *Persicaria perfoliata*, or *Lythrum salicaria*. Native status will be based on the Natural Resources Conservation Service Plants Database. Invasive species are identified on the 2010 National Park Service/U.S. Fish and Wildlife Service document Plant Invaders of Mid-Atlantic Natural Areas (<http://www.nps.gov/plants/alien/pubs/midatlantic/>) and the Maryland Invasive Species Council Invasive Species of Concern in Maryland ([http://www.mdinvasivesp.org/invasive\\_species\\_md.html](http://www.mdinvasivesp.org/invasive_species_md.html)).

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<sup>1</sup> "Relative plant cover" is defined as the cover of a particular species as a percentage of total plant cover. Thus, relative cover will always total 100%, even when total absolute cover is quite low.

<sup>2</sup> American Common Reed, *Phragmites australis* subsp. *americanus*, is not considered to be an invasive plant.

*Phalaris arundinacea* and *Typha* spp. may also be considered as invasive species; and

• **Wetland Species Richness:**

- For scrub/shrub wetlands, establish a minimum of three species of native wetland shrubs (FAC or wetter) with each wetland shrub species having an aerial cover of at least 15%. No more than 50% shall be FAC.
- For forested wetlands, establish a minimum of three species of native wetland trees and two species of native wetland shrubs (FAC or wetter) with each wetland tree and shrub species having an aerial cover of at least 15%. No more than 50% shall be FAC; and

- **Wetland Vegetation Density for Scrub-Shrub and Forested Wetlands:** For scrub-shrub or forested wetlands, native wetland (FAC or wetter) plant density of at least 435 living trees/shrubs per acre with a minimum height of 10 inches shall be achieved by the end of the first growing season following planting and maintained each monitoring year thereafter through the end of the monitoring period; and

- **Wetland Vegetation Cover for Forested Wetlands:** For forested wetlands, average tree height of tallest five native wetland trees within each sample plots shall be at least three feet in height at year three and at least five feet in height at year five and each monitoring year thereafter. Canopy cover<sup>3</sup> of native wetland trees and shrubs must be at least 30% by year ten; and

- **Wetland Hydrology:** Wetland hydrology, defined as 14 consecutive days of flooding or ponding, or a water table 12 inches (30 cm) or less below the soil surface, during the growing season at a minimum frequency of 5 years in 10 (50 percent or higher probability). For the purpose of this determination, the growing season is based on two indicators of biological activity that are readily observable in the field: (1) above-ground growth and development of vascular plants and (2) soil temperature as an indicator of soil microbial activity. These indicators of biological activity shall be used for determinations of growing season and are more fully described in the appropriate regional supplement

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<sup>3</sup> "Canopy cover" is defined as the percentage of ground covered by tree and shrub leaves, when the edges of the leaves are mentally projected down to the ground surface.



to the Corps of Engineers Wetland Delineation Manual.

- **Wetland Soils:** The entire wetland restoration or creation area must meet the Hydric Soil Technical Standard (Technical Note 11) developed by the National Technical Committee for Hydric Soils for saturated conditions and aerobic conditions:
  - Free water must exist within 10 inches (25 cm) of the ground surface for at least 14 consecutive days; and
  - Anaerobic conditions must exist within 10 inches (25 cm) of the ground surface for at least 14 consecutive days. Anaerobic conditions may be determined by one of the following methods, as detailed in the Hydric Soil Technical Standard:
    - a. Positive reaction to alpha-alpha dipirydil, determined as least weekly.
    - b. Reduction of iron determined with IRIS tubes installed for 30 days.
    - c. Measurement of redox potential (Eh) using platinum electrodes, determined at least weekly.
  
- **Buffer Area(s):**
  - **Aerial Cover Vegetative Standards:**
    - By the end of monitoring year one, a minimum of 50% of the mitigation site shall be vegetated (either by planted or volunteer plants) by native species.
    - By the end of monitoring year two, a minimum of 60% of the mitigation site shall be vegetated (either by planted or volunteer plants) by native species.
    - By the end of monitoring year three, a minimum of 70% of the mitigation site shall be vegetated (either by planted or volunteer plants) by native species.
    - By the end of monitoring year five and each monitoring year thereafter, a minimum of 85% of the mitigation site shall be vegetated (either by planted or volunteer plants) by native species.
    - Volunteer species should support functions consistent with the project design goals.
  
  - **Invasive Species:** The goal of any site is to have no invasive species. However, if invasive species are present, no more than 10% of relative plant cover<sup>1</sup> over the entire site shall be made up by non-native or invasive species, with no individual colony greater than or equal to 5% of relative plant

cover. No more than 5% of relative plant cover over the entire site shall be made up of *Phragmites australis*<sup>2</sup>, *Persicaria perfoliata*, or *Pueraria montana*. Native status will be based on the Natural Resources Conservation Service Plants Database. Invasive species are identified on the National Park Service/U.S. Fish and Wildlife Service document *Plant Invaders of Mid-Atlantic Natural Areas* (<http://www.nps.gov/plants/alien/pubs/midatlantic/>) and the Maryland Invasive Species Council *Invasive Species of Concern in Maryland* ([http://www.mdinvasivesp.org/invasive\\_species\\_md.html](http://www.mdinvasivesp.org/invasive_species_md.html)); and

- **Buffer Species Richness:** For forested buffers, establish a minimum of three species of native trees and two species of native shrubs with each tree and shrub species having an aerial cover of at least 15%; and
- **Vegetation Density for Forested Buffers:** For forested buffers, native plant density of at least 435 living trees/shrubs per acre with a minimum height of 10 inches shall be achieved by the end of the first growing season following planting and maintained each monitoring year thereafter through the end of the monitoring period; and
- **Vegetation Cover for Forested Buffers:** For forested buffers, average tree height of tallest five native trees within each sample plots shall be at least three feet in height at year three and at least five feet in height at year five and each monitoring year thereafter. Canopy cover<sup>2</sup> of native trees and shrubs must be at least 30% by year ten;
- **Stream Relocations:**
  - i. The permittee must monitor the stream relocation project components for a minimum of ten (10) years following the completion of the project and prepare monitoring reports. Monitoring requirements are listed below. Monitoring frequency and success criteria are outlined in Table 1.

At a minimum, the monitoring reports must:

- Classify stream flow before and after construction for each stream (perennial, intermittent, and ephemeral).



- Evaluate channel stability by documenting changes in cross-sections across three riffles. The representative riffle cross-section must be monumented and shown in a graphical display which overlays previous cross-sections in annual reports.
- Evaluate vertical stability by performing a longitudinal profile survey to document thalweg and water surfaces elevations. Longitudinal profiles must be shown in a graphical display which overlays previous profiles in annual reports.
- Report vegetation species richness and cover.
- Evaluate stream habitat quality using an assessment method such as EPA's Rapid Bioassessment Protocol (RBP) high gradient stream habitat form. Results of the stream habitat assessment must be shown for all monitoring years assessed at the time the report is submitted, including preconstruction in each monitoring report.
- Photograph site conditions annually along the entire stream relocated project area. Photos of each grade control structure and riffle crest are required.
- Identify any necessary corrective measures.
- Delineate temporary wetland impact areas and relocated wetland areas after construction to demonstrate that the wetlands have been restored after disturbance from construction and quantify acreage.

*Table 1. Success Criteria for Stream Relocation*

Level and Category	Parameter	Measurement	Success Criteria	Monitoring Year
1-Hydrology	Flow	Visual Characterization (Perennial, intermittent, or ephemeral)	Meets or exceeds baseline	PC, 3, 5
	Floodplain Connectivity	Bank height Ratio	<1.2	AB, 5
2-Hydraulics	Floodplain Connectivity	Documented or modeled at	Demonstrate substantial increase in floodplain	By Year 3

		discretion of consultant	connection following construction	
<b>3-Geomorphology</b>	Vertical Stability	Longpro/riffle crest and vertical control elevations	<0.5 ft thalweg degradation from as-built	AB, 3, 5
	Lateral Stability	BEHI	Moderate or better after construction	PC, 3, 5
	Habitat Assessment	RBP-High gradient (or alternative metric)*	Exceeds Baseline	PC, 3, 5
	Vegetative Cover	% cover	>80% cover in LOD	5
<b>4-Water Quality</b>	Summary	Descriptive	Summarize improvements to water quality as a result of project. May use peer reviewed literature to supplement measurements.	N/A
<b>5-Biology</b>	Richness and abundance of fishes	Richness and abundance of fishes	Reported	N/A
	Richness and abundance of amphibians	Richness and abundance of amphibians/Physical or audio sampling	Reported	N/A
	Vegetative Cover in LOD	% cover	>80% cover in LOD	5
	Invasive Plant Reduction	% cover invasive species in LOD	Less than Baseline	PC, 3, 5

Table 1 showing performance standards for stream restoration. AB=As-built, PC=Pre-construction, 1-5 corresponds to the monitoring year following construction, NA = Not applicable. Any alternative metric assessing stream habitat must be approved by Corps project manager.

21. The permittee must prepare an invasive species eradication and maintenance plan to remove non-native invasive plant species within the project site if site visits document their presence. The plan must be submitted to the Corps for review and approval along with the first monitoring report.
22. The permittee must maintain the as-built integrity of the authorized stream relocation and must ensure that the relocation is stable and self-sustaining. The permittee must notify and provide to the Corps, a detailed description and construction plans for any necessary correctives measures, including maintenance and repair, or alteration in any way, of the permitted stream relocation no later than 15 days prior to performance of such corrective measures for Corps review and approval.