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2021 RESTORATION MONITORING SUMMARY REPORT

Bloody Brook
Onondaga County, New York

Prepared for:
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Syracuse, New York

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BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

CERTIFICATION STATEMENT

I, Nickcole M. Evans, certify that I am currently a NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this *2021 Restoration Monitoring Summary Report* was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.

Nickcole M. Evans, P.E.
License Number 085978

In accordance with New York State Education Law, it is a violation for any person, unless he is acting under the direction of a licensed professional engineer, to alter this Work Plan in any way.

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1.0 INTRODUCTION

This 2021 *Restoration Monitoring Summary Report* (RMSR) has been prepared to summarize the results of the monitoring activities completed in June and July 2021 including an evaluation of the success of the vegetation planting and established hydraulic regimes and an inspection for areas of erosion at the Bloody Brook site. The remediation, including construction and restoration activities completed from June 2014 through July 2017, was conducted in accordance with a Voluntary Cleanup Agreement (VCA) between Lockheed Martin Corporation (Lockheed Martin) and New York State Department of Environmental Conservation (NYSDEC) (Index #: D7-0001-01-09, effective July 20, 2002). The remediation included the West Branch of Bloody Brook (WBBB) and Bloody Brook from below the confluence of the West and Middle Branches of Bloody Brook and adjacent property located between the New York State Thruway (Thruway) and Onondaga Lake Parkway (approximately 5,000 foot long section of stream) in the Town of Salina and a portion of the Village of Liverpool, Onondaga County, New York, as shown on Figure 1.[1] The NYSDEC "Release and Covenant Not to Sue" was received by Lockheed Martin for the Bloody Brook site on March 21, 2018.

In compliance with the NYSDEC approved February 2018 *Site Management Plan* (SMP) for Bloody Brook, updated in March 2021 (AECOM, 2018a), annual vegetation restoration inspections are to be completed for five years following completion of restoration activities to ensure the vegetation is growing as intended. Annual erosion inspections will continue to be completed since there is contamination remaining below areas of the soil cover. These inspections are to ensure no erosion of the channel and banks is occurring. The annual inspections are to be completed in accordance with the March 2014 Decision Document (Decision Document) prepared by NYSDEC (NYSDEC, 2014), property-specific owner restoration agreements, and the SMP.

The first of these monitoring events was completed in May 2017 for the majority of the Bloody Brook site and was summarized in the NYSDEC approved *Annual Post-Construction Restoration Monitoring Summary Report* (RMSR) dated July 2017 (AECOM, 2017a) and updated in a response letter to NYSDEC dated September 21, 2017. Site restoration was still in progress at the areas listed below and identified on Figure 2 during the 2017 inspection. Consequently, these areas were not monitored as part of the 2017 annual inspection. The first of the annual inspections for these areas was completed in 2018.

- Apartment complex area including the stream side banks and bottom
- Portion of the commercial property outside of the stream side banks and located between the Old Liverpool Road culvert and the railroad tracks

[1] The term "site" in the VCA is defined as: a portion of the banks, surface waters and sediments of the West and Middle Branches of Bloody Brook located in the Town of Salina with a portion of the site located in the Village of Liverpool and commences downstream of Interstate 90, the New York State Thruway, and extends generally southward past the confluence of the West Branch and the Middle Branch of Bloody Brook creating Bloody Brook, and ends on the upstream side of Onondaga Lake Parkway. After examining data developed during remedial investigation work in the Middle Branch, NYSDEC determined that no further action was required for that branch of Bloody Brook. For this reason, the "site" in this document relates only to those areas within the VCA site where the remedial program has been implemented.

- Construction access area at Onondaga Lake Parkway

During fall 2017 and spring 2018, prior to initiating the 2018 monitoring activities (second year of monitoring), maintenance activities were completed in accordance with the NYSDEC approved *Restoration Maintenance Work Plan* (RMWP) dated October 2017 (AECOM, 2017b). These maintenance activities were completed to address the areas of concern identified during the 2017 monitoring activities and are summarized in the *2017* RMSR dated July 2018 (AECOM, 2018b).

The second year of restoration monitoring (first year for the areas included in the bullets above) was completed in the spring/summer 2018 and summarized in the August 2018 RMSR (AECOM, 2018c). Maintenance activities were completed per the NYSDEC approved October 2018 RMWP and the related letter correspondence from NYSDEC dated November 5, 2018 and were summarized in the RMSR dated February 2019 (AECOM, 2019a). Part of the requirements of the October 2018 RMWP and NYSDEC's follow-up letter included planting a dense stand of trees between the wetlands and the offsite invasive species to act as a barrier and to provide a canopy for shade. In addition to acting as a barrier and providing shade, the planted trees between the Thruway and wetlands could potentially reduce noise from the Thruway heard by the residents in the neighborhood. To create this stand of trees, over 200 rooted cuttings and 26 bare root trees were planted and have been regularly monitored and watered as needed.

The third and fourth years of monitoring (second and third year for the areas included in the bullets above) were completed in summer 2019 and 2020 and summarized in the respective *Restoration Monitoring Summary Report and Maintenance Work Plan* (AECOM, 2019b and AECOM, 2020a). Recommended planting for 2019 and 2020 was limited to help fill in areas believed to be sparse due to high groundwater salinity and to help block invasive species at the edges of some of the habitat areas.

In accordance with the Decision Document and the SMP, it is anticipated that the 2021 inspections, summarized in this report, will be the final inspections for vegetation planted during restoration, with the exception of the areas included in the bullets above.

Consistent with previous monitoring events, activities completed this year and discussed herein were completed in accordance with Appendix J (*Restoration Monitoring Plan*) of the SMP and included the following:

- Inspection of the brook channel side banks and channel bottom for signs of erosion;
- Inspection of vegetation planted during restoration activities on the residential, commercial, and other upland properties; and
- Inspection of the wetland areas to evaluate development of the restored wetlands.

Results for each of these inspections from 2021 are presented and discussed in Section 3 of this report.

1.1 SITE DESCRIPTION

The Bloody Brook site was broken into four distinct areas based on land use and characteristics as shown on Figure 2 and described below.

- Wooded Area – This portion of the site extends from the Thruway south (downstream) approximately 1,050 feet. This undeveloped area is irregularly shaped and relatively wide (i.e., greater than 150 feet) and includes three wetlands. The wooded area is entirely within the Onondaga County Bloody Brook Drainage District (Drainage District) easement and is owned by the Town of Salina. The Drainage District easement provides Onondaga County personnel permanent access for various projects to improve and maintain drainage. Storm water drainage from the surrounding development enters the WBBB from the west via a drainage channel at the southern end of the wooded area.

- Residential Area – The residential area surrounds the wooded area commencing at the Thruway and extending downstream of the wooded area with residential properties abutting the Drainage District easement along the WBBB to the downstream side of Floradale Road.

- Apartment Complex Area – The apartment complex area is located on Pearl Street and Town Gardens Drive between the residential properties along Floradale Road and the commercial properties along Old Liverpool Road.

- Commercial Area – The commercial area extends from commercial properties located along Old Liverpool Road to Onondaga Lake Parkway.

2.0 RESTORATION MONITORING ACTIVITIES

Restoration monitoring for the residential and commercial areas was completed on June 22, 2021. The quantitative monitoring for the wooded area was conducted during two time periods. The tree and shrub survey was conducted on June 29 and July 1, 2021, and the percent coverage estimates were conducted during the week of July 12, 2021. The earlier tree and shrub survey made it easier to locate the trees and shrubs when leaves were open and could be more easily identified, but prior to significant herbaceous growth. The later percent coverage estimates were conducted when the foliage was fully open for a more accurate estimate.

The monitoring included an erosion inspection completed by a qualified environmental professional and vegetation and wetland inspections completed by a qualified biologist. Sections 2.1 through 2.3 below discuss the activities that were completed in the different areas during the monitoring event, and Section 3 summarizes the results. A summary and recommendations are provided in Section 4, and references are provided in Section 5.

2.1 WOODED AREA

Vegetation monitoring in the wooded area, which includes three general habitats: wetlands, upland habitat areas, and riparian areas (transitional areas between wetland and upland areas and areas along the stream channel), was completed in accordance with Appendix J of the SMP (*Restoration Monitoring Plan*). The locations of the habitat areas are provided on Figure 3A. The information collected during the inspection was used to calculate number of targeted plant species and the percent vegetation cover in the different habitat areas in order to assess the progression of development and natural sustainability of the wetlands and habitat areas. Target plant species include all planted shrubs and trees.

2.1.1 Vegetation Monitoring

The site vegetation inspections in the wooded area included inspections of the vegetative cover (e.g., planted seed mixes and emergent plants), trees, and shrubs for each of the wetland, upland, and riparian habitat types. The vegetative cover in these areas was inspected to ensure that germination is covering all areas and that no large bare spots (larger than 1 square foot) exist. Plot and transect procedures were used to evaluate vegetative cover, in accordance with the SMP and the January 1987 *Corps of Engineers Wetland Delineation Manual*. These procedures are described in the sections below.

In addition, the condition and survival of the planted trees and shrubs was determined by counting and inspecting individual planted trees and shrubs in each habitat area. The total number in each area was compared to target numbers developed for each habitat area based on habitat type and provided in the SMP.

2.1.1.1 Plot Procedure

The plot procedure was conducted at eight locations within the emergent habitat locations. See Figure 3A for the plot locations. A 10-foot by 10-foot permanent plot was marked at the corners with 1-inch PVC pipes extending at least 2 feet above the ground surface. Depending on the plant density in the plot, it may have been divided into multiple subplots during counting. The species within the plot were identified to the extent practical. The estimated

percent cover of foliage of each species of herbaceous or woody vegetation in the square was recorded. The average percent cover for the entire plot was calculated. Note that since the foliage of individual plants can overlap, it is possible for the percent coverage to exceed 100 percent. Photographs were taken of each plot and are provided in Attachment A.

2.1.1.2 Transect Procedure

Permanent transects were established across palustrine shrub/scrub (PSS)-1, PSS-2, and palustrine forested (PFO)-1 as shown on Figure 3A. A spacing to provide approximately 20 to 30 measurement points within each transect was chosen (e.g., every five feet provided 22 points in the 109-foot PSS-2 transect). At each measurement point, estimated percent cover of foliage of each species of herbaceous or woody vegetation within a 2-foot wide path of the transect line was recorded, and the average percent cover for the entire plot was calculated. Note that since the foliage of individual plants can overlap, it is possible for the percentage coverage to exceed 100 percent.

2.1.1.3 Streambank Cover Assessment

Portions of the Bloody Brook stream bank in the wooded area were planted with live stakes along the bank armoring for added erosion control. An additional benefit of the live stakes is that as they develop along with existing trees and shrubs, they provide additional stream-side habitat and shade, keeping water temperatures cooler. Starting at the northeast edge of the site at the Thruway fence line, the channel was walked downstream to Weir 3. Photos, facing downstream, were taken approximately every 50 feet to document the vegetation cover and shade during the 2021 monitoring activities (Attachment A).

2.1.1.4 Groundwater Salinity

As is well documented (Kappel, 2000), much of the groundwater around Onondaga Lake is brackish to saline, forming the basis for the salt industry in the early development of the City of Syracuse. During the initial years of vegetation monitoring in the wetlands, it was observed that in areas with groundwater seeps (sections of W-11, PEM-5 [close to the boundary with RIP-1], and PSS-1), success of target vegetation was poor, with bare ground or invasive growth of Phragmites, which has a high salt tolerance. In 2018 and 2019, surveys of total dissolved solids (TDS) were conducted throughout the site (AECOM, 2019b). In general, the results of these surveys indicated the groundwater seeps on the site contained greater 1,000 mg/L TDS, exceeding the NYS surface water standard of 500 mg/L. In the areas where success of target vegetation was particularly poor, the TDS concentrations were higher, at about 2,000 mg/L.

2.1.2 Habitat Area Monitoring

The monitoring procedure for each habitat area differed depending on the type of habitat and target restored vegetation. The quantitative measures used in each of the habitat types are summarized below and in Table 1, and the habitat locations, as designed, are shown on Figure 3A.

- PEM-1, PEM-2, PEM-3, PEM-4, PEM-5, W-10, and W-11 (Palustrine Emergent) – For these wetland areas containing only emergent plants and wetland habitat seed mix (PA New England Province FACW Mix [ERNMX-251]), the plot procedure, as described above, was used to estimate percent cover (Plots 1 through 8). The compositions of the seed mixes used are provided in Attachment B. Salt tolerant shrubs and herbaceous plants were also planted in portions of PEM-5 (close to the boundary of RIP-1) and W-11 in 2019, 2020, and 2021, with the anticipation that they will better compete with the invasive species (AECOM, 2019c; AECOM, 2020b). These plantings have survived and are spreading, indicating they are successfully competing with invasive species and are providing coverage in the previously observed bare areas.

- PSS-1, PSS-2, and PFO-1 (Palustrine Scrub/Shrub and Palustrine Forested) – For the wetland areas containing trees, shrubs, and wetland habitat seed mix (PA New England Province FACW Mix [ERNMX-251]), the transect procedure, as described above, was used to estimate percent cover (PSS Transect 1, PSS Transect 2, and PFO Transect 1). Additionally, the habitat area was walked, and target trees and shrubs were identified, with live trees and shrubs being evaluated to assess achievement of target numbers for the target species.

  To monitor the success of the seed mix, vegetation cover was monitored in each habitat area by visual inspection. The compositions of the seed mixes used are provided in Attachment B.

  During May 2019, restoration activities were completed in and around the habitat area of PSS-1 per the October 2018 RMWP (AECOM, 2018d) and the related letter correspondence from NYSDEC dated November 5, 2018. The area was densely planted with rooted cuttings of black willow, sandbar willow, pussy willow, and sycamore with the intention of creating a stand of trees between the Thruway and the wetlands that would act as a barrier to the invasive species growing on the Thruway easement. Salt tolerant shrubs and herbaceous plants were also planted in this area in 2019, 2020, and 2021, with the anticipation that they will better compete with the invasive species (AECOM, 2019c; AECOM, 2020b). These plantings have survived and are spreading, indicating they are successfully competing with invasive species and are providing coverage in the previously observed bare areas. Also, along the Thruway easement, but on the west side of the brook in UPF-1 and RIP-1, 26 bare root trees were planted in late 2019, and ten were planted in fall 2020. Additionally, in May 2019, rooted cuttings were planted in PSS-2 and PFO-1 to help fill in those habitat areas and to act as a barricade to the spread of invasive species from offsite.

  In accordance with the "Bloody Brook *Phragmites* Control Procedure", approved by NYSDEC in 2015 to control the growth and spread of *Phragmites* at the site, and the more recent *Inter-Agency Guidelines for Implementing Best Management Practices to Control Invasive Species on DEC Administered Lands of the Adirondack Parks* (NYSDEC, 2018), a light-proof weed barrier was placed over much of the ground in PSS-1 to inhibit the growth of *Phragmites*. The weed barrier was removed in October 2020, and the area was planted as discussed above.

- UPF-1 and UPF-2 (Forested Upland) – For these two upland areas containing trees and shrubs as well as forested floor seed mix (Partially Shaded Area Road Mix [ERNMX-140]), the habitat area was walked, and target trees and shrubs were identified, with live trees and shrubs being evaluated to assess achievement of target numbers for the target species.

  To monitor the success of the seed mix, vegetation cover was monitored in each habitat area by visual inspection. The compositions of the seed mixes used are provided in Attachment B.

- RIP-1 (Riparian) – For the riparian habitat containing trees, shrubs, and a riparian habitat seed mix (PA New England Province Riparian Mix [ERNMX-253]), the habitat area was walked, and target trees and shrubs were identified, with live trees and shrubs being evaluated to assess achievement of target numbers for the target species.

  To monitor the success of the seed mix, vegetation cover was monitored by visual inspection. The compositions of the seed mixes used are provided in Attachment B.

- RIP-2 (Riparian area immediately next to Bloody Brook) – The stream bank was walked, and tree coverage was assessed.

- USS-1 (Shrub/Scrub Upland) - For the upland shrub/scrub habitat containing shrubs and a forest floor habitat seed mix (Partially Shaded Area Road Mix [ERNMX-140]), the habitat area was walked, and target shrubs were identified, with live shrubs being evaluated to assess achievement of target numbers for the target species.

  To monitor the success of the seed mix, vegetation cover was monitored by visual inspection. The compositions of the seed mixes used are provided in Attachment B.

- MOW-1, MOW-2, and LAWN (Upland Meadow and Lawn) - For these areas, either an upland meadow or cool season lawn seed mix (Northeastern U.S. Road Native Mix [ERNMX-105]) was used. Visual inspections of the areas were completed to confirm the seed mix was successful and that no large bare spots existed. The compositions of the seed mixes used are provided in Attachment B.

2.1.3 Wetlands Groundwater and Surface Water Level Monitoring

During restoration activities in the wetland areas, three weirs were installed to allow for adjustment of the height of water retained in the wetlands (Figure 3A). With NYSDEC approval, adjustments would be made, as needed, to improve the hydrology to support the different habitat types. During a 2015 high flow event, Weir 2 was damaged and required reconstruction. Following repairs, it was observed that conditions in the wetland behind the repaired weir were drier than anticipated. In May 2017, a field change was submitted to and approved by NYSDEC to permanently raise the height of Weir 2. These adjustments were completed during the summer of 2017 after conditions at the site became suitable (i.e., dry enough). The height of Weir 2 was raised by 8 inches from the initial weir height to lengthen the retention time of water and increase the water level in this wetland area. In May 2018, bentonite was added to where the weir ties into the riprap stone to further reinforce water

retention. Inspections since the height of the weir was raised show that water is now being retained as designed.

Shallow piezometers, installed in four locations at the edge of inundation in the constructed wetlands, were used to monitor groundwater levels in the wetlands. Surface water was monitored using four staff gauges installed in each of the three constructed wetlands. The approximate locations of the piezometers and staff gauges are shown on Figure 3A.

2.1.4 Wetlands Photographic Monitoring

Progress in germination and growth of vegetation were monitored using photographs from five permanent photo points established in uplands surrounding the constructed wetlands. The locations of the permanent photo points are shown on Figure 3A. Photos were taken from these monitoring points with a photo in each direction (i.e., Direction A, B, C, and D, aligned as shown on Figure 3A) after restoration was completed and during each annual monitoring event in order to track the development of vegetation in each of the areas. Photos taken from 2021 from the permanent photo points are included in Attachment A.

2.1.5 Invasive Species Removal

Manual removal of *Phragmites* and purple loosestrife has been conducted over the last five years in and around the wetland habitats per the Standard Operating Procedures (SOP) provided in the SMP. From 2018 through 2021, invasive species were manually removed from areas throughout the site on a regular basis, with the intention being to control spread while the target species become developed. A *Phragmites* Control Procedure, developed and approved by the NYSDEC in 2015 to control the growth and spread of *Phragmites*, was employed again in PSS-1 between May 2019 and October 2020, as discussed above in Section 2.1.2. Invasive species, including activities to control their spread, are discussed in more detail in Section 3.1.4.

2.2 RESIDENTIAL AND COMMERCIAL AREAS

All residential and commercial plantings included in this annual inspection were visually inspected to ensure they are successfully becoming established. Any fences restored on properties were also inspected to ensure they remain as placed. Results for the inspections completed on private residential and commercial properties will be discussed, as needed, with the property owner. Field forms for private properties will be retained in the project files, but they are not included in this summary report.

2.3 EROSION MONITORING

In accordance with the Decision Document and the SMP, the site was inspected for ponding on the side banks and for erosion of the brook bottom and side banks. Results from this inspection indicated that no adjustments are needed and that the soil cover continues to function as designed. The completed field monitoring form for the 2021 site inspection is included in Attachment C.

3.0 RESTORATION MONITORING SUMMARY

Results for the 2021 monitoring activities discussed above are provided in the following sections. Section 3.1 discusses the types of habitats and results for the vegetation monitoring in the wooded area, including the wetland and upland habitats, Section 3.2 discusses results for the vegetation monitoring for the residential and commercial properties, and Section 3.3 discusses the results for the erosion monitoring. Recommendations for each of the areas, as needed, are provided in Section 4.

3.1 WOODED AREA MONITORING

The inspection in the wooded area consisted of monitoring the restored vegetation in the different upland and wetland habitat areas as well as monitoring the conditions of the wetlands to ensure they are suitable for establishment of the intended wetland plants. Results from the 2021 monitoring in the wooded area are presented in the following subsections.

3.1.1 Habitat Area Monitoring

Restoration in the wooded area created seven types of habitat, including wetland and upland habitats, listed in Table 1 in order of hydraulic condition (wettest to driest) along with the method used to quantitatively measure the plant growth in each habitat area. See Section 2.0 of this report for discussion of the quantitative methods used. The restored wetland habitats for the Bloody Brook site were constructed with weirs between the different wetland areas to control the flow in the system. The elevations of the weirs were set to control the water levels behind them to promote the development of different types of wetland habitat, and the lining of the wetlands was designed to allow all water to infiltrate into the subsurface over four weeks. The habitat areas and weir locations are shown on Figure 3A.

The wetland areas were designed and constructed in and around the floodplain of the brook channel. During high flow events, PSS-1 and PEM-3 are flooded by backflow from the main channel and runoff from the Thruway. Additionally, this area receives water input by seepage of groundwater from the northeast. When the water overtops the height of Weir 1, it floods PEM-1, PFO-1, PSS-2, PEM-2, PEM-4, and PEM-5 before re-entering WBBB below Weir 3. In addition, these areas receive water input from seepage of groundwater from the west. Results of the monitoring for these areas are summarized below.

The upland areas were designed with riparian habitats RIP-1 and RIP-2 as transitional areas along the stream channel between the wetlands and upland habitats. The upland habitats included scrub/shrub habitat USS-1, two upland forested habitats (UPF-1 and UPF-2), and the remaining upland meadow areas (MOW-1 and MOW-2). Results of the monitoring for these areas are summarized below.

3.1.1.1 Emergent Wetland

An emergent wetland is defined as a shallow, emergent marsh occurring on mineral rich soil or deep muck soil that is permanently saturated and seasonally flooded. Water depths may range from 15 centimeter (cm) to 1 meter (m) (approximately 0.5 feet to 3.3 feet), but the soil surface is usually exposed and dry at some point in the year.

Typical plants include cattails, sedges, marsh fern, spike rushes, bulrushes, sweetflag, joe-pye weed, and smartweed. They may have scattered shrubs including speckled alder, water willow, and buttonbush (Edinger et al, 2014).

The following seven emergent wetlands were created during restoration and subsequent maintenance activities. See Figure 3A for locations of these emergent habitat areas.

- PEM-1, located between Weir 1 and Weir 2;
- PEM-2, PEM-4, and PEM-5, located between Weir 2 and Weir 3;
- PEM-3, located above Weir 1 in the northeast corner of the site;
- W-10, located along the outlet of PEM-3 leading to the Bloody Brook channel; and
- W-11, located in the northwest corner of the site.

PEM-1 (Plots 1 and 2)

As discussed in Section 2.1.3, Weir 2 was adjusted in accordance with the May 2017 NYSDEC approved field change to lengthen the retention time of water and increase the water level in this wetland area. The extent of ponded water behind Weir 2 was greater during the four years of monitoring events following this adjustment, and most of PEM-1 has remained saturated, suggesting the adjustments in Weir 2 were successful. On the day that the percent coverage inspection was completed (July 13, 2021), PEM-1 had a water depth of 0.13 feet at Staff Gauge 2 (see Figure 3A).

Within PEM-1, a healthy group of cattails, bulrush, and other desirable wetland species that had been identified during previous monitoring events has continued to become well developed, including the areas improved by the Weir 2 adjustments. Furthermore, a large number of volunteer trees continue to grow along the edges of PEM-1. See Section 3.1.2 for additional discussion on volunteer trees and shrubs. Since completion of restoration activities, this area has been and continues to be a focus of invasive species control.

The quantitative data for the two plots in PEM-1 are presented in Tables 2 and 3 and are discussed below. The locations of the plots are shown on Figure 3A, and photos taken during the monitoring event are included in Attachment A.

PEM-1 (PLOT 1)

Plot 1, located in the eastern section of PEM-1, was subdivided into four subplots to facilitate assessment of the thick vegetation (Table 2). The percent cover of all species in Plot 1 was 115 percent, up from 79 percent in 2020. Photographs were taken of each plot and are provided in Attachment A. The data for Plot 1 indicates successful development of desirable species with path rush, beaked spikerush, and soft-stem bulrush dominating. All the species counted are wetland species, and invasive species constitute 20.5 percent of the total (i.e., purple loosestrife at 3.0 percent and *Phragmites* at 17.5 percent), up from 4.3 percent during the 2020 monitoring.

PEM-1 (PLOT 2)

Plot 2, located in western section of PEM-1, was subdivided into four blocks for assessment of the vegetation (Table 3). The percent cover of all species in Plot 2 was 97 percent, up from 86 percent quantified during the 2020 monitoring. During the past three monitoring events (2019 through 2021), the species mix was composed entirely of wetland species, indicating the adjustments to Weir 2 in the fall of 2017, discussed above in Section 2.1.3, successfully created more frequent inundation of the area during the growing season, allowing wetland plants to spread into the area. Photographs were taken of each plot and are provided in Attachment A.

Plot 2 remains dominated by wetland species, including beaked spikerush and path rush. *Phragmites* makes up 2.5 percent of the total coverage, down from 13 percent during the 2020 monitoring.

PEM-2 (Plot 3)

The depth of surface water in PEM-2 is controlled by the elevation of Weir 3. However, a large amount of groundwater seeps into this wetland from the west. Consistent with monitoring in previous years, the central portion of PEM-2 was approximately 3- to 4-feet deep and consisted of open water habitat. Depth of surface water at Staff Gauge 4 was 2.29 feet on July 13, 2021. See Figure 3A for the location of the staff gauge. Emergent vegetation (e.g., cattail, iris, etc.) was evident in the shallower portions of PEM-2. Vegetation development is being quantified in PEM-2 within Plot 3, which is located in the center of the habitat area (Figure 3A). The quantitative data for Plot 3 are presented in Table 4 and are discussed in this section. Photos taken during the monitoring event are included in Attachment A.

Under current conditions and consistent with past inspections, the plot is completely inundated with water. The plot was assessed as a single plot and had a total percent coverage by emergent vegetation of 5 percent, up from 3 percent in 2020 (Table 4). The coverage in 2019 was 100 percent, comprised of 60 percent broad-leafed cattail, 20 percent duckweed, and 20 percent bladderwort. Cattail, the dominant vegetation that has developed in other areas of PEM-2, had begun to spread into Plot 3 in 2019 but was reduced to 2 percent in 2020 due to muskrat activity. Results of monitoring completed in 2021 are consistent with 2020 with 5 percent coverage comprised of duckweed, narrowleaf cattail, and bladderwort. As observed in 2020, there continues to be muskrat activity in the area of Plot 3; and bladderwort may have again been observed at lower densities because the inspection was completed later in 2021, as it was in 2020. The plant would have already flowered and begun to die back. Other areas of PEM-2 are continuing to sustain dense stands of cattails, and the area in and around Plot 3 appears to be suitable habitat for wetland wildlife. Consistent results between 2020 and 2021 suggests the habitat area can sustain the muskrat activity.

It should be noted that, although duckweed (*Limna minor*) is not a rooted macrophyte but floats on the surface, it has been included in the percent coverage estimate for PEM-2 (Table 4). This plant is listed as a wetland plant in the NYSDEC Wetlands Delineation Manual (https://www.dec.ny.gov/docs/wildlife_pdf/wdelman.pdf).

PEM-3 (Plot 4)

PEM-3, at the northeastern corner of the site (Figure 3A), is an area that was re-designated as emergent habitat from a scrub/shrub habitat in 2017 based on the adaptive management recommendations in the NYSDEC approved July 2017 RMSR (updated in a response letter to NYSDEC dated September 21, 2017) due to hydrologic conditions being wetter than anticipated. Since restoration activities, a strong population of emergent plants has become established without seeding.

Vegetation development is being quantified in PEM-3 within Plot-4 (Figure 3A). This plot was assessed as a single plot to facilitate assessment. The quantitative data for Plot 4 are presented in Table 5 and are discussed in this section. Photos taken during the monitoring event are included in Attachment A.

During the 2021 monitoring event, PEM-3 was found to have a percent coverage of 77 percent, compared to 106 percent in 2020 and 43 percent in 2019. In 2019, muskrat activity was observed in PEM-3 and contributed to the low percent coverage. The 2020 coverage was dominated by duckweed, broadleaf cattail, and *Phragmites*. It appears that the muskrat activity from 2019 that reduced the density of cattail had allowed the density of *Phragmites* to increase in this area from 10 percent in 2019 to 20 percent in 2020. *Phragmites* removal efforts in 2021 brought the *Phragmites* coverage down to 15 percent.

PEM-4 (Plot 5)

PEM-4 is an area that was re-designated as emergent from a palustrine forested habitat in 2017, based on the adaptive management recommendations in the NYSDEC approved July 2017 RMSR (updated in a letter response to NYSDEC dated September 21, 2017). See Figure 3A for the location of the habitat area. Vegetation development is being quantified in PEM-4 within Plot-5 (Figure 3A). The quantitative data for Plot 5 are presented in Table 6 and are discussed in this section. Photos taken during the monitoring event are included in Attachment A.

During the 2021 monitoring event, Plot 5 was divided into four subplots for estimating coverage. This plot was found to have a total coverage of 104 percent, up from 81 percent in 2019 and 30 percent in 2020. The density for this area was dominated by soft stem bulrush, broadleaf cattail, and narrowleaf cattail (Table 6). Invasive species cover about 17 percent (i.e., purple loosestrife at 4.25 percent and *Phragmites* at 12.5 percent).

PEM-5 (Plot 6)

PEM-5 is also an area that was re-designated as emergent from a palustrine forested habitat in 2017 based on adaptive management recommendations in the NYSDEC approved July 2017 RMSR (updated in a letter response to NYSDEC dated September 21, 2017). See Figure 3A for the location of the habitat area. Vegetation development is being quantified in PEM-5 within Plot-6 (Figure 3A). The quantitative data for Plot 6 are presented in Table 7 and are discussed in this section. Photos taken during the monitoring event are included in Attachment A.

During the 2021 monitoring event, Plot-6 was assessed as a single plot for estimating cover (Table 7). This plot was found to have 117 percent cover by four wetland species, with duckweed and broadleaf and narrowleaf cattail dominating, up from 67 percent in 2020. No invasive species were observed within the habitat area during the 2021 monitoring.

As described above in Section 2.1.2, PEM-5, close to the boundary of RIP-1, was one of the areas with groundwater seepage of high salinity. Several of the herbaceous plantings and shrubs in these areas appear to be doing well and are proving to be tolerant of the elevated salinity levels. As discussed in Section 2.1.2, these plantings have survived and are spreading, indicating they are successfully competing with invasive species and are providing coverage in the previously observed bare areas.

W-10 (Plot 7)

Due to wet conditions likely attributed to flow of water from the seeps located to the northwest, W-10 is an area that was designated as restored wetlands in 2017 in accordance with NYSDEC approved July 2017 RMSR (updated in a response letter to NYSDEC dated September 21, 2017). These conditions are supporting vegetation typical of emergent wetlands (e.g., primarily cattail). See Figure 3A for the location of the habitat area. Vegetation development is being quantified in W-10 within Plot-7. The quantitative data for Plot 7 are presented in Table 8 and are discussed in this section. Photos taken during the monitoring event are included in Attachment A.

During the 2021 monitoring event, Plot 7 was assessed as a single plot that had a total coverage of 111 percent comprised of seven wetland species, down from 143 percent in 2020. The 2021 cover was dominated by *Phragmites* and narrowleaf cattail. The invasive species constituted over 70 percent of the plot, an increase from 2020 at 50 percent.

W-11 (Plot 8)

Due to wet conditions likely attributed to flow of water from seeps located to the northwest, W-11 is an area that was designated as restored wetlands in 2017 in accordance with NYSDEC approved July 2017 RMSR (updated in a response letter to NYSDEC dated September 21, 2017). These conditions are supporting vegetation typical of emergent wetlands. See Figure 3A for the location. Vegetation development is being quantified in W-11 within Plot-8. The quantitative data for Plot 8 are presented in Table 9 and are discussed in this section. Photos taken during the monitoring event are included in Attachment A.

During the 2021 monitoring event, Plot 8 was subdivided into four subplots (Table 9). W-11 had a total cover of 77 percent by 12 species, all of them being wetland species, up from 69 percent in 2020. The 2021 cover was dominated by soft rush, willowherb, and narrowleaf cattail. Invasive species cover 16.5 percent (i.e., purple loosestrife at 7.75 percent and *Phragmites* at 8.75 percent), down from 30.5 percent (i.e., purple loosestrife at 21 percent and *Phragmites* at 9.5 percent) in 2020.

As described above in Section 2.1.2, W-11 was one of the areas with groundwater seepage of high salinity. Several of the herbaceous plantings and shrubs in this area appear to be doing well and are proving to be tolerant of the elevated salinity levels. As discussed in Section 2.1.2,

these plantings have survived and are spreading, indicating they are successfully competing with invasive species and are providing coverage in the previously observed bare areas.

3.1.1.2 Shrub/Scrub Wetland

Two shrub/scrub wetlands were constructed, PSS-1 at the eastern edge of the site, and PSS-2 in the wetland area between Weirs 2 and 3 (Figure 3A). A shrub/scrub wetland is dominated by tall shrubs. The substrate is usually mineral rich soil or deep muck soil. Shrub/scrub wetlands are variable, but dominant plants may include alder, red osier silky dogwood, willows, buttonbush, blueberry, arrow wood, wild raisin, swamp azalea, and mulberry, among others. Scattered trees such as red maple, elm, and green ash may be present. (Edinger et al., 2014).

PSS-1

Following the adaptive management approach proposed in the NYSDEC approved RMSR dated July 2017 and updated in a response letter to NYSDEC dated September 21, 2017, the area of PSS-1 was shifted to the east in 2017 where the conditions were developing to be more suitable for a shrub/scrub habitat. Vegetation development is being quantified in PSS-1 with the use of the transect procedure (See Section 2.1.1.1) and by determining the survival and condition of target trees and shrubs. See Figure 3A for the location of the habitat area in the east corner of the site and the PSS-1 transect, and Figure 4 for the location of the existing trees and shrubs. The target shrub counts are provided in Table 10 and Attachment D, and the quantitative data for Transect PSS-1 are presented in Table 11. Both assessments are discussed in this section. Photos taken during the monitoring event are included in Attachment A.

During the 2021 inspection, 17 shrubs were counted within PSS-1 (Table 10 and Attachment D). Two pin oaks were also counted, down one from 2019 and 2020 and two less than the target of four trees for the area. However, several of the live stakes planted in 2019 (eleven sycamore and five willows) are developing well and are anticipated to continue to develop into mature trees, providing coverage and diversity for the area as intended.

The transect data for PSS-1, which was 2 feet wide and 42 feet long, are presented in Table 11 and show an overall coverage of 49 percent comprised of 26 species of which 22 are wetland species. This transect is dominated by invasive species however, the compositions were relatively low, at 7.5 and 6.9 percent *Phragmites* and purple loosestrife, respectively. Due to placement of a light-proof weed barrier in PSS-1 between May 2019 and October 2020 to control the spread of *Phragmites* as discussed above in Section 2.1.2, the transect for PSS-1 was not evaluated during the 2020 monitoring.

As described above in Section 2.1.2, PSS-1 was one of the areas with groundwater seepage of high salinity. Several of the herbaceous plantings and shrubs in these areas appear to be doing well and are proving to be tolerant of the elevated salinity levels. As discussed in Section 2.1.2, these plantings have survived and are spreading, indicating they are successfully competing with invasive species and are providing coverage in the previously observed bare areas.

PSS-2

Following the adaptive management approach, the northern border of PSS-2 was adjusted in 2017, with some of the wetter areas being re-designated as PEM-5 (see Section 3.1.1.1 and Figure 3A). Vegetation development is being quantified in PSS-2 with the use of the transect procedure (See Section 2.1.1.1) and by determining the survival of target shrubs. See Figure 3A for the location of the habitat area and the PSS-2 transect and Figure 5 for the location of the existing shrubs. The target shrub counts are provided in Table 10 and Attachment D, and the quantitative data for Transect PSS-2 are presented in Table 12. Both assessments are discussed in this section. Photos taken during the monitoring event are included in Attachment A.

During the July 2021 monitoring event, 91 shrubs were counted within PSS-2, an increase of 11 shrubs since 2020 and exceeding the target number of 69. The area is well vegetated with a shrub scrub mix containing several shrub species.

The transect data for PSS-2, which was 2 feet wide and 109 feet long, are presented in Table 12 and show an overall coverage of 88 percent, slightly up from 86 percent in 2020, comprised of 37 species of which 31 are wetland species. The transect continued to be dominated by broadleaf and narrowleaf cattail, consistent with observations in 2020.

3.1.1.3 Forested Wetland

One forested wetland, PFO-1, was constructed between Weirs 2 and 3. There are several forested wetland types in New York which tend to be differentiated by the dominate tree species, with hydraulic conditions providing underlying factors favoring one group of species over others.

In areas of PFO-1, the water depth has been greater than anticipated during design, likely due to groundwater seeping in from the north. The hydraulic conditions are more typical of an emergent wetland in these areas. Consequently, a dense stand of cattails has developed which dominate the area. See Figure 3A for the location of the habitat area and PFO-1 transect and Figure 6 for the location of the existing trees and shrubs. The target counts are provided in Table 10 and Attachment D, and the quantitative data for Transect PFO-1 are presented in Table 13. Both assessments are discussed in this section. Photos taken during the monitoring event are included in Attachment A.

During the 2021 monitoring event, 24 of the originally planted trees were counted, which does not meet the target number of 37. However, eight black willow, one sycamore, one pussy willow, and one staghorn sumac are developing well as volunteers and from the rooted cuttings planted in previous years and are anticipated to continue to develop into mature trees, providing coverage and diversity for the area as intended. An additional two shrubs were counted in PFO-1, for a total of six up from four.

The transect used for the quantitation of percent cover in PFO-1 in 2021 was 2 feet wide and 95 feet long. The data collected from this transect during the 2021 monitoring event are presented in Table 13 and show a total coverage of 71 percent, up from 29 percent in 2020. The number of wetland species observed in the transect also increased from eight in 2020 to

sixteen in 2021, still dominated by broadleaf and narrowleaf cattail. Trees and shrubs were not encountered in the transect. Invasive species (*Phragmites* and purple loosestrife) continued to account for less than 5 percent of the total cover.

3.1.1.4 Riparian and Upland Habitats

RIP-1 was constructed as a transitional area between the wetlands and stream channel and the upland habitats. The upland habitats included one shrub/scrub habitat (USS-1), two upland forested habitats (UPF-1 and UPF-2), and the remaining upland meadow areas (MOW-1 and MOW-2). These habitat areas were inspected during the 2021 monitoring event, and survival of target trees and shrubs was assessed. See Figure 3A for the location of these transitional and upland habitat areas and Figures 7 through 11 for the location of the existing trees and shrubs. The target tree and shrub counts are provided in Table 10 and Attachment D. Photos taken during the monitoring event are included in Attachment A.

The areas where a seed mixture was placed were visually inspected for large bare spots. The following observations were made in these transitional and upland habitat areas:

RIP-1

RIP-1 is the planned riparian forest community in the area east of Weir 1, and the area planted on the berm around PEM-2 and PSS-2. During the 2021 monitoring activities, 108 planted trees were counted (Figure 7, Table 10, and Attachment D), three more than in 2020 and exceeding the target number of 97. Additionally, approximately 20 rooted willow cuttings were planted in this habitat area in May 2019, as discussed above in Section 2.1.2. During the 2021 monitoring, 26 black willows were observed to be developing well, indicating successful spread of target species. In addition to these plantings, saplings for several hundred volunteer trees including 19 different species (e.g., cottonwood, silver maple, sugar maple, staghorn sumac, back willow, box elder, cherry, and sandbar willow among others) were counted in this habitat area.

During the 2021 monitoring activities, 293 planted shrubs were counted in RIP-1 which is below the target of 314. However, there are a large number of volunteer shrubs and trees in this habitat that will help provide the desired cover. Section 3.1.2 below summarizes an evaluation of volunteer trees and shrubs on the site. Additionally, shrubs were planted in groups of three, so if one or two of the cluster died, the cluster could continue to grow and reproduce at that location (Figure 7, Table 10, and Attachment D). No large bare spots were observed in the seeded areas.

RIP-2

RIP-2 is the area immediately adjacent to the channel of Bloody Brook, including rip/rap and planted live stakes (see location of RIP-2 on Figure 3A). It is generally desirable to have shading provided along stream banks. This has been accomplished along the main channel of Bloody Brook primarily through the planting of willow and dogwood live stakes. Existing large trees also provide shade to some parts of the stream banks. Starting at the northeastern edge of the site, at the Thruway fence line, the channel was walked down to Weir 3, and photos (facing downstream) were taken approximately every 50 feet to document the vegetation cover

and shade during the 2021 monitoring activities. These photos are provided in Attachment A. In general, most of the 750 feet of the WBBB in the wooded area above Weir 3 has either good existing cover (greater than about 50 percent), or there are saplings and/or live stakes developing that will provide suitable cover and shade in the future.

USS-1

USS-1 is the planned upland shrub community located between Weir 2 and Weir 3 (Figure 8). Thirty-nine shrubs were planted during the initial restoration activities, and all continue to survive (Table 10 and Attachment D) with one additional grey dogwood counted in 2021. No large bare spots were observed in the seeded areas.

UPF-1

UPF-1 is the planned upland forest community in the area north of Weir 1. Thirty-four target trees were counted, which is above the target number of 26 (Table 10, Attachment D, and Figure 9). Additionally, consistent with observations in 2020, approximately 150 volunteer trees greater than 3-foot in height were counted in this area in 2021. Section 3.1.2 below that further discusses volunteer trees and shrubs on the site.

Eighty-five planted shrubs were counted which is below the target of 86 shrubs and up from 84 counted in 2020. Shrubs were planted in groups of three, so if one or two of the cluster died, the cluster could continue to grow and reproduce at that location (Table 10, Attachment D, and Figure 9). A large number of volunteer trees and shrubs were counted in this area as well. No large bare spots were observed in the seeded areas.

UPF-2

UPF-2 is the planned upland forest community in the area southwest of Weir 3. Consistent with 2020, twenty-one planted trees were counted during the 2021 monitoring activities, meeting the target of 21 trees.

Fifty-seven shrubs were counted during the 2021 monitoring activities, which is below the target of 83 shrubs and slightly down from 61 shrubs counted in 2020. Shrubs were planted in groups of three, so if one or two of the cluster died, the cluster could continue to grow and reproduce at that location (Table 10, Attachment D, and Figure 10). No large bare spots were observed in the seeded areas.

UPF-2 was originally designed to be a natural forested area. However, Onondaga County personnel have been mowing it to maintain the open areas as lawn. Similar to what was observed in 2019, numerous shrubs have been mowed down to ground levels. Leaves can be observed attempting to sprout.

MOW-1 and MOW-2

MOW-1 and MOW-2 are the upland areas where an upland meadow seed mix was applied during the restoration activities then again during the 2017 maintenance activities (completed in May 2018) (Figure 3A). At the time of the 2021 monitoring activities, the area was fully covered in plant growth and no bare spots were observed in these areas.

3.1.2 Volunteer Tree and Shrubs

Many volunteer trees and shrubs are growing across the different wetland and upland habitat areas. Similar to the 2019 and 2020 evaluations, these volunteers were estimated in July 2021 by walking through areas where particularly high numbers were observed (sections of RIP-1, PEM-1, and UPF-1) and counting any trees and shrubs that were waist high or taller (i.e., about 3 feet). Numerous smaller plants were also observed during the volunteer count. Throughout the site, over 400 volunteer plants, primarily trees, were present in 2021. At this time, due to the dynamic nature of the area, these volunteers typically have not been included in any of the target tree or shrub counts for the monitoring activities in the different habitat areas. However, it is anticipated that many of these saplings will continue to develop within the habitat areas, adding habitat and diversity where the conditions are suitable.

3.1.3 Wetlands Photographic Monitoring

Photographs taken from the five permanent photo points in 2021 show successful germination and development of target wetland and upland plant species in all areas (Attachment A). Due to the adaptive management approach being followed for some of the habitat areas, comparison of some of the 2021 photos to those from the previous years may indicate differences in plant species. The locations of the permanent photo points are shown in Figure 3A. Photos from 2021 from the permanent photo points are included in Attachment A and document the successful development of the wetland habitats following completion of construction activities.

3.1.4 Invasive Species

Consistent with previous years, two primary invasive plant species were found on the site during the July 2021 monitoring event, *Phragmites* and purple loosestrife. These are discussed in more detail in the subsections below.

An intensive program of manual removal of *Phragmites* and purple loosestrife, consistent with management options included in the *Inter-Agency Guidelines for Implementing Best Management Practices to Control Invasive Species on DEC Administered Lands of the Adirondack Parks* (NYSDEC, 2018), has been and continues to be conducted since 2015 as the designed wetland habitats become established. The percent coverage by invasive species during July 2021 is provided in Table 14. The combined coverage of both *Phragmites* and purple loosestrife exceed the stated goal of less than five percent coverage by invasive species in six out of the ten quantitative plots and transects. This is up from 2020 with a combined coverage of 15 percent; however, when weighting the plots by how much area each represents, the invasive coverage is 9.8 percent, still exceeding the target of less than five percent but slightly down from 10.3 percent in 2020.

3.1.4.1 *Phragmites*

Phragmites continued to be observed throughout the site in relatively high densities in some areas of the site during the July 2021 monitoring event. In the quantitative assessments at 11 locations completed in 2021 and discussed above in Section 3.1, *Phragmites* exceeded the target of less than 5 percent in wetland habitat areas PEM-1, PEM-3, PEM-4, W-10, W-11,

and PSS-1 and on average covered 12.5 percent of the wetlands. Notably, in areas where water depth was sufficient to allow vigorous growth of cattail, consistent with previous years, *Phragmites* was generally absent (e.g., PFO-1, PEM-2, PEM-5, PSS-2).

3.1.4.2 Purple Loosestrife

Based on the 2021 quantitative assessment discussed in Section 3.1, purple loosestrife made up less 5 percent of the total cover in the plots and transects in nine out of eleven surveys. For the remaining two habitat areas, PSS-1 and W-11, the target of less than 5 percent total coverage was exceeded. Purple loosestrife comprised 6.9 percent in PSS-1 and 7.8 percent in W-11. On average, purple loosestrife covered 2.7 percent of the wetland area.

3.2 RESIDENTIAL AND COMMERCIAL AREAS

All residential and commercial plantings included in this annual inspection were visually inspected to ensure they are successfully establishing in accordance with the property-specific access/restoration agreements between Lockheed Martin and the property owner. Results for the inspections completed on private residential and commercial properties will be discussed, as needed, with the property owner. Field forms for private properties will be retained in the project files, but they are not included in this summary report.

3.3 EROSION INSPECTION

In accordance with the Decision Document and the SMP, the site was inspected for ponding on the side banks and for erosion of the brook bottom and side banks. The completed field form from the June 2021 erosion inspection is provided in Attachment C and indicated that the stream bottom and side banks are intact, and that the soil cover continues to function as designed.

4.0 SUMMARY AND RECOMMENDATIONS

4.1 WOODED AREA

4.1.1 Summary

As discussed above in Section 3, the habitat areas are developing as designed and consistent with the approved adaptive management approach. No new plantings are proposed. Although the target numbers of trees and/or shrubs have not been met for all areas (e.g., trees in PSS-1 and PFO-1 and shrubs in RIP-1 and UPF-1), there are a large number of tree and shrub volunteers in these areas that, along with the target shrubs and trees that are surviving, will provide the desired cover. Additionally, shrubs were planted in groups of three so if one or two of the cluster died, the cluster could continue to grow and reproduce at that location.

The target number of shrubs has not been met in UPF-2. As discussed above in Section 3.1.1.4, this habitat area was originally designed to be a natural forested area. However, Onondaga County personnel have been mowing it to maintain the open areas as lawn. Similar to what was observed in 2019 and 2020, numerous shrubs have been mowed down to ground levels during the 2021 monitoring. Because of this and consistent with 2020, new plantings are not being proposed for UPF-2. The missing shrubs are accounted for in other habitat areas, therefore overall site vegetation density is not being lost.

The percent coverage by emergent vegetation in PEM-2 (Plot 3) was 5 percent, up from 3 percent in 2020. Other areas of PEM-2 are continuing to sustain dense stands of cattails, and the area in and around Plot 3 appears to be suitable habitat for wetland wildlife. Consistent results between 2020 and 2021 suggests the habitat area can sustain the observed muskrat activity.

Photographs taken from the five permanent photo points from 2021 show successful germination and development of target wetland and upland plant species in all areas (Attachment A). Due to the adaptive management approach being followed for some of the habitat areas, comparison of some of the photos to those from the previous years may indicate differences in plant species. However, all of the photos indicate dense target vegetation growth and successful restoration in the wooded area. The locations of the permanent photo points are shown in Figure 3A.

Removal of *Phragmites* and purple loosestrife was completed regularly through each growing season since 2015, consistent with management options included in the *Inter-Agency Guidelines for Implementing Best Management Practices to Control Invasive Species on DEC Administered Lands of the Adirondack Parks* (NYSDEC, 2018), and appears to have allowed the development and spread of several different target wetland plant species. Although these removal activities prevented the spread of these invasive species throughout the wetlands, several habitat areas continue to have percent coverages exceeding five percent, ranging from a combined 14 percent in PSS-1 to 72 percent in W-10.

4.1.2 Recommendations

Per the Decision Document and SMP, monitoring of wetland vegetation was to be completed for five years to ensure the wetland habitats were developing with at least the target number of trees, shrubs, and ground coverage, and that they would be expected to continue to develop as diverse habitats. Based on the cumulative results of the monitoring completed between 2017 and 2021, it is recommended that the 2021 be the final vegetation monitoring event for the wooded area and that the following are completed:

- Since areas of PFO-1 are developing as emergent wetlands with cattails as the dominant species (Section 3.1.1.3), it is proposed that the boundaries of PFO-1 be updated as shown in Figure 3B, reclassifying the northern part of the habitat area as PEM habitat.

- Since W-10 and W-11 have been classified as emergent wetlands and continue to develop as such, for consistency, it is proposed that these habitat areas be combined with their adjacent PEM habitats as shown in Figure 3B.

- Because invasive species continue to exceed the target percent coverage of less than five percent in several of the areas (PEM-1, PEM-3, PEM-4, W-10, W-11, and PSS-1), additional control measures are proposed going forward. While physical removal appears to have allowed the distribution of target wetland species in many areas, this method is proposed to be eliminated in spring 2022 and replaced with herbicide application to be completed by a certified herbicide applicator with experience in wetlands. Per the *Inter-Agency Guidelines for Implementing Best Management Practices to Control Invasive Species on DEC Administered Lands of the Adirondack Parks* (NYSDEC, 2018), herbicide treatments can be effective at locally eradicating *Phragmites* infestations. Results of the herbicide application will be evaluated in fall 2022 to determine if any future applications are necessary. Additional details will be provided in the SMP updated in early 2022 for NYSDEC review and approval. The proposed methods, which includes the herbicide application targeting invasive species, will be consistent with those recently approved by NYSDEC for use at the nearby Onondaga Lake and Ninemile Creek National Priority List (NPL) sites.

4.2 RESIDENTIAL AND COMMERCIAL AREAS

No major issues were identified on the private properties during the monitoring event. Results and recommendations for these inspections completed on private properties will be discussed as needed with the property owner. Consistent with the access agreements with the property owners, this is anticipated to be the final year of monitoring for the vegetation restoration in most areas.

The first of the annual inspection for the areas listed below was completed in 2018. Therefore, it is anticipated that 2022 will be the final year of monitoring in these areas.

- Apartment complex area including the stream side banks and bottom
- Portion of the commercial property outside of the stream side banks and located between the Old Liverpool Road culvert and the railroad tracks
- Construction access area at Onondaga Lake Parkway

4.3 EROSION

No areas of concern along the brook channel were noted during the 2021 site inspection. The stream bottom and side banks were intact and showed little signs of damage during the June 2021 erosion inspection. No changes to the annual site-wide inspection for erosion of the soil cover are currently proposed. Per the SMP, annual site-wide inspections will be completed.

5.0 REFERENCES

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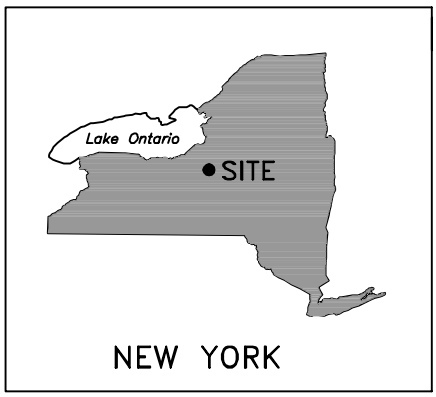
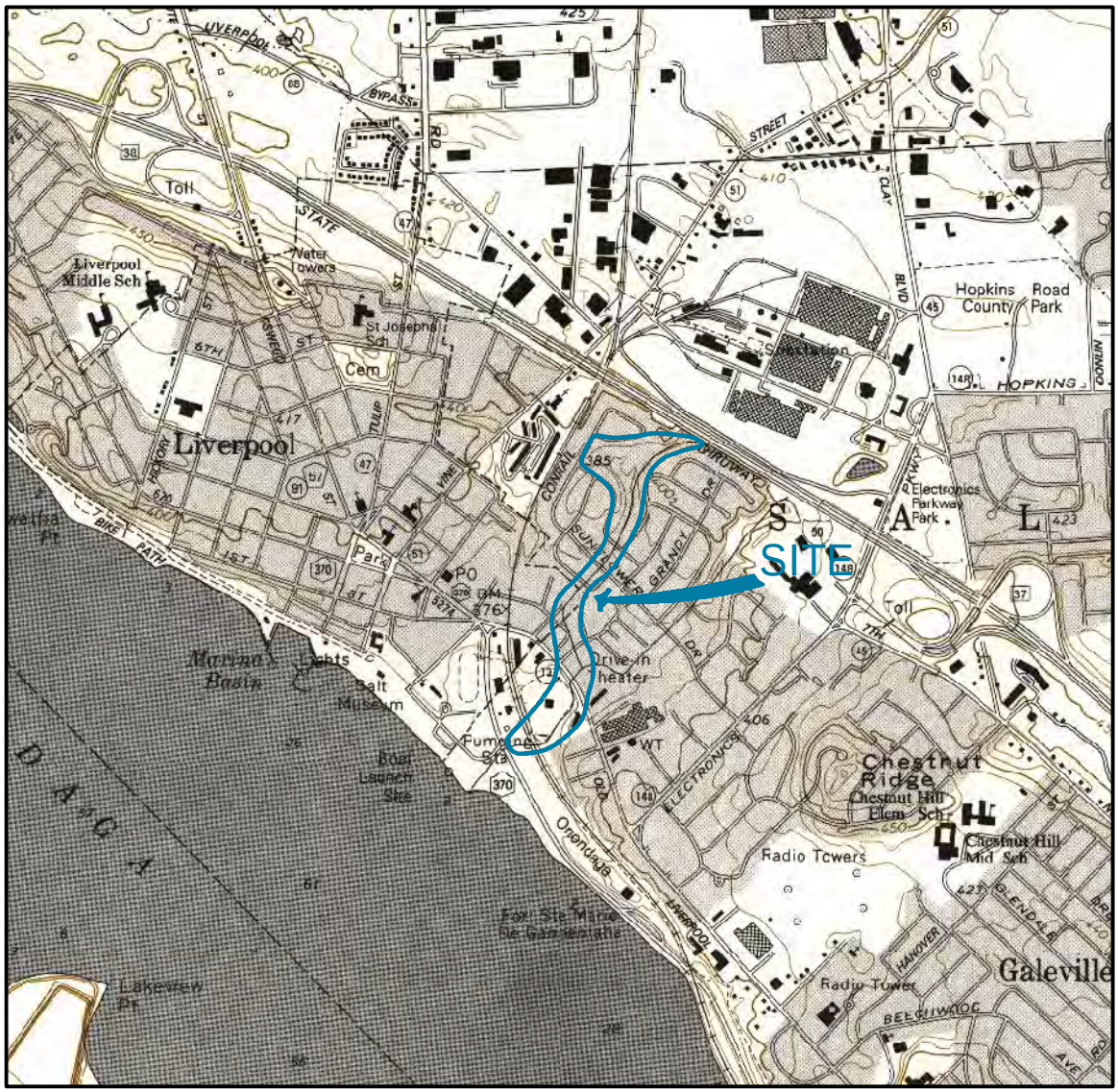
FIGURES





0' 2000' 4000'

APPROXIMATE SCALE

REFERENCE:

1. NYSDOT 7.5 MIN TOPOGRAPHIC MAP OF SYRACUSE WEST, QUADRANGLE 1990, SCALE: 1" = 2000'.

AECOM

LOCKHEED MARTIN CORPORATION

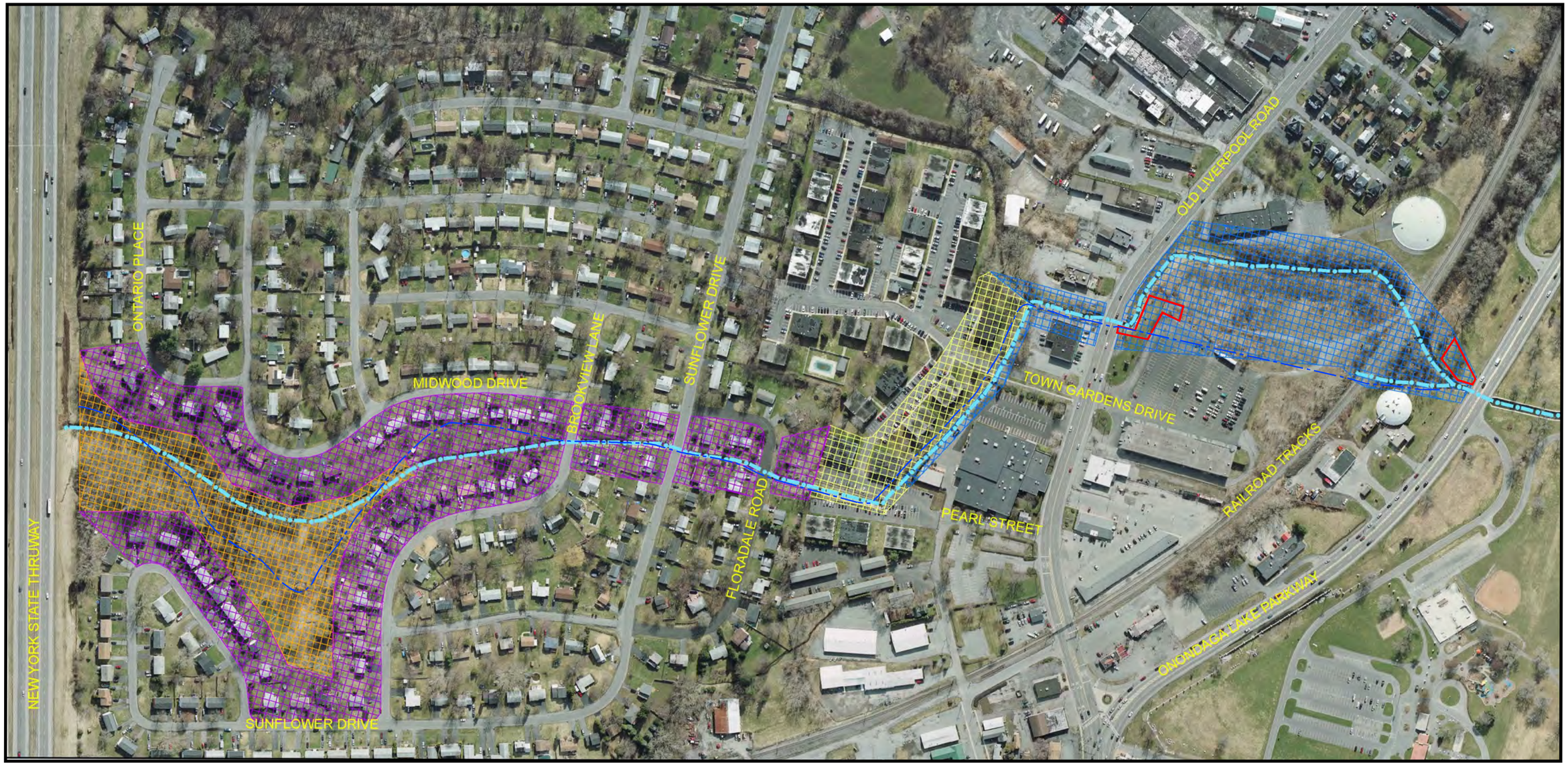
SITE LOCATION MAP

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
A1FIG1_2020.dwg	CLS	60624670	9 / 2020	1

Plotted By: carrie.szczepanski
Layout-Sheet Name: LAYOUT1
Plot File Date Created: Sep/29/2020 6:13 PM

Filename: D:\BLOODY BROOK SEPT 2020\A1FIG1_2020.DWG



Legend

- CURRENT BROOK ALIGNMENT
- WOODED AREA
- RESIDENTIAL AREA
- APARTMENT COMPLEX AREA
- COMMERCIAL-LIGHT INDUSTRIAL AREA
- COMMERCIAL AREAS EXCLUDED FROM MAY 2017 MONITORING

0' 300' 600'

APPROXIMATE SCALE

AECOM

LOCKHEED MARTIN CORPORATION

SITE AREA MAP

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
SiteAreaMap FIG2.dwg	CLS	60624670	9 / 2020	2

Plotted By: carrie.szczepanski
Layout-Sheet Name: FIGURE 1-2
Plot File Date Created: Sep/29/2020 6:41 PM

Filename: D:\BLOODY BROOK SEPT 2020\SITEAREAMAP FIG2.DWG


ONTARIO PLACE
MIDWOOD DRIVE
CRANBERRY DRIVE
MIDWOOD DRIVE
MATCHLINE TO SHEET 2 OF 3
NEW YORK STATE THRUWAY
SUNFLOWER DRIVE
BROOKVIEW LANE
BOX CULVERT INV.=384.4
INV.12"CSP=397.23
PSS-1 1,742 SF
PSS TRANSECT 1
PEM-3 3,485 SF
W-10 871 SF
UPF-1 8,712 SF
PEM-1 16,553 SF
MOW-1
MOW-2
RIP-1 31,363 SF
UPF-2 11,326 SF
PEM-4 3,049 SF
PFO TRANSECT 1
PFO-1 10,890 SF
USS-1 3,485 SF
PEM-2 8,276 SF
PEM-5 6,970 SF
PSS TRANSECT 2
PSS-2 6,970 SF
W-11 10,019 SF
MOW-5
WEIR #2
WEIR #3
ADDITIONAL AREA OF W-11 THAT WAS PLANTED PER THE 2020 RESTORATION MONITORING SUMMARY REPORT AND WORK PLAN.
CENTERLINE OF DRAINAGE SWALE
LEGEND
BLOODY BROOK DRAINAGE DISTRICT EASEMENT
PROPERTY BORDER
TOPOGRAPHIC CONTOUR LINE (PRE-EXCAVATION)
PROPOSED BLOODY BROOK CENTERLINE
STREAM/WATER EDGE
UNDERGROUND DRAIN LINE
OVERHEAD WIRES
RETAINING WALL
GUARD RAIL
UTILITY MANHOLE
DRAINAGE MANHOLE
SANITARY MANHOLE
RAILROAD TRACKS
CATCH BASIN
DRAINAGE STRUTURES
FLAG POLE
CULVERT
NYS PLANE COORDINATE SYSTEM EASTING
NYS PLANE COORDINATE SYSTEM NORTHING
AERIAL SURVEY GROUND CONTROL POINT
CHANNEL CENTERLINE SURVEY STATION
TOPOGRAPHIC SPOT ELEVATION
CONIFEROUS TREE
DECIDUOUS TREE
LIGHT POLE
UTILITY POLE / GUY WIRE
WETLAND ELEVATION CONTROL WEIR LOCATION
RIP RAP
EXISTING WETLAND
WETLAND PIEZOMETER LOCATION
WETLAND MONITORING STAFF GAUGE
PSS PALUSTRINE SHRUB / SCRUB
PEM PALUSTRINE EMERGENT
PFO PALUSTRINE FORESTED
UPF FORESTED UPLAND
USS SHRUB / SCRUB UPLAND
MOW UPLAND MEADOW
RIP RIPARIAN
LAWN LAWN
W WETLAND
WETLAND MONITORING PHOTOGRAPH LOCATION (MULTIPLE VIEWS)
APPROXIMATE SCALE
AECOM
LOCKHEED MARTIN CORPORATION
WETLAND HABITATS
BLOODY BROOK
ONONDAGA COUNTY, NEW YORK
FILE NAME: 2021 Wetland Habitat.dwg
DRN CLS
PROJECT NO. 60624670
DATE 9 / 2021
FIGURE NO. 3A

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.

Plotted By: carrie.szczepanski
Layout-Sheet Name: FIG 1_FUL_SITE - NO PLANTS
Plot File Date Created: Sep/01/2021 7:26 PM

Filename: D:\BLOODY BROOK JANUARY 2021\2021 WETLAND HABITAT.DWG


NEW YORK STATE THRUWAY
ONTARIO PLACE
MIDWOOD DRIVE
CRANBERRY DRIVE
MIDWOOD DRIVE
SUNFLOWER DRIVE
BROOKVIEW LANE
MATCHLINE TO SHEET 2 OF 3
BOX CULVERT INV.=384.4
INV. 12" CSP=397.23
HIGHWAY BOUNDARY
CHAIN LINK FENCE
PSS-1 1,742 SF
PSS TRANSECT 1
SG-1
PEM-3 PLOT 4
PEM-3 3,485 SF
PZ-1
PHOTO-1
RIP-2
PEM-3 PLOT 7
PEM-3 931 SF
RIP-1
WEIR #1
PHOTO-2
UPF-1 8,712 SF
SG-2
PEM-1 PLOT 1
PZ-2
PEM-1 16,553 SF
PEM-1 PLOT 2
LAWN
PHOTO-3
WEIR #2
RIP-1
MOW-1
PFO TRANSECT 1
PEM-4
PEM-4 PLOT 5
PFO-1 7,198 SF
PZ-3
SG-3
PEM-4 13,709 SF
USS-1 3,485 SF
WEIR #3
SG-4
RIP-1 31,363 SF
PHOTO-5
PEM-2 8,276 SF
PZ-4
PEM-2 PLOT 3
PEM-4 PLOT 6
PSS TRANSECT 2
PSS-2 6,970 SF
RIP-1
PEM-4 PLOT 8
PHOTO-4
MOW-5
PEM-4 10,019 SF
CENTERLINE OF DRAINAGE SWALE
MOW-5
LAWN
MOW-2
LAWN
UPF-2 11,326 SF
MOW-2
LAWN
LAWN
MOW-2
MOW-2
LAWN
LAWN
RIP-2
PHOTO-6
LEGEND
BLOODY BROOK DRAINAGE DISTRICT EASEMENT
PROPERTY BORDER
TOPOGRAPHIC CONTOUR LINE (PRE-EXCAVATION)
PROPOSED BLOODY BROOK CENTERLINE
STREAM/WATER EDGE
UNDERGROUND DRAIN LINE
OVERHEAD WIRES
RETAINING WALL
GUARD RAIL
UTILITY MANHOLE
DRAINAGE MANHOLE
SANITARY MANHOLE
RAILROAD TRACKS
CATCH BASIN
DRAINAGE STRUTURES
FLAG POLE
CULVERT
E 924,000 NYS PLANE COORDINATE SYSTEM EASTING
N 1,131,000 NYS PLANE COORDINATE SYSTEM NORTHING
BL-115 AERIAL SURVEY GROUND CONTROL POINT
CHANNEL CENTERLINE SURVEY STATION
TOPOGRAPHIC SPOT ELEVATION
CONIFEROUS TREE
DECIDUOUS TREE
LIGHT POLE
UTILITY POLE / GUY WIRE
WETLAND ELEVATION CONTROL WEIR LOCATION
RIP RAP
EXISTING WETLAND
PZ-1 WETLAND PIEZOMETER LOCATION
SG-1 WETLAND MONITORING STAFF GAUGE
PSS PALUSTRINE SHRUB / SCRUB
PEM PALUSTRINE EMERGENT
PFO PALUSTRINE FORESTED
UPF FORESTED UPLAND
USS SHRUB / SCRUB UPLAND
MOW UPLAND MEADOW
RIP RIPARIAN
LAWN LAWN
W WETLAND
PHOTO-1 WETLAND MONITORING PHOTOGRAPH LOCATION (MULTIPLE VIEWS)
0' 50' 100'
APPROXIMATE SCALE

AECOM

LOCKHEED MARTIN CORPORATION

PROPOSED WETLAND HABITATS

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

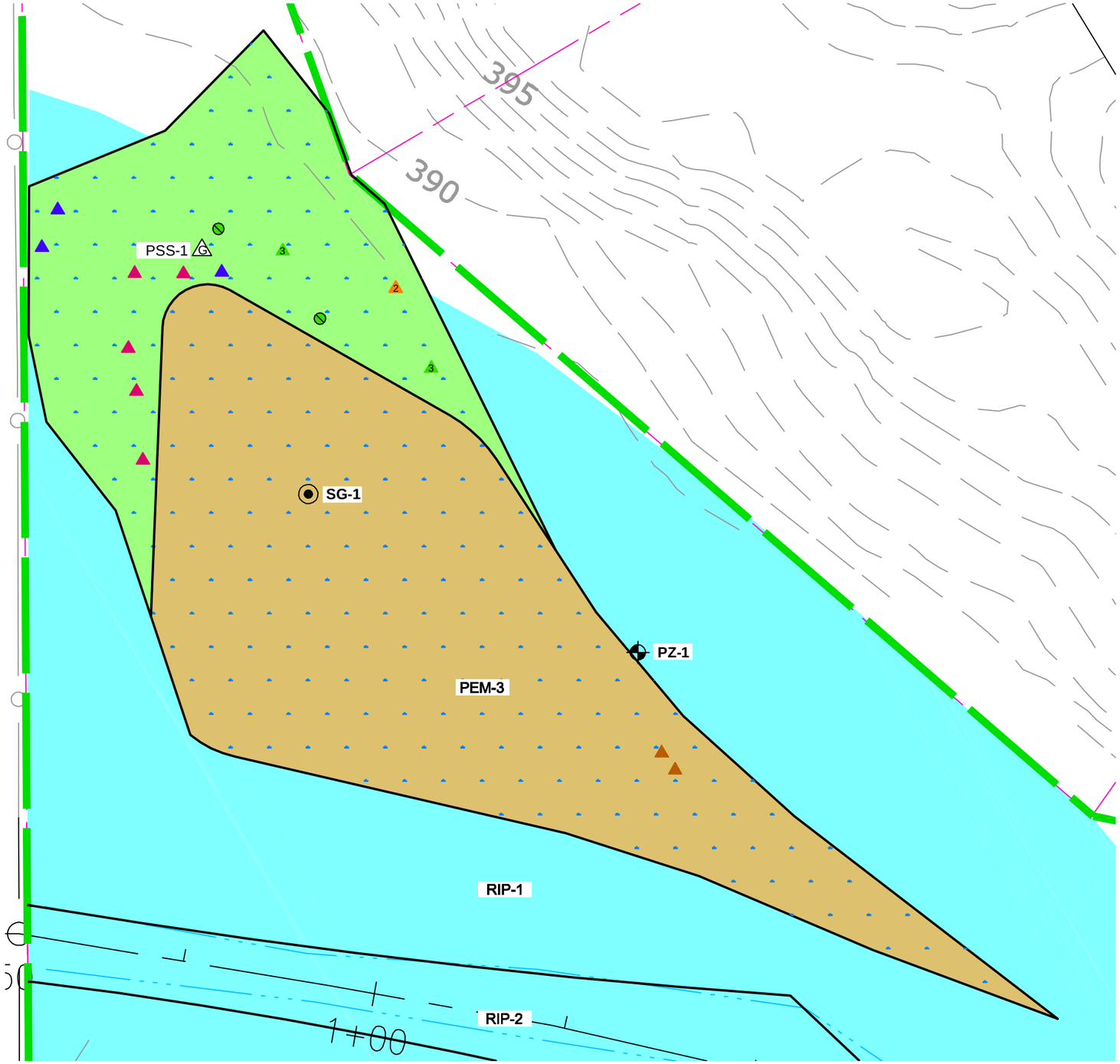
FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
2021 Proposed WH 3B.dwg	CLS	60624670	9 / 2021	3B

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.

Plotted By: carrie.szczepanski
Layout-Sheet Name: FIG 1_FUL_SITE - NO PLANTS
Plot File Date Created: Sep/08/2021 6:51 PM

Filename: D:\BLOODY BROOK JANUARY 2021\2021 PROPOSED WH 3B.DWG



LEGEND

- PZ-1 — WETLAND PIEZOMETER LOCATION
- SG-1 — WETLAND MONITORING STAFF GAUGE
- PSS — PALUSTRINE SHRUB / SCRUB
- PEM — PALUSTRINE EMERGENT
- RIP — RIPARIAN
- EXISTING WETLAND

EXISTING TREES

- PIN OAK

EXISTING SHRUBS

- GREY DOGWOOD
- BUTTONBUSH
- ELDERBERRY
- RED CHOKEBERRY
- NORTHERN ARROWWOOD
- G — SWEET GALE

PLANT STATUS BASED ON JULY 2021 INSPECTION

- LIVING TREE
- STRESSED TREE
- 3 — NUMBER OF LIVING SHRUBS

NOTES

1. THE TRIANGLES REPRESENTING PLANTED SHRUBS INDICATE ONE LIVE SHRUB OF THAT SPECIES COUNTED AT THAT LOCATION DURING THE 2021 MONITORING EVENT, UNLESS OTHERWISE NOTED.

2. THE SHRUBS WITHIN PEM-3 WERE PLANTED PRIOR TO THIS AREA BEING DESIGNATED AS AN EMERGENT WETLAND DUE TO WETTER CONDITIONS AND THE ADAPTIVE MANAGEMENT APPROACH.

0’ 15’ 30’

AECOM

LOCKHEED MARTIN CORPORATION

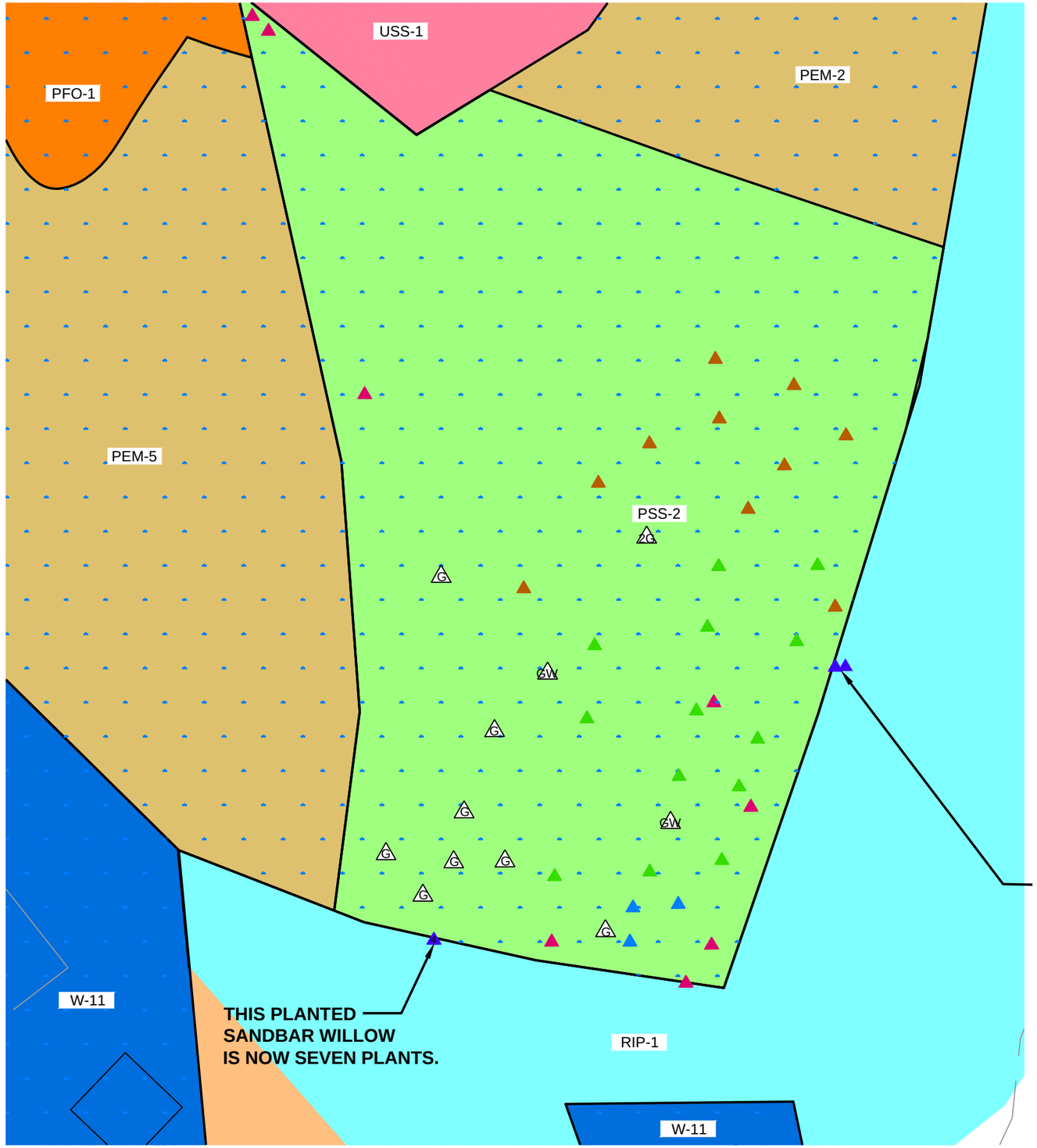
PLANTING LOCATIONS FOR PSS-1

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE
2021 Plant Plan.dwg	CLS	60624670	9 / 2021	4

Plotted By: carrie.szczepanski
Layout-Sheet Name: FIG 2_PLANTING PLAN PSS-1
Plot File Date Created: Sep/08/2021 2:33 PM

Filename: D:\SEPTEMBER 2021\2021 PLANT PLAN.DWG



LEGEND

- PSS — PALUSTRINE SHRUB / SCRUB
- PEM — PALUSTRINE EMERGENT
- PFO — PALUSTRINE FORESTED
- USS — SHRUB / SCRUB UPLAND
- RIP — RIPARIAN
- W — WETLAND
- EXISTING WETLAND

EXISTING SHRUBS

- ELDERBERRY
- BUTTONBUSH
- RED CHOKEBERRY
- SANDBAR WILLOW
- NORTHERN ARROWWOOD
- SWEET GALE (G)
- GRAY WILLOW (GW)

NOTES

1. THE TRIANGLES REPRESENTING PLANTED SHRUBS INDICATE ONE LIVE SHRUB OF THAT SPECIES COUNTED AT THAT LOCATION DURING THE 2021 MONITORING EVENT, UNLESS OTHERWISE NOTED.

0’ 15’ 30’

AECOM

LOCKHEED MARTIN CORPORATION

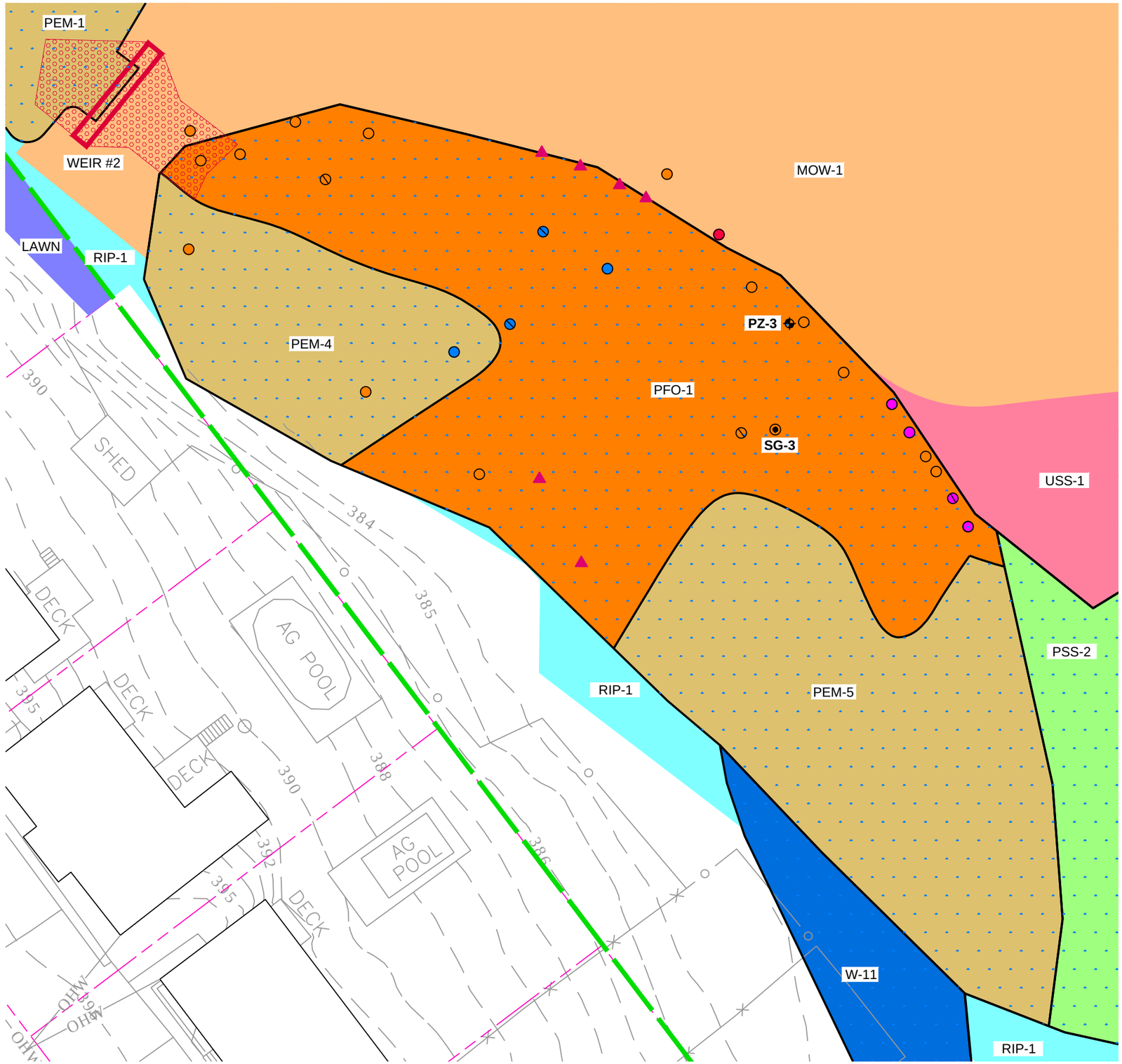
PLANTING LOCATIONS FOR PSS-2

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE
August 2021 Plant Plan.dwg	CLS	60624670	9 / 2021	5

Plotted By: carrie.szczepanski
Layout-Sheet Name: FIG 3_PLANTING PLAN PSS-2
Plot File Date Created: Sep/08/2021 6:01 PM

Filename: D:\BLOODY BROOK JANUARY 2021\AUGUST 2021 PLANT PLAN.DWG



LEGEND

- PZ-3 — WETLAND PIEZOMETER LOCATION
- SG-3 — WETLAND MONITORING STAFF GAUGE
- PSS — PALUSTRINE SHRUB / SCRUB
- PEM — PALUSTRINE EMERGENT
- PFO — PALUSTRINE FORESTED
- USS — SHRUB / SCRUB UPLAND
- MOW — UPLAND MEADOW
- RIP — RIPARIAN
- LAWN — LAWN
- W — WETLAND
- EXISTING WETLAND

EXISTING TREES

- BLACK WILLOW
- RED MAPLE
- RIVER BIRCH
- SWAMP WHITE OAK

SHRUBS

- ELDERBERRY

PLANT STATUS BASED ON JULY 2021 INSPECTION

- LIVING TREE
- STRESSED TREE

NOTES

1. THE TRIANGLES REPRESENTING PLANTED SHRUBS INDICATE ONE LIVE SHRUB OF THAT SPECIES COUNTED AT THAT LOCATION DURING THE 2021 MONITORING EVENT, UNLESS OTHERWISE NOTED.

2. THE TREES WITHIN PEM-4 WERE PLANTED PRIOR TO THESE AREAS BEING DESIGNATED AS EMERGENT WETLANDS DUE TO WETTER CONDITIONS AND THE ADAPTIVE MANAGEMENT APPROACH.

0’ 25’ 50’

AECOM

LOCKHEED MARTIN CORPORATION

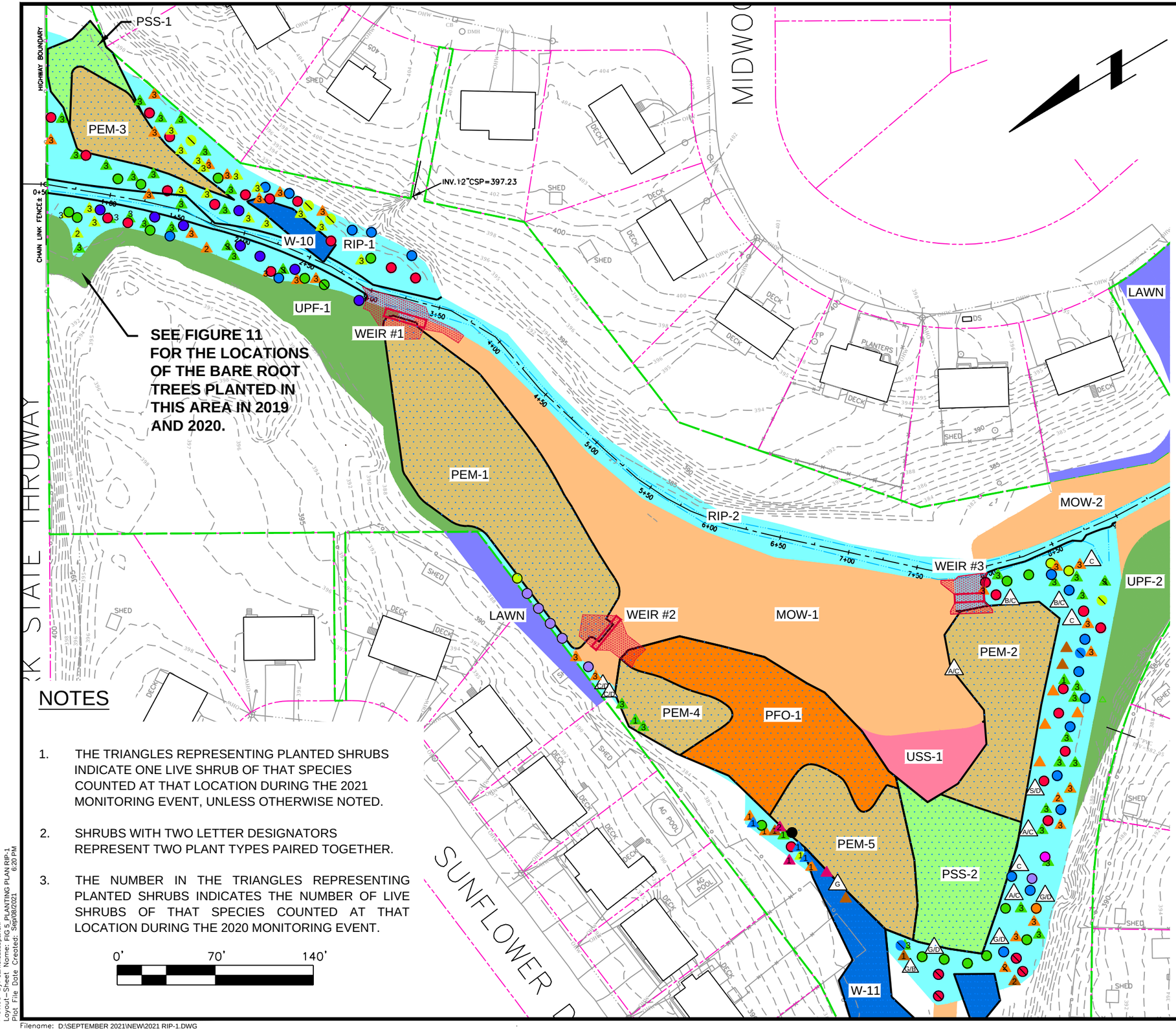
PLANTING LOCATIONS FOR PFO-1

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE
2021 PFO-1.dwg	CLS	60624670	9 / 2021	6

Plotted By: carrie.szczepanski
Layout–Sheet Name: FIG 4_PLANTING PLAN PFO-1
Plot File Date Created: 9/08/2021 6:09 PM

Filename: D:\SEPTEMBER 2021\NEW\2021 PFO-1.DWG



LEGEND

PSS	PALUSTRINE SHRUB / SCRUB		
PEM	PALUSTRINE EMERGENT		
PFO	PALUSTRINE FORESTED		
UPF	FORESTED UPLAND		
USS	SHRUB / SCRUB UPLAND	RIP	RIPARIAN
MOW	UPLAND MEADOW	LAWN	LAWN
	EXISTING WETLAND	W	WETLAND

EXISTING TREES

	BLACK WILLOW		SILVER MAPLE
	EASTERN HEMLOCK		SUGAR MAPLE
	PIN OAK		SWAMP WHITE OAK
	RED MAPLE		SYCAMORE
			WHITE PINE

EXISTING SHRUBS

- BUTTON BUSH
- GREY DOGWOOD
- NANNYBERRY
- NORTHERN ARROWWOOD
- ELDERBERRY
- RED CHOKEBERRY
- C — HIGH BUSH CRANBERRY
- G — SWEET GALE
- B/C — BUTTON BUSH/HIGH BUSH CRANBERRY
- D/A — GREY DOGWOOD/SPECKLED ALDER
- C/D — HIGH BUSH CRANBERRY/GREY DOGWOOD
- C/G — HIGH BUSH CRANBERRY/SWEET GALE
- A/C — SPECKLED ALDER/HIGH BUSH CRANBERRY
- G/D — SWEET GALE/GREY DOGWOOD
- S/D — STEEPLE BUSH/GREY DOGWOOD
- G/B — SWEET GALE/BUTTON BUSH

PLANT STATUS BASED ON JULY 2021 INSPECTION

- ○ LIVING TREE
- / STRESSED TREE
- 3 NUMBER O F LIVING SHRUBS

NOTES

1. THE TRIANGLES REPRESENTING PLANTED SHRUBS INDICATE ONE LIVE SHRUB OF THAT SPECIES COUNTED AT THAT LOCATION DURING THE 2021 MONITORING EVENT, UNLESS OTHERWISE NOTED.
2. SHRUBS WITH TWO LETTER DESIGNATORS REPRESENT TWO PLANT TYPES PAIRED TOGETHER.
3. THE NUMBER IN THE TRIANGLES REPRESENTING PLANTED SHRUBS INDICATES THE NUMBER OF LIVE SHRUBS OF THAT SPECIES COUNTED AT THAT LOCATION DURING THE 2020 MONITORING EVENT.

0' 70' 140'

AECOM

LOCKHEED MARTIN CORPORATION

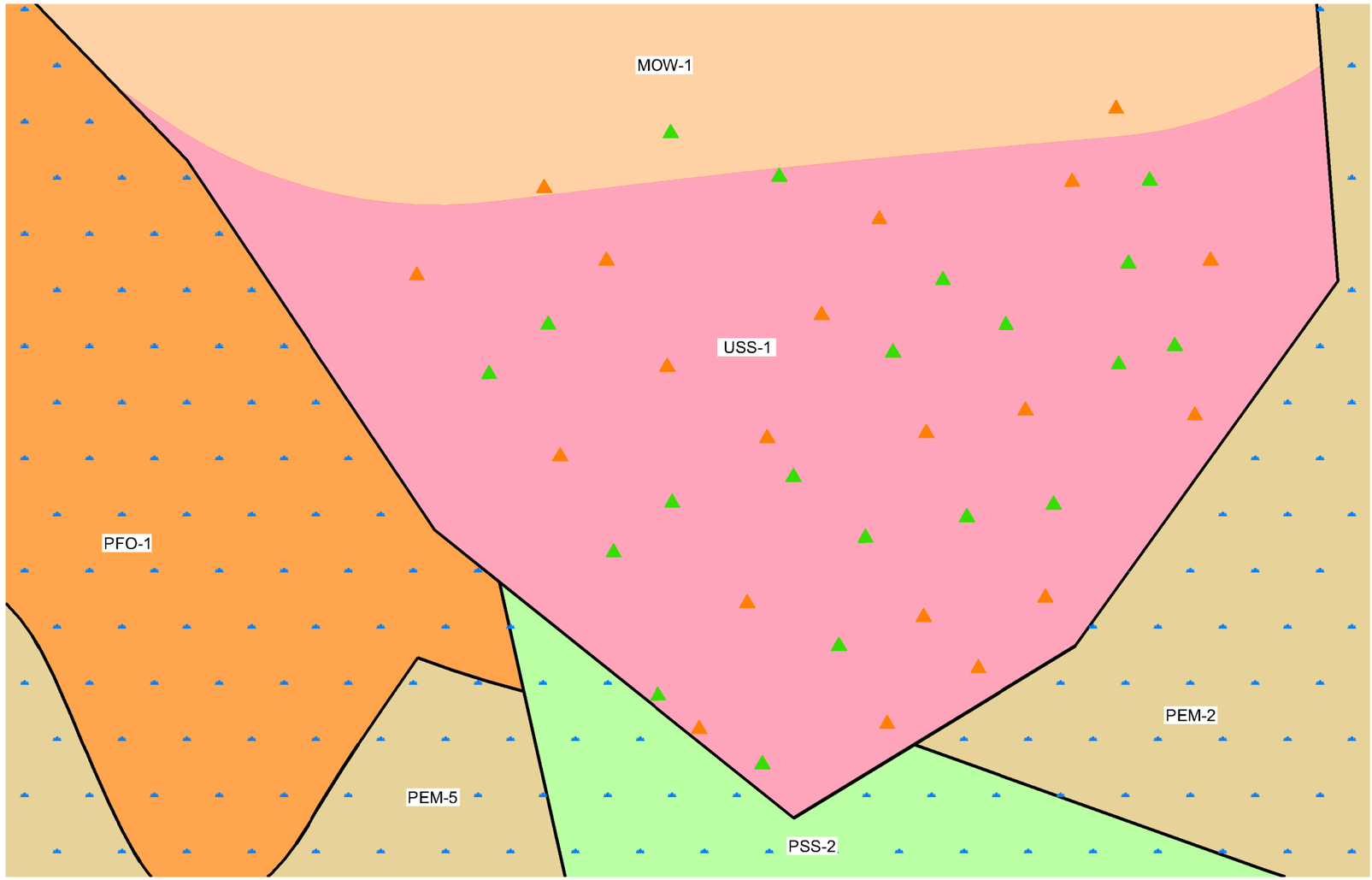
PLANTING LOCATIONS FOR RIP-1

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE
2021 RIP-1.dwg	CLS	60624670	9 / 2021	7

Plotted By: carrie.szczepanski
Layout-Sheet Name: FIG 5_PLANTING PLAN RIP-1
Plot File Date Created: Sep/08/2021 6:20 PM

Filename: D:\SEPTEMBER 2021\NEW\2021 RIP-1.DWG



LEGEND

PSS	PALUSTRINE SHRUB / SCRUB
PEM	PALUSTRINE EMERGENT
PFO	PALUSTRINE FORESTED
USS	SHRUB / SCRUB UPLAND
MOW	UPLAND MEADOW
	EXISTING WETLAND

EXISTING SHRUBS

- GREY DOGWOOD
- NORTHERN ARROWWOOD

NOTES

1. THE TRIANGLES REPRESENTING PLANTED SHRUBS INDICATE ONE LIVE SHRUB OF THAT SPECIES COUNTED AT THAT LOCATION DURING THE 2021 MONITORING EVENT, UNLESS OTHERWISE NOTED.

0' 10' 20'

AECOM

LOCKHEED MARTIN CORPORATION

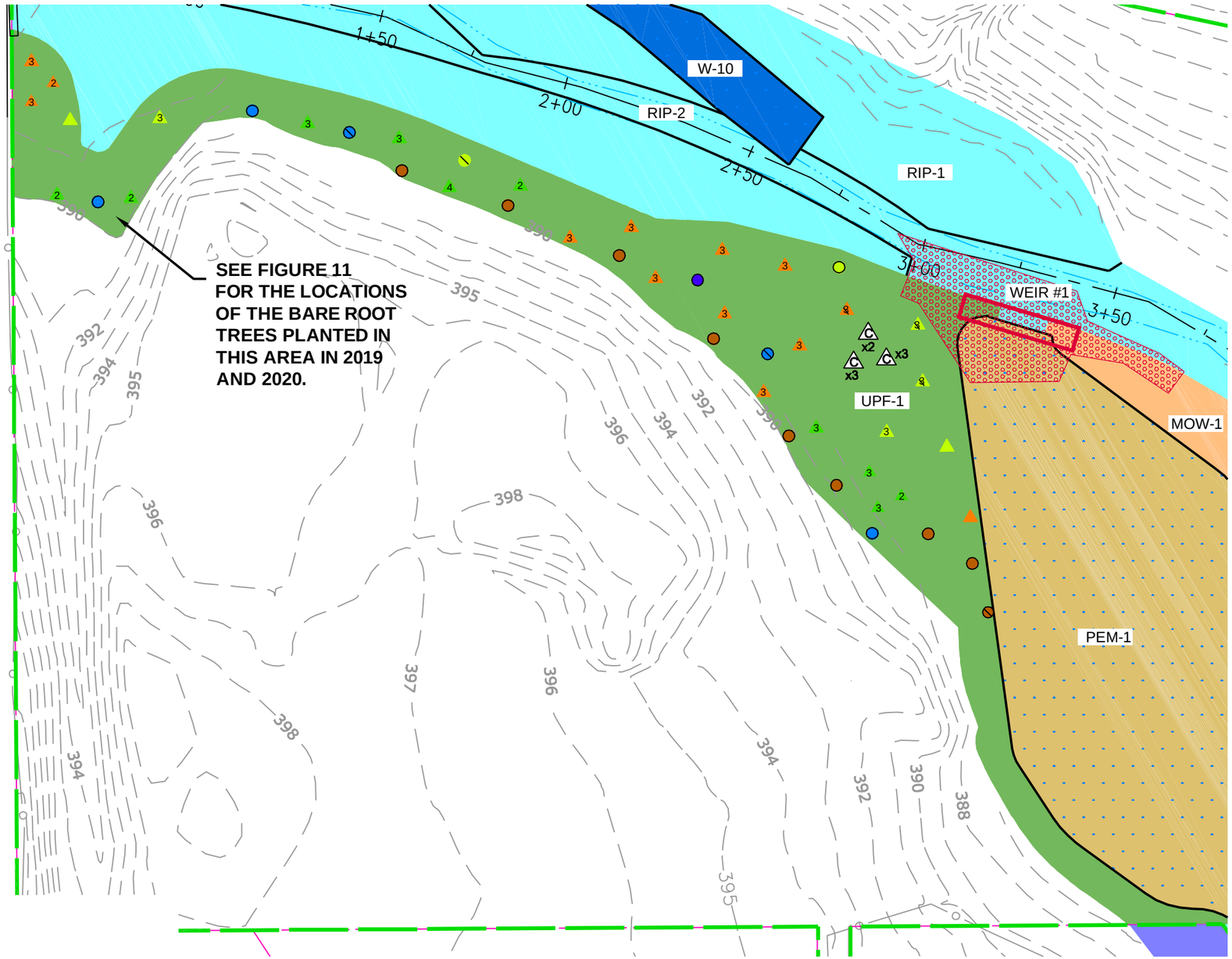
PLANTING LOCATIONS FOR USS-1

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE
2021 USS-1.dwg	CLS	60624670	9 / 2021	8

Plotted By: carrie.szczepanski
Layout-Sheet Name: FIG 6_PLANTING PLAN USS-1
Plot File Date Created: Sep/16/2021 10:07 AM

Filename: D:\SEPTEMBER 2021\NEW\2021 USS-1.DWG



LEGEND

- PEM — PALUSTRINE EMERGENT
- UPF — FORESTED UPLAND
- MOW — UPLAND MEADOW
- RIP — RIPARIAN
- W — WETLAND
- EXISTING WETLAND

EXISTING TREES

- AMERICAN BEECH
- EASTERN HEMLOCK
- SILVER MAPLE
- SUGAR MAPLE

EXISTING SHRUBS

- GREY DOGWOOD
- NANNYBERRY
- NORTHERN ARROWWOOD
- HIGHBUSH CRANBERRY

PLANT STATUS BASED ON JULY 2021 INSPECTION

- LIVING TREE
- STRESSED TREE
- 3 — NUMBER OF LIVING SHRUBS

NOTES

1. THE TRIANGLES REPRESENTING PLANTED SHRUBS INDICATE ONE LIVE SHRUB OF THAT SPECIES COUNTED AT THAT LOCATION DURING THE 2021 MONITORING EVENT, UNLESS OTHERWISE NOTED.

0’ 15’ 30’ 60’

AECOM

LOCKHEED MARTIN CORPORATION

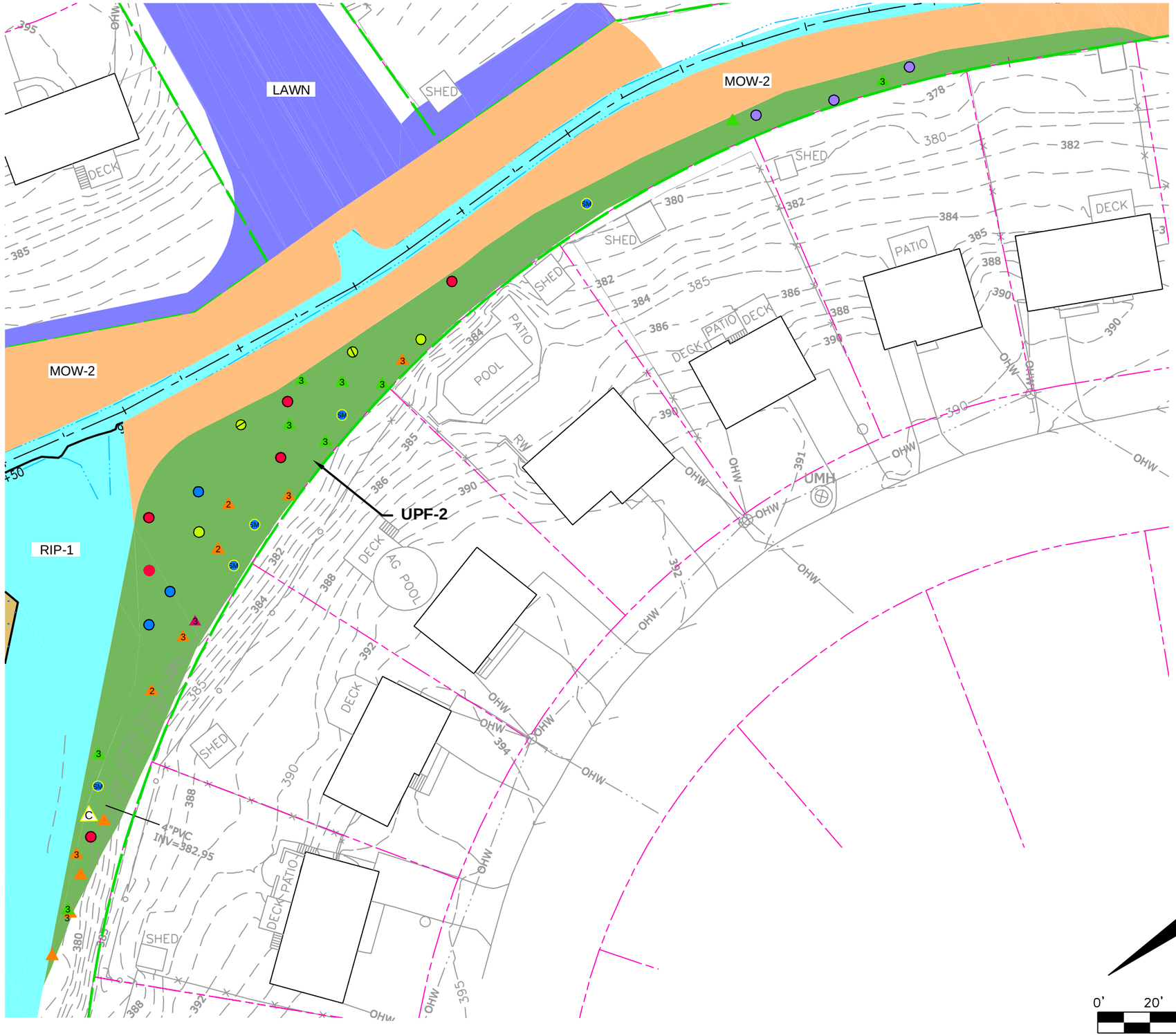
PLANTING LOCATIONS FOR UPF-1

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE
2021 Plant Plan UPF-1.dwg	CLS	60624670	9 / 2021	9

Plotted By: carrie.szczepanski
Layout--Sheet Name: FIG 7_PLANTING PLAN UPF-1
Plot File Date Created: Sep/08/2021 6:33 PM

Filename: D:\BLOODY BROOK JANUARY 2021\2021 PLANT PLAN UPF-1.DWG



LEGEND

- UPF — FORESTED UPLAND
- MOW — UPLAND MEADOW
- RIP — RIPARIAN
- LAWN — LAWN
- EXISTING WETLAND

EXISTING TREES

- EASTERN HEMLOCK
- RED MAPLE
- SUGAR MAPLE
- WHITE PINE
- RIVER BIRCH

EXISTING SHRUBS

- ELDERBERRY
- GREY DOGWOOD
- NORTHERN ARROWWOOD
- C — HIGH BUSH CRANBERRY

PLANT STATUS BASED ON JULY 2021 INSPECTION

- LIVING TREE
- STRESSED TREE
- 3 — NUMBER OF LIVING SHRUBS

NOTES

1. THE TRIANGLES REPRESENTING PLANTED SHRUBS INDICATE ONE LIVE SHRUB OF THAT SPECIES COUNTED AT THAT LOCATION DURING THE 2021 MONITORING EVENT, UNLESS OTHERWISE NOTED.

0’ 20’ 40’ 80’

AECOM

LOCKHEED MARTIN CORPORATION

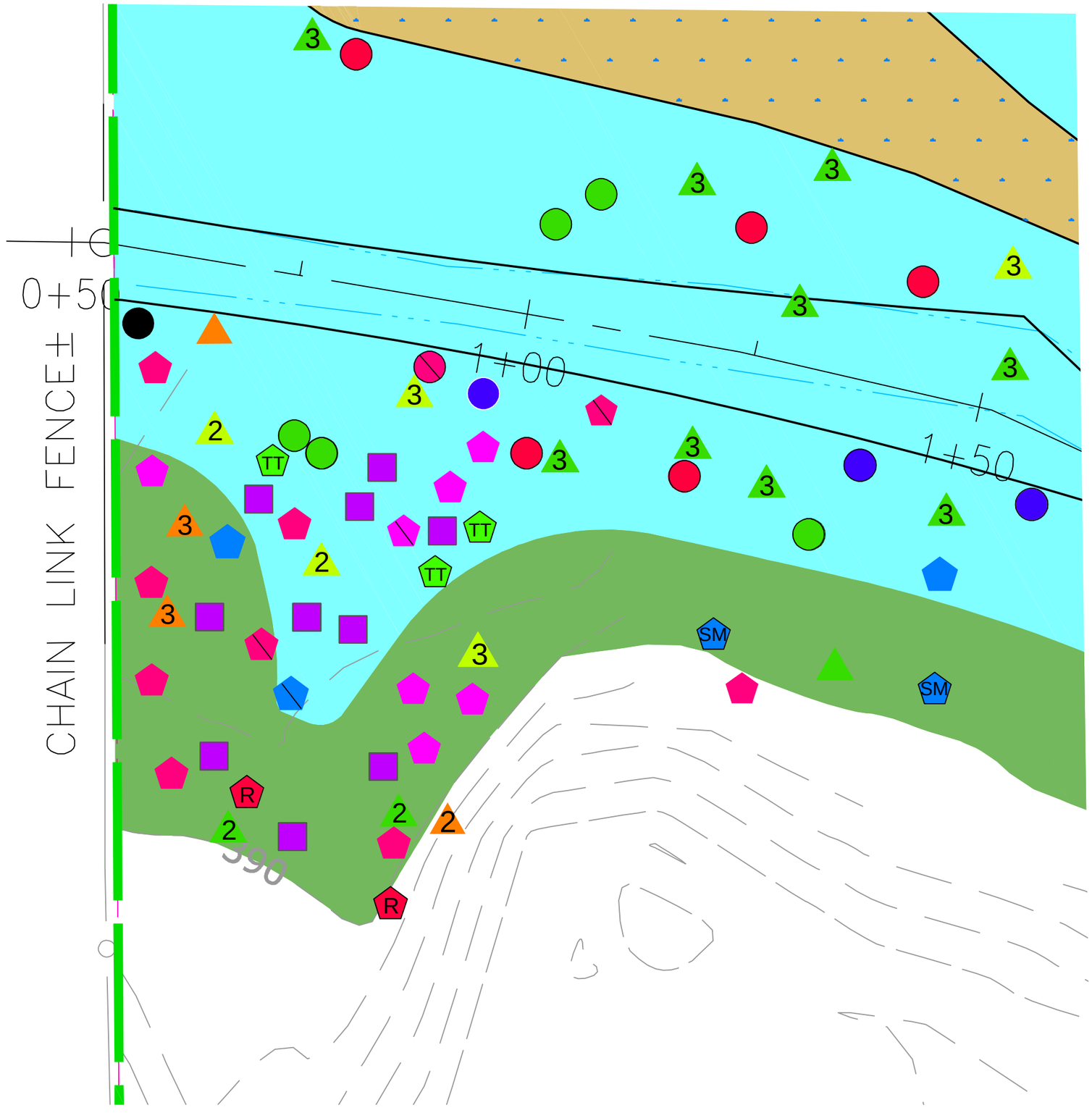
PLANTING LOCATIONS FOR UPF-2

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE
2021 Plant Plan UPF-2.dwg	CLS	60624670	9 / 2021	10

Plotted By: carrie.szczepanski
Layout—Sheet Name: FIG 8_PLANTING PLAN UPF-2
Plot File Date Created: Sep/08/2021 6:38 PM

Filename: D:\SEPTEMBER 2021\NEW\2021 PLANT PLAN UPF-2.DWG



LEGEND

PEM — PALUSTRINE EMERGENT
UPF — FORESTED UPLAND
RIP — RIPARIAN

TREES

- PIN OAK
- SILVER MAPLE
- RED MAPLE
- SYCAMORE

SHRUBS

- GREY DOGWOOD
- NANNYBERRY
- NORTHERN ARROWWOOD

2019 BARE ROOT TREES

- RED MAPLE
- SUGAR MAPLE
- TULIP TREE
- SWAMP WHITE OAK
- BASSWOOD
- RIVER BIRCH

2020 BARE ROOT TREES

- SERVICE BERRY

PLANT STATUS BASED ON JULY 2021 INSPECTION

- LIVING TREE
- STRESSED TREE
- 3 — NUMBER OF LIVING SHRUBS
- 2019 LIVING BARE ROOT TREE
- 2020 LIVING BARE ROOT TREE

AECOM

LOCKHEED MARTIN CORPORATION
RESTORATION MAINTENANCE SUMMARY REPORT
LOCATIONS of 2019 AND 2020 BARE ROOT TREES in RELATION TO SURROUNDING PLANTINGS
BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE
2021 Bare Root Trees.dwg	CLS	60624670	9 / 2021	11

Plotted By: carrie.szczepanski
Layout=Sheet Name: BARE ROOT TREES (2)
Plot File Date Created: Sep/16/2021 10:57 AM

Filename: D:\SEPTEMBER 2021\2021 BARE ROOT TREES.DWG

TABLES

Table 1. Restored Wooded and Wetland Habitat Types

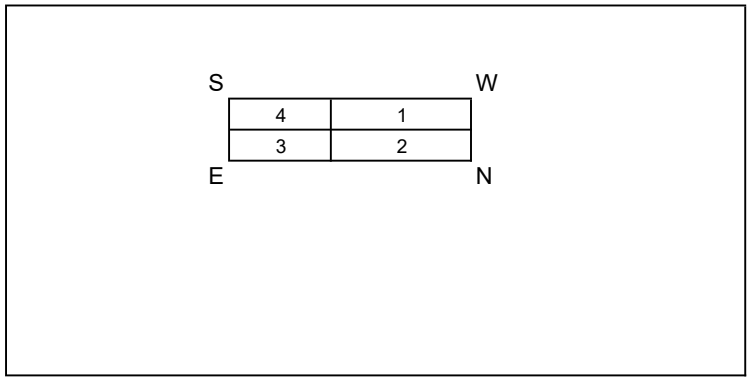
Habitat Type	Habitat ID*	Quantitative measure*
Emergent	PEM-1 North	Plot 1
	PEM-1 South	Plot 2
	PEM-2	Plot 3
	PEM-3	Plot 4
	PEM-4	Plot 5
	PEM-5	Plot 6
	W-10	Plot 7
	W-11	Plot 8
Scrub shrub	PSS-1	PSS Transect 1
	PSS-2	PSS Transect 2
		Number of planted trees/shrubs / Survival Rate
Palustrine Forested	PFO-1	PFO Transect 1
		Number of planted trees/shrubs / Survival Rate
Riparian	RIP-1	Number of planted trees/shrubs / Survival Rate
Upland Shrub	USS-1	Number of planted trees/shrubs / Survival Rate
Upland Forest	UPF-1	Number of planted trees/shrubs / Survival Rate
	UPF-2	
Upland Meadow	MOW-1	Only qualitative measure used – visual inspection of ground cover.
	MOW-2	
	LAWN	

* See Figure 3A for habitat, plot, and transect locations.

Table 2. Emergent Vegetation Percent Cover for PEM-1 North Plot 1 (July 2021)

Block	Path Rush	Beaked Spikerush	Soft-Stem Bulrush	Phragmites	Narrowleaf Cattail	Broadleaf Cattail	Purple Loosestrife	Water Purslane	Bristly Sedge	Fox Sedge	Lurid Sedge	Block Total % coverage
1	25	25	5	30	1	5	1	0	0	0	0	92
2	35	35	15	15	10	10	5	0	0	1	0	126
3	35	35	30	10	10	0	5	0	3	1	1	130
4	30	30	30	15	1	0	1	5	1	0	0	113
% Species Coverage of Plot	**31**	**31**	**20**	**18**	**5.5**	**3.8**	**3.0**	**1.3**	**1.0**	**0.50**	**0.25**	**115**

Permanent PEM-1 North Plot 1



Species List

Beaked Spikerush	*Eleocharis rostellata*
Bristly Sedge	*Carex comosa*
Broadleaf Cattail	*Typha latifolia*
Fox Sedge	*Carex vulpinoidea*
Lurid Sedge	*Carix luridae*
Narrowleaf Cattail	*Typha angustifolia*
Path Rush	*Juncus tenuis*
Phragmites	*Phragmites australis*
Purple Loosestrife	*Lythrum salicaria*
Soft-Stem Bulrush	*Schoenoplectus tabernaemontani*
Water Purslane	*Lythrum portula*

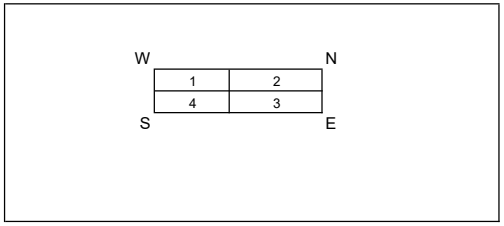
Notes:

1. The numbers in the grids above correspond to the block number in PEM-1 North Plot 1.
2. Gauge is at 0.13 ft

Table 3. Emergent Vegetation Percent Cover for PEM-1 South Plot 2 (July 2021)

Block	Beaked Spikerush	Path Rush	Soft-Stem Bulrush	Lurid Sedge	Green Bulrush	Phragmites	Soft Rush	Purple Loosestrife	Broadleaf Cattail	Swamp Milkweed	Black Willow	Boneset	Cottonwood	Joe Pye Weed	Monkeyflower	Narrowleaf Cattail	Silver Maple	Total % coverage of Plot
1	35	35	3	5	0	3	2	2	5	0	0	0	0	0	0	0	0	90
2	25	25	2	5	8	1	5	2	1	1	0	0	0	0	0	0	0	75
3	50	50	10	3	5	1	0	2	0	0	1	1	0	1	0	0	0	124
4	40	40	0	1	0	5	3	2	0	2	1	1	1	0	1	1	1	99
% Species Coverage of Plot	**38**	**38**	**3.8**	**3.5**	**3.3**	**2.5**	**2.5**	**2.0**	**1.5**	**0.75**	**0.50**	**0.50**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**97**

Permanent PEM-1 South Plot 2



Notes:

1. The numbers in the grids above correspond to the block number in PEM-1 South Plot 2.

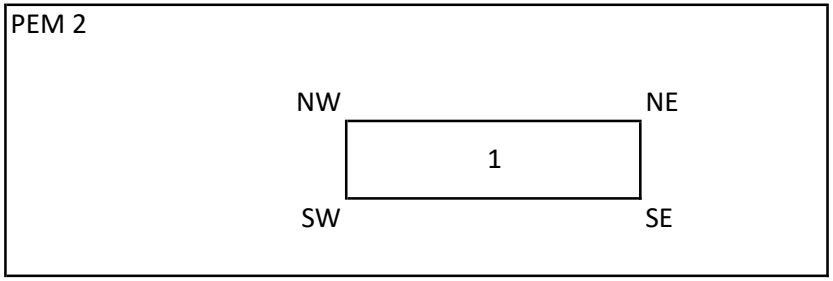
Species List

Beaked Spikerush	*Eleocharis rostellata*
Black Willow	*Salix nigra*
Boneset	*Eupatorium perfoliatum*
Broadleaf Cattail	*Typha latifolia*
Cottonwood	*Populus deltoides*
Green Bulrush	*Scirpus atrovirens*
Joe Pye Weed	*Eutrochium*
Lurid Sedge	*Carix luridae*
Monkeyflower	*Mimulus ringens*
Narrowleaf Cattail	*Typha angustifolia*
Path Rush	*Juncus tenuis*
Phragmites	*Phragmites australis*
Purple Loosestrife	*Lythrum salicaria*
Silver Maple	*Acer saccharinum*
Soft Rush	*Juncus effusus*
Soft-Stem Bulrush	*Schoenoplectus tabernaemontani*
Swamp Milkweed	*Asclepias incarnata L. ssp. Pulchra*

Table 4. Emergent Vegetation Percent Cover for PEM-2 Plot 3 (July 2021)

Block	Duckweed	Narrowleaf Catail	Bladderwort	Total % coverage of block
1	2.0	2.0	1.0	5.0
% Species Coverage of Plot	**2.0**	**2.0**	**1.0**	**5.0**

Permanent PEM-2 Plot 3



Species List

Bladderwort	*Utricularia*
Duckweed	*Lemna minor*
Narrowleaf Cattail	*Typha angustifolia*

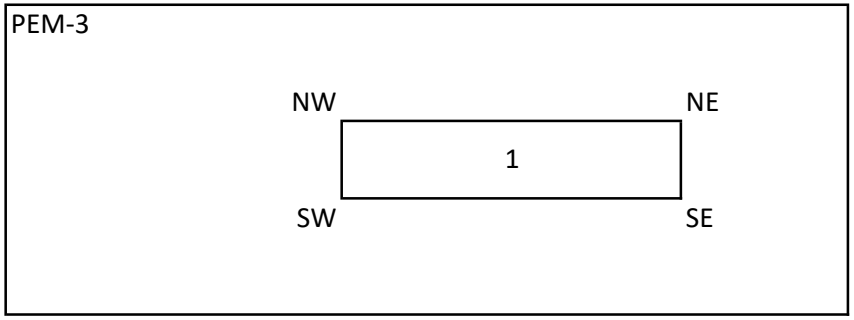
Notes:

1. The numbers in the grids above correspond to the block number in PEM-2 Plot 3.
2. Gauge SG-4 is at 2.29 ft

Table 5. Emergent Vegetation Percent Cover for PEM-3 Plot 4 (July 2021)

Block	Duckweed	Phragmites	Broadleaf Cattail	Total % coverage of block
1	60	15	2	77
% Species Coverage of Plot	**60**	**15**	**2**	**77**

Permanent PEM-3 Plot 4



Species List

Boradleaf Cattail	*Typha latifolia*
Duckweed	*Lemna minor*
Phragmites	*Phragmites australis*

Notes:

1. The numbers in the grids above correspond to the block number in PEM-3 Plot 4.
2. Gauge SG-1 is at 0.81 ft

Table 6. Emergent Vegetation Percent Cover for PEM-4 Plot 5 (July 2021)

Block	Soft-Stem Bulrush	Broadleaf Cattail	Narrowleaf Cattail	Phragmites	Monkeyflower	Soft Rush	Purple Loosestrife	Duckweed	Marsh Purslane	Woolgrass	Bristly Sedge	Total % coverage of block
1	30	15	15	10	2	10	10	5	4	0	0	101
2	40	20	20	10	10	5	1	2	0	5	0	113
3	40	20	20	20	5	2	5	2	1	0	1	116
4	20	20	20	10	10	1	1	1	1	0	1	85
% Species Coverage of Plot	**33**	**19**	**19**	**13**	**6.8**	**4.5**	**4.3**	**2.5**	**1.5**	**1.3**	**0.50**	**104**

Permanent PEM-4 Plot 5

PEM-4

W N

4	1
3	2

S E

Species list

Bristly Sedge	*Carex comosa*
Broadleaf Cattail	*Typha latifolia*
Duckweed	*Lemna minor*
Marsh Purslane	*Ludwigia palustris*
Monkeyflower	*Mimulus ringens*
Narrowleaf Cattail	*Typha angustifolia*
Phragmites	*Phragmites australis*
Purple Loosestrife	*Lythrum salicaria*
Soft Rush	*Juncus effusus*
Soft-Stem Bulrush	*Schoenoplectus tabernaemontani*
Woolgrass	*Scirpus cyperinus*

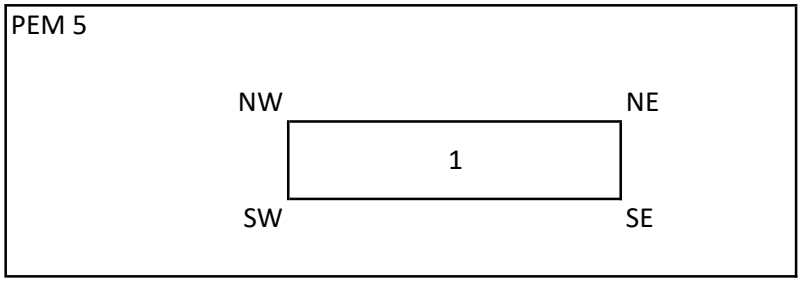
Notes:

1. The numbers in the grids above correspond to the block number in PEM-4 Plot 5.

Table 7. Emergent Vegetation Percent Cover for PEM-5 Plot 6 (July 2021)

Block	Duckweed	Cattail Island, by Muskrat	Narrowleaf Cattail	Jewel Weed	Total % coverage of block
1	75	25	15	2.0	117
% Species Coverage of Plot	**75**	**25**	**15**	**2.0**	**117**

Permanent PEM-5 Plot 6



Species list

Cattail Island, by Muskrat	*N/A*
Duckweed	*Lemna minor*
Jewel Weed	*Impatiens capensis*
Narrowleaf Cattail	*Typha angustifolia*

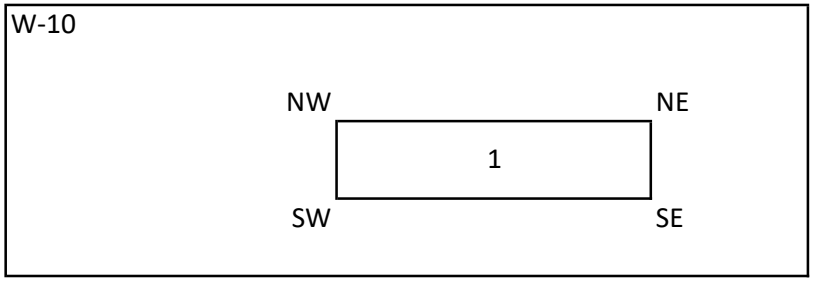
Notes:

1. The numbers in the grids above correspond to the block number in PEM-5 Plot 6.

Table 8. Emergent Vegetation Percent Cover for W-10 Plot 7 (July 2021)

Block	Phragmites	Narrowleaf Cattail	Duckweed	Purple Loosestrife	Soft-Stem Bulrush	Horsetail	Devil's Beggartick	Total % coverage of block
1	70	30	5	2	2	1	0.5	111
% Species Coverage of Plot	**70**	**30**	**5.0**	**2.0**	**2.0**	**1.0**	**0.5**	**111**

Permanent W-10 Plot 7



Species list

Devil's Beggartick	*Bidens frondosa*
Duckweed	*Lemna minor*
Horsetail	*Equisetum arvense*
Narrowleaf Cattail	*Typha angustifolia*
Phragmites	*Phragmites australis*
Purple loosestrife	*Lythrum salicaria*
Soft-Stem Bulrush	*Schoenoplectus tabernaemontani*

Notes:

1. The numbers in the grids above correspond to the block number in W-10 Plot 7.

Table 9. Emergent Vegetation Percent Cover for W-11 Plot 8 (July 2021)

Block	Soft Rush	Willowherb	Narrowleaf Cattail	Phragmites	Purple Loosestrife	Swamp Milkweed	Soft-Stem Bulrush	Boneset	Blue-Stemmed Goldenrod	Fox Sedge	Green Bulrush	Kentucky Bluegrass	Total % coverage of block
1	5	12	20	15	10	2	4	0	0	0	1	0	69
2	50	10	3	5	7	2	0	2	1	1	0	0	81
3	40	10	8	5	4	10	0	1	0	0	0	1	79
4	35	15	10	10	10	0	0	0	0	0	0	0	80
% Species Coverage of Plot	**33**	**12**	**10**	**8.8**	**7.8**	**3.5**	**1.0**	**0.75**	**0.25**	**0.25**	**0.25**	**0.25**	**77**

Permanent W-11 Plot 8

W-11

NW		NE
	1 | 2	
	4 | 3	
SW		SE

Species list

Blue-Stemmed Goldenrod	*Solidago caesia*
Boneset	*Eupatorium perfoliatum*
Fox Sedge	*Carex vulpinoidea*
Green Bulrush	*Scirpus atrovirens*
Kentucky Bluegrass	*Poa pratensis*
Narrowleaf Cattail	*Typha angustifolia*
Phragmites	*Phragmites australis*
Purple Loosetrife	*Lythrum salicaria*
Soft Rush	*Juncus effusus*
Soft-Stem Bulrush	*Schoenoplectus tabernaemontani*
Swamp Milkweed	*Asclepias incarnata L. ssp. Pulchra*
Willowherb	*Onagraceae*

Notes:

1. The numbers in the grids above correspond to the block number in W-11 Plot 8.

Table 10. Target Tree and Shrub Counts from June/July 2020 and July 2021 Monitoring Events

Wetland Habitat Area	Area (square feet)	Total Number of Target Trees/Shrubs[1]	Species	Total Number of Trees and Shrubs Counted during Monitoring in June 2020	Total Number of Trees and Shrubs Counted during Monitoring in June/July 2021
PSS-1 Trees	1,726	4		3	2
			Pin Oak	3	2
PSS-1 Shrubs	1,726	17		14	17
			Grey Dogwood	2	2
			Northern Arrowwood	7	6
			Sweet Gale	1	1
			Chokeberry	2	3
			Elderberry	2	5
PSS-2 Shrubs	6,940	69		80	91
			Sandbar Willow	46	47
			Elderberry	8	8
			Red Chokeberry	3	3
			Buttonbush	6	10
			Sweet Gale	4	10
			Northern Arrowwood	13	13
PFO-1 Trees	10,817	37		19	24
			Red Maple	1	1
			Black Willow	11	16
			River Birch	3	3
			Swamp White Oak	4	4
PFO-1 Shrubs	10,817	4		4	6
			Elderberry	4	6
RIP-1 Trees	31,515	97		105	108
			Red Maple	27	29
			Sugar Maple	20	20
			Pin Oak	18	18
			Eastern Hemlock	11	7
			White Pine	6	6
			Swamp White Oak	4	4
			Tulip Tree	5	3
			Basswood	3	3
			Riverbirch	1	2
			Black Willow	1	1
			Sycamore	Not counted in 2020	1
			Service Berry	Planted in 2020	6
			Silver Maple	9	8
RIP-1 Shrubs	31,515	314		288	293
			Northern Arrowwood	117	117
			Nannyberry	51	51
			Grey Dogwood	90	91
			Highbush Cranberry	11	9
			Steeplebush	2	1
			Red Chokeberry	0	3
			Sweet Gale	6	5
			Buttonbush	9	10
			Elderberry	Not counted in 2020	4
			Speckled Alder	2	2
USS-1 Shrubs	3,291	39		39	40
			Grey Dogwood	19	20
			Northern Arrowwood	20	20
UPF-1 Trees	8,675	26		32	34
			Sugar Maple	9	5
			American Beech	9	9
			Red Maple	3	2
			Silver Maple	1	1
			Basswood	5	6
			Swamp White Oak	3	4
			Service Berry	Planted in 2020	4
			River Birch	Not counted in 2020	1
			Eastern Hemlock	2	2
UPF-1 Shrubs	8,675	86		84	85
			Northern Arrowwood	27	27
			Nannyberry	14	14
			Grey Dogwood	35	36
			Highbush Cranberry	8	8
UPF-2 (Woodland) Trees	11,300	21		21	21
			Sugar Maple	5	5
			White Pine	3	3
			River Birch	3	3
			Red Maple	5	6
			Eastern Hemlock	5	4
UPF-2 (Woodland) Shrubs	11,300	83		61	53
			Northern Arrowwood	30	25
			Grey Dogwood	28	24
			High bush cranberry	0	1
			Elderberry	3	3

Notes:
1) Target trees and shrubs refer to the trees and shrubs planted in accordance with NYSDEC approved restoration activities.

Table 11. Vegetation Percent Coverage for PSS-1 Monitoring Transect (July 2021)

Distance from southern shore (ft)	Phragmites	Purple Loosestrife	Elderberry	Soft-Stem Bulrush	Pin Oak	Black Willow	Path Rush	Kentucky Bluegrass	Black Grass	Evening Primrose	Boneset	Chokeberry	Joe Pye Weed	Blue-Stemmed Goldenrod	Forget-Me-Nots	Saltmarsh Bulrush	Bedstraw	Broadleaf Cattail	Horsetails	Narrowleaf Cattail	Bindweed	Deadly Nightshade	Grass	Jewel Weed	Red Maple	Swamp Milkweed	Total % coverage of block
3	3	1	0	0	0	0	0	0	0	0	0	0	10	1	0	0	0	0	0	0	0	0	0	1	0	0	16
6	5	10	0	0	0	0	5	0	0	0	0	0	5	0	0	0	0	0	1	0	0	0	0	0	1	0	27
9	7	0	0	20	0	0	0	5	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	33
12	1	0	0	50	0	0	0	20	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	72
15	10	1	0	0	30	0	35	3	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	81
18	15	3	15	0	25	0	2	1	0	0	15	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	78
21	10	0	70	0	1	0	1	0	0	0	0	7	0	0	1	0	0	1	0	0	0	0	0	0	0	0	91
24	5	0	0	0	0	5	0	1	1	0	0	10	0	0	1	0	0	0	0	0	0	0	0	0	0	0	23
27	5	0	0	0	0	40	0	0.5	1	0	3	0	0	7	1	1	0	0	0	1	0	0	0	0	0	0	60
30	1	0	0	0	0	5	1	1	5	0	0	0	0	0	1	2	0	0	0	1	0	0	0	0	0	0	17
33	2	1	0	0	0	0	1	1	1	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	1	10
36	1	1	0	10	0	0	2	0	15	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	30
39	20	10	0	0	0	0	0	5	0	10	0	0	0	5	0	0	2	0	0	0	0	1	0	0	0	0	53
42	20	70	0	0	0	0	0	0	0	10	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	101
% Species Coverage of Plot	**7.5**	**6.9**	**6.1**	**5.7**	**4.0**	**3.6**	**3.4**	**2.7**	**1.6**	**1.4**	**1.3**	**1.2**	**1.1**	**0.93**	**0.57**	**0.36**	**0.21**	**0.14**	**0.14**	**0.14**	**0.071**	**0.071**	**0.071**	**0.071**	**0.071**	**0.071**	**49**

Species

Bedstraw	*Galium mollugo*
Bindweed	*Convolvulus arvensis*
Black Grass	*Ophiopogon planiscapus*
Black Willow	*Salix nigra*
Blue-Stemmed Goldenrod	*Solidago caesia*
Boneset	*Eupatorium perfoliatum*
Broadleaf Cattail	*Typha latifolia*
Chokeberry	*Aronia melanocarpa*
Deadly Nightshade	*Atropa belladonna*
Elderberry	*Sambucus nigra*
Evening Primrose	*Oenothera biennis*
Forget-Me-Nots	*Myosotis*
Grass	*Poaceae*
Horsetails	*Equisetum*
Jewel Weed	*Impatiens capensis*
Joe Pye Weed	*Eutrochium purpureum*
Kentucky Bluegrass	*Poa pratensis*
Narrowleaf Cattail	*Typha angustifolia*
Path Rush	*Juncus tenuis*
Phragmites	*Phragmites australis*
Pin Oak	*Quercus palustris*
Purple Loosestrife	*Lythrum salicaria*
Red Maple	*Acer rubrum*
Saltmarsh Bulrush	*Bolboschoenus maritimus*
Soft-Stem Bulrush	*Schoenoplectus tabernaemontani*
Swamp Milkweed	*Asclepias incarnata L. ssp. Pulchra*

Table 12. Vegetation Percent Coverage for PSS-2 Monitoring Transect (July 2021)

Distance from northern shore (ft)	Narrowleaf Cattail	Broadleaf Cattail	Soft Rush	Elderberry	Path Rush	Bristly Sedge	Purple Loosestrife	Soft-Stem Bulrush	Phragmites	Common Golden Rod	Arrowwood	Reed Canary Grass	Marsh Purslane	Bedstraw	Duckweed	Watercress	Chokeberry	Boneset	Beaked Spikerush	Grey Willow	Red-Stemmed Goldenrod	Fox Sedge	Jewel Weed	Kentucky Bluegrass	Pilewort	Swamp Milkweed	Water Plantain	Wood Sorrel	Bindweed	Cinquefoil	Woolgrass	Common Thistle	Devil's Beggartick	Narrowleaf Golden Rod	Rough Avens	St. John's Wort	Vervain	Total % coverage of block
5	45	45	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93
10	45	45	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	94
15	60	20	0	0	0	0	0	5	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	91
20	60	20	0	0	0	0	0	10	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	91
25	60	20	0	0	0	1	0	10	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	95
30	50	30	0	0	0	0	0	25	1	0	0	0	15	1	0.5	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	124
35	25	25	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	55
40	40	10	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52
45	80	10	0	0	0	0	0	0	0	0	0	0	5	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	96
50	80	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	82
55	60	20	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	82
60	50	50	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	102
65	35	35	0	0	0	0	5	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	79
70	25	25	0	0	0	0	3	0	0	0	0	0	2	1	1	20	0	0	5	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	85
75	0	10	10	0	0	0	20	0	3	0	0	0	1	3	0	0	0	0	5	10	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	65
80	0	0	25	0	0	15	7	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	49
85	0	0	20	0	10	1	10	0	0	0	0	0	0	10	0	0	0	3	0	0	1	5	0	0	0	0	0	0	0	0	1	0	0	0	0	0	61
90	0	0	20	0	30	1	2	0	0	5	0	0	1	1	0	0	0	5	0	0	4	0	0	1	0	1	0	0	0	0	0	1	0	0	1	0	73
95	0	0	20	0	40	25	1	0	0	25	5	0	0	2	0	0	0	2	0	0	0	3	0	5	1	1	0	2	0	0	0	0	0	0	0	1	0	133
100	0	0	10	0	2	6	2	0	30	1	25	30	0	0	0	0	15	0	0	0	0	0	2	0	0	1	0	2	0	0	0	1	0	0	0	0	128
105	0	0	10	20	0	15	5	0	0	0	0	0	0	3	0	0	2	2	0	0	4	0	0	0	0	0	0	1	0	2	0	0	1	0	0	0	66
109	0	0	30	90	0	5	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	132
% Species Coverage of Plot	33	17	6.6	5.0	3.7	3.1	2.5	2.5	1.6	1.5	1.4	1.4	1.2	1.0	0.93	0.91	0.77	0.55	0.45	0.45	0.45	0.36	0.32	0.27	0.27	0.27	0.27	0.23	0.091	0.091	0.091	0.045	0.045	0.045	0.045	0.045	88

Species

Arrowwood	*Viburnum dentatum*
Beaked Spikerush	*Eleocharis rostellata*
Bedstraw	*Galium mollugo*
Bindweed	*Convolvulus arvensis*
Boneset	*Eupatorium perfoliatum*
Bristly Sedge	*Carex comosa*
Broadleaf Cattail	*Typha latifolia*
Chokeberry	*Aronia melanocarpa*
Cinquefoil	*Potentilla simplex*
Common Golden Rod	*Solidago canadensis*
Common Thistle	*Cirsium vulgare*
Devil's Beggartick	*Bidens frondosa*
Duckweed	*Lemna minor*
Elderberry	*Sambucus nigra*
Fox Sedge	*Carex vulpinoidea*
Grey Willow	*Salix cinerea*
Jewel Weed	*Impatiens capensis*
Kentucky Bluegrass	*Poa pratensis*
Marsh Purslane	*Ludwigia palustris*
Narrowleaf Cattail	*Typha angustifolia*
Narrowleaf Golden Rod	*Euthamia graminifolia*
Path Rush	*Juncus tenuis*
Phragmites	*Phragmites australis*
Pilewort	*Erechtites hieracifolia*
Purple Loosestrife	*Lythrum salicaria*
Red-Stemmed Goldenrod	*Solidago uliginosa*
Reed Canary Grass	*Phalaris arundinacea*
Rough Avens	*Geum laciniatum*
Soft Rush	*Juncus effusus*
Soft-Stem Bulrush	*Schoenoplectus tabernaemontani*
St. John's Wort	*Hypericum perforatum*
Swamp Milkweed	*Asclepias incarnata L. ssp. Pulchra*
Vervain	*Verbena*
Water Plantain	*Alisma subcordatum*
Watercress	*Nasturtium officinale*
Wood Sorrel	*Oxalis*
Woolgrass	*Scirpus cyperinus*

Notes:

1. Distance of 25 ft from the southern shore is the path

Table 13. Vegetation Percent Coverage for PFO-1 Monitoring Transect (July 2021)

Distance from western shore (ft)	Broadleaf Cattail	Narrowleaf Cattail	Duckweed	Elderberry	Phragmites	Soft-Stem Bulrush	Purple Loosestrife	Bristly Sedge	Water Plantain	Horsetails	Sensitive Fern	Marsh Purslane	Centurian	Fox Sedge	Jewel Weed	Soft Rush	Total % coverage of block
5	10	0	0	50	30	0	2	0	0	0	0	0	0	0	1	0	93
10	25	25	5	15	20	0	1	0	0	0	0	0	0	0	0	1	92
15	75	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	105
20	75	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	105
25	60	0	25	0	0	0	0	0	1	0	0	0	0	0	0	0	86
30	20	20	15	0	0	0	1	0	1	0	0	1	0	0	0	0	58
35	10	30	20	0	0	0	0	0	0	0	0	1	0	0	0	0	61
40	15	35	15	0	0	0	0	0	0	0	0	0	0	0	0	0	65
45	35	15	10	0	0	3	0	0	0	0	0	0	0	0	0	0	63
50	25	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	35
55	10	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	25
60	45	0	10	0	0	10	10	0	0	0	0	0	0	0	0	0	75
65	40	40	5	0	0	0	0	0	0	0	0	0	0	0	0	0	85
70	40	40	5	0	0	0	0	0	0	0	0	0	0	0	0	0	85
75	50	0	10	0	0	0	0	0	1	0	0	0	0	0	0	0	61
80	70	0	5	0	0	0	0	0	1	0	0	0	0	0	0	0	76
85	40	40	3	0	0	0	0	1	3	0	0	0	0	0	0	0	87
90	25	25	1	0	0	1	0	5	1	0	0	0	0	0	0	0	58
95	5	5	0	0	0	7	4	10	0	5	5	0	1	1	0	0	43
% Species Coverage of Plot	**36**	**14**	**11**	**3.4**	**2.6**	**1.1**	**0.95**	**0.84**	**0.42**	**0.26**	**0.26**	**0.11**	**0.053**	**0.053**	**0.053**	**0.053**	**71**

Species

Bristly Sedge	*Carex comosa*
Broadleaf Cattail	*Typha latifolia*
Centurian	*Malus centurion*
Duckweed	*Lemna minor*
Elderberry	*Sambucus nigra*
Fox Sedge	*Carex vulpinoidea*
Horsetails	*Equisetum*
Jewel Weed	*Impatiens capensis*
Marsh Purslane	*Ludwigia palustris*
Narrowleaf Cattail	*Typha angustifolia*
Phragmites	*Phragmites australis*
Purple Loosestrife	*Lythrum salicaria*
Sensitive Fern	*Onoclea sensibilis*
Soft Rush	*Juncus effusus*
Soft-Stem Bulrush	*Schoenoplectus tabernaemontani*
Water Plantain	*Alisma subcordatum*

Notes:

1. Eastern shore point is between the willows and the elderberries
2. Western shore point is a wooden stake at the base of the large cottonwood

Table 14. Percent Coverage by Invasive Species (July 2021)

Location	Phragmites (%)	Purple Loosestrife (%)	Total (%)	sq ft	% of Total Wetland	Percent of Total Site Area Covered by Invasive Species Based on Weighted Areas (%)	Total Area Covered by Invasive Species (sq ft)
PEM-1	17.5	3	20.5	16,553	19%	4.0	339337
PEM-1	2.5	2	4.5	16,553	19%	0.9	74489
PEM-2	0	0	0	8,276	10%	0	0
PEM-3	15	0	15	3,485	4%	0.61	52275
PEM-4	12.5	4.3	17	3,049	4%	0.60	51071
PEM-5	0	0	0	6,970	8%	0.000	0
W-10	70	2	72.0	871	1%	0.735	62712
W-11	8.75	7.75	17	10,019	12%	1.94	165314
PSS-1	7.5	6.93	14	1,742	2%	0.29	25137
PSS-2	1.59	2.5	4.1	6,970	8%	0.33	28507.3
PFO-1	2.63	0.95	3.58	10,890	13%	0.457	38986.2
Average	12.5	2.7	15.2	Weighted Average of Invasive Coverage			9.8

1. Square foot of habitat areas are provided in Figure 3A.

ATTACHMENT A

Photographic Logs

Wetland Plot Plant Identification and Count

July 2021

Wetland Plot Plant Identification and Count
July 2021 PEM-1 South

Wetland Plot Plant Identification and Count

July 2021 PEM-1 North

Wetland Plot Plant Identification and Count

July 2021 PEM-2

Wetland Plot Plant Identification and Count

July 2021 PEM-3

Wetland Plot Plant Identification and Count

July 2021 PEM-4

Wetland Plot Plant Identification and Count

July 2021 PEM-5

Wetland Plot Plant Identification and Count

July 2021 W-10

Wetland Plot Plant Identification and Count

July 2021 W-11

Stream Bank Cover Assessment 0-700’

July 2021

Stream Bank Cover Assessment
July 2021

Stream bank 0-50’

Stream bank 50-100’

Stream Bank Cover Assessment
July 2021

Stream bank 100-150’

Stream bank 150-200’

Stream Bank Cover Assessment
July 2021

Stream bank 200-250’

Stream bank 250-300’

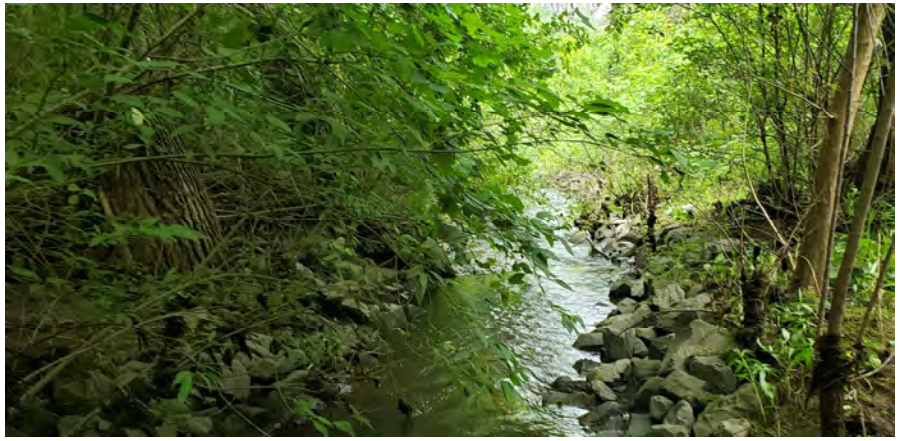
Stream Bank Cover Assessment
July 2021

Stream bank 300-350’

Stream bank 350-400’

Stream Bank Cover Assessment
July 2021

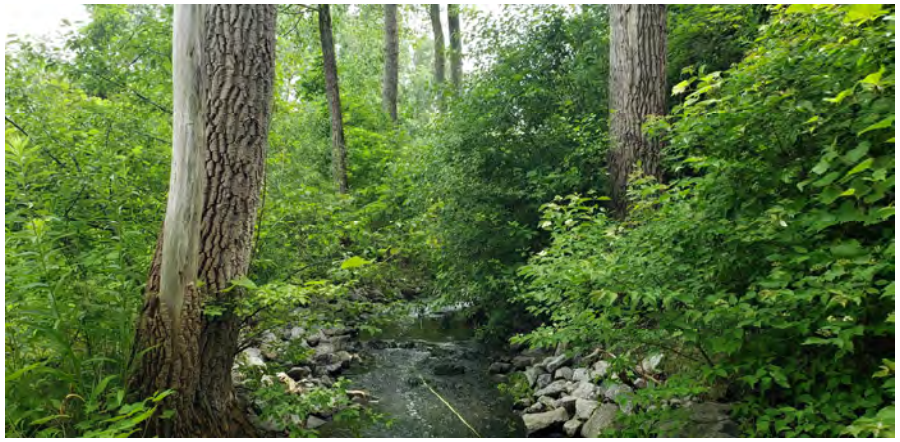
Stream bank 400-450’



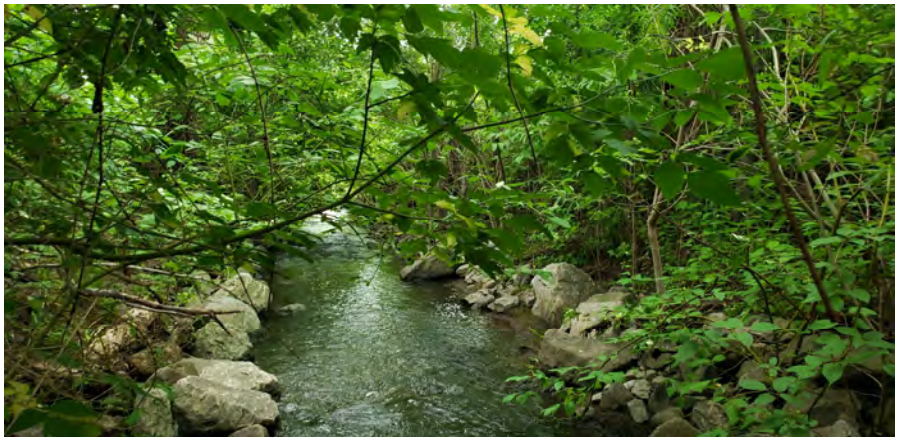
Stream bank 450-500’

Stream Bank Cover Assessment
July 2021

Stream bank 500-550’



Stream bank 550-600’



Stream Bank Cover Assessment
July 2021

Stream bank 600-650’

Stream bank 650-700’

Wetland Panoramic Photos from Permanent Photo Station 1-5

July 2021

Wetland Panoramic Photos from Permanent Photo Station 1*
July 2021
* See Figure 3 for photo station locations

Direction A, July 15, 2021

Direction B, July 15, 2021

Direction C, July 15, 2021

Direction D, July 15, 2021

Wetland Panoramic Photos from Permanent Photo Station 2*
July 2021
* See Figure 3 for photo station locations

Direction A, July 15, 2021

Direction B, July 15, 2021

Direction C, July 15, 2021

Direction D, July 15, 2021

Wetland Panoramic Photos from Permanent Photo Station 3*
July 2021
* See Figure 3 for photo station locations

Direction A, July 15, 2021

Direction B, July 15, 2021

Direction C, July 15, 2021

Direction D, July 15, 2021

Wetland Panoramic Photos from Permanent Photo Station 4*
July 2021
* See Figure 3 for photo station locations

Direction A, July 15, 2021

Direction B, July 15, 2021

Direction C, July 15, 2021

Direction D, July 15, 2021

Wetland Panoramic Photos from Permanent Photo Station 5*
July 2021
* See Figure 3 for photo station locations

Direction A, July 15, 2021

Direction B, July 15, 2021

Direction C, July 15, 2021

Direction D, July 15, 2021

ATTACHMENT B

Applied Seed Mixtures

PA New England Province Riparian Mix

ERNMX # ERNMX-253
Seeding Rate Approximately 20 lb per acre
Mix Type Wet Meadow & Wetland Sites

- 14% Little Bluestem, Fort Indiantown Gap-PA Ecotype (Schizachyrium scoparium, Fort Indiantown Gap-PA Ecotype)
- 14% Indiangrass, PA Ecotype (Sorghastrum nutans, PA Ecotype)
- 10% Riverbank Wildrye, PA Ecotype (Elymus riparius, PA Ecotype)
- 10% Virginia Wildrye, PA Ecotype (Elymus virginicus, PA Ecotype)
- 9% Deertongue, 'Tioga' (Panicum clandestinum (Dichanthelium c.), 'Tioga')
- 8% Big Bluestem, 'Niagara' (Andropogon gerardii, 'Niagara')
- 7% Fox Sedge, PA Ecotype (Carex vulpinoidea, PA Ecotype)
- 2% Switchgrass, 'Shelter' (Panicum virgatum, 'Shelter')
- 2% Boneset, PA Ecotype (Eupatorium perfoliatum, PA Ecotype)
- 2% Soft Rush (Juncus effusus)
- 2% Swamp Milkweed, PA Ecotype (Asclepias incarnata, PA Ecotype)
- 2% Autumn Bentgrass, PA Ecotype (Agrostis perennans, PA Ecotype)
- 2% Wild Senna, VA & WV Ecotype (Senna hebecarpa (Cassia h.), VA & WV Ecotype)
- 2% Oxeye Sunflower, PA Ecotype (Heliopsis helianthoides, PA Ecotype)
- 2% Blue Vervain, PA Ecotype (Verbena hastata, PA Ecotype)
- 2% Partridge Pea, PA Ecotype (Chamaecrista fasciculata (Cassia f.), PA Ecotype)
- 1% Wild Bergamot, PA Ecotype (Monarda fistulosa, PA Ecotype)
- 1% Redtop Panicgrass, PA Ecotype (Panicum rigidulum (P. stipitatum), PA Ecotype)
- 1% Joe Pye Weed, PA Ecotype (Eupatorium fistulosum, PA Ecotype)
- 1% Flat Topped White Aster, PA Ecotype (Aster umbellatus (Doellingeria umbellata), PA Ecotype)
- 1% Purplestem Aster, PA Ecotype (Aster puniceus (Symphyotrichum puniceum), PA Ecotype)
- 1% Zigzag Aster, PA Ecotype (Aster prenanthoides (Symphyotrichum p.), PA Ecotype)
- 1% New England Aster (Aster novae-angliae (Symphyotrichum n.))
- 1% New York Ironweed, PA Ecotype (Vernonia noveboracensis, PA Ecotype)
- 1% Many Leaved Bulrush, PA Ecotype (Scirpus polyphyllus, PA Ecotype)
- 1% Spotted Joe Pye Weed, PA Ecotype (Eupatorium maculatum (Eupatoriadelphus maculatus), PA Ecotype)

Total: 100%

Northeastern U.S. Roadside Native Mix

ERNMX # ERNMX-105
Seeding Rate Approximately 20 lb per acre, or 1/2 lb per 1,000 sq ft
Mix Type Upland & Meadow Sites

- 24% Big Bluestem, 'Prairie View'-IN Ecotype (Andropogon gerardii, 'Prairie View'-IN Ecotype)
- 20% Sideoats Grama, 'Butte' (Bouteloua curtipendula, 'Butte')
- 19% Virginia Wildrye, PA Ecotype (Elymus virginicus, PA Ecotype)
- 5% Broomsedge, MO Ecotype (Andropogon virginicus, MO Ecotype)
- 5% Blackeyed Susan, Coastal Plain NC Ecotype (Rudbeckia hirta, Coastal Plain NC Ecotype)
- 4% Partridge Pea, PA Ecotype (Chamaecrista fasciculata (Cassia f.), PA Ecotype)
- 4% Purple Coneflower (Echinacea purpurea)
- 3% Ohio Spiderwort, PA Ecotype (Tradescantia ohiensis, PA Ecotype)
- 2% Swamp Milkweed, PA Ecotype (Asclepias incarnata, PA Ecotype)
- 2% Wild Senna, VA & WV Ecotype (Senna hebecarpa (Cassia h.), VA & WV Ecotype)
- 2% Oxeye Sunflower, PA Ecotype (Heliopsis helianthoides, PA Ecotype)
- 2% Zigzag Aster, PA Ecotype (Aster prenanthoides (Symphyotrichum p.), PA Ecotype)
- 2% Blue False Indigo, Southern WV Ecotype (Baptisia australis, Southern WV Ecotype)
- 2% Flat Topped White Aster, PA Ecotype (Aster umbellatus (Doellingeria umbellata), PA Ecotype)
- 1% Wild Bergamot, PA Ecotype (Monarda fistulosa, PA Ecotype)
- 1% Early Goldenrod, PA Ecotype (Solidago juncea, PA Ecotype)
- 1% New England Aster, PA Ecotype (Aster novae-angliae (Symphyotrichum n.), PA Ecotype)
- 1% Marsh (Dense) Blazing Star (Spiked Gayfeather), PA Ecotype (Liatris spicata, PA Ecotype)

Total: 100%

PA New England Province FACW Mix

ERNMX # ERNMX-251

Seeding Rate Approximately 20 lb per acre

Mix Type Wet Meadow & Wetland Sites

- 24% Fox Sedge, PA Ecotype (Carex vulpinoidea, PA Ecotype)
- 20% Virginia Wildrye, PA Ecotype (Elymus virginicus, PA Ecotype)
- 10% Lurid (Shallow) Sedge, PA Ecotype (Carex lurida, PA Ecotype)
- 5% Hop Sedge, PA Ecotype (Carex lupulina, PA Ecotype)
- 4% Blue Vervain, PA Ecotype (Verbena hastata, PA Ecotype)
- 3% Green Bulrush, PA Ecotype (Scirpus atrovirens, PA Ecotype)
- 3% Soft Rush (Juncus effusus)
- 2% Swamp Milkweed, PA Ecotype (Asclepias incarnata, PA Ecotype)
- 2% Wood Reedgrass, PA Ecotype (Cinna arundinacea, PA Ecotype)
- 2% Boneset, PA Ecotype (Eupatorium perfoliatum, PA Ecotype)
- 2% Cosmos (Bristly) Sedge, PA Ecotype (Carex comosa, PA Ecotype)
- 2% Oxeye Sunflower, PA Ecotype (Heliopsis helianthoides, PA Ecotype)
- 2% Redtop Panicgrass, PA Ecotype (Panicum rigidulum (P. stipitatum), PA Ecotype)
- 2% Sensitive Fern (Onoclea sensibilis)
- 1% Joe Pye Weed, PA Ecotype (Eupatorium fistulosum, PA Ecotype)
- 1% Pennsylvania Smartweed, PA Ecotype (Polygonum pensylvanicum, PA Ecotype)
- 1% Spotted Joe Pye Weed, PA Ecotype (Eupatorium maculatum (Eupatoriadelphus maculatus), PA Ecotype)
- 1% Northern Long Sedge, PA Ecotype (Carex folliculata, PA Ecotype)
- 1% Slender Mountainmint (Pycnanthemum tenuifolium)
- 1% Flat Topped White Aster, PA Ecotype (Aster umbellatus (Doellingeria umbellata), PA Ecotype)
- 1% Bladder (Star) Sedge, PA Ecotype (Carex intumescens, PA Ecotype)
- 1% Rattlesnake Grass, PA Ecotype (Glyceria canadensis, PA Ecotype)
- 1% Many Leaved Bulrush, PA Ecotype (Scirpus polyphyllus, PA Ecotype)
- 1% Great Blue Lobelia, PA Ecotype (Lobelia siphilitica, PA Ecotype)
- 1% New York Ironweed, PA Ecotype (Vernonia noveboracensis, PA Ecotype)
- 1% Narrowleaf Blue Eyed Grass (Sisyrinchium angustifolium)
- 1% Brown Bulrush, PA Ecotype (Scirpus pendulus, PA Ecotype)
- 1% New England Aster (Aster novae-angliae (Symphyotrichum n.))
- 1% Zigzag Aster, PA Ecotype (Aster prenanthoides (Symphyotrichum p.), PA Ecotype)
- 1% Purplestem Aster, PA Ecotype (Aster puniceus (Symphyotrichum puniceum), PA Ecotype)
- 1% Square Stemmed Monkeyflower, PA Ecotype (Mimulus ringens, PA Ecotype)

Total: 100%

Partially Shaded Area Roadside Mix

ERNMX # ERNMX-140

Seeding Rate Approximately 20 lb per acre, or 1/2 lb per 1,000 sq ft

Mix Type Woodland Openings, Partially Shaded Sites & Shrubby Sites Associated with Bioengineering

- 20% Virginia Wildrye, PA Ecotype (Elymus virginicus, PA Ecotype)
- 17% Creeping Red Fescue (Festuca rubra)
- 17% Deertongue, 'Tioga' (Panicum clandestinum (Dichanthelium c.), 'Tioga')
- 10% Autumn Bentgrass, Albany Pine Bush-NY Ecotype (Agrostis perennans, Albany Pine Bush-NY Ecotype)
- 6% Tall White Beardtongue (Penstemon digitalis)
- 5% Partridge Pea, PA Ecotype (Chamaecrista fasciculata (Cassia f.), PA Ecotype)
- 4% Purple Coneflower (Echinacea purpurea)
- 4% Zigzag Aster, PA Ecotype (Aster prenanthoides (Symphyotrichum p.), PA Ecotype)
- 4% Blackeyed Susan, Coastal Plain NC Ecotype (Rudbeckia hirta, Coastal Plain NC Ecotype)
- 3% Marsh (Dense) Blazing Star (Spiked Gayfeather), PA Ecotype (Liatris spicata, PA Ecotype)
- 3% Ohio Spiderwort, PA Ecotype (Tradescantia ohiensis, PA Ecotype)
- 2% Thimbleweed, PA Ecotype (Anemone virginiana, PA Ecotype)
- 2% Oxeye Sunflower, PA Ecotype (Heliopsis helianthoides, PA Ecotype)
- 1% Blue False Indigo, Southern WV Ecotype (Baptisia australis, Southern WV Ecotype)
- 1% Wild Bergamot, PA Ecotype (Monarda fistulosa, PA Ecotype)
- 1% Slender Bushclover, VA Ecotype (Lespedeza virginica, VA Ecotype)

Total: 100%

ATTACHMENT C

Site Inspection Form

Bloody Brook
Liverpool, NY
Site-Wide Inspection Form

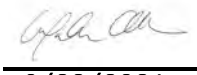
Engineering Control: Soil Cover

Inspection Date: 6/22/2021

Item	Yes	No	N/A	Comments
Was ponding observed in any areas of the soil cover? If so, identify the stream mile marker in the comment section of this form.		X		
Were areas of erosion observed in the soil cover or along the streambed? If so, identify the stream mile marker in the comment section of this form.		X		
Based on the above items, does the engineering control continue to perform as designed?	X			
Were the weirs and piezometers within the wetland areas inspected and appear to be in good condition, functioning as designed?	X			
Were the permanent plot, transect, and photo locations within the wetlands clearly marked?	X			
Has there been any apparent intrusive activity, excavation, or construction at the site? If so, were the activities performed in accordance with the SMP?		X		
Were vegetation and wetland monitoring completed during this site inspection? If so, were the vegetation inspection logs completed?		X		

Note: Upon completion of the form, any non-conforming items warranting corrective action should be identified here within.

Name of Inspector: Marleiah O'Neill

Signature of Inspector: 

Inspector's Company: AECOM

Date: 6/22/2021

IMMEDIATELY REPORT ANY FAILURE OR DEFECT TO THE PROJECT MANAGER SO A COUNTERMEASURE PLAN CAN BE IMPLEMENTED.

ATTACHMENT D

Vegetation Monitoring Forms

Post-Remediation Vegetation Monitoring
Bloody Brook
Onondaga, New York

Habitat Area: PSS-1

Date: 6/29/2021

Weather: warm (80F) **Inspector(s):** Robert Montione, Alexandra Golden

Planting Type	Common Name	Total Number Needed for Target Trees/Shrubs	Total Number Counted During 2021 Monitoring	Percent Survival of Target Number	Comments/Notes
Shrub	Grey Dogwood		2		
Shrub	Northern Arrowwood		6		
Shrub	Sweet Gale		1		
Shrub	Chokeberry		3		
Shrub	Elderberry		5		
Shrub	Steeplebush		0		
Total Number of Target Shrubs		**17**	**17**	100%	
Tree	Pin Oak		2		Stressed
Total Number of Target Trees		**4**	**2**	50%	

Post-Remediation Vegetation Monitoring
Bloody Brook
Onondaga, New York

Habitat Area: PSS-2
Date: 6/29/2021
Weather: warm (80 F)
Inspector(s): Robert Montione, Alexandra Golden

Planting Type	Common Name	Total Number Needed for Target Shrubs	Total Number Counted During 2021 Monitoring	Percent Survival of Target Number	Comments/Notes
Shrub	Steeplebush		0		These have been missing for the past couple of monitoring events.
Shrub	Buttonbush		10		
Shrub	Sandbar willow		47		Many volunteers growing near previously planted sandbar willows
Shrub	Northern Arrowwood		13		
Shrub	Elderberry		7		
Shrub	Sweet Gale		10		
Shrub	Spice bush		0		These have been missing for the past several monitoring events.
Shrub	Red chokeberry		3		
Total Number of Target Shrubs		**69**	**90**	130%	

Post-Remediation Vegetation Monitoring
Bloody Brook
Onondaga, New York

Habitat Area: PFO-1
Date: 6/29/2021
Weather: warm (80F)
Inspector(s): Robert Montione, Alexandra Golden

Planting Type	Common Name	Total Number Needed for Target Trees/Shrubs	Total Number Counted During 2021 Monitoring	Percent Survival of Target Number	Comments/Notes
Tree	Red maple	4	1		
Tree	Pin oak	5	0		
Tree	Black willow	14	16		Two stressed
Tree	River birch	8	3		Two stressed
Tree	Swamp white oak	6	4		One stressed
Total Number of Target Trees		**37**	**24**	**65%**	
Shrub	Elderberry	4	6	150%	
Total Number of Target Shrubs		**4**	**6**	**150%**	

Post-Remediation Vegetation Monitoring
Bloody Brook
Onondaga, New York

Habitat Area: UPF-1
Date: 7/1/2021
Weather: warm (85 F) **Inspector(s):** Robert Montione, Alexandra Golden

Planting Type	Common Name	Total Number Needed for Target Trees/Shrubs	Total Number Counted During 2021 Monitoring	Percent Survival of Target Number	Comments/Notes
Tree	Sugar maple		5		
Tree	American beech		9		
Tree	Black cherry		0		
Tree	Red Maple		2		
Tree	Basswood		6		
Tree	Swamp White Oak		4		
Tree	Silver Maple		1		
Tree	River Birch		1		
Tree	Serviceberry		4		Planted in 2020
Tree	Eastern hemlock		2		One stressed
Total Number of Target Trees		**26**	**34**	**131%**	
Shrub	Northern arrowwood		27		
Shrub	Nannyberry		14		
Shrub	Highbush Cranberry		8		
Shrub	Grey dogwood		36		
Total Number of Target Shrubs		**86**	**85**	**99%**	

Post-Remediation Vegetation Monitoring
Bloody Brook
Onondaga, New York

Habitat Area: UPF-2
Date: 7/1/2021
Weather: warm (85 F) **Inspector(s):** Robert Montione, Alexaandra Golden

Planting Type	Common Name	Total Number Needed for Target Trees/Shrubs	Total Number Counted During 2021 Monitoring	Percent Survival of Target Number	Comments/Notes
Tree	Sugar maple		5		
Tree	White pine		3		
Tree	Red maple		5		
Tree	River Birch		3		
Tree	Eastern hemlock		5		Two stressed
Total Number of Target Trees		**21**	**21**	**100%**	
Shrub	Northern arrowwood		24		some mowed down
Shrub	Grey dogwood		25		
Shrub	Elderberry		3		
Shrub	High Bush Cranberry		1		
Shrub	Nannyberry		0		
Total Number of Target Shrubs		**83**	**53**	**64%**	

Post-Remediation Vegetation Monitoring
Bloody Brook
Onondaga, New York

Habitat Area: RIP-1
Date: 7/1/2021

Weather: warm (85 F) **Inspector(s):** Robert Montione, Alexandra Golden

Planting Type	Common Name	Total Number Needed for Target Trees/Shrubs	Total Number Counted During 2020 Monitoring	Percent Survival of Target Number	Comments/Notes
Tree	Red maple		29		Four stressed
Tree	Sugar maple		20		One stressed
Tree	Swamp White Oak		4		
Tree	Black Willow		1		
Tree	Silver Maple		8		
Tree	Pin oak		18		One stressed
Tree	Eastern hemlock		7		Four are generally stressed but growing well
Tree	Tulip Tree		3		
Tree	Basswood		3		
Tree	Riverbirch		2		
Tree	Serviceberry		6		Planted in 2020
Tree	Sycamore		1		
Tree	White pine		6		
Total Number of Target Trees		**97**	**108**	**111%**	
Shrub	Northern arrowwood		117		
Shrub	Nannyberry		51		
Shrub	Grey dogwood		91		
Shrub	Highbush Cranberry		9		
Shrub	Steeplebush		1		
Shrub	Sweet Gale		5		
Shrub	Elderberry		4		
Shrub	Red Chokeberry		3		
Shrub	Buttonbush		9		
Shrub	Speckled Alder		2		
Total Number of Target Shrubs		**314**	**292**	93%	

Post-Remediation Vegetation Monitoring
Bloody Brook
Onondaga, New York

Habitat Area: USS-1
Date: 6/29/2021
Weather: warm (80F)
Inspector(s): Robert Montione, Alexandra Golden

USS	Common Name	Total Number Needed for Target Trees/Shrubs	Total Number Counted During 2019 Monitoring	Percent Survival of Target Number	Comments/Notes
Shrub	Grey dogwood	19	20	105%	Volunteer shrub
Shrub	Northern Arrowwood	20	20	100%	
Total Number of Target Shrubs		**39**	**40**	103%	