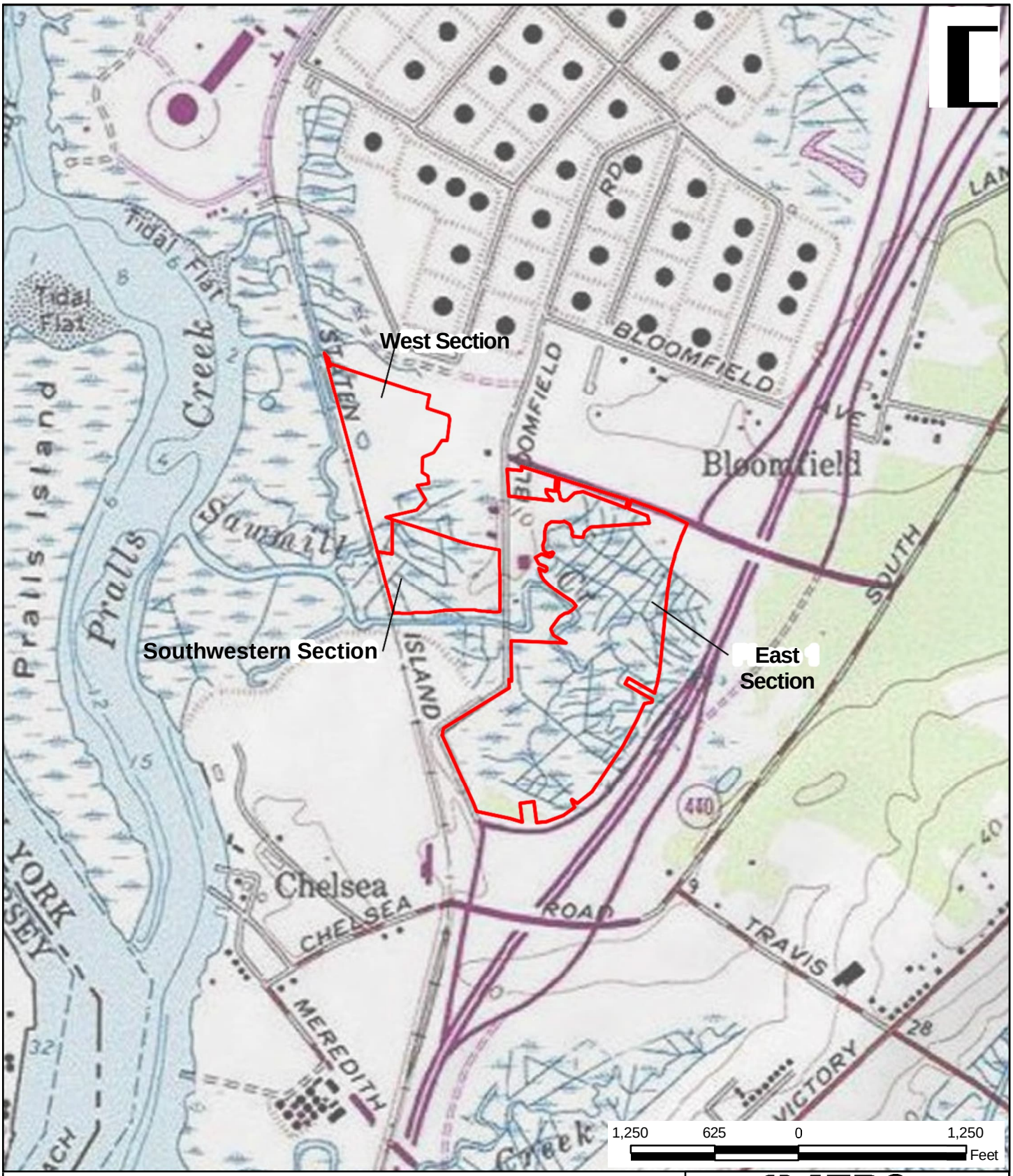
REVISED EXHIBIT A
VICINITY MAP WITH SOUTHWESTERN SECTION



Southwestern Section

Source: ESRI, USA Topo Map Service.

NYC/EDC

Saw Mill Creek Pilot Wetland Mitigation Bank

Staten Island, New York

Vicinity Map

WSP

February 2023

EXHIBIT B
SOUTHWESTERN SECTION ADDITIONS

Description of Property- Southwestern Section

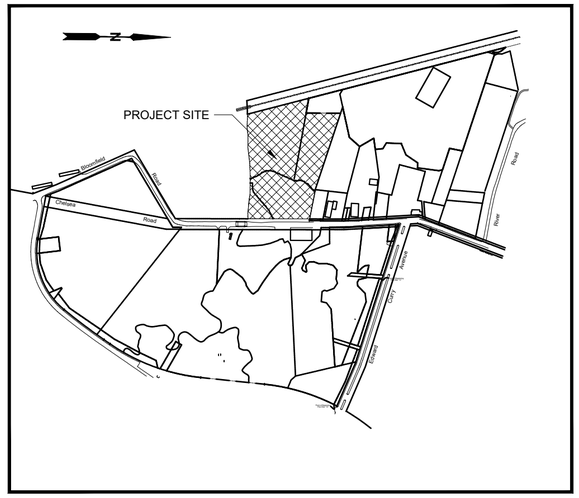
The Property is located on Staten Island in Richmond County, New York as shown on the U.S. Geologic Survey (USGS) topographic map of Arthur Kill, NY 7.5-minute quadrangle (Exhibit A). The Southwestern section is bounded by railroad tracks to the west, private commercial properties and the western section of the Bank to the north, Chelsea Road to the east and Saw Mill Creek to the south.

The total area for the Southwestern Section property is 10.90 acres. The Property is located at Latitude 40.609077 and Longitude -74.190386 within the NYSDEC Atlantic Ocean/Long Island Sound Watershed and the 8- digit Hydrologic Unit Code (HUC08) Sandy Hook-Staten Island subbasin (02030104). As of the Effective Date, the Property is designated on the Tax Map for the Borough of Staten Island with the following block and lot numbers.

Block	Lot	Owner
1815	204	The City of New York
1815	220	The City of New York
1815	235	The City of New York
1815	251	The City of New York

ATTACHMENT 1

METES AND BOUNDS DESCRIPTION AND BOUNDARY SURVEY MAP FOR SOUTHWESTERN SECTION



LOCATION SKETCH
(NOT TO SCALE)

SURVEYOR'S DESCRIPTION

STATEN ISLAND BLOCK 1815, LOTS 204, 220, 235 & 251

ALL THAT CERTAIN LOT, PIECE OR PARCEL OF LAND SITUATE, LYING AND BEING IN THE BOROUGH OF STATEN ISLAND, COUNTY OF RICHMOND, CITY AND STATE OF NEW YORK, BEING BOUNDED AND DESCRIBED AS FOLLOWS:

Beginning at a point, said point being on the westerly side of Chelsea Road, and being the northeasterly corner of Block 1815 Lot 204, and having coordinates N: 161,411.85, E: 931,836.00 and running thence;

Along the westerly side of Chelsea Road, South 00° 20' 08" East, a distance of 464.78 feet to a point, said point being the corner formed by the intersection of the westerly side of Chelsea Road with the northerly side of Saw Mill Creek, said point also being the southeasterly corner of Block 1815, Lot 220, running thence the following 18 courses and distances along the northerly side of Saw Mill Creek;

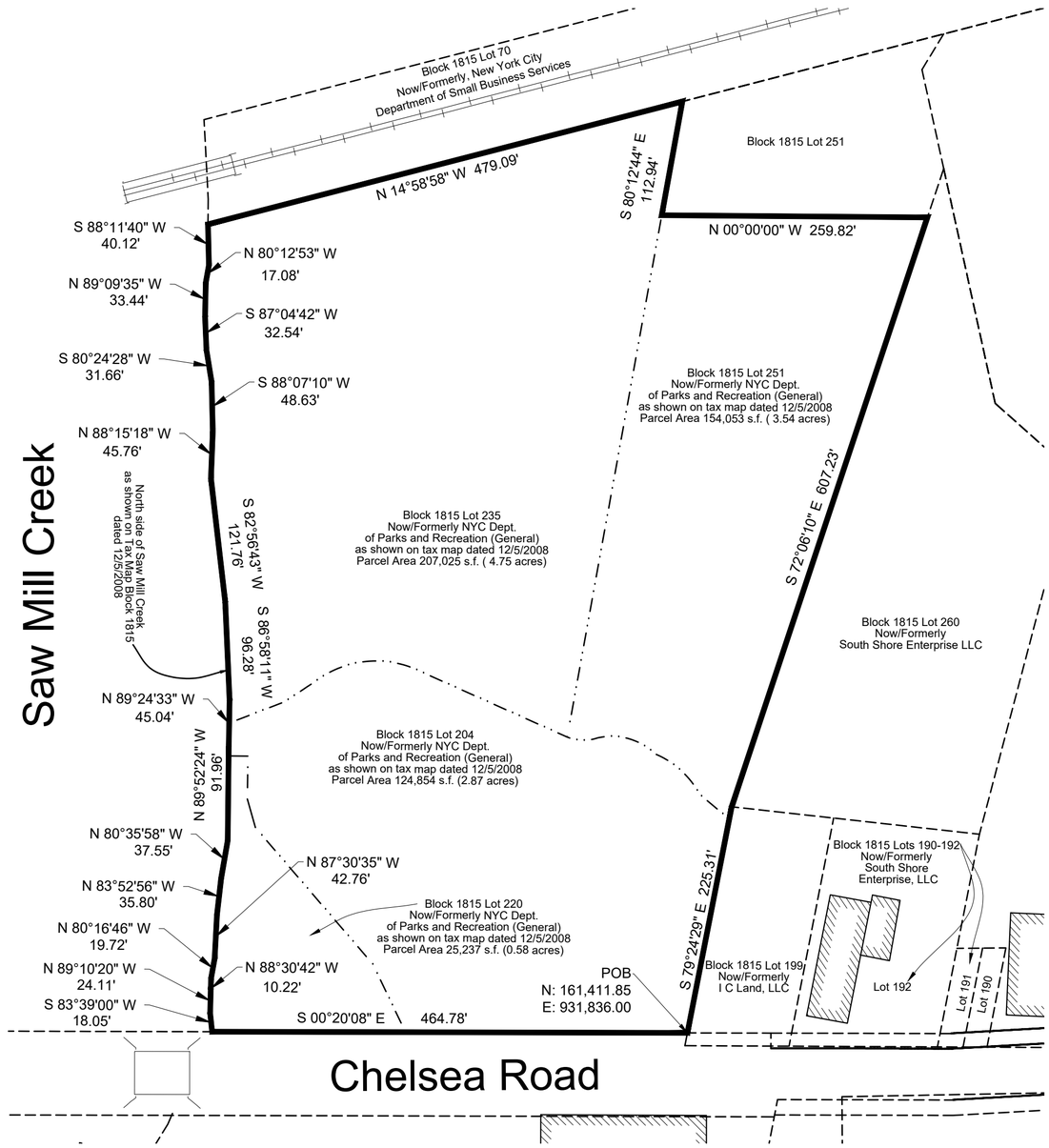
1. South 83° 39' 00" West, a distance of 18.05 feet to a point, thence;
2. North 89° 10'20" West, a distance of 24.11 feet to a point, thence;
3. North 88° 30' 42" West, a distance of 10.22 feet to a point, thence;
4. North 80° 16' 46" West, a distance of 19.72 feet to a point, thence;
5. North 87° 30' 35" West, a distance of 42.76 feet to a point, thence;
6. North 83° 52' 56" West, a distance of 35.80 feet to a point, thence;
7. North 80° 35' 58" West, a distance of 37.55 feet to a point; thence;
8. North 89° 52' 24" West, a distance of 91.96 feet to a point; thence;
9. North 89° 24' 33" West, a distance of 45.04 feet to a point; thence;
10. South 86° 58' 11" West, a distance of 96.28 feet to a point; thence;
11. South 82° 56' 43" West, a distance of 121.76 feet to a point; thence;
12. North 88° 15' 18" West, a distance of 45.76 feet to a point; thence;
13. South 88° 07' 10" West, a distance of 48.63 feet to a point; thence;
14. South 80° 24' 28" West, a distance of 31.66 feet to a point; thence;
15. South 87° 04' 42" West, a distance of 32.54 feet to a point; thence;
16. North 89° 09' 35" West, a distance of 33.44 feet to a point; thence;
17. North 80° 12' 53" West, a distance of 17.08 feet to a point; thence;
18. South 88° 11' 40" West, a distance of 40.12 feet to a point on the easterly side of Block 1815 Lot 70 and land now or formerly of the City of New York, running thence;

Along the easterly side of Block 1815 Lot 70 North 14° 58' 58" West, a distance of 479.09 feet to a point, said point being where the easterly side of Block 1815 Lot 70 intersects the southerly side of Block 1815 Lot 251, running thence, South 80° 12' 44" East, a distance of 112.94 feet to a point on the southerly side of Block 1815 Lot 251, running thence, through a portion of Block 1815 Lot 251, North 00° 00' 00" East, a distance of 259.82 feet to a point on the southerly side of Block 1815 Lot 260, and lands now or formerly of South Shore Enterprises, LLC., running thence;

Along the southerly side of Block 1815, Lot 260, South 72° 06' 10" East, a distance of 607.23 feet to a point, said point being where the northerly side of Block 1815 Lot 251 meets the southerly side of Block 1815 Lot 199 and lands now or formerly of I C Land, LLC., running thence;

Along the southerly side of Block 1815 Lot 119, South 79° 24' 29" East, a distance of 225.31 feet to the westerly side of Chelsea Road and the point or place of beginning.

Containing 474,666 square feet (10.8968 acres) more or less.



NOTES:

The property lines shown on this plan are based upon an actual field survey completed by Gayron de Bruin Land Surveying and Engineering, PC in June 2013 and from deeds and plans of record.

The existing conditions shown on this plan are based upon an actual on-the-ground instrument survey completed by Gayron de Bruin Land Surveying and Engineering, PC on in June 2013 and supplemented by stock photogrammetry performed by Geomaps International, Inc. in 2010.

There is no guarantee that all easements have been shown.

Horizontal datum is North American Datum 1983 (2011) Epoch 2010.00 (New York State Plane Coordinate System, Long Island Zone). All linear measurements are in U.S. Survey Feet.

GdB Geospatial

GdBGeospatial.com
88 Duryea Road | Melville, NY 11747 | 516.579.3111

STATE OF NEW YORK
JASON R. GRAF
050874
LICENSED LAND SURVEYOR

3/22/2023

JASON R. GRAF, L.S. DATE
N.Y.S. L.S. No. 050874
JGraf@GdBGeospatial.com

SCALE: 1" = 100'

0 50' 100' 200' 300'
FEET

DATE:	03/17/2023
PROJECT NO.:	5830
FILE NAME:	5830 LOTS 204_220_235_251 SURVEY PLOT
DRAWN BY:	T.C.
CHECKED BY:	M.L.

Boundary Survey of Lots 204, 220, 235 and 251 Saw Mill Creek

Staten Island Richmond County, NY

V-100 SCALE C(18X24)

SHEET 1 OF 1

EXHIBIT C
BASELINE CONDITIONS REPORT FOR SOUTHWESTERN SECTION

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LIST OF FIGURES

LIST OF TABLES

ATTACHMENTS

This Baseline Conditions Report has been prepared as a result of baseline studies conducted within the 10.90- acre additional area of proposed mitigation for the Saw Mill Creek Pilot Wetland Mitigation Bank (Bank). The Bank Sponsor is submitting this information to support its request to modify the June 2015 Mitigation Banking Instrument (MBI) to add the additional 10.90 acres area of proposed mitigation to the Bank.

In early 2013, the original 91.1-acre "general project area" considered for the Bank included the 10.90-acre area now known as Southwestern Section. However, due to budget and other limitations, in late 2013 the western portion of the Bank was reduced to the 15.00-acre area in the approved MBI. The information in this Baseline Conditions Report includes data collected in 2013 and more recent data collected to confirm existing conditions.

1.0 Project Location

The proposed Bank area is located immediately south of the existing Bank on Staten Island in Richmond County, New York as shown on the U.S. Geologic Survey (USGS) topographic map of Arthur Kill, NY 7.5-minute quadrangle (Figure C-1). The geographic location of the project area is:

* Latitude: 40.609077
* Longitude: -74.190386

The area encompasses approximately 10.90 acres and is bounded by a railroad to the west, privately-owned parcels to the north, Chelsea Road to the east, and Saw Mill Creek to the south. The project area is comprised of 4 parcels owned by New York City as summarized in Table C-1 and consists mainly of tidal marsh and upland areas with some areas of fill and development from adjoining parcels.

TABLE C-1. PROJECT AREA PARCEL SUMMARY

Block	Lots
1815	235, 204, 220 and portion of 251

Attachment C-1 provides photographs of the project area and surrounding area.

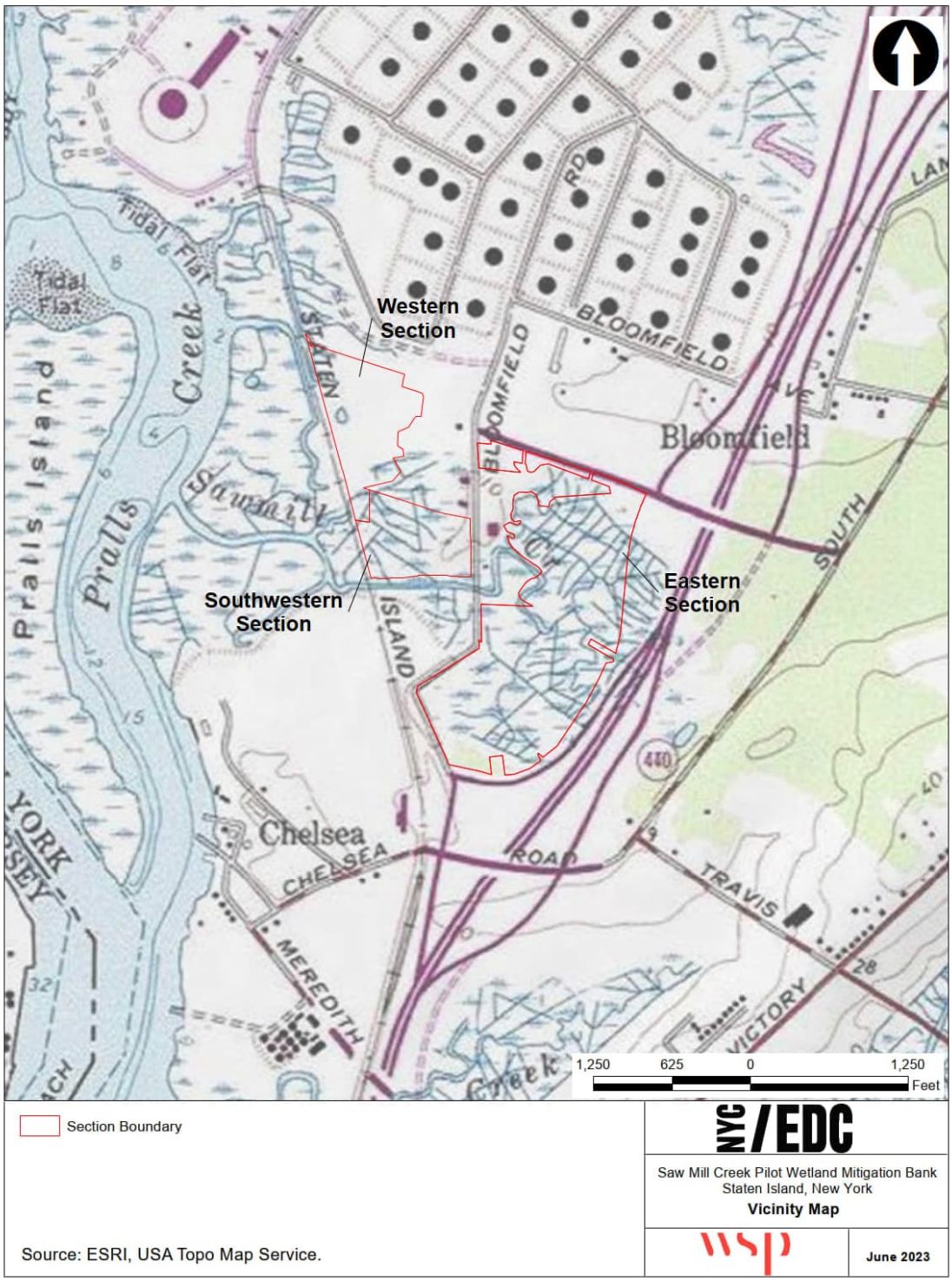

Figure C-1. Vicinity Map

2.0 Historic and Existing Conditions

A review of historic aerials and topographic maps indicates that most of the project area was originally tidal marsh, but the topography of the area has been significantly altered over the past century by filling and ditching. Chelsea Road appears on a 1857 map as running along the eastern side of a strip of land approximately 300 to 400 feet wide, north of Saw Mill Creek. Some mosquito control ditches are evident in a 1924 aerial photo. In a 1943 aerial photo the marsh had been ditched to its current extent. Mosquito ditches are very straight, narrow channels that were dug to drain the upper reaches of salt marshes, as it was formerly thought that ditching marshes would control mosquito breeding. The ditching often negatively impacted the hydrology and habitat of tidal marshes.

Railroad tracks were built on fill along the western parcel edge by 1957. There are no culverts under the railroad embankment along the project area boundary. The railroad tracks cross a bridge over Saw Mill Creek. The developed lots along the western side of Chelsea Road appear to remain confined to the original upland footprint until the 1960s. Available aerial imagery (Attachment C-3) indicates that these lots were progressively filled westward and southward into the marsh.

Saw Mill Creek, a tidally influenced tributary of Pralls Creek and several tributaries and drainage ditches are located within the project area. The confluence of Saw Mill Creek and Pralls Creek is located approximately 600 feet west of the project area. Pralls Creek is a tributary of the Arthur Kill. The project area is connected to the Staten Island Sound through a series of smaller tidal channels. Part of the project area experiences daily tidal inundation.

3.0 Geology and Geomorphology

Duke Geological Laboratory, Trips on the Rocks, Guide 04: Staten Island and Vicinity, NY and NJ (Merguirian and Sanders, 2010) indicates the surficial geologic deposits beneath the organic material within the project area consist of glacial and Quaternary deposits of fine to coarse sand. These surficial deposits are underlain by the Newark Supergroup, a sequence of sedimentary rocks consisting of brownish and reddish shales and sandstones. Depth to bedrock in the vicinity of the project area is estimated to be approximately 30 to 50 feet below ground surface (bgs). Much of the project area was originally tidal salt marsh, but the topography of the area has been significantly altered over the past century by filling and ditching. The forested area immediately north of Saw Mill Creek and west of Chelsea Road is portrayed as land on the 1857 and 1894 maps, though site inspection indicates that filling and dumping have also occurred there.

4.0 Topography

The proposed project is in the Piedmont physiographic province, near its intersection with the Atlantic Coastal Plain and the Manhattan Prong of the New England Uplift. The topography of the project area is low lying, with ground-surface elevations ranging from 3 to 10 feet above mean sea level (see Figure C-1). The meandering courses of Saw Mill Creek indicate the low surface relief of the Saw Mill Creek Study Area.

5.0 Soils

The U.S Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), Custom Soil Resource Report for Richmond County, New York (2022) indicates that soils within the project area consists of the soil mapping units described below and shown on Figure C-2.

Appoquinimink mucky peat, 0 to 1 percent slopes, very frequently flooded comprises approximately 1.5% of the site. These soils are on tidal marshes on lowlands. The parent material consists of loamy fluviomarine deposits over herbaceous organic material. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is frequently ponded. A zone of water saturation is at 0 inches during all months. Organic matter content in the surface horizon is about 80 percent. This soil meets hydric criteria. The soil has a strongly saline horizon within 30 inches of the soil surface. The hydrologic soil group is B/D.

Ipswich- mucky peat, 0 to 2 percent slopes, very frequently flooded comprises approximately 65% of the site. This component is on tidal marshes on coastal plains. The parent material consists of partially- decomposed herbaceous organic material. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Available water to a depth of 60 inches (or restricted depth) is very high. This soil is not ponded. A zone of water saturation is at 0 inches during al months. Organic matter content in the surface horizon is about 64 percent. This component is in the R144AY002CT Tidal Salt High Marsh mesic very frequently flooded, Tidal Salt Low Marsh mesic very frequently flooded ecological site. This soil meets hydric criteria. The soil has a moderately saline horizon within 30 inches of the soil surface. The hydrologic soil group is A/D.

Urban land, tidal marsh substratum, 0 to 3 percent slopes comprises approximately 13% of the site. Surficial soils within the northernmost portion of the area consist of urban land. These soils are formed in nearly level to gently sloping urbanized areas filled with a mixture of natural soil materials and construction debris over swamp, tidal marsh, or water. This unit contains a mixture of anthropogenic soils which vary in coarse fragment content. The land surface is covered by impervious pavement and buildings.

Windsor, loamy substratum comprises approximately 19% of the site. The Windsor, loamy substratum is on outwash plains. The parent material consists of sandy glaciofluvial deposits over loamy glaciolacustrine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Available water to a depth of 60 inches (or restricted depth) is low. This soil is not flooded or is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 50 percent. Below this thin organic horizon the organic matter content is about 3 percent. This component is in the F144AY022MA Dry Outwash ecological site. This soil does not meet hydric criteria. The hydrologic soil group is A.

Each mapping unit component includes soil series and miscellaneous areas. In general, soils in a series have the same parent material, drainage class, and sequence of major horizons.

Figure C-2. Soils Map

6.0 Hydrology

6.1 Surface Water Classification

Saw Mill Creek, a tidally influenced tributary of Pralls Creek and several tributaries and drainage ditches are located within the project area. Average annual rainfall/snowfall is 48.6 inches. The confluence of Saw Mill Creek and Pralls Creek is located approximately 600 feet west of the project area. Pralls Creek is a tributary of the Arthur Kill. The project is 0.8 aerial miles from the Arthur Kill (closest Traditional navigable Water [TNW]) to the Chelsea Road Bridge over Saw Mill Creek in the center of the project area. The project area is connected to the Staten Island Sound through a series of smaller tidal channels. Part of the project area experiences daily tidal inundation. Groundwater within the project area is expected to be present within the glacial and overlying organic material at depths influenced by the tide. At high tide, the low-lying marsh is saturated and inundated in the lower lying areas. At low tide, groundwater is estimated to be present at less than 6 feet bgs. Groundwater flow is anticipated to be to the west towards Pralls Creek. Saw Mill creek and its tributaries can be classified as Relatively Permanent Waters (RPW) as they flood daily with the tide cycle.

According to the effective Federal Emergency Management Agency (FEMA) map of the location (Map Number 36049703202F, Revised September 5, 2007), the site is wholly contained within the 100-year designated AE flood zone of elevation 9 feet North American Vertical Datum of 1988 (NAVD88).

6.2 Tides and Tidal Circulations

The hydrology of Saw Mill Creek is dominated by semidiurnal tides from Newark Bay. Tides in the Arthur Kill generally flood from Raritan Bay to Newark Bay and ebb in the reverse direction. Mean high water at the project area is 2.39 feet (NAVD 88), with a mean higher high water (spring high tidal) of 2.62 feet (NAVD 88). Mean low water is -2.82 feet (NAVD88), with a mean lower low water level of -3.05 feet (NAVD88). Table C-2 shows tide heights at the Saw Mill Creek gauge from tide gauges place within the project area during the summer of 2013.

TABLE C-2. SAW MILL CREEK TIDAL DATA (NAVD 88)

Mean High Water (MWH)	Mean Low Water (MLW)	Mean Higher High Water (MHHW)	Mean Low Low Water (MLLW)
2.39	-2.82	2.62	-3.05

Source: Tidal Data Analysis Report in Attachment D-1 of Exhibit D (Project Development Plan) of Instrument.

6.3 Proposed Bank's Landscape Position in the Watershed and Sources of Watershed Impairment

The Bank site, including the Southwestern Section, is identified in the *Comprehensive Restoration Plan for the New York-New Jersey Harbor Estuary* which was developed as part of the Hudson-Raritan Estuary (HRE) Ecosystem Restoration Study by the U.S. Army Corps of Engineers - New York District and The Port Authority of New York & New Jersey in partnership with the New York- New Jersey Harbor & Estuary Program and other federal, state and local resource agencies. The 2009 Comprehensive Restoration Plan (CRP) for the HRE states that it "is a master plan to guide ecosystem restoration efforts throughout the estuary. It is intended to be used by all stakeholders, thus allowing the whole region to work towards a series of common restoration goals providing benefits to the estuary. To achieve this goal, a team of estuarine scientists identified 11 measurable objectives for restoration, termed Target Ecosystem Characteristics (TECs), each of which defines specific goals for an important ecosystem property or feature that is of ecological and/or societal value. The TECs reflect the broad interest of HRE stakeholders and address habitat and degradation issues. Achieving the objectives in the TECs will increase the sustainability and resiliency of the HRE.

Information from the *Comprehensive Restoration Plan for the New York-New Jersey Harbor Estuary* (USACE and others, 2009) is excerpted in the following paragraphs discussing the watershed of the proposed addition to the mitigation bank. The HRE study area is located within one of the largest estuaries on the east coast of the United States, comprising over 1,600 square miles and almost 1,000 linear miles of shoreline. The actual borders of the HRE study area and its planning regions were delineated based on a combination of watershed boundaries and physical landmarks, creating ecologically and historically distinct areas that are all tidally influenced. The HRE study area was delineated into eight planning regions to facilitate stakeholders' identification of restoration needs and opportunities specific to each region.

The proposed addition to the Saw Mill Creek Pilot Wetland Mitigation Bank is located in the Arthur Kill/Kill Van Kull HRE region. This HRE planning region is joined to Upper New York Bay via the Kill Van Kull and mixes waters with Newark Bay. The Arthur Kill is also the water body connecting Newark Bay with Raritan Bay. The Arthur Kill/Kill Van Kull planning region has a dynamic hydrology due to the variation in tidal velocity, amount of freshwater flow, and bathymetry among the three connecting bays (i.e., Upper New York, Newark, and Raritan bays).

The Arthur Kill/Kill Van Kull complex has been designated as a Significant Habitat Complex of the New York Bight Watershed by the USFWS (USFWS, 1997). The extensive tributary system of Arthur Kill provides major blocks of tidal and freshwater wetlands, marshlands, mudflats, and intact riparian habitat. According to the HRE CRP, "this HRE planning region contains over 30,000 acres (>120 kilometers^2) of open space, these sites have the potential of being important for future habitat restoration programs." However, these waterways exist within a heavily industrialized and developed corridor, with an average population density of almost 5,000 people

per square mile. The Arthur Kill and Kill Van Kull also have deepwater navigation channels that allow transport of cargo into and out of the ports of New York and New Jersey. Abandoned industrial areas are also common, which are typically littered with debris.

The CRP also states, "The Arthur Kill and Kill Van Kull Planning Region appears to offer substantial opportunities to restore coastal wetlands, shorelines and shallows, tributary connections, public access, and waterbird habitat. There are large expanses of coastal wetlands along the tributaries to the Arthur Kill that could benefit from restoration activities, and adjacent areas may be appropriate for the creation of additional acreage. The islands of this planning region once supported large colonies of waterbirds, but today do not support any nesting activities. **There are also opportunities within this planning region to reverse human- induced alterations that have led to habitat degradation** (*emphasis added*). There are 54 CRP Restoration Sites in this planning region, which is one of the largest number of identified acquisition and restoration sites per planning region in the HRE study area"

The proposed addition to the mitigation bank site is one of those 54 CRP Sites and once constructed it will restore and enhance 10.90-acres of degraded habitat within the Saw Mill Creek watershed, including the creation of 1.68-acres of tidal wetland from filled land. The site is currently littered with debris. Portions of the site are covered by over ten feet of fill material and paved with asphalt. Areas of wetland and upland within the proposed addition Bank area have been overrun by non-native, invasive vegetation that compromises the site's ecological functions. The clean-up, enhancement, and restoration of the site will increase the acreage of tidal wetlands in the Saw Mill Creek watershed, improving the watershed's water quality, sediment quality, and flood attenuation while also increasing plant diversity and wildlife species abundance and diversity. The restoration of large, contiguous wetland habitats is a singular feature of wetland banks. By providing comprehensive restoration of a large site, there is a much greater chance of realizing long-term gains in ecological functions and services. Portions of the site are adjacent to existing healthy saltmarsh that will maximize habitat.

Restoration of the area is expected to achieve the following 7 of the 11 HRE CRP Target Ecosystem Characteristics (measurable objectives for restoration, each of which defines specific goals for an important ecosystem property or feature that is of ecological and/or societal value): Tributary Connections; Shorelines and Shallows; Sediment Quality; Coastal Wetlands; Coastal and Maritime Forests; Habitat for Waterbirds; and Habitat for Fish, Crab and Lobsters.

6.4 Specific Waterbodies, Characteristics, and Improvements

Section 6.4 of Exhibit C in the Saw Mill Creek Instrument provides information on the tributaries in the area to be added to the Bank. Tributaries 1, 2 and 3 are in this Southwestern Section area. Attachment C-2 of the approved Instrument provides photographs for each of these waterbodies/tributaries, including the connection between the tributary and Saw Mill Creek (Photos 1, 2, 3, 4 and 5). Table C-4 in the Instrument provides detailed information on each waterbody/tributary currently on the Site. An

excerpt from Table C-3 is provided below. Based on site inspections in 2022, these photos and assessments provide an accurate overview of the existing tributaries in the area.

TABLE C-3. SAW MILL CREEK TRIBUTARY INFORMATION FOR ADDITIONAL AREA

Tributary	Average Width from top of bank to top of bank (feet)	Average Depth from bottom to top of bank (feet)	Average Side Slopes (Horiz:Vert)	Condition	Sinuosity	State (Natural, Artificial, Manipulated)	Water Quality
1	12	5	1.5/1	Stable	Straight	Artificial (mosquito ditch)	Water color muddy
2	4	1	3/1	Stable	Straight	Artificial (mosquito ditch)	Water color muddy
3	3	1	2/1	Stable	Straight	Artificial (mosquito ditch)	Water color muddy

7.0 Habitat Types and Vegetative Communities

Over the last 200 years, the vegetation within the project area has been altered by human activities, including upland clearing, wetland ditching and filling, industrial development, introduction and spread of invasive species (including common reed and Japanese knotweed), obstructions of surface water movement, and other less physically intrusive disturbances such as noise from automobile traffic. These actions have directly or indirectly changed and shaped the historical ecological communities to their present state. The defined community types, although influenced by human development and/or invasion by non-native plant species, support a variety of plant species and provide habitat for area wildlife. Figure C-3 depicts habitat cover type maps within the project area. Wetland and upland communities and their dominant vegetation are described below.

7.1 Wetlands and Open Waters

Most of the project area consists of wetland habitats. The presence of wetland indicators (i.e., hydric soils, prevalence of hydrophytic vegetation, and hydrologic regime) was verified during field studies, including during performance of a wetland delineation. Figure C-4 depicts National Wetlands Inventory (NWI) mapping within the project area. Based on NWI mapping and field delineation, one wetland area composed of four classes of wetlands/watercourses were identified within the project area in accordance with *The Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin *et al.* 1979). This wetland is summarized below in Table C-4 and depicted the Design plans in the revised Exhibit D. On March 31, 2014, the Corps of Engineers issued a Jurisdictional Determination, concurring with the boundaries of these wetlands and stating that these wetlands are below the headwaters. Since the 2014 Jurisdictional Determination has expired, WSP biologists conducted a field delineation in May 2023 to confirm the current wetland boundary within the project area. WSP submitted an updated Preliminary Jurisdictional Determination request for the wetland boundary to the Corps of Engineers in August 2023. The 2023 wetland boundary within the southwestern section is substantially the same as the 2014 wetland boundary.

TABLE C-4. SUMMARY OF DELINEATED WETLANDS

Wetland	Size (Acres)	Wetland Cover Type(1)
A	7.0	E1UBL, E2EM5Pd, E2EM5P, and E2EM1Pd

(1) Classification of wetlands based on field examination.
Classification under Cowardin 1979:

E1UBL	Estuarine, Subtidal, Unconsolidated Bottom, Subtidal
E2EM1Pd	Estuarine, Intertidal, Emergent, Persistent, Irregularly flooded, partially drained/ditched
E2EM5P	Estuarine, Intertidal, Emergent, Narrow-leaved Persistent
E2EM5Pd	Estuarine, Intertidal, Emergent, Narrow-leaved Persistent, Partially Drained/Ditched

Figure C-3. Habit Cover Types

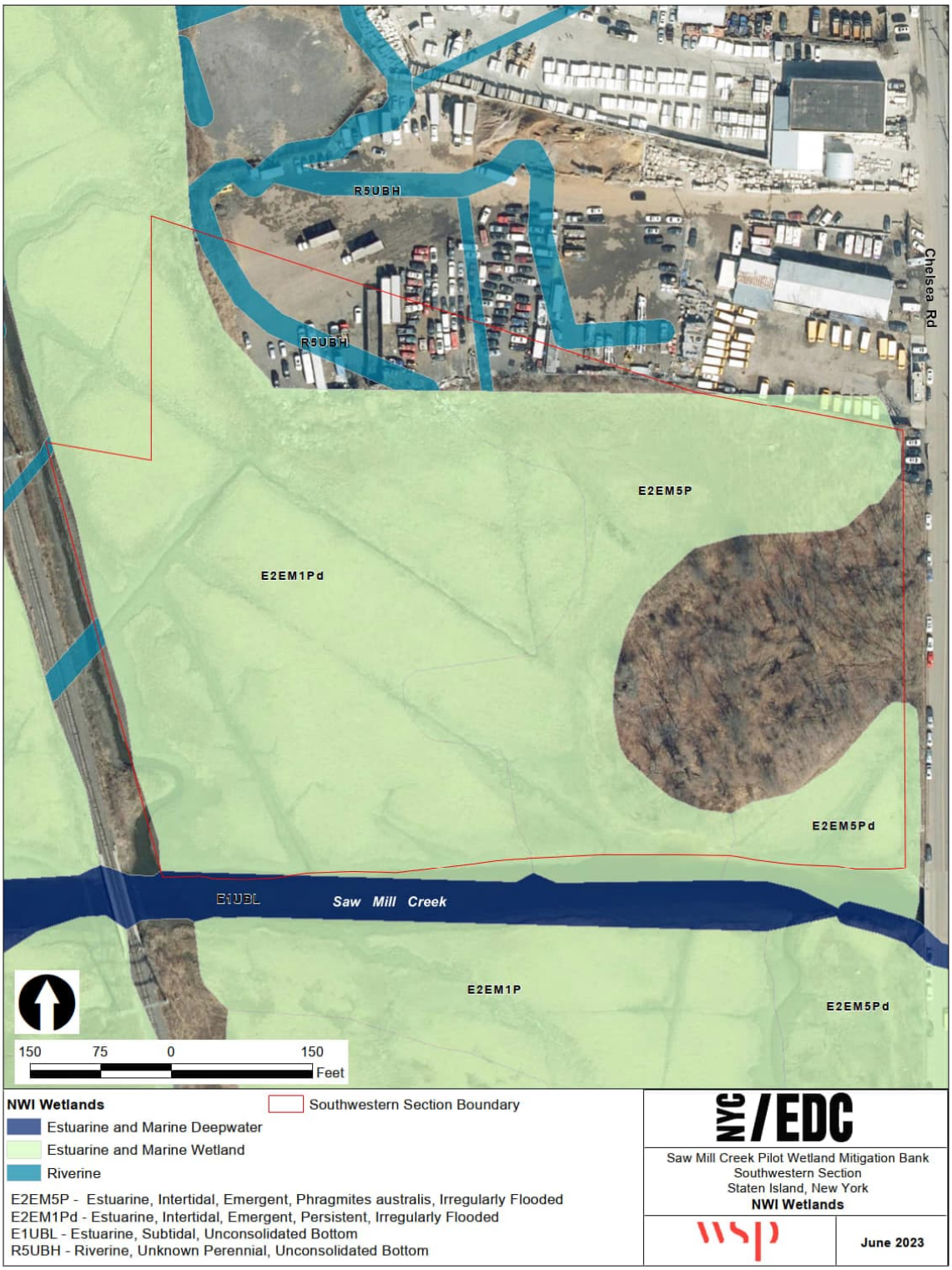

Figure C-4. National Wetlands Inventory Map

The majority of the project area and the adjacent area west of the railroad tracks consist of estuarine tidal wetland associated with Saw Mill Creek and its tributaries. Saw Mill Creek is a steep-banked tidal creek that enters the project area from west of the rail line at the western project area boundary, flows east under the Chelsea Road bridge, and meanders through the eastern portion of the existing Bank towards Route 440. As per NWI mapping, Saw Mill Creek is classified as Estuarine, Subtidal, Unconsolidated Bottom, Subtidal water regime (E1UBL). Portions of the tidal marsh have been filled in the past for roadways and commercial properties, and the remaining tidal marsh habitat contains linear ditches and remnants of filled areas and related berms. The majority of the ditches are completely exposed at low tide, while the bed of Saw Mill Creek remains inundated.

As depicted on Figure C-5, there are no NYSDEC mapped freshwater wetlands within the project area. NYSDEC tidal wetland categories mapped within the project area consist of high marsh and intertidal (low) marsh. Portions of Saw Mill Creek that fall within the project area are mapped as littoral zone. Most of the site is irregularly flooded high marsh habitat. Vegetation in the high marsh community includes spike grass *(Distichlis spicata*), saltmeadow cordgrass *(Spartina patens)*, smooth cordgrass *(Spartina alterniflora*), black grass (*Juncus gerardii*), and common reed. The low marsh community is dominated by smooth cordgrass along creek edges, in shallow ditches, and where lower elevations allow regular tidal flooding. Intertidal scrub-shrub habitat, consisting primarily of Jesuit's bark (*Iva frutescens*), is scattered throughout the high marsh. Common reed is dominant in the upper reaches of the marsh adjacent to uplands and in some areas forms a dense monoculture. Common reed, Jesuit's bark, and eastern baccharis (*Baccharis halimifolia*) are common within transition areas between wetlands and uplands.

7.2 Uplands

Approximately 2.2 acres of successional upland forest habitat is present within the eastern portion of the project area. The upland forest has an herbaceous zone and understory dominated by a mix of invasive plant species consisting of Japanese knotweed, Japanese honeysuckle (*Lonicera japonica*), Morrow's honeysuckle (*Lonicera morrowii*), oriental bittersweet (*Celastrus orbiculatus*), and some *Phragmites* on the periphery. Native plants observed in the herbaceous and understory layers include switchgrass (*Panicum* sp.), deer tongue (*Dichanthelium clandestinum*), late boneset (*Eupatorium serotinum*), wood reed grass (*Cinna arundinacea*) and common serviceberry (*Amelanchier arborea*). The canopy consists of black cherry (*Prunus serotina*), scarlet oak (*Quercus coccinea*), pin oak (*Q. palustris*), red oak (*Q. rubra*), tree of heaven (*Ailanthus altissima*), and honey locust (*Gleditsia triacanthos*). A portion of the understory also contains a stand of persimmon (*Diospyros virginiana*), which is listed as a NYS threatened species. Areas of past fill material, including piles of asphalt, concrete and stone, and scattered trash were observed within the buffer area. Upland/wetland edges are dominated by common reed.

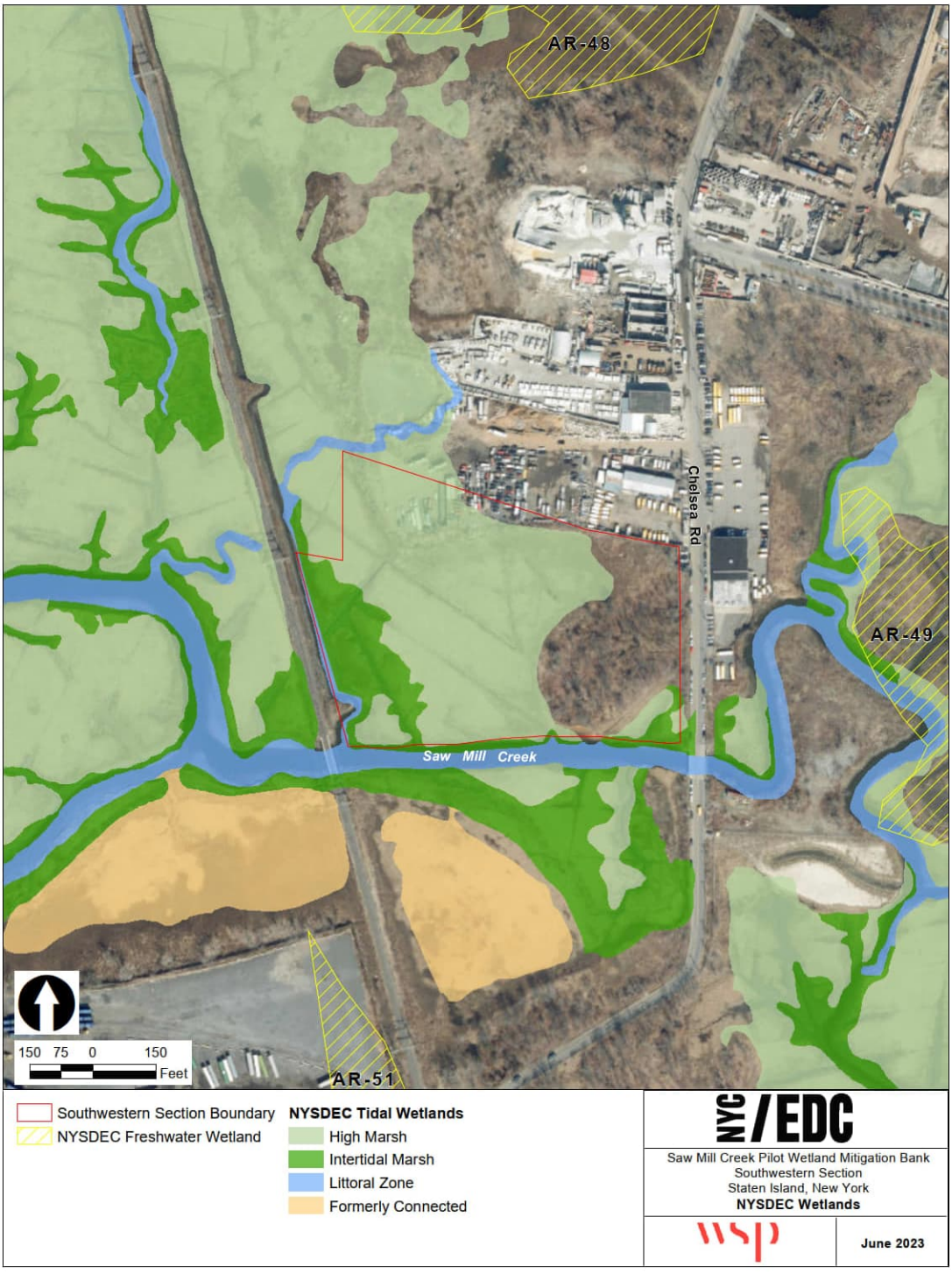

Figure C-5. New York State Department of Environmental Conservation Wetlands Map

Table C-5 presents a list of vegetation observed within the general project area.

TABLE C-5. VEGETATION OBSERVED WITHIN THE PROJECT AREA

Scientific Name	Common Name	Indicator Status
Trees		
Ailanthus altissima	tree-of-heaven	UPL
Diospyros virginiana	persimmon	FAC
Gleditsia triacanthos	honeylocust	FAC
Nyssa sylvatica	blackgum	FAC
Prunus serotina	black cherry	FACU
Quercus coccinea	scarlet oak	--
Quercus palustris	pin oak	FACW
Quercus rubra	red oak	FACU
*Robinia pseudoacacia**	black locust	FACU
Shrubs/Vines		
Amelanchier arborea	common serviceberry	FACU
*Ampelopsis brevipedunculata**	porcelainberry	UPL
Baccharis halimifolia	groundsel tree	FACW
*Celastrus orbiculata**	Oriental bittersweet	UPL
Elaeagnus umbellata	Autumn olive	UPL
Iva frutescens	high tide bush	FACW
*Lonicera japonica**	Japanese honeysuckle	FAC
Parthenocissus quinquefolia	Virginia creeper	FACU
*Rosa multiflora**	multiflora rose	FACU
Rubus idaeus	wild raspberry	FACU
Smilax rotundifolia	greenbriar	FAC
Toxicodendron radicans	poison ivy	FAC
Herbaceous		
Ageratina altissima	white snakeroot	FACU
*Alliaria petiolata**	garlic mustard	FACU
*Artemisia vulgaris**	mugwort	NI
Atriplex patula	common orach	FACW
Cinna arundinacea	wood reed grass	FACW
Dichanthelium clandestinum	deer tongue	FACW
Distichlis spicata	spike grass	FACW
Eupatorium serotinum	late boneset	FAC
Juncus gerardii	black grass	FACW
Limonium carolinianum	Carolina sea lavender	OBL
Panicum virgatum	switchgrass	FAC
*Phragmites australis**	common reed	FACW
Pluchea odorata	saltmarsh fleabane	OBL
*Polygonum cuspidatum**	Japanese knotweed	FACU

Salicornia sp.	glasswort	OBL
Solidago sempervirens	seaside goldenrod	FACW
Solidago sp.	goldenrod	--
Spartina alterniflora	smooth cordgrass	OBL
Spartina patens	saltmeadow cordgrass	OBL

** Invasive Species. New York State Prohibited and Regulated Invasive Plants (September 10, 2014), available at http://www.dec.ny.gov/docs/lands_forests_pdf/isprohibitedplants2.pdf.*

Key to indicator categories
OBL: Obligate Wetland, occur almost always (estimated probability >99%) under natural conditions in wetlands.
FACW: Facultative Wetland, usually occur in wetlands (estimated probability 67%-99%), but occasionally found in non-wetlands.
FAC: Facultative, equally likely to occur in wetlands or non-wetlands (estimated probability 34%-66%).
FACU: Facultative Upland, usually occur in non-wetlands (estimated probability 67%-99%), but occasionally found in wetlands (estimated probability 1%-33%).
NI: No Indicator, on national listings of plants occurring in wetlands.
NA: Not Applicable, only vascular plants are assigned indicator statuses.

Sources: 2020 National Wetlands Plant List: Northcentral-Northeast, US Army Corps of Engineers
2023 Plants Database, United States Department of Agriculture Natural Resources Conservation Service

8.0 Faunal Communities

The primary habitat available to fish and wildlife within the project area consists of estuarine tidal wetland habitat associated with Saw Mill Creek and its tributaries. The existing intertidal marsh is predominantly irregularly flooded high marsh habitat. Smaller areas of open water/mudflat, low marsh and intertidal scrub-shrub habitat are present within the project area. Upland forest habitat is present on the east side of the project area in a previously filled area that was not developed. The forested habitat is degraded through the placement of fill material, debris and trash, and invasive plant species Historical fill, ditching, dumping, and invasion by nuisance plant species has degraded existing habitat quality within the project area, limiting habitat diversity and, therefore, decreasing wildlife species diversity. Common reed dominated wetland habitats like those found within the project area are usually considered to have low wildlife and waterfowl value because they can form dense, impenetrable monocultures. These areas contain minimal or no surface water for aquatic species. Utilization of these areas by waterfowl and wading birds is limited due to the dense stands of common reed that cannot be traversed by these groups of birds.

Species expected to utilize the estuarine tidal wetland habitats present within the project area are listed in Table C-6.

TABLE C-6. ANTICIPATED WILDLIFE UTILIZATION IN TIDAL WETLAND COMMUNITIES

Tidal Wetland Community	Common Name	Scientific Name
High marsh	salt marsh mosquitoes	*Aedes* spp.
	greenhead flies	*Tabanidae*
	grasshoppers	Suborder Caelifera
	spiders	Order Araneae
	salt marsh snail	*Melampus bidentatus*
	clapper rail	*Rallus longirostris*
	sharp-tailed sparrow	*Ammodramus caudacutus*
	marsh wren	*Cistothorus palustris*
	eastern meadowlark	*Sturnella magna*
	American black duck	*Anas rubripes*
	northern harrier	*Circus cyaneus*
	muskrat	*Ondatra zibethicus*
Low marsh	clapper rail	*Rallus longirostris*
	willet	*Catoptrophorus semipalmatus*
	marsh wren	*Cistothorus palustris*
	seaside sparrow	*Ammodramus maritimus*
	wading birds (egrets, herons)	Family Ardeidae
	fiddler crabs	*Uca* spp.
	ribbed mussel	*Geukensia demissa*
	mummichog	*Fundulus heteroclitus*
	sheepshead minnow	*Cyprinodon variegatus*
	Atlantic silverside	*Menidia menidia*
	winter flounder (juvenile and larvae)	*Pleuronectes americanus*
	bluefish (juvenile and larvae)	*Pomatomus saltatrix*
Salt shrub	marsh wren	*Cistothorus palustris*

Source: Edinger, et al., 2002.; Niedowski 2000. Louis Berger & Assoc., P.C., 2013

The salt marsh and tidal creek habitats within the project area provide foraging habitat for long-legged wading bird species (herons, egrets, ibises) that make up the population known as the New York City Harbor Herons. Within the Arthur Kill/Staten Island wetland complex, Prall's Island, Shooter's Island, and the Isle of Meadows had previously been popular breeding areas for wading bird species (Craig, 2010). No wader-nesting activity has been observed on these islands since the late 1990s, but they are still used by a wide variety of bird guilds including waterfowl, birds of prey, songbirds, crows and blackbirds (Craig 2010, Harbor Herons Subcommittee 2010).

According to 2013 correspondence from National Marine Fisheries Service, the project area provides habitat for a variety of resident, migratory, and forage species such as bluefish (*Pomatomus saltatrix*), striped bass (*Morone saxatalis*), menhaden (*Brevoortia tyrannus),* killifish (*Fundulus* spp.), bay anchovies (*Anchoa mitchilli*), and blue crabs (*Callinectes sapidus*).

Wildlife species observed at the project area during 2013 and 2021 field investigations include fish, most likely mummichog (*Fundulus heteroclitus*), marsh snail (*Melampus bidentatus*), mud snail (*Ilyanassa obsoletus*), ribbed mussel (*Geukensia demissa),* and fiddler crabs (*Uca minax* and *Uca pugnax*) within the tidal marsh habitat.

Feral cats (*Felis cattus*) were observed within the high marsh and the upland areas.

Bird species observed by site or call during 2013 and 2021 field investigation included great egret (*Ardea alba*), snowy egret (*Egretta thula*), great blue heron (*Ardea herodias*), marsh wren (*Cistothorus palustris*), swamp sparrow (*Melospiza georgiana*), red-winged blackbird (*Agelaius phoeniceus*), and turkey vulture (*Cathartes aura).*

9.0 Sensitive Species

WSP gathered information from state and federal agencies regarding the potential presence of any federal and/or state threatened, endangered, proposed or candidate species in the vicinity of the project area, as well as any other species or habitats of special concern. Information collected from United States Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) online resources is summarized in Table C-7.

TABLE C-7. SUMMARY OF STATE AND FEDERAL SPECIAL STATUS SPECIES

Agency	Common Name	Scientific Name	NY State Listing	Heritage Conservation Status
USFWS				
Species may occur within the project boundary	Piping plover	*Charadrius melodus*	Threatened	Endangered
NMFS				
Project area within the range of waters used by this species	Atlantic sturgeon	*Acipenser oxyrinchus oxyrinchus*	Endangered	High Priority Species of Greatest Conservation Need

9.1 Threatened and Endangered Species

The USFWS Long Island Ecological Services Office was contacted through the Information, Planning, and Conservation System (IPaC) regarding the potential presence of species under the jurisdiction of the USFWS within the project area. The USFWS Official Species List indicates that one threatened species, piping plover (*Charadrius melodus*), may occur within the project area. The piping plover is a small shorebird weighing 1.5 to 2.25 ounces and is 5.5 inches long. The piping plover is light beige with orange legs. In spring and summer, it has a single black neck band and a narrow black band across its forehead. The rump is white and the bill is yellowish with a black tip. Piping plover forage on beaches, dunes and in tidal wrack. Piping plovers breed on dry sandy beaches or in areas that have been filled with dredged sand, often near dunes in areas with little or no beach grass. They occur along the Atlantic Coast from southwestern Newfoundland and southeastern Quebec south to North Carolina. In New York, this species breeds on Long Island's sandy beaches, from Queens to the Hamptons, in the eastern bays and in the harbors of northern Suffolk County. Habitat is only found at the shoreline, on barrier islands, sandy beaches, and dredged material disposal islands. Potential suitable habitat for piping plover is not present within the project area. A No Effect determination was made for piping plover utilizing the IPaC Northeast Endangered Species Determination Key; therefore, no further consultation with, or concurrence from, the USFWS is required with respect to Section 7 of the ESA.

According to IPaC, eight birds of conservation concern are expected to occur within the project area: bald eagle (*Haliaeetus leucocephalus*), black-billed cuckoo (*Coccyzus erythropthalmus*), chimney swift (*Chaetura pelagica*), praire warbler (*Dendroica discolor*), prothonotary warbler (*Protonotaria citrea*), red-headed woodpecker (*Melanerpes erythrocephalus*), rusty blackbird (*Euphagus carolinus*), and wood thrush (*Hylocichla mustelina*).

The NYSDEC Natural Heritage Program (DEC NHP) was contacted regarding the potential presence of rare or state-listed animals and plant species and significant natural communities within the project area. DEC NHP indicates that the state threatened pied-billed grebe (*Podilymbus podiceps*) has been documented breeding in an area that includes the project area. State threatened bald eagle (*Haliaeetus leucocephalus*) has been documented breeding within 0.5 mile of the project area. A description of these two species is provided below.

- Pied-billed grebe: The pied-billed grebe is a small waterbird measuring approximately 11 to 15 inches in total length, with a 20 to 22.5 inch wingspan and average weight of just 0.75 to 1.0 pound. Their name comes from their most distinguishing characteristic: the pied, or two- colored, bill which is bluish-white with a distinct black vertical bar on either side. The bill is short, laterally compressed, and slightly hooked downward. They return to New York between late March and mid-April. Pied-billed grebes nest in freshwater marshes associated with ponds, bogs, lakes, reservoirs, or slow-moving rivers. Breeding sites typically contain fairly deep open water interspersed with submerged or floating aquatic vegetation and dense emergent vegetation. Non-breeding habitat includes freshwater

ponds, impoundments, lakes, rivers, brackish marshes, estuaries, inlets and coastal bays.

- Bald eagle: The bald eagle is a long-lived bird, with a life span in the wild of more than 30 years. Adult bald eagles have a wingspan of 7 to 8 feet, a full white head and tail, dark brown, almost black body, and bright yellow bill. They reach adult size by the time they can fly. Preferred bald eagle habitat includes areas of forest that are associated with rivers, marshes, large lakes and other large areas of open water. Foraging habitat for bald eagles consists of large perch trees near a body of open water where they hunt for fish. Bald eagles prefer to nest, perch and roost in old-growth and mature forest stands of conifers and hardwoods.

There is also a historical record of state threatened least bittern (*Ixobrychus exilis*) breeding at Pralls Island and Saw Mill Creek Marsh in 1982. For this historical record, it is not known whether the rare plant or animal still exists at these locations. However, the rare plant or animal listed in the record may still occur in the area if habitat and site conditions are favorable.

The following plants listed as endangered or threatened by New York State were documented within 0.5 mile of the project area: sweetbay magnolia (*Magnolia virginiana var. virginiana* – state endangered); rose-pink (*Sabatia angularis* – state endangered); and persimmon (*Diospyros virginiana* – state threatened).

According to the NMFS Endangered Species Act Section 7 Mapper, no critical habitat for any species exists within the project area. The project area is within the range of waters used by the federally endangered Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*). Migrating and foraging subadult and adult Atlantic sturgeon may occur year round in the vicinity of the project area.

WSP conducted biological field surveys on to determine the presence of any special status species and conducted habitat suitability assessments to determine the potential for special status flora and fauna to occur within the project area. Special attention was focused on special status flora and fauna identified through the literature review conducted prior to the field surveys. As discussed in Section 7.2, WSP biologists observed stand of permission in the successional upland forest within the eastern portion of the project area. No other special status flora and fauna were encountered or detected by sign within the project area.

9.2 Rare Species

According to NYSDEC Environmental Resource Mapper, the project area is in the vicinity of plants and animals listed as endangered, threatened, or rare by New York State. Atlantic coast leopard frog (*Lithobates kauffeldi*), a critically imperiled species in New York, was documented within 0.5 mile of the project aera. Seaside dragonlet (*Erythrodiplax berenice*), an imperiled species in New York, was documented in an area adjacent to the project area in 2008.

9.3 Significant Natural Communities

The DEC NHP tracks locations of significant natural communities because they serve as habitat for a wide range of plants and animals, both rare and common, and because community occurrences in good condition support intact ecological processes and provide ecological value and services. Significant natural communities include rare or high-quality wetlands, forests, grasslands, ponds, streams, and other types of habitats, ecosystems, and natural areas. DEC NHP reports that red maple-sweetgum swamp, a significant natural community, was documented within 0.5 mile east of the project area. According to the DEC NHP Online Conservation Guide, this community is concentrated in the western half of Staten Island. Sweetgum (*Liquidambar styraciflua*) is often the dominant tree or may be codominant with red maple (*Acer rubrum*). There has been extensive historical extirpation of red maple-sweetgum swamps, and no old-growth examples remain north of Richmond County.

10.0 ESSENTIAL FISH HABITAT

According to NOAA's EFH Mapper, the waters within the vicinity of the project area are designated as Essential Fish Habitat (EFH) for various life stages of 11 federally managed species. The species and life stages with designated EFH are listed in **Table C-8**. EFH is defined as waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. The project area also supports forage species which are an important resource for EFH-designated fish species. There are no Habitat Areas of Particular Concern (HAPC) or EFH areas protected from fishing (EFHA) designated by NOAA's EFH Mapper within the Site. However, summer flounder HAPC is defined as all native species of macroalgae, seagrasses, and freshwater and tidal macrophytes in any size bed, as well as loose aggregations, within adult and juvenile summer flounder EFH. Therefore, the vegetated intertidal marsh within the project area may be considered a HAPC for summer flounder.

TABLE C-8. DESIGNATED ESSENTIAL FISH HABITAT WITHIN THE PROJECT AREA

Species	Eggs	Larvae	Juveniles	Adults
Atlantic butterfish *(Peprilus triacanthus)*		X		
Atlantic herring *(Clupea harengus)*		X	X	X
Bluefish *(Pomatomus saltatrix)*			X	X
Clearnose skate (*Raja eglanteria*)			X	X
Little skate (*Leucoraja erinacea*)			X	X
Longfin inshore squid (*Doryteuthis (Amerigo) pealeii*)	X			
Red hake *(Urophycis chuss)*	X	X	X	X
Summer flounder *(Paralichthys dentatus)*		X	X	X

Windowpane flounder *(Scophthalmus aquosus)*	X	X	X	X
Winter flounder *(Pseudopleuronectes americanus)*	X	X	X	X
Winter skate (*Leucoraja ocellata*)			X	X

Clearance for potential impacts to EFH and HAPC will be obtained from the NMFS prior to restoration activities. Construction of the project will result in primarily beneficial impacts to habitat for aquatic biota within the project area and the greater Arthur Kill region. Construction activities may result in short-term increases in erosion and delivery of sediment to nearby wetlands and waters. Most EFH-designated species likely to occur in the project area are typically found in the often turbid conditions of estuaries and can avoid temporary increases in suspended sediments. Impacts will be mitigated by measures including performing the majority of earthwork during low tide, avoiding in-water work from January through June to protect winter flounder and anadromous fish, employing measures to minimize migration of turbidity off-site, and re- stabilizing soils with plants after construction is completed. Additionally, best management practices for soil erosion and sediment control will be used to minimize sediment entering waterways.

It is anticipated that temporary impacts to EFH would occur during construction of the project, however, adverse impacts would be minimized by implementing minimization and avoidance measures such as seasonal restrictions and best management practices during an in-water construction. For these reasons, no long-term adverse impacts to EFH-designated species or habitat, or forage species are expected from construction and operation of the Bank.

11.0 Phase 1 ESA

In May 2013, a Phase I Environmental Site Assessment (ESA) for the 91.1-acre general project area was conducted. The general project area, which includes the 68.5-acre pilot bank project area as well as the proposed 10.90-acres of additional Southwestern Section area, consists almost entirely of undeveloped tidal marsh and upland areas with some areas of fill and development from adjoining parcels. Based on the data obtained during the inspection, interviews, historical resources review and regulatory agency records review, the ESA recommends action and/or additional investigation of the Recognized Environmental Conditions (RECs). Finding of the ESA in the 10.90 additional Southwestern Section area are summarized below.

Nonindigenous Fill Material

Nonindigenous fill material should be removed and properly disposed of at an off-site location in accordance with all applicable laws and regulations during marsh restoration activities. It was recommended that prior to and/or during removal activities, an investigation of the fill material should be conducted to identify the extent, depth and physical characteristics of the fill in accordance with the NYSDEC DER-10-Technical Guidance for Site Investigation and Remediation (May 2010) (DER-10). Widespread dumping was observed, some of which consisted of:

- General Dumping
- Discarded 55-gallon Drums in Fill Berm
- Discarded 55-gallon Drum in Fill Area

All discarded and dumped items, and general project area-wide debris should be removed and properly disposed of at an off-site location in accordance with all applicable laws and regulations during marsh restoration activities. If, during removal, a release is encountered, additional investigation in accordance with the DER-10 may be warranted. Other RECs that were noted in are:

- Potential Off-Site Impacts
- Suspected Pesticide Application
- Conrail Railroad Along Western General Project Area Boundary

The Phase I ESA indicated that an area-wide characterization plan be developed and implemented to investigate potential impacts caused by adjacent property uses, recent and/or historic spills, investigate suspected wide-spread pesticide application during the early- and mid-20th century to reduce mosquito populations, and to investigate any potential impacts caused by the adjacent active railroad.

Based on the results of the Phase I ESA, WSP prepared and implemented a Site Characterization Work Plan to investigate and identify the extent, depth and physical characteristics of the RECs identified during the Phase I ESA.

12.0 Soil and Sediment Contamination Screening

Based on the ESA, a Phase II Site Investigation Work Plan (Phase II) was prepared in coordination with the Interagency Regulatory Team (IRT) in June 2013. In accordance with the Work Plan, rigorous soil, sediment, and groundwater sampling was performed at areas of historic fill and widespread dumping as well as in areas of undisturbed sediments. The Phase II Report (Preliminary Site Screening Letter Results Report) was submitted to the IRT and New York City Department of Environmental Protection (NYCDEP) in October 2013.

The proposed restoration activities may include, but are not limited to, modifications to existing project area topography and the construction of meandering channels. These activities will require excavation of on-site soils. In accordance with WSP's Preliminary Site Screening Work Plan dated June 2013, soil, sediment and groundwater sampling was performed at areas of historic fill and widespread dumping, as identified in WSP's May 2013 Draft *Phase I Environmental Site Assessment Report*, as well as in areas of undisturbed sediments which may have been impacted from nearby filling and dumping. The purpose of the Site Screening was to investigate and identify the extent, depth and physical characteristics of the historic fill material. In accordance with the June 2013 work plan, the following tasks were conducted from July to September 2013:

- Soil and Sediment Borings;
- Soil, Sediment and Groundwater Sampling and Analysis;
- Soil and Sediment Logging; and
- Sieve analysis (grain size distribution) analysis.

Soil sampling was targeted to two distinct environmental conditions; areas of historic fill and widespread dumping and included samples in the Southwestern Section area. The sediment samples were targeted to areas of anticipated excavation and areas with direct exposure to dumping. Soil analysis for samples located within the historic fill included Total Petroleum Hydrocarbon Content (TPHC), Target Analyte List (TAL) Metals, Polycyclic Aromatic Hydrocarbons (PAHs), Polychlorinated Biphenyls (PCBs) on 25% of samples exhibiting the highest TPHC results, and Target Compound List (TCL) Volatile Organic Compounds (VOC+15) at any location where readings from a properly calibrated photoionization detector (PID) exceeded 5 times background levels (5 ppm). In addition, Total Organic Carbon (TOC), grain size distribution and pH analyses were performed on deeper samples collected from the native material at each location.

Soil analysis for samples collected within the areas of widespread dumping included sampling for TPHC and TCL+30/TAL. Grain Size Distribution, TOC and pH analyses were performed on deeper samples collected from the native material at each location.

The analytical results for the soil samples collected were compared to the Soil Cleanup Objectives as per the NYSDEC Regulations 6 NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives (December 14, 2006) (SCOs) for Restricted Use Residential (Track 2) and Protection of Ecological Resources (Track 2). It should be noted that these guidelines are not cleanup standards, but screening guidelines.

Sediment analysis included sampling for TPHC, TCL+30/TAL, grain size distribution, TOC and pH analysis at each location. The analytical results for the sediment samples collected were compared to the Salt Water Sediment Criteria, Technical Guidance for Screening Contaminated Sediment, NYSDEC, January 1999 for Human Health (bioaccumulation), Benthic Aquatic Life (acute toxicity and chronic toxicity), and Wildlife (bioaccumulation) (SCSs). Furthermore, the sediment results were also compared to the Effects Range-Low (ERL) and the Effects Range-Median (ERM) in accordance with the Technical Guidance for Screening Contaminated Sediment, NYSDEC, January 1999.

Soil and sediment borings were visually classified in the field using the Burmister Classification System (Burmister, 1949) and Unified Soil Classification System (USCS). Munsell® Rock- Color Charts (GSA, 1995) were used for the color identification. All borings were backfilled with on-site soil or sediment.

Significant areas of fill were identified within the Southwestern Section area, primarily concentrated along roadways and around the perimeter of the privately-owned parcels that abut the

area. However, filling has occurred outside of the privately held parcels. In general, storm-driven debris consisting of, but not limited to, plastic materials, tires and household garbage is located throughout the area, primarily concentrated along the areas of topographic highs. Purposeful dumping of a variety of items including construction and demolition debris, scrap metal, tires, garbage, and drums is also prevalent throughout the project area, primarily within the areas of fill.

Three soil boring locations were sampled to investigate historic fill and widespread dumping within the Southwestern Section (SB11, SB12 and SBGW4). Each soil boring was advanced to a depth great enough to reach the native material below the fill (if present) or to the maximum depth that could be achieved. From each soil boring, an A-interval sample was collected at the 6- inch interval most representative of the fill material and the deeper B-interval sample was collected from the first 6-inches of native material. Fill material consisted of brick, wood, concrete, fiberglass, floor tile, stone (schist block fragments), metal, glass, plastic, rope and plywood. Native soils were found to consist of dark yellowish brown coarse to fine sand exhibiting a mottled texture overlain in some places by black to greenish black organic silt with roots. Groundwater was encountered at a minimum depth of 1 foot bgs and always within 6 feet of the ground surface at each of the soil boring locations.

Two sediment boring locations were completed to investigate sediments within the Southwestern Section (S3 and S5). Sediment borings were advanced to a depth of 2.5 feet bgs. Sediments were found to consist of black to dark yellowish orange sands and organic clayey silty sands. At each sediment location, groundwater was encountered at the surface or within 1 foot of the surface.

Based on the results of analytical sampling, the conclusions and recommendations are as follows:

- Fill material was placed in historic wetlands and uplands, mostly adjacent to privately held parcels of land. Fill material consist of brick, wood, concrete, fiberglass, floor tile, stone (schist block fragments), metal, glass, plastic, rope and plywood.
- Metals are the primary contaminant.
- In most cases contaminant concentrations are found to decrease with depth.
- Soil lead concentrations at three locations were high.
- Excavated soils must be handled and disposed of in accordance with 6 NYCRR PART 375 Environmental Remediation Programs.

Supplemental sampling is proposed in 2023 to further characterize the Southwestern Section area. The proposed supplemental sampling plan was developed in accordance with the final revised Addendum Site Screening Work Plan Revision 4 (for the eastern and western sections) which was approved by both New York State Department of Environmental Conservation (NYSDEC) and NYCDEP implemented in 2014. This supplemental sampling plan includes the comparison of results to NYSDEC Regulations Title 6 of the Official Compilation of New York Codes, Rules and Regulations (6 NYCRR) Part 375 Remedial Program Soil Cleanup Objectives, the Protection of Health Residential (Track 2) Soil Cleanup Objectives (SCOs), the Protection of Ecological Resources, (Track 2) SCOs, and the Protection of Groundwater (Track 2) SCOs.

The results will be used to inform the restoration design, so that the site is designed to remove the contaminants.

13.0 Fish and Wildlife Resource Impact Analysis

WSP performed an ecological evaluation of the general project area, including the Southwestern Section area. A Resource Characterization (Part 1 of a Fish and Wildlife Resources Impact Analysis) was conducted based on the New York State Department of Environmental Conservation (NYSDEC) DER-10 Technical Guidance for Site Investigation and Remediation to evaluate the actual or potential impacts to fish and wildlife resources from project area contaminants of ecological concern under existing and proposed conditions.

Environmentally sensitive areas identified on and immediately adjacent to the project area include wetlands and surface water. Fish and wildlife resources are present within and adjacent to the project area and have been observed utilizing these resources. Evidence of dumping of trash/debris was observed throughout the project area, predominately in the forested portions of the project area, adjacent to private parcels, and along perimeter roads. Observed debris included concrete, automobiles and parts, scrap metal, drums, and household garbage. Additionally, portions of the project area's historic wetlands have been filled. There were no signs of ecological stress or absence of biota observed within or adjacent to the project area, and all investigated vegetated areas appeared healthy.

There are known contaminants of ecological concern within the project area's surficial soils and sediments. A review of soil and sediment samples collected from the project area indicates that the following known contaminants of ecological concern occur within the project area:

- metals (arsenic, barium, chromium, copper, lead, nickel, mercury, selenium, and zinc);
- pesticides (4,4-DDE and 4,4-DDT);

Based on the data collected during this investigation, the project area does currently appear to pose an ecological risk. There are known contaminants of ecological concern present in sediments and soils within the project area boundaries. Environmentally sensitive areas were identified on and immediately adjacent to the project area. Contaminant migration pathways are present within the project area in the form of direct exposure to wildlife via contaminated soils and sediments and the flow of contaminated sediments to other sensitive areas. Although no apparent ecological impacts were observed, project area contaminants of ecological concern could potentially impact fish and wildlife resources. However, current conditions will be significantly improved through the planned restoration of wetlands within the area. Southwestern Section of the Saw Mill Creek Pilot Wetland Mitigation Bank will remove contaminated soils and debris from the project area, thereby reducing contaminants of ecological concern. The material will be disposed off at an off-site upland disposal facility in accordance with federal, state and city regulations.

14.0 Cultural Resource Summary

For the Bank and following the 2012 CEQR technical manual (Section 9.320), WSP submitted a written description of the project to the New York City Landmarks Preservation Commission (LPC) in June 2013. LPC completed an initial environmental review of the proposed project area's lots and indicated the following.

- There are no Properties with Architectural significance on site.
- All lots possess archaeological significance and will require the completion of an archaeological documentary study for project area.

In October 2013, NYCEDC's consultants submitted a Phase IA Archaeological Documentary Study to LPC. The Phase IA study indicated that there are a few areas of archaeological sensitivity and recommended Phase IB archaeological testing be undertaken if there will be ground disturbance in these areas. On the west side, there is one area of "historic period sensitivity" that will be excavated during wetland restoration activities of Phase 2.

In November 2013, the NYC Landmarks Preservation Commission agreed there is limited sensitivity within the project area. LPC requested that NYCEDC provide a scope of work for archaeological fieldwork in areas of proposed ground disturbance. NYCEDC established an archaeological fieldwork protocol for the sensitive area on the west side for approval by LPC and the New York State Office of Parks, Recreation, and Historic Preservation. As archaeological fieldwork requires excavation of fill from the western wetland, it makes sense to conduct fieldwork during construction. All archaeological testing will be conducted according to OSHA regulations and applicable archaeological standards (New York Archaeological Council 1994, NYSOPRHP 2005; LPC 2002; CEQR 2012). Professional archaeologists, with an understanding of and experience in urban archaeological excavation techniques, would be required to be part of the archaeological team.

LPC accepted the archaeological monitoring protocol on February 10, 2014. Coordination with the State Historic Preservation Office (SHPO) is complete.

15.0 FEDERAL AVIATION ADMINISTRATION COORDINATION

Per the 1996 Federal Aviation Administration (FAA) Wetland Banking Mitigation Strategy (FAA Banking Strategy) and Advisory Circular 150/5200-33 *Hazardous Wildlife Attractants On or Near Airports,* the FAA recommends a separation distance of 10,000 feet for any potential hazardous wildlife attractant for airports that serve turbine-powered aircraft. The FAA Banking Strategy states that "*to minimize wetland-related risk to aviation safety, FAA program offices and airport sponsors are strongly encouraged not to establish a bank or purchase credits from banks that are located within*

- *5,000 feet of a runway that serves piston-powered aircraft; or*

- *10,000 feet of a runway that serves turbine-powered aircraft.…..*
- *FAA program offices and airport sponsors may consider using a wetland bank not meeting these distance criteria only when the bank provides special ecological functions such as:*
- *maintaining habitat essential to Federally-listed endangered or threatened species; or*
- *maintaining unique wetland functions (e.g., aquifer recharge, flood control, filtration).*"

The proposed addition to the Bank is located well beyond the 10,000 foot separation distance. The area is over 12,000 feet (2.4 miles) from Linden Airport (LDJ) and over 22,000 feet (4.2 miles) from Newark Liberty International Airport (EWR).

According to the FAA Banking Strategy, "Written verification that the bank is not within the 5,000 or 10,000-foot criteria…shows that the bank providing the credits should not pose hazardous conditions to aviation."

Therefore, NYCEDC believes the Bank is in compliance with the FAA Banking Strategy and that there is no need to demonstrate that the proposed bank meets the special ecological function noted in the FAA Banking Strategy. NYCEDC does note that the area has been designated as a Significant Habitat Complex of the New York Bight Watershed by the U.S. Fish and Wildlife Service (US FWS).

On January 23, 2014, FAA issued a determination that the "FAA has no objections at this time."

16.0 Development Trends

The Sandy-Hook-Staten Island Watershed (HUC 02030104) is currently under significant development pressure. Activities include the development of currently undeveloped lands and the redevelopment, expansion, and maintenance of existing infrastructure. There are currently trends and initiatives on Staten Island and the greater NYC area that will shape development in the region for years to come. Richmond County has been one of the fastest developing counties in New York State. The demand for wetland mitigation does not directly come from construction of new housing; rather, it is the expansion and/or construction of infrastructures to support the incoming population, improve NYC's climate resilience, support a transition to renewable energy, and create economic opportunities on the waterfront which generate the need for wetland mitigation. While at this time it is not possible to determine acreages of wetland impacts that come as a result of these trends, it is reasonable to assume that some wetland impacts will occur as a result.

Before the existing Saw Mill Creek Pilot Wetland Mitigation Bank became operational, a market analysis was conducted in order to assess the need for bank credits within the Bank's service area. Agencies and organizations that operate within the service area of the Bank that were contacted include: The New York State Department of Transportation (NYSDOT) Region 11, The Brooklyn Bridge Park, The Hudson River Park, New York City Department of Parks and Recreation, The New York City Department of Environmental Protection, and other entities. Agencies and

organizations that operate in the NYC area were surveyed to determine what (if any) future projects they were planning that could potentially involve wetland impacts needing mitigation credits. Sources of information included: City Environmental Quality Review applications, available on the webpage of the Mayor's Office of Environmental Coordination: the Land Use and CEQR Application Tracking System (LUCATS) maintained by the Department of City Planning; personal communications with individuals; and the websites of the various organizations. Data collected indicated numerous planned projects would require wetland mitigation into the future, particularly within Staten Island.

NYCEDC began marketing mitigation credits generated by the Saw Mill Creek Pilot Wetland Mitigation Bank in 2018. Credits have since fulfilled mitigation requirements for multiple infrastructure projects ranging from small in-water construction projects to large-scale coastal and transportation projects. Trends during the first several years of credit availability demonstrate an ongoing need for mitigation for privately-owned and managed projects as well as significant public infrastructure improvements such as those associated with coastal resiliency, open space, transportation and logistics, and renewable energy projects.

The Department of City Planning has active studies and proposals for the development of Staten Island's neighborhoods and transportation networks. There are designated Brownfield Opportunity Areas for the West Brighton and Mid-Island – Bloomfield and Chelsea areas, which involve evaluating existing conditions and identifying opportunities for improvements to transportation networks, industrial facilities, and waterfront access. The **Working West Shore 2030** report lays the framework for investment in development and land use decisions on the West Shore of Staten Island. Physical challenges that hinder opportunities on the West Shore include industrial properties lacking adequate connections to infrastructure; wetlands and environmental challenges constraining reuse; transportation connections left incomplete; and historic communities with limited local services. The final report identifies strategies that will help create jobs, upgrade infrastructure, preserve open space and manage growth over the next twenty years. The **North Shore 2030** report describes how this area of Staten Island can reach its potential through four strategies: promoting quality jobs and workplaces, reconnecting people with the working waterfront, supporting and creating neighborhood centers, and improving connections and mobility. This effort builds upon recently completed and planned investments being made in Staten Island, including the expansion of the New York Container Terminal, the Goethals Bridge expansion, redevelopment at the Stapleton Waterfront and the former Coast Guard site, new public open space at Heritage Park (the former Blissenbach Marina), expanded cultural uses at Snug Harbor, improvements to the St. George Ferry Terminal, and individual investments by the area's maritime businesses.

In the aftermath of Hurricane Sandy, efforts are underway to secure the area from the possible direct and indirect effects of future storms and sea level rise from climate change. The USACE New York District is considering levees, sea walls, and hurricane gates for storm surge protection on the south shore of Staten Island (Schuerman 2013). A draft of the USACE New York & New Jersey Harbor

and Tributaries Study (HATS) released in September 2022 included several alternatives to reduce coastal storm risk that incorporated a variety of storm surge barriers, shoreline based measures, induced flooding mitigation measures, and risk reduction features. The tentatively selected alternative contains many proposed elements within the Bank's service area that would conceivably result in unavoidable impacts to wetlands and therefore require mitigation.

In addition, the State of New York is advancing with ambitious renewable energy targets. The Climate Leadership and Community Protection Act (2019) requires the development of 9,000 megawatts of energy from offshore wind by 2035 en route to a 100% carbon free electricity system in New York State by 2040. New York City has committed to investing over $191M over 15 years to attract the offshore wind industry to the city. This will spur development of ports and infrastructure to support construction and operation of the turbines and invest in other workforce development and research programs to grow a new industry. These initiatives could result in a significant amount of infrastructure construction work within New York City. Such construction would likely impact some wetland areas and require mitigation of the impacts.

17.0 Site Selection Criteria

The addition to the Saw Mill Creek Bank was selected by NYCEDC for the pilot New York City wetland mitigation bank through a consultation process with state agency representatives as well as discussions with representatives from the New York City agencies that currently steward the City's open spaces. The site was selected as the preferred alternative for the addition to the Pilot Bank based on the following criteria: (i) location; (ii) the ecological suitability and services resultant from restoration; and (iii) technical and physical design considerations.

18.0 Alternatives Considered

The objective of this alternatives analysis for the Saw Mill Creek Bank is to demonstrate that the proposed Bank conforms to relevant laws, directives, regulations, and policies that govern such construction, especially as it affects wetland resources. Compliance with these regulations requires an assessment of reasonable alternatives to the proposed action that will avoid or minimize adverse effects.

In evaluating the alternatives, a set of assessment criteria was used to select the preferred alternative. These criteria specified that the preferred alternative must meet project goals, demonstrate utility, and represent a reasonable and practicable alternative, taking into consideration cost, existing technology and logistics, in light of project purposes. Alternatives were also evaluated to determine the environmental consequences associated with implementation. The selected preferred alternative was identified as the scheme that is practicable, meets project goals, and avoids and minimizes environmental impacts to the greatest extent practicable.

The Bank will provide compensatory mitigation for unavoidable impacts to waters of the US,

including wetlands, that result from construction impacts including transportation, residential and commercial buildings, and utility-related activities authorized under the applicable state and federal rules and provided such use has met all applicable requirements. The need for the Bank is based on an understanding of mitigation demand by these entities in the New York City area for the foreseeable future. At the current time, the Saw Mill Creek Pilot Wetland Mitigation Bank is the only bank of its kind servicing NYC..

Part of the Saw Mill Creek project area is currently degraded and contains the invasive *Phragmites australis* (common reed) that has outcompeted native plant species. Sections of the site were historically altered from the tidal influence of Saw Mill Creek by the creation of multiple berms, and the construction of a human-made mosquito ditch network. All of these actions have severely degraded the site and have altered the functions and services provided by the wetlands and waterways of the Saw Mill Creek project area. The establishment of the Bank represents an opportunity to ecologically restore, enhance and preserve a large tract of land within NYC, while providing compensatory mitigation for public and private construction and transportation projects.

18.1 Regulatory Compliance

Prior to public and private entities utilizing the Bank, applicants will be required to obtain necessary permits, which may include: USACE Section 404 & 10 Permits for the placement of fill materials into waters of the United States; NYSDEC Section 401 Water Quality Certification, Protection of Waters, Tidal Wetlands permits; and NYSDOS Coastal Consistency Concurrence. As part of this permitting process, these applicants will have to satisfy the requirements of and provide justification for the placement of fill materials into wetlands according to the Clean Water Act's Section 404(b)(1) Guidelines, in addition to satisfying state requirements. Therefore, the existence of the Bank will not diminish or lower the standards for fill placement under the Section 404(b)(1) Guidelines. Only when an applicant can satisfy the requirements of the Section 404(b)(1) Guidelines will that applicant have potential access to the Bank. Projects that satisfy the Section 404(b)(1) Guidelines should be permitted. Projects that do not satisfy the requirements of the Section 404(b)(1) Guidelines should not be permitted. The Bank offers a means of providing quality mitigation to public and private entities for unavoidable wetland losses, but only after an applicant satisfies the guidelines prepared for administering the Clean Water Act. As such, the Bank will provide quality mitigation in the New York City including, Manhattan, Staten Island and portions of the Boroughs of the Bronx, Brooklyn and Queens.

Federal agencies involved with the environmental review and permit process include the USACE, U.S. Environmental Protection Agency (EPA), National Marine Fisheries Service (NMFS), and USFWS, while the State agencies are the NYSDEC and the NYSDOS. In addition, each of these agencies has a wetland mitigation specialist representative on the IRT. The IRT is tasked with reviewing all wetland mitigation proposals located within the Lower Hudson River watershed.

Wetland mitigation bank development requiring discharges within waters of the U.S. is governed by a number of laws, directives, regulations and policies. Applicable regulations are described

below. It is the intent of this section to demonstrate that the proposed Bank conforms with all existing relevant regulatory requirements.

18.2 Section 404(b)(1) Guidelines

EPA has developed criteria to be used in the evaluation of discharges of dredged or fill material into waters of the United States under Section 404 of the Clean Water Act. *The Guidelines for Specification of Disposal Sites for Dredged or Fill Material* (40 CFR Part 230, December 24, 1980) are commonly known as the Section 404(b)(1) Guidelines. These guidelines indicate that dredged or fill material should not be discharged into the aquatic system unless it can be demonstrated that such a discharge will not have an unacceptable adverse impact. Compliance with the guidelines requires an analysis of alternatives. Specifically, the guidelines state that no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge that would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences. An alternative is defined as practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

The USACE regulates the issuance of permits to fill waters of the United States, including wetlands, pursuant to Section 404 of the Clean Water Act. However, the issuance of a Section 404 permit must be done in compliance with the EPA guidelines described above, pursuant to Section 404(b)(1) of the Clean Water Act, unless the USACE concludes that the economics of navigation and anchorage warrant permit issuance.

Further elaboration and clarification of the application of the Section 404(b)(1) Guidelines was provided in the Memorandum of Agreement (MOA) between the EPA and the USACE on the Clean Water Act, Section 404(b)(1) Guidelines (55 FR 9211, March 12, 1990). This MOA indicates that the EPA and USACE will strive to achieve a goal of no overall net loss of functions and services for wetlands. To achieve this goal the EPA and the USACE have established a sequence by which proposed projects in wetlands are to be evaluated. First, it must be determined that potential impacts have been avoided to the maximum extent practicable. Remaining impacts are to be minimized through appropriate and practicable steps including project modifications, followed by mitigation.

18.3 Methodology

Alternatives investigated for the Bank include the No-Build Alternative and the Build Alternative, as discussed below. The No-Build Alternative was evaluated assuming the Bank would not be implemented. This alternative provides the baseline against which the Build Alternative was evaluated.

18.3.1 No-Build Alternative

Public and private entities and agencies have an acute need for mitigation of anticipated impacts to wetlands in the New York City area. Wetland mitigation is necessary to adhere to the no net loss of wetland functions and services provision. Although no wetland impacts would result from the No-Build Alternative, this alternative would not serve to meet an existing and projected demand for wetland mitigation.

The No-Build Alternative would result in no restoration of the existing degraded, *Phragmites* wetland complex and areas of previous fill resulting in historic berms and illegal dumping. The 10.90 acres of the Saw Mill Creek project area would remain in the same degraded condition. The *Phragmites* and fills would remain as relatively low quality habitat. Therefore, due to the need for better mitigation options within New York City and the environmental benefits of wetland restoration, enhancement and preservation at the Bank site, it has been determined that the No-Build Alternative does not meet the Project Purpose and Need and has not been advanced for further consideration.

18.3.2 Build Alternative

The Bank is proposed within a parcel of land (Saw Mill Creek) owned by the City of New York. Based on the desired removal of *Phragmites* and fill, and to provide reestablishment of tidal flow to portions of the Bank area, it was determined that a channels would need to be established to provide tidal flooding of areas historically filled. For this reason, new channel locations were investigated. Suitable channel design was dependent upon the completion of several baseline studies including Hydrologic and Hydraulic analyses. The channels are designed based on local data, including surveyed cross sections, from on-site functioning tidal wetlands (reference wetlands). The proposed channels are similar to the length, width, sinuosity, and density of channels within the reference wetlands. To ensure the proposed channels adequately convey tidal water to/from the proposed marsh, the cross-sectional area of the channels were designed in accordance with Design Guidelines for Tidal Channels in Coastal Wetlands (U.S. Army Corps of Engineers, Waterways Experiment Station, 1995).

18.4 Conclusion of Alternatives Analysis

This Alternatives Analysis assessed the No-Build and the Build Alternative pursuant to Section 404 (b)(1) Guidelines. Each alternative was first assessed to determine whether the alternative met project objectives. If an alternative did not meet project objectives it was not advanced for further consideration. Each alternative assessed to meet project objectives was evaluated in terms of impacts to waters of the U.S. including wetlands.

Although the No-Build Alternative would not result in any temporary wetland impacts, it was determined that this alternative was not feasible and did not satisfy the project purpose and need.

The No-Build Alternative would not result in restoration of the existing degraded, *Phragmites* dominated wetland complex, nor removal of the historic fill. The *Phragmites* monoculture would remain as relatively low quality habitat. The need for better mitigation options within NYC would not be met. Therefore, the No-Build Alternative was rejected.

In summary, the Build Alternative would allow for the establishment of the Bank, and provide NYC private and public agencies with a viable compensatory wetland mitigation option. Hydrologic and Hydraulic analyses indicated tidal influence from Saw Mill Creek, through new channels would be adequate to provide the appropriate tidal regime.

Removal of historic fill, and restoration of the existing degraded, *Phragmites* dominated wetland complex would occur, the *Phragmites* monoculture would be replaced with a thriving, healthy tidal marsh complex providing improved habitat, and private entities/public agencies would be provided with a viable compensatory wetland mitigation option.

Avoidance, minimization, and reduction components were incorporated into the Build Alternative to minimize wetland and open water impacts to the maximum extent practicable and feasible. It is anticipated that no permanent impacts to wetlands or open waters will occur. Temporary impacts to wetlands would result from construction equipment on timber mats or equivalent will be used to excavate the channels, and removal of historic fill.

In conclusion, the Build Alternative meets project objectives and achieves the intended purpose of meeting the existing and projected demand for compensatory mitigation in the New York City area. The design alternative avoids, minimizes, and reduces wetland impacts to the maximum extent practicable and feasible. Therefore, this alternatives analysis demonstrates that the proposed Bank conforms to relevant laws, directives, regulations, and policies that govern such actions, especially as it affects wetland resources. The Build Alternative was identified as the scheme that is practicable, meets project goals, and avoids and minimizes wetland and environmental impacts.

19.0 CONCLUSIONS

All information collected to date indicates that the project area is ecologically suited to be established as an addition to the existing wetland mitigation bank.

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ATTACHMENT C-1
PROJECT AREA PHOTOGRAPHS

Photo 1: Paved Wetland Re-establishment Area, facing east, November 2021.

Photo 2: Debris piles located in the Upland Buffer Rehabilitation Area, facing west, November 2021.

Photo 3: Wetland Enhancement Area facing west, November 2021.

Photo 4: Wetland Enhancement Area, facing north, November 2021.

Photo 5: Wetland Enhancement Area transitioning to Upland Buffer Rehabilitation Area, facing east, November 2021.

Photo 6: Upland Buffer Rehabilitation Area, facing north, November 2021.

Photo 7: Understory of Japanese knotweed in Upland Buffer Rehabilitation Area ,facing south, November 2021.

Photo 8: *Phragmites*-dominated Wetland Rehabilitation Area, facing north, November2021.

Photo 9: Edge of *Phragmites*-dominated Wetland Rehabilitation Area transitioning to Wetland Enhancement Area, facing east, November 2021.

Photo 10: Fill material on edge of Wetland Re-establishment Area, facing northeast, November 2021.

REVISED ATTACHMENT C-3
HISTORIC AERIALS WITH SOUTHWESTERN SECTION DEPICTED

Site Boundary

NYC/EDC

Historic Aerial
1857
Marshes Southwestern Section Staten Island, New York

WSP

February 2023

Site Boundary

NYC/EDC

Historic Aerial
1924
Marshes Southwestern Section Staten Island, New York

WSP

February 2023

Site Boundary

NYC/EDC

Historic Aerial
1943
Marshes Southwestern Section Staten Island, New York

WSP

February 2023

Site Boundary

NYC/EDC

Historic Aerial
1954
Marshes Southwestern Section
Staten Island, New York

WSP

February 2023

NYC/EDC

Historic Aerial
1966
Marshes Southwestern Section Staten Island, New York

WSP

February 2023

Site Boundary

NYC/EDC

Historic Aerial
1970
Marshes Southwestern Section Staten Island, New York

WSP

February 2023

100 50 0 100
Feet

Site Boundary

NYC/EDC

Historic Aerial
1975
Marshes Southwestern Section Staten Island, New York

WSP

February 2023

Site Boundary

NYC/EDC

Historic Aerial
1984
Marshes Southwestern Section Staten Island, New York

WSP

February 2023

Site Boundary

NYC/EDC

Historic Aerial
1991
Marshes Southwestern Section Staten Island, New York

WSP

February 2023

Site Boundary

NYC/EDC

Historic Aerial
2006
Marshes Southwestern Section Staten Island, New York

WSP

February 2023

EXHIBIT D
PROJECT DEVELOPMENT
PLAN FOR SOUTHWESTERN SECTION

Project Development Plan

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1.0 Overview

This Project Development Plan has been prepared for the 10.90-acre additional area of proposed mitigation for the Saw Mill Creek Pilot Wetland Mitigation Bank (Bank). The Bank Sponsor is submitting this information to support its request to modify the June 2015 Mitigation Banking Instrument (MBI) to add the additional 10.90 acres area of proposed mitigation to the Bank. The purpose of the project is to restore, enhance, and maintain 10.90 acres of emergent wetlands, scrub shrub wetlands, open water channels, mudflat habitat, and uplands on Staten Island in accordance with the provisions of this MBI and regulatory permits. The City of New York has developed a Bank Development Plan for the additional area which is described below. Upon construction completion, signed and sealed as-built drawings will be submitted to the IRT for review and approval in accordance with Section IV.K of the Instrument.

The proposed site provides a significant tidal wetland restoration opportunity in New York City and in the NYSDEC Atlantic Ocean/Long Island Sound Watershed and the HUC08 Sandy Hook-Staten Island subbasin (02030104). It is anticipated that the additional area will provide the following wetland functions and services:

- Improved water quality,
- Improved flood attenuation;
- Improved sediment quality,
- Increased plant diversity, and
- Increased wildlife species abundance and diversity.

The first goal for the Bank Development Plan is to restore and maintain targeted tidal hydrology by restoring tidal flow with new tidal swales. The second goal for the restoration design is to provide the correct site topography to support the desired tidal marsh vegetation and features. Once appropriate tidal hydrology and topography are established on the site, the next goal is to establish native vegetation and habitat. To encourage native plants, an invasive species control plan will be implemented, followed by the planting of native saltmarsh species. In addition to the proposed plantings, additional native species, such as salt marsh fleabane (*Pluchea odorata, P. purpurescens)*, are anticipated to colonize the site. The growth of these native species will be encouraged, while the growth of invasive species, such as *Phragmites,* will be discouraged.

The final goal for the restoration design is to maximize wetland functions and services, particularly for wildlife habitat and water quality improvement. The site's location designates it as part of the Atlantic Flyway, providing a crucial stopover site for birds during their southbound migration in late summer and fall. It also serves as an oasis for wildlife in a predominantly urban watershed, offering natural habitat in a watershed limited with such resources. The dominance of *Phragmites* throughout portions of the site has created a monoculture of habitat, which limits habitat and decreases wildlife species diversity. *Phragmites* has replaced native plant species and its dense cover has adversely affected hydrology and the use of open water and marsh surface by aquatic species. By restoring the marsh to contain heterogeneity of habitats, wildlife species diversity will improve. Avian species, in particular, are attracted to a variety of habitats in comparison to a single habitat type. The combination of mud flat, open water, low marsh, high marsh, scrub-shrub and forest proposed for the site would provide the diversity of habitat types needed to support a variety of wildlife species, whether on a migratory stopover or as a resident.

2.0 Restoration Design Plan

The Final Rule for Compensatory Mitigation for Losses of Aquatic Resources (33 CFR 332.2) defines "restoration" as the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. To track net gains in aquatic resource area, restoration is divided into two categories: reestablishment and rehabilitation.

Based on the mitigation definitions from the NYSDEC *Guidelines on Compensatory Mitigation*, "restoration" means reclaiming a degraded wetland to bring back one or more functions that have been partially or completely lost by such actions as filling or draining. It is the preferred form of mitigation because it typically has the greatest chance of successfully establishing natural wetland functions.

In accordance with the federal and state definitions, the proposed additional area will restore former and degraded wetlands to natural/historic functions. This plan proposes to restore tidal hydrology to a previously filled, hydrologically impaired, and *Phragmites*-dominated area. The restoration design strives to maximize ecological restoration and avoid indirect impacts to adjacent properties. As part of

the design process, technical studies were undertaken to assess topography, tidal elevations, and other features. A New York State licensed land surveyor conducted a survey to develop a surface topographic map that was used as the basis of the design plans. Bio-benchmark surveys of key vegetative communities were performed to aid in determining target wetland planting elevations, which dictate design grades. Hydrologic and hydraulic analyses were conducted, including the installation of tide gages to measure site specific tidal fluctuations at the site (see Attachment D-1, Tidal Data Analysis Report). Final design elevations and optimal habitat ranges were determined through integration of the bio-benchmark and hydrology data and incorporation of project goals and site/constructability constraints and by observations during the construction and post-construction monitoring of the eastern area of the Bank (Phase 1).

Restoration of ditched, filled, and/or degraded wetland and upland areas to a high level of function shall be accomplished by a combination of practices, including removal of pavement, berms and other fill material, regrading to suitable tidal marsh elevations, restoration of tidal swales, treating non-native invasive species with an EPA-approved herbicide for use in aquatic habitats, and replanting with native vegetation like those listed in Table D-1. The design will be conducted in accordance with the *New York State Salt Marsh Restoration and Monitoring Guidelines* and the *Native Species Planting Guide for New York City and Vicinity*.

Portions of the site will also be enhanced. *The Final Rule for Compensatory Mitigation for Losses of Aquatic Resources* (33 CFR 332.2) defines "enhancement" as the manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). The Bank Development restoration and enhancement plan is described in the following sections and the proposed habitats are depicted on Figure D-1. Design Plans are provided as Attachment D-2.

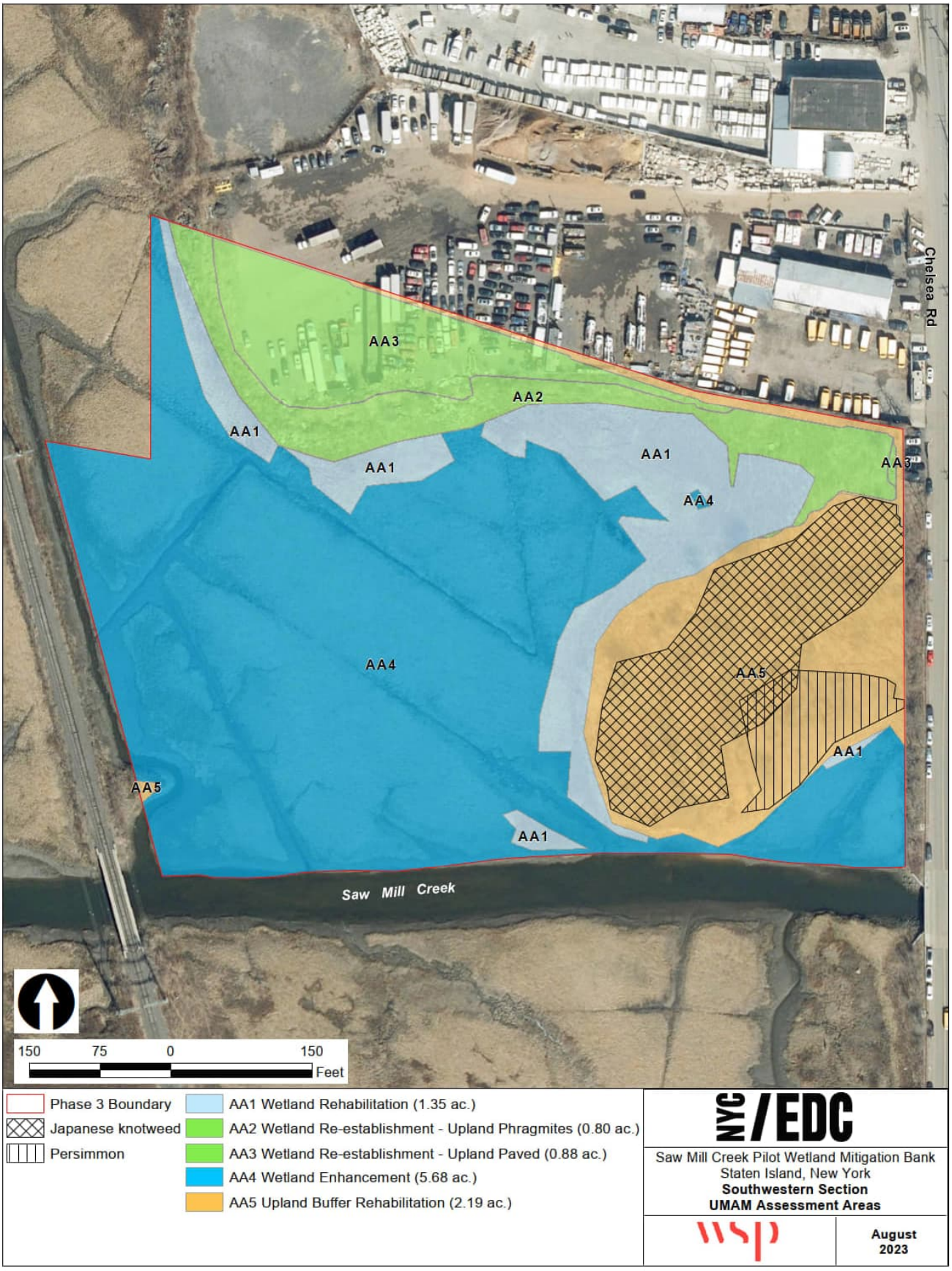

Chelsea Rd
AA1
AA2
AA3
AA4
AA5
Saw Mill Creek
150 75 0 150
Feet
Phase 3 Boundary
Japanese knotweed
Persimmon
AA1 Wetland Rehabilitation (1.35 ac.)
AA2 Wetland Re-establishment - Upland Phragmites (0.80 ac.)
AA3 Wetland Re-establishment - Upland Paved (0.88 ac.)
AA4 Wetland Enhancement (5.68 ac.)
AA5 Upland Buffer Rehabilitation (2.19 ac.)
NYC EDC
Saw Mill Creek Pilot Wetland Mitigation Bank
Staten Island, New York
Southwestern Section
UMAM Assessment Areas
WSP
August 2023

Table D-1. Anticipated Species to be Planted at Bank

Planting Zone	Scientific Name (Common Name)
Low Marsh	*Spartina alterniflora* (smooth cordgrass)
High Marsh	*Distichlis spicata* (spike grass)
	Spartina patens (saltmeadow cordgrass)
	Spartina alterniflora (smooth cordgrass)
	Juncus gerardii (black grass)
Scrub-Shrub Wetland	*Baccharis halimifolia* (groundsel tree)
	Iva frutescens (Jesuit's bark)

2.1 Design Elements for Additional Area

Wetland Restoration (Re-Establishment)

Much of northern section of this additional area consists of construction/demolition debris and other fill material over former marshlands. This material will be removed and the area graded to low and high marsh elevations, tidal swales will be excavated to restore tidal flow and circulation, and the marsh plain will be planted with appropriate native salt marsh grasses and shrubs.

Wetland Restoration (Rehabilitation)

Portions of the additional area are dominated by fill and invasive *Phragmites*. Survey data indicates that elevations in this area are too high to support salt marsh species and this area will be excavated to achieve suitable elevations to support a tidal salt marsh. Debris and fill material will be removed and the area graded to low and high marsh elevations, tidal swales will be excavated to restore tidal flow and circulation, and the marsh plain will be planted with appropriate native salt marsh grasses and shrubs.

Wetland Enhancement

Parts of the project area consist of low and high marsh. Based on conditions within the proposed additional area boundary, it is expected that *Phragmites* will continue to be the primary invasive species

threatening wetland habitats. To prevent the decline of these aquatic resources, *Phragmites* will be managed during the life of the Bank in low and high marsh habitats through spot applications of an EPA-approved herbicide. In addition, these marshes are threatened by the pervasive dumping in the area. Existing debris in these areas will be removed. By enhancing these wetlands as part of a mitigation bank, the threat of illegal filling and dumping is minimized. The design will include impediments to dumping to the maximum extent possible, including permanent fencing. After site construction and planting, the site will be posted and frequently inspected.

Buffer Rehabilitation

Forested buffers within the additional area will be rehabilitated through removal of debris and non-native, invasive species that compromise native diversity and wildlife usage. Target invasive species include, but are not limited to, Japanese knotweed, oriental bittersweet, and tree-of-heaven. These and other dominant non-native invasive species will be managed through the application of an EPA-approved herbicide for use in aquatic habitats and by the seeding of select native species. After site construction and planting, the site will be posted, fenced, and frequently inspected to discourage dumping.

2.2 Hydrology Design

Based on the desired removal of *Phragmites* and fill, and to provide reestablishment of tidal flow to portions of the Bank area, it was determined that shallow tidal swales would need to be established to provide tidal flooding of areas historically filled. The swales were designed based on local data, including surveyed cross sections, from on-site functioning tidal wetlands (reference wetlands). The proposed swales are similar to the length, width, sinuosity, and density of swales within the reference wetlands.

2.3 Habitat Improvements

The proposed project would improve fish and wildlife habitat by removing existing soils containing metals and other harmful substances, exposing cleaner soils.

3.0 Sea Level Rise

It is important to plan for sea level rise (SLR) impacts in designing tidal wetland restoration projects. One of the main goals of the project is to create resilient tidal wetlands in the face of sea level rise. To support the project design, WSP projected future impacts of sea level rise at the site (see Attachment D-3). In simulating future impacts of sea level rise at the site, the NOAA Global and Regional Sea Level Rise Scenarios for the United States methodology was used (NOAA, 2022).

WSP calculated the intermediate low, intermediate medium, intermediate high, and high rates of relative SLR at the site at 10-year intervals for an approximate period of 50 years from the assumed 2024 project start date, under both build scenario and the no-build scenario. Levels for mean low water (MLW), mean high water (MHW), and mean high water spring (MHWS) (with the sea level rates incorporated) were calculated to provide the data for the impact analysis. An examination of the existing site topography and proposed grading indicate that under all four sea level rise scenarios, there would be no apparent effects to roads, parking, facilities or facility access. However, higher tides from spring tide and storm surge events would rise beyond the mapped low sea level rise MHW line, possibly affecting roads and parking lots, on occasion. The potential impacts of future sea level rise will not change the amount of credits generated by the Bank. The target aquatic and upland buffer habitats established during construction and the five-year monitoring period are the basis for the bank credits.

4.0 Construction Activities

4.1 Construction Sequence

Construction will be undertaken with the following sequence:

- Site Clearing of upland areas that are designated as Wetland Restoration (reestablishment) on the Bank Development Plan.
- Temporary Silt Fence is proposed around the project site boundary.
- Temporary Construction Entrance the placement of temporary construction entrances on the project site.

- Chain Link Fencing and Gates will be installed along the project site boundary.
- Debris Removal consists of the handling, separation, stockpiling, compaction, removal, transportation and disposal of all human-made debris from the bank mitigation property, including items seen on the surface and debris encountered during excavation.
- Unclassified Excavation & Disposal of non-contaminated soils.
- Phase 1B archaeological testing will be conducted concurrent with excavation, in accordance with the protocol established in the Programmatic Agreement.
- Laboratory Analysis will involve all work to take site samples and test soils in order to separate and properly dispose of contaminated soils.
- Segregation and Storage of Contaminated Soil involves the removal and stockpile of contaminated soils from non-contaminated soils during excavation.
- Disposal of Contaminated Non-Hazardous Waste Soil involves the disposal of all excavation deemed as a contaminated soil.
- Temporary Seed & Mulch is proposed during construction on the upland grass areas.
- Herbivory Fencing will be placed on areas designated as Wetland Restoration.
- Herbaceous Planting Smooth cordgrass, spike grass, saltmeadow hay, and black grass are proposed to be planted on 2-foot centers in the Wetland Restoration areas.
- Shrub Planting Groundsel tree and Jesuit's bark are proposed to be planted on 5-foot centers in the Wetland Restoration areas.
- Herbaceous Seed Mix will be spread in the area designated as Buffer Rehabilitation. The seed mix is comprised of *Echinochloa walteri* (coast cockspur grass), *Andropogon gerardii* (big bluestem), *Hordeum jubatum* (foxtail barley), *Lolium multiflorum* (ryegrass), and *Panicum virgatum* (switchgrass).
- Controlling Invasive Plant Species by Herbicide application following five annual growing seasons to control invasive plant species from encroaching into the project area.

4.2 Anticipated Construction Phases and Schedule

Assuming the longest construction Schedule for the channel excavation and planting, construction activities would take approximately eight (8) months, from Fall 2023 to Spring 2024. As of the date the

Instrument is entered into by the Parties, the anticipated timelines are outlined below, (while detailed descriptions of each phase are provided thereafter):

Month 1

Construction Entrance - Temporary
Turbidity Curtain – Temporary
Silt Fence – Temporary
Clearing and Grubbing
Temporary Chain Link Fencing and Gates
Invasive Species Control

Month 2 – Month 5

Excavation & Disposal
Wetland Restoration (Re-establishment)
Wetland Restoration (Rehabilitation)
Tidal Channels

Month 6 - Month 8

Herbivory Fencing
Planting
Herbaceous Seed Mix
Permanent Fencing

ATTACHMENT D-1
TIDAL DATA ANALYSIS REPORT

Attachment 1
to Exhibit D

Tidal Data Analysis Report

During the design phase of the Saw Mill Creek Bank, four tide measurement gages (solinst leveloggers) were installed to measure site specific tidal fluctuations at the proposed project site for all three phases of the project site. One solinst barologger was also installed. The solinst levelogger measured-water levels are displayed as temperature compensated pressure readings, and these readings were barometrically compensated with the aid of the Solinst Barologger which measures atmospheric pressure. Tidal fluctuations were recorded at 15-minute intervals. Tide gage locations are shown in Figure 1. As shown in Figure 1, one tide gage (gage 4) was installed in Saw Mill Creek just outside of the project boundary and on the western side of the Chelsea Road Bride. Gage 4 was used to compute site tidal datums since this part of the creek captures the entire envelope of the tidal range.

Source: Image courtesy of USGS © 2013 Microsoft Corporation

Legend

General Project Area

Proposed Tide Gage Locations

400 200 0 400 Feet

New York City Economic Development Corporation

Saw Mill Creek Wetland Mitigation Bank

Proposed Tidge Gage Locations

The Louis Berger Group, Inc.

May 2013

Figure 1

Figure 2 shows the time series plot of the measured tide data for all four gages on-site. The tide data monitored over the three-month period provide on-site data regarding tidal amplitude. The analysis demonstrates a clear documentation of the tidal range and duration at the site. The truncation of the tide at gages 1, 2 and 3 at low tide is likely the due to the fact that the gage sensors were unable to read water levels below those elevations. The only rational explanation for this anomaly is that the bottom elevation of the creek at these locations are higher than the low tide elevation and the gages went dry as water level recedes from these locations. As such, gage 4 which measures the full tidal range was used for the site tidal datum computation. This computation work was completed for the overall project, including the Southwestern Section site, and is still relevant to the site today.

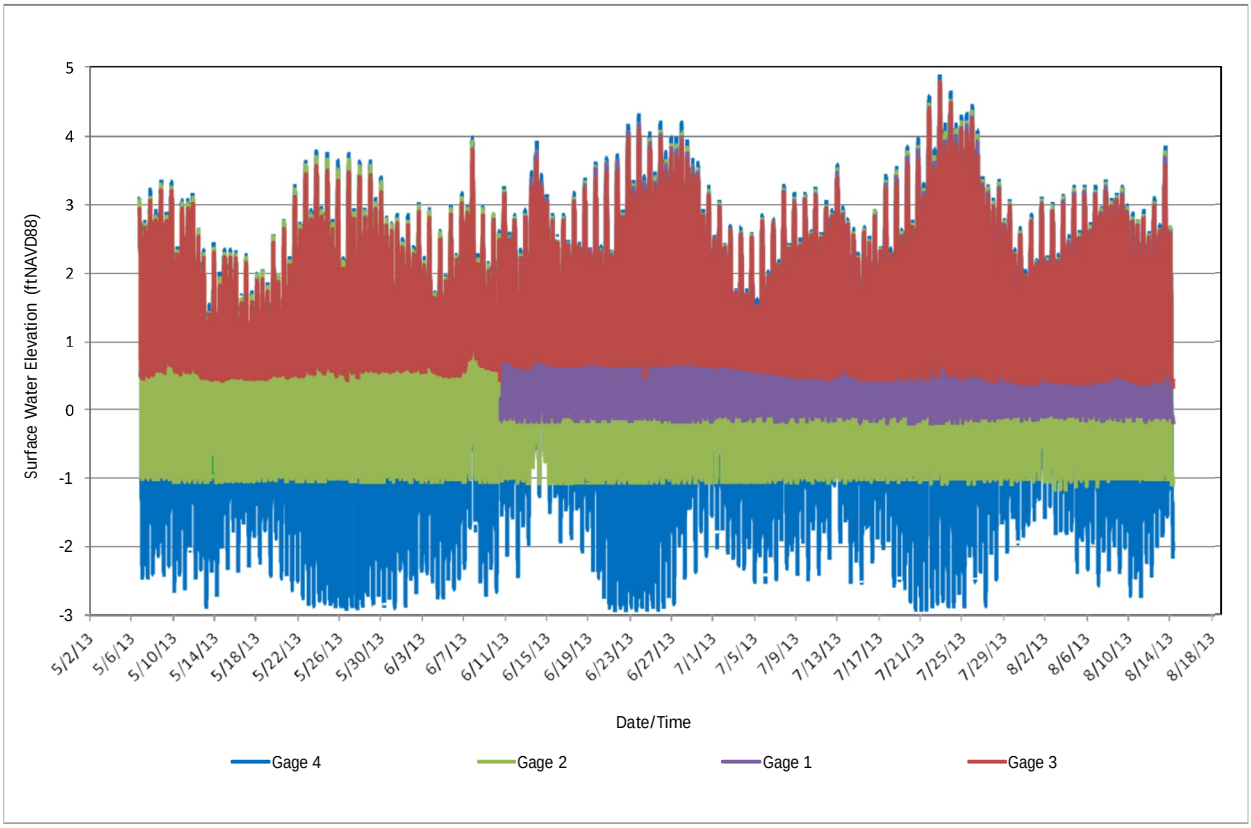


Figure 2: Marshes tide gage locations.

A set of local tidal elevations were estimated using the Saw Mill Creek tide gage (gage 4) data. The following tidal datums were determined relative to North American Vertical Datum of 1988 (NAVD88), and later compared to the tidal datum of Old Place Creek tide gage (USACE, 2005), Rahway River tide gage (NOAA, 2004) and the 19-year epoch-based tidal datums of Bergen Point West Reach, NY (Station ID: 8519483).

- Mean High Water Spring(MHWS)
- Mean Higher High Water (MHHW)
- Mean High Water (MHW)
- Mean Tide Level (MTL)
- Mean Low Water (MLW)
- Mean Lower Low Water (MLLW)
- Diurnal Tide Level (DTL)
- Mean Range (Mn),
- Great Diurnal Range (Gt)

For tidal datums reflective of current conditions, the MHW and MLW were computed from the observed water level data by averaging the highest water level and lowest water level, respectively, in a tidal cycle. MTL was computed by averaging the MHW and MLW. MHHW was computed by averaging the highest of the high tides within a tidal cycle. MLLW was computed by averaging the lowest of the low tides within a tidal cycle. DTL was computed by averaging the MHHW and the MLLW. Mn was computed by taking the difference between the MHW and MLW. Gt was computed by taking the difference between the MHHW and the MLLW

The values of tidal datums reflective of Saw Mill Creek (gage 4) conditions are presented in Table 1. Tidal datums calculated for Saw Mill Creek were compared to those observed at Old Place Creek, Rahway River and epoch-based tidal datums of Bergen Point West Reach. The Bergen Point West Reach, the Rahway River and the Old Place Creek tide gages are located approximately 5 miles, 2.5 miles and 1 mile respectively from the project site. The locations of these gages are depicted on Figure 3.

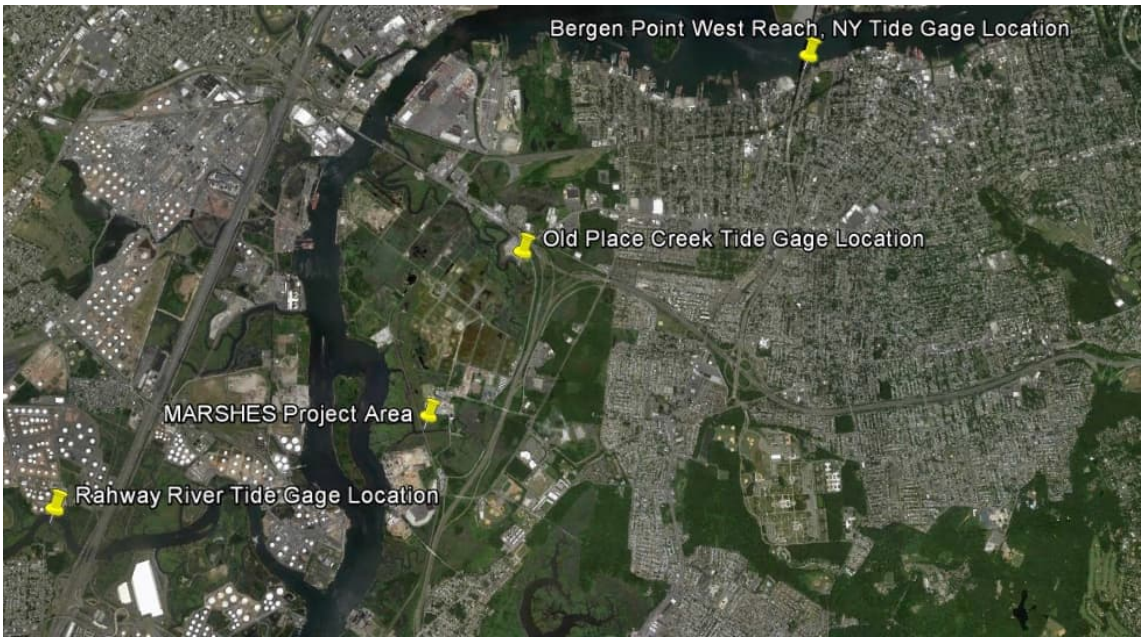


Figure 3: Neighboring Tide Gage Locations

Epoch based tidal datums for the project site were estimated by reconstructing the Saw Mill Creek gage data using tidal epoch datums reported from the nearest control tide station, Bergen Point West Reach Tide Gage, New York (Station ID: 8519483) using the Modified Range Ratio Method of the "Computational Techniques for Tidal Datums Handbook" published by NOAA (NOAA Special Publication NOS CO-OPS 2, September 2003). The Saw Mill Creek data series was reduced to equivalent 19-year epoch based tidal datums by comparison with simultaneous observations from Bergen Point West Reach tide station. Use of the data reduction method by using the Modified Range Ratio Method resulted in tidal datums that correspond to the best estimate of what would have been observed from 1983 to 2001 which is the current National Tidal Datum Epoch (NTDE) established by the National Ocean Service.

In the reduction process, the monthly MTL, DTL, Mn and Gt of the Saw Mill Creek gage data for the months of May, June and July 2013 were first computed. Next, the corresponding monthly values for the Bergen Point tide gage (control station) were obtained from the NOAA website. In correcting the

Saw Mill Creek MTL to 19 year NTDE equivalent value, the monthly MTL differences between the two gages were calculated and averaged. The corrected MTL at Saw Mill Creek was computed by adding the accepted MTL of Bergen Point to the three month average discussed above. A similar approach of MTL correction was also performed for DTL. In correcting the Saw Mill Creek Mn tide data to 19 year NTDE equivalent value, the monthly Mn ratio of the two gages was calculated and averaged. The corrected Mn at Saw Mill Creek was computed by multiplying the accepted Mn at Bergen Point by the average. A similar approach of Mn correction was also performed for Gt. The correction steps for MTL, DTL, Mn and Gt are shown in Table 1

Table 1: Correction procedure for MTL, DTL, Mn and Gt

Month	Mean Tide Level (MTL)			Diurnal Tide Level (DTL)			Mean Range (MN)			Great Diurnal Range (GT)		
	(A)	(B)	(A-B)	(A)	(B)	(A-B)	(A)	(B)	(A/B)	(A)	(B)	(A/B)
May-13	0.17	0.15	0.02	0.26	0.12	0.14	5.24	5.12	1.02	5.55	5.59	0.99
Jun-13	0.52	0.48	0.04	0.48	0.47	0.01	5.32	5.07	1.05	5.85	5.62	1.04
Jul-13	0.52	0.51	0.01	0.47	0.52	-0.04	5.28	4.95	1.07	5.72	5.43	1.05
Sums			0.079			0.109			3.14			3.09
Means			0.026			0.036			1.05			1.03
Accepted Values for (B)			-0.24			-0.19			4.98			5.51
Correct Values for (A)			-0.21			-0.16			5.21			5.67

Notes:
Surbordinate Station (A): Marshes Gage 4, NY
Control Station (B); Bergen Point West Gage, NY

After the correction of the Saw Mill Creek MTL, DTL, Mn and Gt gage data as discussed in the preceding paragraph, the 19 year equivalent epoch based datums for the Saw Mill Creek gage were determined as follows:

$$MLW_{\text{corrected for A}} = MTL_{\text{corrected for A}} - \tfrac{1}{2}\, Mn_{\text{corrected for A}}$$
$$MHW_{\text{corrected for A}} = MLW_{A} + Mn_{\text{corrected for A}}$$
$$MLLW_{\text{corrected for A}} = DTL_{\text{corrected for A}} - \tfrac{1}{2}\, Gt_{\text{corrected for A}}$$
$$MHHW_{\text{corrected for A}} = MLLW_{A} + Gt_{\text{corrected for A}}$$

The values of the observed tidal datums and reconstructed (epoch-based) tidal datums estimated from the three months tidal data (May, June and July 2013) at the Saw Mill Creek site gage 4 are presented in 2. This table also includes comparisons to tidal datums with other previously computed data of neighboring Old Place Creek gage, Rahway River gage and the NOAA tide gage station at Bergen Point West Reach, NY. Site specific reconstructed Epoch based MHWS, MHHW, MHW, MTL, MLW and MLLW are 2.91, 2.62, 2.39, -0.2, -2.82, and -3.05 feet NAVD 1988, respectively. Tidal elevations determined from observed data for all gages are relatively similar.

Tidal datums based on the May to July 2013 observations may be best used to represent current physical processes, whereas epoch based datums are used for long term considerations and for legal delineation (NOAA special Publication NOS CO-OPS 1, June 2000).

Table 2: Tidal Datums

Datum	Marshes Saw Mill Creek gage (Gage 4) Observed May-June 2013	Marshes Saw Mill Creek gage (Gage 4) Reconstructed Epoch Based (1983-2001)	Old Place Creek Tide Gage Observed 2005	Rahway River Tide Gage Observed 2004	Bergen Point West Reach Tide Gage (Primary NOAA Gage) Epoch based (1983-2001)
MHHWS	-	2.91***	-	-	-
MHHW	3.27	2.62	2.98	2.52	2.57
MHW	2.97	2.39	2.36	2.19	2.25
MTL	0.42	-0.21	-	-	-0.24
MLW	-2.31	-2.82	-2.28	-3.18	-2.73
MLLW	-2.44	-3.05	-2.42	-3.4	-2.94

*** Computed BY adding the Bergen Point station's principal lunar and solar semidiurnal constituents (Marmer, p.130).

The Saw Mill Creek tide data was also used to estimate the inundation time for the mitigation site for anticipated marsh elevations. Table 3 lists both the percentage of time the Saw Mill Creek tidal gage was above selected site elevations and the inundation time for these elevations over a tidal day (24.8 hours).

Table 3: Marsh Inundation Data

Elevation, ft NAVD'88	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
Inundation Time (hours/day)	13.9	12.3	10.8	9.0	6.8	4.3	2.2	0.9	0.3
Percentage of time above gage elevation during lunar day (24.8 hours)	56%	50%	43%	36%	28%	17%	9%	4%	1%

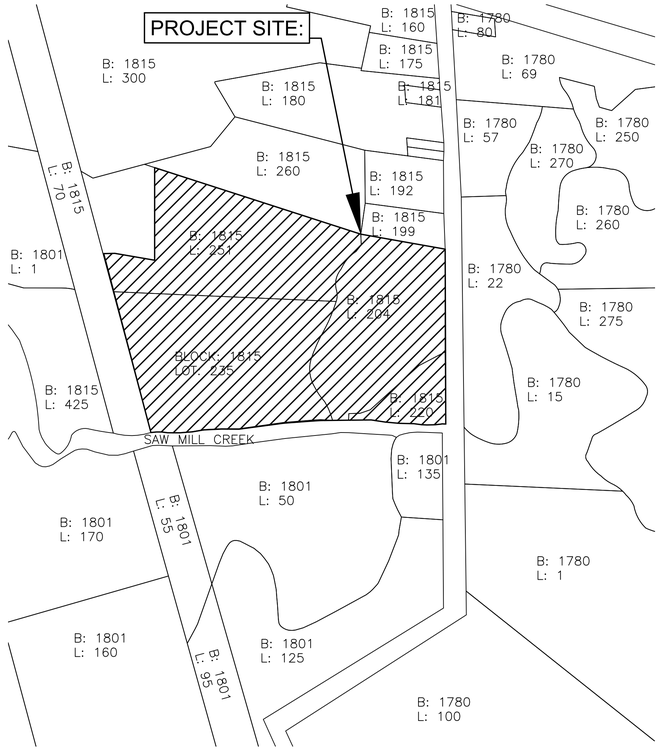
ATTACHMENT D-2
DESIGN PLANS

PLANS FOR

SOUTHWESTERN SECTION OF THE SAW MILL CREEK WETLAND MITIGATION BANK

STATEN ISLAND, NEW YORK

LOCATION MAP
SCALE 1"=200'



LOCATION PLAN
SCALE 1"=200'

LOCATION OF UTILITIES SHOWN ON THE PLANS ARE PLOTTED FROM AVAILABLE DATA ON FILE WITH THE UTILITY COMPANIES AND ARE NOT WARRANTED AS TO EXACTNESS. CONTRACTOR IS TO DETERMINE EXACT LOCATION AND DEPTH OF UTILITIES AT ALL CROSSINGS PRIOR TO CONSTRUCTION IN ACCORDANCE WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

PRIOR TO DIGGING CALL 1-800-962-7962

PLAN INDEX		
SHEET NUMBER	SHEET TITLE	DRAWING NO.
1	TITLE SHEET	CVR
2	GENERAL NOTES AND LEGEND	GN
3	EXISTING CONDITIONS	EX
4	EXISTING CROSS SECTIONS	EX–CS
5	HABITAT AREA	HA
6	PROPOSED GRADING	GR
7	PROPOSED CROSS SECTIONS	PR–CS
8	PLANTING PLAN	PP
9	PLANTING NOTES AND DETAILS	PN
10	SOIL EROSION AND SEDIMENT CONTROL PLANS	SESC–1
11	SOIL EROSION AND SEDIMENT CONTROL NOTES AND DETAILS 1	SESC–2
12	SOIL EROSION AND SEDIMENT CONTROL NOTES AND DETAILS 2	SESC–3
13	SOIL EROSION AND SEDIMENT CONTROL NOTES AND DETAILS 3	SESC–4
14	SOIL EROSION AND SEDIMENT CONTROL NOTES AND DETAILS 4	SESC–5

OWNER:
NEW YORK CITY ECONOMIC DEVELOPMENT CORP.
ONE LIBERTY PLAZA, 14TH FLOOR
NEW YORK, NY 10006

PREPARED BY
JACLYN J. FLOR, P.E., P.P., C.M.E.
CONSULTING ENGINEER

LICENSED PROFESSIONAL ENGINEER
STATE OF N.Y. LICENSE No. G101540
ENGENUITY INFRASTRUCTURE
CERTIFICATE OF AUTHORIZATION 0017153

ENGENUITY
INFRASTRUCTURE

wsp

PROJECT NO.WSP–00030
DRAWING CVR
SHEET NO. 1 OF 14

FILE NAME: N:\WSP\WSPG–00030 Sawmill Creek\Plans\WSPG–00030 CVR.dwg

NOT FOR CONSTRUCTION

GENERAL NOTES

1. THE HORIZONTAL COORDINATE SYSTEM IS THE NEW YORK STATE PLANE, NORTH AMERICAN DATUM OF 1983, U.S SURVEY FEET (NAD83, FT).
2. ALL ELEVATIONS SHOWN ARE IN NORTH AMERICAN VERTICAL DATUM OF 1988, FEET (NAVD88, FT).
3. THE TOPOGRAPHIC BASE SURVEY (SHORELINE AND UPLAND AREAS SURROUNDING SAW MILL CREEK) WAS CONDUCTED BY GAYRON DE BRUIN LAND SURVEYING AND ENGINEERING, P.C. IN JUNE 2013.
4. THE INFORMATION SHOWN ON THESE PLANS CONCERNING TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING HIS OWN DETERMINATIONS AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO. ANY DAMAGE TO UTILITIES WILL BE REPAIRED IMMEDIATELY AT THE CONTRACTOR'S EXPENSE.
5. THE CONTRACTOR SHALL, DURING CONTRACT OPERATIONS, ADHERE TO ALL CONDITIONS SET FORTH IN THE PERMITS.
6. CONSTRUCTION VEHICLES AND STOCKPILE/STORAGE AREAS ARE NOT PERMITTED BEYOND THE LIMITS OF PROPOSED WORK.
7. ANY AREAS DISTURBED OUTSIDE THE DESIGNATED LIMITS OF DISTURBANCE SHALL BE RESTORED TO EXISTING CONDITIONS AT THE CONTRACTOR'S EXPENSE.
8. HEAVY EQUIPMENT USED IN GRADING OPERATIONS IN WETLANDS MUST OPERATE ON TIMBER MARSH MATS OR EQUIVALENT. LOW GROUND PRESSURE CLASSIFIED EQUIPMENT IS ALLOWED TO OPERATE WITHOUT BEING ON TIMBER MARSH MATS. NO CONSTRUCTION EQUIPMENT (INCLUDING EXCAVATORS, MARSHMASTERS, ROLLIGONS, MARSH BUGGIES, ARGOS, OR SIMILAR EQUIPMENT) SHALL BE ALLOWED TO TRAVERSE THE GRADED MARSH AND ANY AREA TO BE PLANTED UNDER THIS PROJECT.
9. EXISTING TREES WITHIN THE LIMITS OF DISTURBANCE WHICH MIGHT BE DAMAGED DURING CONSTRUCTION SHALL BE PROTECTED BY A 4' – 6" HIGH TREE PROTECTIVE FENCE, SECURELY ERECTED AT THE CRITICAL ROOT ZONE OF THE TREE. SEE DETAIL IN SOIL EROSION AND SEDIMENT CONTROL DETAILS. ANY TREE THAT IS DAMAGED DURING THE WORK UNDER THIS CONTRACT SHALL BE REPLACED IN KIND OR AS APPROVED BY THE ENGINEER.
10. THE PROJECT SITE IS SUBJECT TO TIDAL FLOW. THE CONTRACTOR MUST TAKE THIS UNDER CONSIDERATION WHEN PLANNING CONSTRUCTION ACTIVITIES TO ACCOUNT FOR THE VARIATION IN TIDE CYCLES ON A DAILY AND MONTHLY BASIS.
11. THE CONTRACTOR SHALL PROVIDE A TIDAL ENVELOPE PLAN FOR APPROVAL, ADHERING TO ALL DEWATERING MEASURES SET BY THESE PLANS AND BY NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH THE ENGINEER THE TEMPORARY PLACEMENT AND STORAGE OF STOCKPILED MATERIALS, EQUIPMENT AND VEHICLES WITHIN THE CONSTRUCTION AREA. THE STAGING AREA SHALL NOT EXCEED THE LIMITS SHOWN WITHIN THESE PLANS, UNLESS APPROVED BY THE ENGINEER.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING PROPOSED WORK WITH THE ENGINEER, PROVIDING ADEQUATE CONTROLS FOR SITE SAFETY, AND MINIMIZING IMPACTS TO ADJACENT PROPERTY OWNERS. UNDER NO CIRCUMSTANCES WILL THE CONTRACTOR INITIATE ACTIVITIES THAT WILL RESTRICT ACCESS OF EMERGENCY VEHICLES.
14. ALL PHASING AND SEQUENCING SHALL BE COORDINATED WITH THE ENGINEER AND NYCEDC.
15. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS RELATED TO THIS PROJECT PRIOR TO SHOP DRAWING PRODUCTION.
16. CONTRACTOR SHALL SUBMIT COMPLETE SHOP DRAWINGS FOR ALL PARTS OF THE WORK, CONSTRUCTION METHODS AND SEQUENCING WHERE APPLICABLE. NO PERFORMANCE OF THE WORK SHALL COMMENCE WITHOUT PRIOR REVIEW AND APPROVAL OF THE SHOP DRAWINGS BY THE ENGINEER.
17. THE INFORMATION PROVIDED IN THESE DRAWINGS IS SOLELY TO ASSIST THE CONTRACTOR IN ASSESSING THE NATURE AND EXTENT OF CONDITIONS WHICH WILL BE ENCOUNTERED DURING WORK.
18. CONTRACTOR SHALL SUBMIT A CONSTRUCTION SCHEDULE WITH PROPOSED WORKING HOURS TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO ANY CONSTRUCTION AT THE SITE.
19. ANY CHANGES TO CONSTRUCTION SEQUENCING MUST BE SUBMITTED TO THE ENGINEER PRIOR TO THE START OF CONSTRUCTION.
20. THE CONTRACTOR SHALL CONTACT THE ENGINEER IMMEDIATELY ON ANY CONFLICTS ARISING DURING CONSTRUCTION OF ANY IMPROVEMENTS SHOWN ON THESE DRAWINGS.

WORK AREA REQUIREMENTS:

21. NO CONSTRUCTION ACTIVITY IS TO TAKE PLACE OUTSIDE THE LIMIT OF DISTURBANCE.

PREPARATION:

22. STAKEOUT COORDINATION OF ALL WORK WITH UTILITY COMPANIES, AND TEMPORARY SUPPORT OF UTILITY POLES, IF REQUIRED, IS THE RESPONSIBILITY OF THE CONTRACTOR.
23. CONTRACTOR SHALL VIDEO AND TAKE PHOTOGRAPHS OF ALL AREAS WITHIN THE LIMIT OF WORK PRIOR TO BEGINNING, CONSTRUCTION. THE VIDEO SHALL BE SHARED VIA FTP SITE. PHOTOGRAPHS SHALL BE DIGITAL, ELECTRONIC COPIES TO BE PROVIDED. THE VIDEOS AND PHOTOS WILL BE PROVIDED TO THE ENGINEER PRIOR TO CONSTRUCTION. THE COST FOR THE VIDEOS AND PHOTOGRAPHS SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS SCHEDULED IN THE BID FORM.
24. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING SECURING AND REHABILITATING TEMPORARY STAGING, STORAGE AND/OR STOCKPILING AREAS, IF NEEDED, DURING CONSTRUCTION. MATERIAL SHOULD BE STOCKPILED IN UPLAND AREAS ON SITE FOR DISPOSAL UNLESS APPROVED OF BY THE ENGINEER AND OWNERS FIELD REPRESENTATIVE TO BE IN A LOCATION OUTSIDE OF THE LIMIT OF WORK.
25. RESTORATION, INCLUDING THE REMOVAL OF EXCESS EXCAVATED MATERIAL AND PLACEMENT OF TEMPORARY PAVEMENT, SHALL BE PERFORMED AND COMPLETED DAILY. ALL ROADS SHALL BE PASSABLE TO VEHICULAR TRAFFIC AT THE END OF EACH WORK DAY.
26. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ACCESS AT ALL LOCATIONS THROUGHOUT THE DURATION OF THE PROJECT. THE COST FOR THIS WORK SHALL BE INCLUDED IN THE PRICES BID IN THE VARIOUS ITEMS IN THE BID FORM.
27. DURING EXCAVATIONS, THE CONTRACTOR SHALL, AS A MINIMUM, COMPLY WITH THE EXCAVATION SAFETY STANDARDS, PROVIDE SPECIAL SHORING (IF REQUIRED), AND PROVIDE COMPLIANCE WITH THE OCCUPATIONAL HEALTH AND SAFETY ADMINISTRATION (OSHA) EXCAVATION SAFETY STANDARD 29 CFR 1926/650 (SUBPART B AS AMENDED).
28. EXCAVATED AND BACKFILL MATERIAL SHALL NOT BE PLACED WITHIN ROADWAY RIGHT–OF–WAY AT ANY TIME OUTSIDE OF REGULAR WORKING HOURS.
29. THE CONTRACTOR SHALL EXERCISE CAUTION SO AS NOT TO DAMAGE THE ROOT SYSTEM OF ANY PLANTINGS TO REMAIN. ALL ROOTS OF ANY PLANTS OR TREES TO REMAIN WHICH ARE EXPOSED DURING CONSTRUCTION, SHALL BE WATERED AND KEPT SHADED OR COVERED WITH WET STRAW, MOSS OR OTHER SUITABLE MATERIAL UNTIL THE FINAL GRADING IS COMPLETED. THE CONTRACTOR SHALL REPLACE ANY EXISTING PLANTINGS DAMAGED DURING CONSTRUCTION, AS IN THE OPINION OF THE ENGINEER, WITH A PLANTING OF SIMILAR SPECIES, HEIGHT AND/OR CALIPER TO THE SATISFACTION OF THE ENGINEER AT NO ADDITIONAL COST TO THE CITY. PLANT ESTABLISHMENT AND REPLACEMENT PERIOD WILL BE SPECIFIED IN THE STANDARD SPECIFICATIONS.
30. CONTRACTOR IS RESPONSIBLE FOR ALL WORKER SAFETY, TRAINING, AND SAFETY DEVICE USAGE FOR AND DURING THE CONSTRUCTION OF THE IMPROVEMENTS SHOWN ON THIS PLAN. THE CONTRACTOR IS DESIGNATED AS RESPONSIBLE PARTY DURING CONSTRUCTION OF THE IMPROVEMENTS HEREON. AS SUCH, CONTRACTOR WILL PROVIDE ADEQUATE SAFETY TRAINING, EQUIPMENT AND OVERSIGHT.

TIDAL DATA AT SITE (NAVD88)	
MEAN LOWER LOW WATER	–3.05 FT
MEAN LOW WATER	–2.82 FT
MEAN TIDE LEVEL	–0.21 FT
MEAN HIGH WATER	2.39 FT
MEAN HIGHER HIGH WATER	2.62 FT
MEAN HIGHER HIGH WATER SPRING	2.91 FT
FEMA 100 YEAR FLOOD ELEVATION	9.00 FT

NOTE:

NORMAL TIDE ELEVATIONS CAN BE AS HIGH AS 5 FT (NAVD88).

LEGEND

	EXISTING	PROPOSED
PHASE 3 BOUNDARY		
MAJOR CONTOURS		
MINOR CONTOURS		
UNDERGROUND WATER LINE	W	W
WETLANDS		
CROSS–SECTIONS		
MEAN HIGH WATER	MHW	MHW
MEAN LOW WATER	MLW	MLW
SPRING HIGH WATER	SHW	SHW
SPOT ELEVATIONS	2.8	2.8
TIDE GAGES	TIDE GAUGE #	
WETLAND FLAGS		
SOIL POINTS		
SURVEY BENCHMARKS		
VEGETATION TREE LINE		
VEGETATION BUSH		
VEGETATION TREE		
DEBRIS TO BE REMOVED		
LIMIT OF DISTURBANCE	LOD	
PLANTING LIMIT AREA–NO HEAVY EQUIPMENT ALLOWED		PL
CONSTRUCTION VEHICLE ACCESS TO BE APPROVED BY DESIGN ENGINEER		CVR
INVASIVE PLANT TREATMENT AREA		
FLOATING TURBIDITY BARRIER		
PERMANENT CHAIN–LINK FENCE AND GATES		
SILT FENCE		
COIR LOG CHECK DAM		
HAY BALE		

HABITAT ZONES:

- WETLAND RESTORATION OPEN WATER/ MUDFLAT
- WETLAND RESTORATION – LOW MARSH
- WETLAND RESTORATION – HIGH MARSH
- WETLAND RESTORATION – SCRUB SHRUB
- UPLAND SLOPE
- TIDAL WETLAND ENHACEMENT
- BUFFER REHABILITATION

HABITAT AREAS:

- WETLAND RESTORATION (REHABILITATION)
- WETLAND RESTORATION (RE–ESTABLISHMENT)
- TIDAL WETLAND ENHACEMENT
- BUFFER REHABILITATION
- JAPANESE KNOTWOOD AREA
- PERSIMMON TREE AREA
- UPLAND SLOPE

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: JAK
DRAWN BY: JAK
SHEET CHK'D BY: JJF
CROSS CHK'D BY: STA
APPROVED BY: JJF
DATE: FEBRUARY 21, 2023

ENGENUITY INFRASTRUCTURE
GALLERIA: 2 BRIDGE AVE., SUITE 323
RED BANK, NJ 07701
732.741.3176
ENGENUITYNJ.COM

GENERAL NOTES AND LEGEND

BLOCK 1815
LOT 204, 220, 235, 251
CHELSEA RD, STATEN ISLAND, NY

SOUTHWESTERN SECTION OF THE SAW MILL CREEK WETLAND MITIGATION BANK
NEW YORK ECONOMIC DEVELOPMENT CORP.
ONE LIBERTY PLAZA, NEW YORK, NY 10006
NEW YORK, NY 10006

JACLYN J. FLOR, P.E., P.P., C.M.E
CONSULTING ENGINEER

LICENSED PROFESSIONAL ENGINEER
STATE OF NJ LICENCE NO. 24GE045426
CERTIFICATE OF AUTHORIZATION 24GA28268000

DATE

PROJECT NO.WSP–00030
DRAWING
GN
SHEET NO.
2 OF **14**

FILE NAME: N:\WSP\WSPG–00030 Sawmill Creek\Plans\WSPG–00030 GN.dwg

NOT FOR CONSTRUCTION

NOTES:
1. VERTICAL DATUM IS NAVD88. HORIZONTAL DATUM IS NAD83.
2. BATHYMETRY IS NOT SHOWN ON PLANS.
3. NORMAL TIDE ELEVATIONS CAN BE AS HIGH AS 5 FT (NAVD88).
4. THE TOPOGRAPHIC BASE SURVEY (SHORELINE AND UPLAND AREAS SURROUNDING SAW MILL CREEK) WAS CONDUCTED BY GAYRON DE BRUIN LAND SURVEYING AND ENGINEERING, P.C. IN JUNE 2013.

TIDAL DATA AT SITE (NAVD88)	
MEAN LOWER LOW WATER	−3.05 FT
MEAN LOW WATER	−2.82 FT
MEAN TIDE LEVEL	−0.21 FT
MEAN HIGH WATER	2.39 FT
MEAN HIGHER HIGH WATER	2.62 FT
MEAN HIGHER HIGH WATER SPRING	2.91 FT
FEMA 100 YEAR FLOOD ELEVATION	9.00 FT

GRAPHIC SCALE
50 0 25 50
(IN FEET)
1 inch = 50 ft.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: JAK
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SHEET CHK'D BY: JJF
CROSS CHK'D BY: STA
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ENGENUITY INFRASTRUCTURE
GALLERIA: 2 BRIDGE AVE., SUITE 323
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EXISTING CONDITIONS
BLOCK 1815
LOT 204, 220, 235, 251
CHELSEA RD, STATEN ISLAND, NY

SOUTHWESTERN SECTION OF THE SAW MILL CREEK WETLAND MITIGATION BANK
NEW YORK ECONOMIC DEVELOPMENT CORP.
ONE LIBERTY PLAZA, NEW YORK, NY 10006
NEW YORK, NY 10006

JACLYN J. FLOR, P.E., P.P., C.M.E
CONSULTING ENGINEER

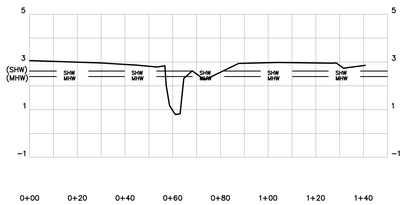
LICENSED PROFESSIONAL ENGINEER
STATE OF NJ LICENCE NO. 24GE045426
CERTIFICATE OF AUTHORIZATION 24GA28268000

DATE

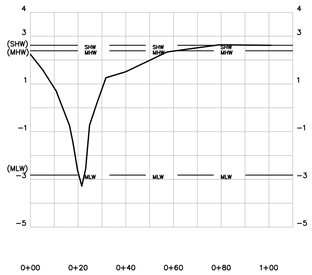
PROJECT NO. WSP−00030
DRAWING
EX
SHEET NO.
3 OF **14**

NOT FOR CONSTRUCTION

FILE NAME: N:\WSP\WSPG−00030 Sawmill Creek\Plans\WSPG−00030 EXG COND.dwg



Section 1



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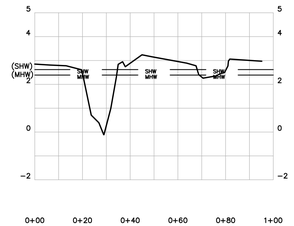

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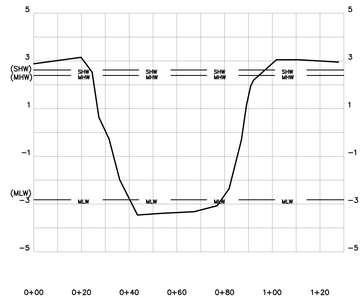

Section 4

NOTES:
1. VERTICAL DATUM IS NAVD88. HORIZONTAL DATUM IS NAD83.
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TIDAL DATA AT SITE (NAVD88)	
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MEAN TIDE LEVEL	−0.21 FT
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MEAN HIGHER HIGH WATER	2.62 FT
MEAN HIGHER HIGH WATER SPRING	2.91 FT
FEMA 100 YEAR FLOOD ELEVATION	9.00 FT

VERTICAL GRAPHIC SCALE

3 0 1.5 3

(IN FEET)
1 inch = 3 ft.

HORIZONTAL GRAPHIC SCALE

30 0 15 30

(IN FEET)
1 inch = 30 ft.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: JAK
DRAWN BY: JAK
SHEET CHK'D BY: JJF
CROSS CHK'D BY: STA
APPROVED BY: JJF
DATE: FEBRUARY 21, 2023

ENGENUITY INFRASTRUCTURE
GALLERIA: 2 BRIDGE AVE., SUITE 323
RED BANK, NJ 07701
732.741.3176
ENGENUITYNJ.COM

EXISTING CROSS SECTIONS

BLOCK 1815
LOT 204, 220, 235, 251
CHELSEA RD, STATEN ISLAND, NY

SOUTHWESTERN SECTION OF THE SAW MILL CREEK WETLAND MITIGATION BANK
NEW YORK ECONOMIC DEVELOPMENT CORP.
ONE LIBERTY PLAZA, NEW YORK, NY 10006
NEW YORK, NY 10006

JACLYN J. FLOR, P.E., P.P., C.M.E
CONSULTING ENGINEER

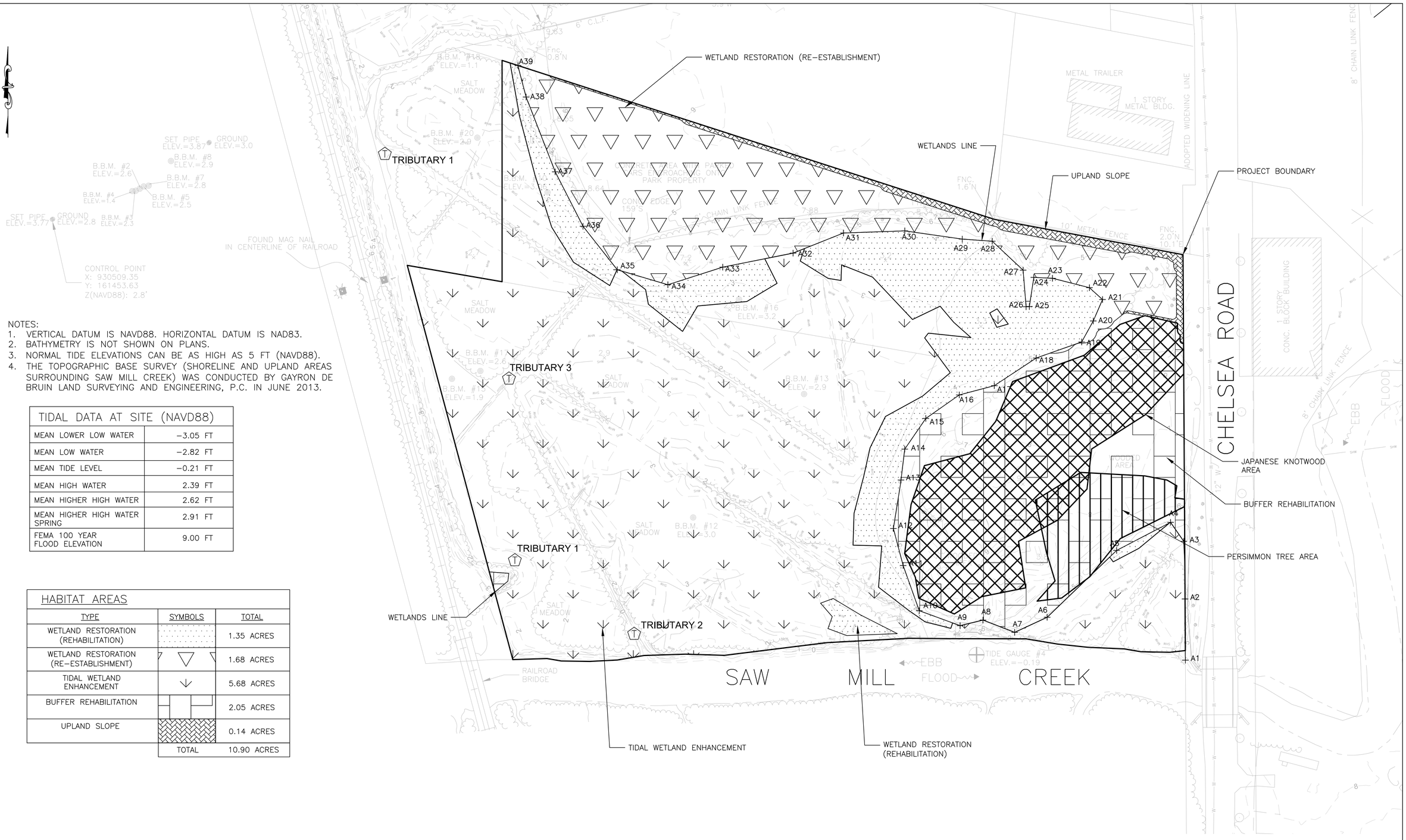
LICENSED PROFESSIONAL ENGINEER
STATE OF NJ LICENCE NO. 24GE045426
CERTIFICATE OF AUTHORIZATION 24GA28268000

DATE

PROJECT NO.WSP−00030
DRAWING
EX-CS
SHEET NO.
4 OF **14**

NOT FOR CONSTRUCTION

FILE NAME: N:\WSP\WSPG−00030 Sawmill Creek\Plans\WSPG−00030 EXG COND.dwg



NOTES:
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TIDAL DATA AT SITE (NAVD88)	
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MEAN LOW WATER	-2.82 FT
MEAN TIDE LEVEL	-0.21 FT
MEAN HIGH WATER	2.39 FT
MEAN HIGHER HIGH WATER	2.62 FT
MEAN HIGHER HIGH WATER SPRING	2.91 FT
FEMA 100 YEAR FLOOD ELEVATION	9.00 FT

HABITAT AREAS		
TYPE	SYMBOLS	TOTAL
WETLAND RESTORATION (REHABILITATION)		1.35 ACRES
WETLAND RESTORATION (RE-ESTABLISHMENT)		1.68 ACRES
TIDAL WETLAND ENHANCEMENT		5.68 ACRES
BUFFER REHABILITATION		2.05 ACRES
UPLAND SLOPE		0.14 ACRES
	TOTAL	10.90 ACRES

GRAPHIC SCALE
50 0 25 50
(IN FEET)
1 inch = 50 ft.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: JAK
DRAWN BY: JAK
SHEET CHK'D BY: JJF
CROSS CHK'D BY: STA
APPROVED BY: JJF
DATE: FEBRUARY 21, 2023

ENGENUITY INFRASTRUCTURE
GALLERIA: 2 BRIDGE AVE., SUITE 323
RED BANK, NJ 07701
732.741.3176
ENGENUITYNJ.COM

HABITAT AREA
BLOCK 1815
LOT 204, 220, 235, 251
CHELSEA RD, STATEN ISLAND, NY

SOUTHWESTERN SECTION OF THE SAW MILL CREEK WETLAND MITIGATION BANK
NEW YORK ECONOMIC DEVELOPMENT CORP.
ONE LIBERTY PLAZA, NEW YORK, NY 10006
NEW YORK, NY 10006

JACLYN J. FLOR, P.E., P.P., C.M.E
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LICENSED PROFESSIONAL ENGINEER
STATE OF NJ LICENCE NO. 24GE045426
CERTIFICATE OF AUTHORIZATION 24GA28268000

DATE

PROJECT NO.WSP-00030
DRAWING **HA**
SHEET NO. **5** OF **14**

FILE NAME: N:\WSP\WSPG-00030 Sawmill Creek\Plans\WSPG-00030 HABITAT AREA.dwg

NOT FOR CONSTRUCTION

NOTES:

1. VERTICAL DATUM IS NAVD88. HORIZONTAL DATUM IS NAD83.
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5. REFER TO SOIL EROSION AND SEDIMENT CONTROL FOR CONSTRUCTION ACCESS ENTRANCES, STAGING AREAS, STOCKPILE LOCATIONS, AND ALL OTHER SOIL AND TREE PROTECTION MEASURES.

TIDAL DATA AT SITE (NAVD88)	
MEAN LOWER LOW WATER	−3.05 FT
MEAN LOW WATER	−2.82 FT
MEAN TIDE LEVEL	−0.21 FT
MEAN HIGH WATER	2.39 FT
MEAN HIGHER HIGH WATER	2.62 FT
MEAN HIGHER HIGH WATER SPRING	2.91 FT
FEMA 100 YEAR FLOOD ELEVATION	9.00 FT

EXCAVATION BY HABITAT AREAS	
TYPE	TOTAL
WETLAND RESTORATION (REHABILITATION)	1,320 CY
WETLAND RESTORATION (RE−ESTABLISHMENT)	7,130 CY
TIDAL WETLAND ENHANCEMENT	10 CY
UPLAND SLOPE	200 CY
TOTAL	8,660 CY

GRAPHIC SCALE

50 0 25 50

(IN FEET)
1 inch = 50 ft.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: JAK
DRAWN BY: JAK
SHEET CHK'D BY: JJF
CROSS CHK'D BY: STA
APPROVED BY: JJF
DATE: FEBRUARY 21, 2023

ENGENUITY INFRASTRUCTURE
GALLERIA: 2 BRIDGE AVE., SUITE 323
RED BANK, NJ 07701
732.741.3176
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PROPOSED GRADING
BLOCK 1815
LOT 204, 220, 235, 251
CHELSEA RD, STATEN ISLAND, NY

SOUTHWESTERN SECTION OF THE SAW MILL CREEK WETLAND MITIGATION BANK
NEW YORK ECONOMIC DEVELOPMENT CORP.
ONE LIBERTY PLAZA, NEW YORK, NY 10006
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JACLYN J. FLOR, P.E., P.P., C.M.E
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LICENSED PROFESSIONAL ENGINEER
STATE OF NJ LICENCE NO. 24GE045426
CERTIFICATE OF AUTHORIZATION 24GA28268000

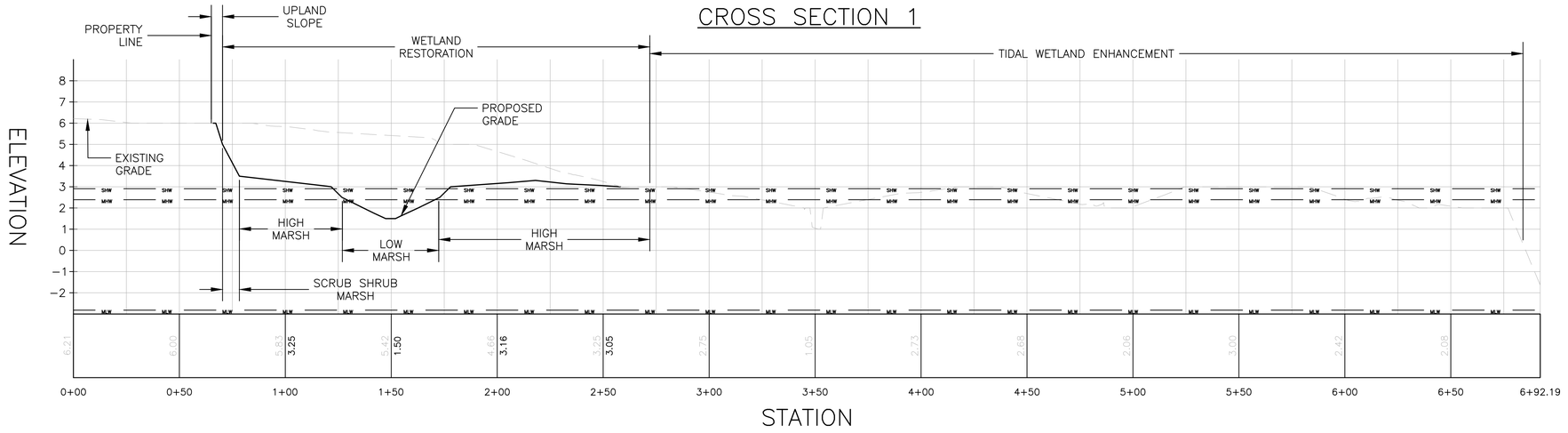
DATE

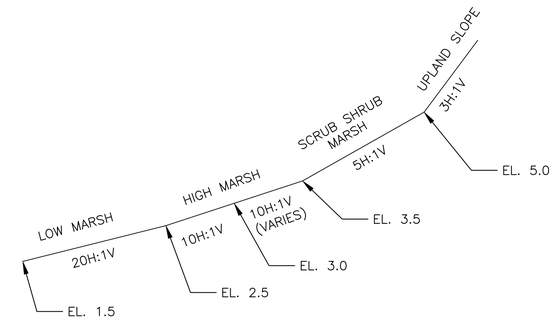
PROJECT NO.WSP−00030
DRAWING **GR**
SHEET NO. **6** OF **14**

FILE NAME: N:\WSP\WSPG−00030 Sawmill Creek\Plans\WSPG−00030 GR PLAN.dwg

NOT FOR CONSTRUCTION

CROSS SECTION 1

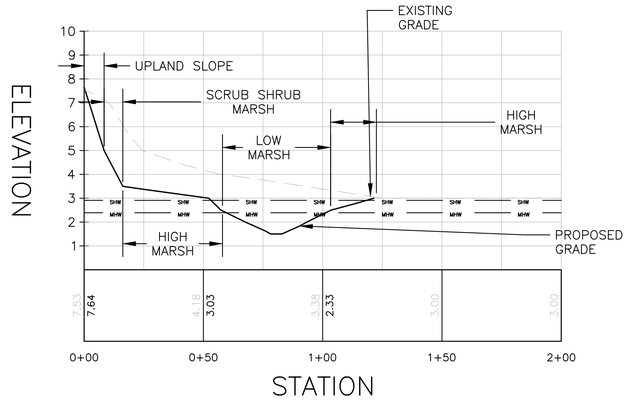




TYPICAL WETLAND SECTION

N.T.S.

CROSS SECTION 2



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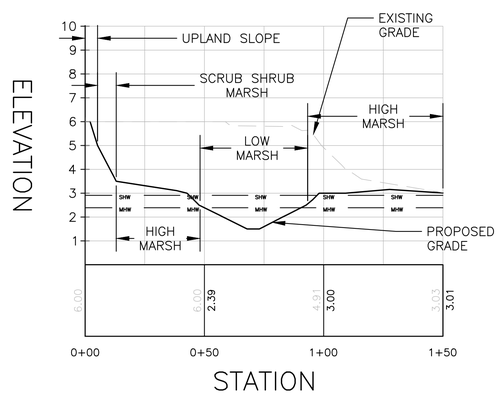
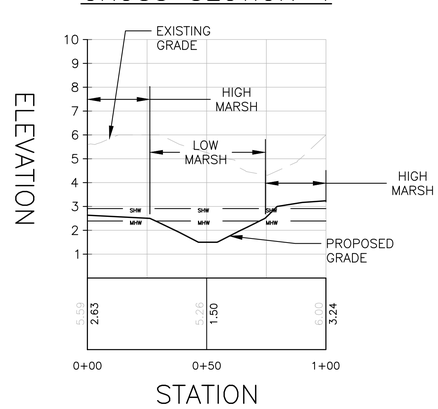
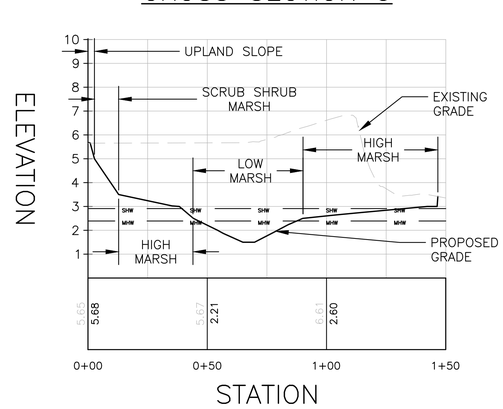


CROSS SECTION 4



CROSS SECTION 5



TIDAL DATA AT SITE (NAVD88)	
MEAN LOWER LOW WATER	−3.05 FT
MEAN LOW WATER	−2.82 FT
MEAN TIDE LEVEL	−0.21 FT
MEAN HIGH WATER	2.39 FT
MEAN HIGHER HIGH WATER	2.62 FT
MEAN HIGHER HIGH WATER SPRING	2.91 FT
FEMA 100 YEAR FLOOD ELEVATION	9.00 FT

NOTES:
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3. THE TOPOGRAPHIC BASE SURVEY (SHORELINE AND UPLAND AREAS SURROUNDING SAW MILL CREEK) WAS CONDUCTED BY GAYRON DE BRUIN LAND SURVEYING AND ENGINEERING, P.C. IN JUNE 2013.

VERTICAL GRAPHIC SCALE
3 0 1.5 3
(IN FEET)
1 inch = 3 ft.

HORIZONTAL GRAPHIC SCALE
30 0 15 30
(IN FEET)
1 inch = 30 ft.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: JAK
DRAWN BY: JAK
SHEET CHK'D BY: JJF
CROSS CHK'D BY: STA
APPROVED BY: JJF
DATE: FEBRUARY 21, 2023

ENGENUITY INFRASTRUCTURE
GALLERIA: 2 BRIDGE AVE., SUITE 323
RED BANK, NJ 07701
732.741.3176
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PROPOSED CROSS SECTIONS

BLOCK 1815
LOT 204, 220, 235, 251
CHELSEA RD, STATEN ISLAND, NY

SOUTHWESTERN SECTION OF THE SAW MILL CREEK WETLAND MITIGATION BANK
NEW YORK ECONOMIC DEVELOPMENT CORP.
ONE LIBERTY PLAZA, NEW YORK, NY 10006
NEW YORK, NY 10006

JACLYN J. FLOR, P.E., P.P., C.M.E
CONSULTING ENGINEER

LICENSED PROFESSIONAL ENGINEER
STATE OF NJ LICENCE NO. 24GE045426
CERTIFICATE OF AUTHORIZATION 24GA28268000

DATE

PROJECT NO.WSP−00030
DRAWING
PR-CS
SHEET NO.
7 OF **14**

FILE NAME: N:\WSP\WSPG-00030 Sawmill Creek\Plans\WSPG-00030 GR PLAN.dwg

NOT FOR CONSTRUCTION

NOTES:
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5. NO PROPOSED PLANTING IN THE TIDAL WETLAND ENHANCEMENT AREA.

TIDAL DATA AT SITE (NAVD88)	
MEAN LOWER LOW WATER	−3.05 FT
MEAN LOW WATER	−2.82 FT
MEAN TIDE LEVEL	−0.21 FT
MEAN HIGH WATER	2.39 FT
MEAN HIGHER HIGH WATER	2.62 FT
MEAN HIGHER HIGH WATER SPRING	2.91 FT
FEMA 100 YEAR FLOOD ELEVATION	9.00 FT

HABITAT ZONES

HABITAT ZONE	HABITAT ELEVATION RANGE	HATCHING	EAST
WETLAND RESTORATION LOW MARSH	1.5 FEET – 2.5 FEET		0.75 AC
WETLAND RESTORATION HIGH MARSH	2.5 FEET – 3.5 FEET		1.97 AC
WETLAND RESTORATION SCRUB SHRUB	3.5 FEET – 5.0 FEET		0.31 AC
UPLAND SLOPE	> 5.0 FEET		0.14 AC
TIDAL WETLAND ENHANCEMENT	NO SPECIFIC ELEVATION		5.68 AC
BUFFER REHABILITATION	NO SPECIFIC ELEVATION		2.05 AC
		TOTAL	10.90 AC

GRAPHIC SCALE
50 0 25 50
(IN FEET)
1 inch = 50 ft.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: JAK
DRAWN BY: JAK
SHEET CHK'D BY: JJF
CROSS CHK'D BY: STA
APPROVED BY: JJF
DATE: FEBRUARY 21, 2023

ENGENUITY INFRASTRUCTURE
GALLERIA: 2 BRIDGE AVE., SUITE 323
RED BANK, NJ 07701
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PLANTING PLAN
BLOCK 1815
LOT 204, 220, 235, 251
CHELSEA RD, STATEN ISLAND, NY

SOUTHWESTERN SECTION OF THE SAW MILL CREEK WETLAND MITIGATION BANK
NEW YORK ECONOMIC DEVELOPMENT CORP.
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STATE OF NJ LICENCE NO. 24GE045426
CERTIFICATE OF AUTHORIZATION 24GA28268000

DATE

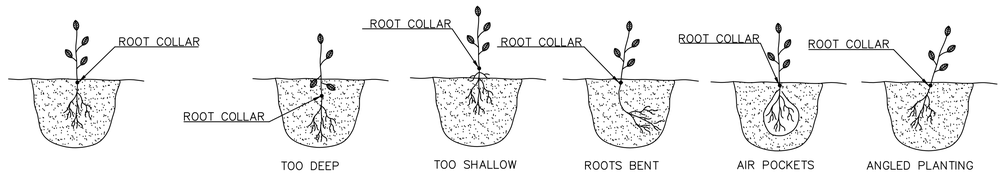
PROJECT NO.WSP−00030
DRAWING
PP
SHEET NO.
8 OF **14**

FILE NAME: N:\WSP\WSPG−00030 Sawmill Creek\Plans\WSPG−00030 PLANT PLANS.dwg

NOT FOR CONSTRUCTION

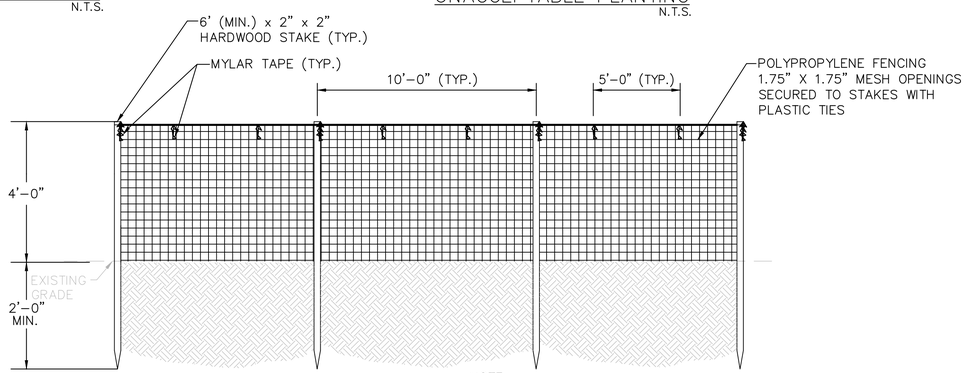
PLANTING TABLE

PLANTING ZONE/ELEVATION	AREA (ACRES)	SPECIES NAME – % OF AREA (COMMON NAME)	HEIGHT	ROOT	SPACING	UNITS	QUANTITY TOTAL
LOW MARSH ELEVATIONS 1.5–2.5	0.75	SPARTINA ALTERNIFLORA – 100% (SMOOTH CORDGRASS)	6 IN MIN.	2 IN X 2 IN MINIMUM PLUG	2 FT O.C.	EACH	14,520
HIGH MARSH ELEVATIONS 2.5–3.5	1.97	DISTICHLIS SPICATA – 35% (SPIKE GRASS)	6 IN MIN.	2 IN X 2 IN MINIMUM PLUG	2 FT O.C.	EACH	13,349
		SPARTINA PATENS – 35% (SALTMEADOW CORDGRASS)				EACH	13,349
		SPARTINA ALTERNIFLORA – 10% (SMOOTH CORDGRASS)				EACH	3,814
		JUNCUS GERARDII – 20% (BLACK GRASS)				EACH	7,628
SCRUB SHRUB ELEVATIONS 3.5–5	0.31	IVA FRUTESCENS – 50% (JESUIT'S BARK)	24 IN – 30 IN MIN.	CONTAINER NO. 2	5 FT O.C.	EACH	270
		BACCHARIS HALIMIFOLIA – 50% (SEA MYRTLE)				EACH	270
UPLAND SLOPE SHRUB ELEVATION 5.0 AND ABOVE	0.14	BACCHARIS HALIMIFOLIA – 20% (SEA MYRTLE)	24 IN – 30 IN MIN.	CONTAINER NO. 2	5 FT O.C.	EACH	49
		MYRICA PENSYLVANICA – 20% (BAYBERRY)				EACH	49
		ROSA CAROLINA – 15% (PASTURE ROSE)				EACH	37
		RHUS COPALLINUM – 15% (SHINING SUMAC)				EACH	37
		PRUNUS MARITIMA – 10% (BEACH PLUM)				EACH	24
		SAMBUCUS CANADENSIS–20% (COMMON ELDERBERRY)				EACH	49
UPLAND SLOPE WARM NATIVE SEED MIX ELEVATION 5.0 AND ABOVE & UPLAND BUFFER REHABILITATION AREAS	2.18	PANICUM VIRGATUM – 3 LBS PLS/AC (SWITCH GRASS)	N/A	SEED	25 LBS OR PLS/AC	LBS	6.6
		SORGHASTRUM NUTANS – 3LBS PLS/AC (INDIAN GRASS)				LBS	6.6
		SCHIZACHYRIUM SCOPARIUM – 3LBS PLS/AC (LITTLE BLUESTEM)				LBS	6.6
		SYMPHYOTRICHUM NOVAE–ANGLIAE – 0.5 LBS PLS/AC (NEW ENGLAND ASTER)				LBS	1.1
		SOLIDAGO SEMPERVIRENS – 0.5 LBS PLS/AC (SEASIDE GOLDENROD)				LBS	1.1
		AVENA SATIVA (OATS) – 15 LBS PLS/AC				LBS	32.9



PROPER PLANTING
N.T.S.

UNACCEPTABLE PLANTING
N.T.S.



PROFILE

NOTE:
MAX. 50'x50' GRID, TYPICAL. GRID MAY VARY, BASED ON SITE CONTOURS AND WATERWAY LOCATIONS.

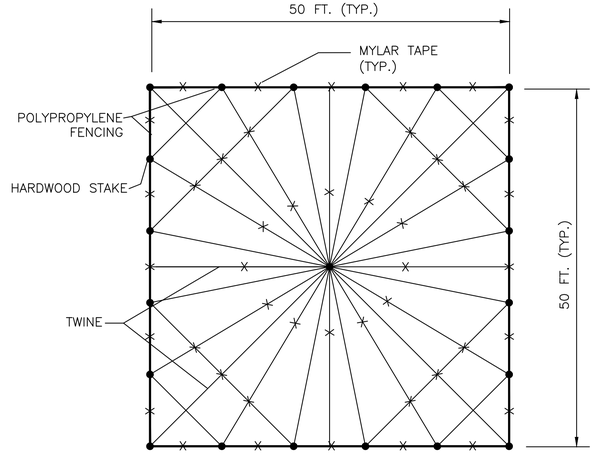
PLANTING NOTES

GENERAL

1. THE CONTRACTOR SHALL SUBMIT COPIES OF THE PLANT MATERIAL ORDERS TO THE ENGINEER AT LEAST FOUR MONTHS PRIOR TO THE PROPOSED PLANTING DATE.
2. ALL PROPOSED CHANGES TO THE PLANTING PLAN SHALL BE MADE IN WRITING TO THE ENGINEER AT LEAST FOUR MONTHS PRIOR TO ALL PLANTING. ALL PROPOSED CHANGES MUST BE APPROVED IN WRITING.
3. ALL PLANT STOCK WILL BE INSPECTED ON–SITE PRIOR TO INSTALLATION. PLANTING STOCK NOT MEETING SPECIFICATIONS WILL NOT BE PLANTED AND SHALL BE REPLACED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.
4. ALL SHRUBS PLANT MATERIAL SHALL BE INOCULATED WITH MYCORRHIZAE FUNGI EITHER AT THE NURSERY OR ON–SITE AT THE TIME OF PLANTING. THE METHOD OF INOCULATION SHALL BE APPROVED IN ADVANCE BY THE ENGINEER.
5. THE HANDLING AND CARE OF ALL PLANT MATERIAL SHALL FOLLOW APPROPRIATE PROCEDURES TO PROTECT STEMS AND ROOT SYSTEMS FROM EXPOSURE TO FREEZING TEMPERATURES, EXCESSIVE HEAT, AND DESICCATION DUE TO SUN AND WIND. PLANT MATERIAL THAT IS NOT PROTECTED FROM THESE CONDITIONS SHALL BE REJECTED BY THE ENGINEER AND SHALL BE REPLACED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.
6. ALL PLANT MATERIAL SHALL BE INSTALLED WITHIN 48 HOURS OF DELIVERY TO THE SITE. PLANT MATERIAL NOT INSTALLED WITHIN THIS TIME FRAME MAY BE REJECTED BY THE ENGINEER AND SHALL BE REPLACED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.
7. NO POWER EQUIPMENT SHALL BE USED TO GENERATE PLANTING HOLES, HAND TOOLS ONLY.

EMERGENT PLANTINGS – PLUGS : LOW MARSH AND HIGH MARSH

1. NO AREA SHALL BE PLANTED UNTIL IT HAS BEEN CLEARED OF PHRAGMITES WRACK AND OTHER DEBRIS, PROTECTED BY HERBIVORY FENCING POSTS AND FENCING, AND APPROVED BY THE ENGINEER. IMMEDIATELY AFTER PLANTING A 50' X 50' GRID, INSTALL MYLAR TAPE AND TWINE.
2. LOW MARSH AND HIGH MARSH PLANTING WINDOW IS FROM APRIL 1 TO JUNE 15
3. THE PLUGS SHALL BE PLANTED IN THE SOIL NO MORE THAN ONE INCH (1") DEEPER THAN GROWN IN THE NURSERY AND TO A DEPTH THAT WILL ENSURE THAT THE TOP OF THE ROOTSTOCK MASS LIES NO MORE THAN ONE INCH (1") BELOW THE SOIL SURFACE.
4. PRIOR TO PLACEMENT OF THE PLANT IN THE PLANTING HOLE, FERTILIZER SHALL BE PLACED IN THE BOTTOM OF THE PLANTING HOLE (18–6–12 ANALYSIS) AT THE RATE OF THIRTY (30) GRAMS PER PLANT. THE PLANTS SHALL THEN BE PLACED AT THE APPROPRIATE DEPTH WITH THE ROOT SYSTEM ORIENTED DOWNWARD. WHILE THE PLANT IS IN THIS POSITION, THE SOIL PROFILE OR SECTION SHALL BE FULLY AND FIRMLY CLOSED. IF A SOIL DEPRESSION IS FORMED ABOVE OR IMMEDIATELY ADJACENT TO THE PLANTING LOCATION, ENOUGH SOIL SHALL BE SLOUGHED FROM THE SURROUNDING AREA AND FIRMLY TAMPED INTO THE DEPRESSION TO LEAVE THE PLANTING AREA AT THE SAME ELEVATION AS THE SURROUNDING SOIL OR SLIGHTLY HIGHER. ALL AIR AND WATER VOIDS SHOULD BE ELIMINATED IN FILLING THE HOLE.
5. JUNCUS GERARDII SHALL BE PLANTED IN THE HIGHER ELEVATION RANGE OF THE HIGH MARSH (EL. 3 TO 3.5) AND SPARTINA ALTERNIFLORA SHALL BE PLANTED IN THE LOWER RANGE (EL. 2.5 TO 3.0). ALL OTHER HIGH MARSH SPECIES WILL BE PLANTED THROUGHOUT THE ENTIRE HIGH MARSH (EL. 2.5 TO 3.5).



PLAN VIEW

HERBIVORY FENCING, TYPICAL
N.T.S

PLANTING NOTES, CONTINUED

SALT TOLERANT SCRUB SHRUB PLANTINGS

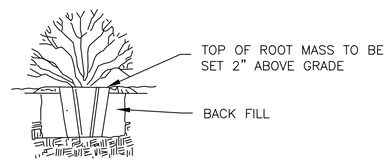
1. THE SCRUB SHRUB AREAS SHALL BE PLANTED AT A COMBINED DENSITY OF 1,750 TO 1,760 SHRUBS PER ACRE AND SPACED AT 5–FOOT ON CENTER.
2. ALL SHRUBS SHALL CONFORM TO THE MATERIAL SPECIFICATION REQUIREMENTS OF THE AMERICAN STANDARD FOR NURSERY STOCK (1986 OR LATER EDITION). THE BACCHARIS SHALL CONFORM TO TYPE 4 STOCK, TWO– TO THREE–FOOT (2'–3') TALL, MINIMUM OF TWO CANES.
3. PLANT PITS SHALL BE DUG APPROXIMATELY FOUR INCHES (4") WIDER THAN THE STOCK SIZE. PRIOR TO PLACEMENT OF THE PLANT IN THE PLANTING HOLE, A 20–GRAM FERTILIZER TABLET (20–10–5 ANALYSIS) SHALL BE PLACED IN THE BOTTOM OF THE PLANTING HOLE. BACKFILL SOIL MATERIALS SHALL BE THE SAME AS EXCAVATED FOR THE PLANTING PITS.

SHRUB PLANTING: UPLAND SLOPE

1. PLANTING SHALL ONLY OCCUR WHEN THE SOLUBLE SALT LEVEL OF THE SOIL MEASURES LESS THAN 1.0 MMHOS/CM.
2. ALL SHRUBS SHALL CONFORM TO THE MATERIAL SPECIFICATION REQUIREMENTS OF THE AMERICAN STANDARD FOR NURSERY STOCK (1986 OR LATER EDITION). THE BACCHARIS SHALL CONFORM TO TYPE 4 STOCK, TWO– TO THREE–FOOT (2'–3') TALL, MINIMUM OF TWO CANES.
3. PLANT PITS SHALL BE DUG APPROXIMATELY FOUR INCHES (4") WIDER THAN THE STOCK SIZE. PRIOR TO PLACEMENT OF THE PLANT IN THE PLANTING HOLE, A 20–GRAM FERTILIZER TABLET (20–10–5 ANALYSIS) SHALL BE PLACED IN THE BOTTOM OF THE PLANTING HOLE. BACKFILL SOIL MATERIALS SHALL BE THE SAME AS EXCAVATED FOR THE PLANTING PITS.

SEEDING: UPLAND SLOPE

1. THE WARM SEASON SEEDING MIXTURE SHALL BE AS SHOWN IN THE PLANTING TABLE, IN POUNDS OF PURE LIVE SEED PER ACRE
2. WARM SEASON SEEDING SHALL OCCUR AFTER MARCH 15 AND BEFORE JUNE 1.
3. NO EARLIER THAN ONE–WEEK PRIOR TO THE SEEDING, THE SEEDED AREA SHALL BE DISKED TO A MINIMUM DEPTH OF SIX INCHES (6") AND FIRMED TO FORM A GOOD SEED BED. IF DIRECTED BY THE ENGINEER, DISKING MAY BE OMITTED IN FAVOR OF A SHALLOW HARROW OPERATION PRIOR TO THE PLACEMENT OF THE SEED.
4. NITROGEN FERTILIZER SHALL NOT BE APPLIED AT THE TIME OF THE SEEDING.
5. SEED MAY BE BROADCAST OR DRILL SEEDED. IF BROADCAST SEEDING IS USED, THE SEEDED AREA SHALL BE DRAGGED WITH A CHAIN OR TINE HARROW AND FIRMED THE SAME DAY AS SEEDED TO ENSURE GOOD SOIL TO SEED CONTACT IS ESTABLISHED. THE SEED MIX SHALL BE MULCHED AT THE RATE OF 4,000 POUNDS OF STRAW MULCH PER ACRE. THE MULCH SHALL BE BOUND IN PLACE WITH AN APPROVED BINDER.
6. ADD EROSION CONTROL MATTING ON THE UPLAND SLOPE AFTER SEEDING HAS OCCURRED. SEE SOIL EROSION AND SEDIMENT CONTROL PLANS AND DETAILS.



NOTES
1. REMOVE PLANT BY CUTTING OR INVERTING CONTAINER
2. USE A KNIFE OR SHARP BLADE TO MAKE (4 OR 5) 1" CUTS THE LENGTH OF THE ROOT BALL

CONTAINERIZED SHRUB PLANTING
N.T.S

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: JAK
DRAWN BY: JAK
SHEET CHK'D BY: JJF
CROSS CHK'D BY: STA
APPROVED BY: JJF
DATE: FEBRUARY 21, 2023

ENGENUITY INFRASTRUCTURE
GALLERIA: 2 BRIDGE AVE., SUITE 323
RED BANK, NJ 07701
732.741.3176
ENGENUITYNJ.COM

PLANTING NOTES AND DETAILS

BLOCK 1815
LOT 204, 220, 235, 251
CHELSEA RD, STATEN ISLAND, NY

SOUTHWESTERN SECTION OF THE SAW MILL CREEK WETLAND MITIGATION BANK
NEW YORK ECONOMIC DEVELOPMENT CORP.
ONE LIBERTY PLAZA, NEW YORK, NY 10006
NEW YORK, NY 10006

JACLYN J. FLOR, P.E., P.P., C.M.E
CONSULTING ENGINEER

LICENSED PROFESSIONAL ENGINEER
STATE OF NJ LICENCE NO. 24GE045426
CERTIFICATE OF AUTHORIZATION 24GA28268000

DATE

PROJECT NO.WSP–00030
DRAWING
PN
SHEET NO.
9 OF **14**

FILE NAME: N:\WSP\WSPG–00030 Sawmill Creek\Plans\WSPG–00030 PLANT PLANS.dwg

NOT FOR CONSTRUCTION

NOTES:
1. VERTICAL DATUM IS NAVD88. HORIZONTAL DATUM IS NAD83.
2. BATHYMETRY IS NOT SHOWN ON PLANS.
3. NORMAL TIDE ELEVATIONS CAN BE AS HIGH AS 5 FT (NAVD88).
4. THE TOPOGRAPHIC BASE SURVEY (SHORELINE AND UPLAND AREAS SURROUNDING SAW MILL CREEK) WAS CONDUCTED BY GAYRON DE BRUIN LAND SURVEYING AND ENGINEERING, P.C. IN JUNE 2013.
5. ACCESS BY FOOT IS ONLY ALLOWED OUTSIDE THE LIMIT OF DISTURBANCE AND IN PLANTING LIMIT ZONES.
6. SILT FENCE SHALL BE USED IN AREAS SPECIFIED ON THE PLANS ABOVE THE SPRING HIGH TIDE.
7. COIR LOG CHECK DAM SHALL BE USED IN AREAS SPECIFIED ON THE PLANS AND BELOW THE SPRING HIGH TIDE

TIDAL DATA AT SITE (NAVD88)	
MEAN LOWER LOW WATER	−3.05 FT
MEAN LOW WATER	−2.82 FT
MEAN TIDE LEVEL	−0.21 FT
MEAN HIGH WATER	2.39 FT
MEAN HIGHER HIGH WATER	2.62 FT
MEAN HIGHER HIGH WATER SPRING	2.91 FT
FEMA 100 YEAR FLOOD ELEVATION	9.00 FT

GRAPHIC SCALE
50 0 25 50
(IN FEET)
1 inch = 50 ft.

SAW MILL CREEK

TRIBUTARY 1
TRIBUTARY 2
TRIBUTARY 3
TRIBUTARY 1

SILT FENCE (TYP.)
COIR LOG CHECK DAM (TYP.)
SILT FENCE (TYP.)
PLANTING LIMIT
COIR LOG CHECK DAM (TYP.)
PERMANENT CHAIN–LINK FENCING
WETLANDS LINE
ADD EROSION CONTROL MATTING ON THE UPLAND SLOPE AREAS (EL. >5)
STOCK PILE AREA 20' X 30'
HAY BALE AND SILT FENCE
STABILIZED CONSTRUCTION ENTRANCE
30'
50'
CHAIN–LINK FENCE GATE
PLANTING LIMIT
PERMANENT CHAIN–LINK FENCING
CHELSEA ROAD

STOCKPILE AREA 75' X 125'
APPROXIMATE FIELD OFFICE LOCATION
STAGING AREA 125' X 150'
STABILIZED CONSTRUCTION ENTRANCE
CHAIN–LINK FENCE GATE & FENCING

BERM OVERGROWN WITH VEGETATION
CONCRETE AREA WITH PARKED CARS ENCROACHING ONTO PARK PROPERTY
CONCRETE BLOCK WALL
METAL QUONSET HUT
METAL TRAILER
1 STORY METAL BLDG.
BRICK/CONC. BLDG.
ADOPTED WIDENING LINE
RAILROAD BRIDGE
EBB
FLOOD
TIDE GAUGE #4
ELEV. = 0.0
SALT MEADOW
WOODED AREA
LOD
PL

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: JAK
DRAWN BY: JAK
SHEET CHK'D BY: JJF
CROSS CHK'D BY: STA
APPROVED BY: JJF
DATE: FEBRUARY 21, 2023

ENGENUITY INFRASTRUCTURE
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SESC PLANS
BLOCK 1815
LOT 204, 220, 235, 251
CHELSEA RD, STATEN ISLAND, NY

SOUTHWESTERN SECTION OF THE SAW MILL CREEK WETLAND MITIGATION BANK
NEW YORK ECONOMIC DEVELOPMENT CORP.
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JACLYN J. FLOR, P.E., P.P., C.M.E
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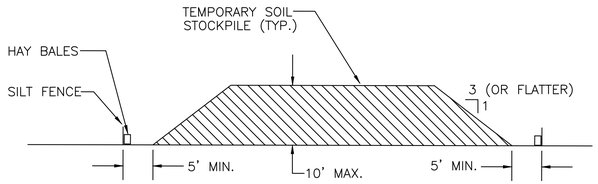
LICENSED PROFESSIONAL ENGINEER
STATE OF NJ LICENCE NO. 24GE045426
CERTIFICATE OF AUTHORIZATION 24GA28268000

DATE

PROJECT NO.WSP−00030
DRAWING
SESC-1
SHEET NO.
10 OF **14**

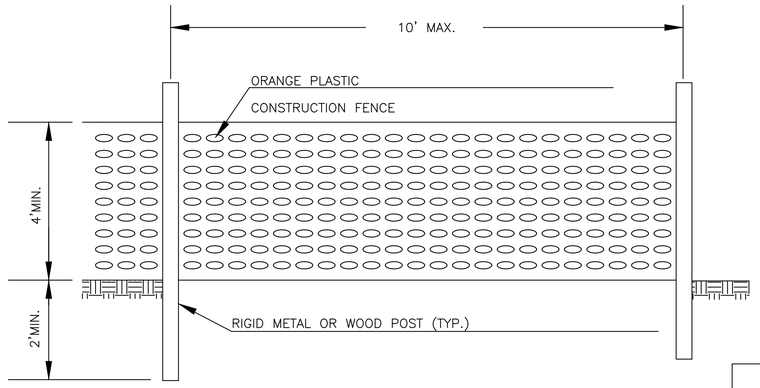
FILE NAME: N:\WSP\WSPG−00030 Sawmill Creek\Plans\WSPG−00030 SESC.dwg

NOT FOR CONSTRUCTION



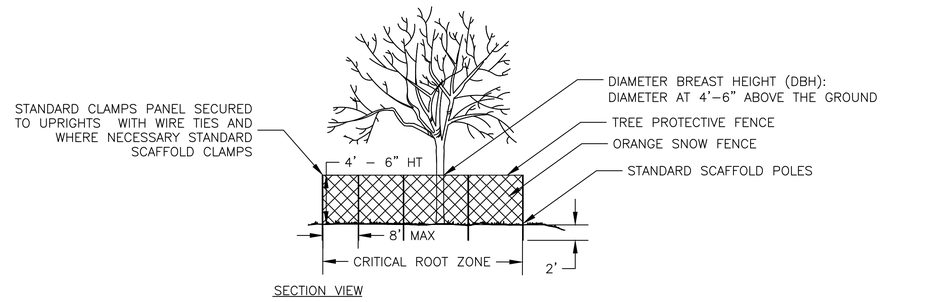
SOIL STOCKPILE DETAIL

N.T.S.



ORANGE CONSTRUCTION FENCE DETAIL

N.T.S.



NOTE:
1. TREE PROTECTION SHALL BE USED AT THE DISCRETION OF THE ENGINEER DURING CONSTRUCTION ON SITE
2. 12 X DBH(FEET) = RADIUS OF CRITICAL ROOT ZONE (FEET)

TREE PROTECTION DURING SITE CONSTRUCTION N.T.S.

SOIL EROSION AND SEDIMENT CONTROL NOTES

1. ALL SOIL EROSION AND SEDIMENT CONTROL (SESC) PRACTICES WILL BE INSTALLED PRIOR TO ANY SOIL DISTURBANCE OR IN THEIR PROPER SEQUENCE, AND MAINTAINED UNTIL PERMANENT PROTECTION IS ESTABLISHED.
2. ANY DISTURBED AREAS ABOVE ELEVATION 2.42 FT (MEAN HIGH WATER) LEFT EXPOSED FOR MORE THAN 30 DAYS THAT ARE NOT SUBJECT TO CONSTRUCTION TRAFFIC WILL IMMEDIATELY RECEIVE TEMPORARY SEEDING. IF THE SEASON PREVENTS THE ESTABLISHMENT OF TEMPORARY COVER, THESE AREAS WILL BE MULCHED WITH STRAW OR EQUIVALENT MATERIAL AT A RATE OF 2 TONS PER ACRE, ACCORDING TO NEW YORK STATE STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL.
3. PERMANENT VEGETATION WILL BE ESTABLISHED ON ALL EXPOSED AREAS WITHIN 10 DAYS AFTER FINAL GRADING.
4. UNFILTERED DEWATERING IS NOT PERMITTED. TAKE ALL NECESSARY PRECAUTIONS DURING ALL DEWATERING OPERATIONS TO MINIMIZE SEDIMENT TRANSFER. ANY DEWATERING METHODS USED WILL BE IN ACCORDANCE WITH STATE STANDARDS.
5. SHOULD THE CONTROL OF DUST AT THE SITE BE NECESSARY, THE SITE WILL BE SPRINKLED WITH FRESHWATER UNTIL THE SURFACE IS WET, IN ACCORDANCE WITH THE STATE STANDARDS FOR EROSION CONTROL.
6. ALL SOIL WASHED, DROPPED, SPILLED OR TRACKED OUTSIDE THE LIMIT OF DISTURBANCE OR ONTO PUBLIC RIGHTS-OF-WAYS WILL BE REMOVED IMMEDIATELY.
7. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY EROSION OR SEDIMENTATION THAT MAY OCCUR BELOW STORMWATER OUTFALLS OR OFFSITE AS A RESULT OF CONSTRUCTION OF THE PROJECT.
8. STOCKPILE LOCATIONS DETERMINED IN THE FIELD WILL BE PLACED WITHIN THE PROJECT SITE LIMITS IN ACCORDANCE WITH THE NYSDEC SPDES PERMIT.

CONSTRUCTION SEQUENCE:

1. MOBILIZE TO THE SITE.
2. INSTALL ALL SITE SOIL EROSION AND SEDIMENT CONTROL MEASURES AND TREE PROTECTION.
3. PERFORM INVASIVE SPECIES CONTROL.
4. ESTABLISH VEHICULAR/PEDESTRIAN TRAFFIC CONTROL MEASURES.
5. LOCATE AND MARK ALL UNDERGROUND UTILITIES WITHIN AREAS OF EXCAVATION.
6. SET UP AND INSTALL TEMPORARY WATER DIVERSION MEASURES (INCLUDING DEWATERING CONTROLS AND MEASURES).
7. CLEAR PROPOSED WORK AREA AND REMOVE AND DISPOSE OF ALL DEBRIS ON SITE.
8. EXCAVATE AND GRADE SITE TO SUB-GRADE ELEVATIONS.
9. REPLANT SUB-GRADE ELEVATIONS ACCORDING TO PLANTING PLAN.
10. RESTORE ALL DISTURBED AREAS TO MATCH EXISTING CONDITIONS AND CLEANUP SITE.
11. DEMOBILIZE.

NOTE: THIS IS A GENERAL CONSTRUCTION SEQUENCE ONLY; THE CONTRACTOR SHALL PROVIDE A DETAILED CONSTRUCTION SEQUENCE PRIOR TO THE START OF CONSTRUCTION.

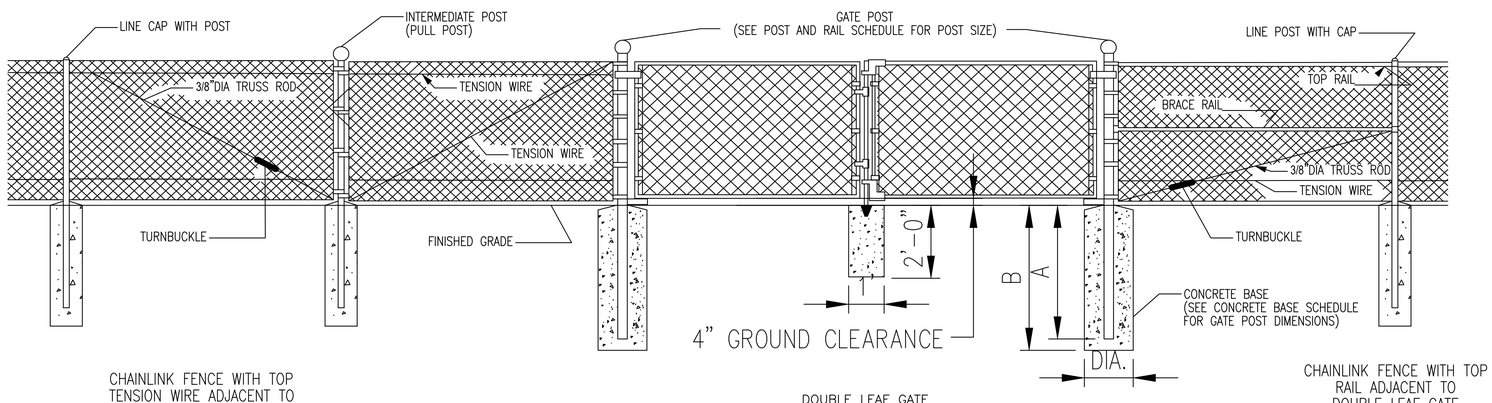
POST AND RAIL SCHEDULE					
		STEEL			
USE	SECTION	NPS DESIGNATOR	ROLLFORMED	O.D. SIZE	WEIGHT LBS/FT
GATE POSTS FOR DOUBLE LEAF GATES, 10' - 24' SPAN	SCHEDULE 40 PIPE	3 1/2		4"	9.11
	ROLLFORMED		3 1/2 X 3 1/2		5.10
GATE FRAME FOR GATES GREATER THAN 8' IN WIDTH	SCHEDULE 40 PIPE	2		2 3/8"	3.65

NOTES

1. GATES POSTS IN ROCK. WHERE SUBSTANTIAL ROCK IS ENCOUNTERED A HOLE 1" LARGER THAN THE GATE POST AND A MINIMUM DEPTH OF 1'-6" FOR SINGLE LEAF GATES UP TO 12' SPAN AND DOUBLE LEAF GATES UP TO 36' SPAN, AND 2' IN DEPTH FOR DOUBLE LEAF GATES 40' SPAN TO 44' SPAN SHALL BE MADE. AFTER INSERTING THE POSTS, THE HOLES SHALL BE BACKFILLED WITH A HANDMIXED 1:2 MORTAR CONSISTING OF ONE PART PORTLAND CEMENT AND TWO PARTS FINE AGGREGATE MIXED TO A PLASTIC CONSISTENCY SHOWING NO SIGN OF FREE WATER. THE HANDMIXING AND CONSOLIDATION OF THE MORTAR SHALL BE PREFORMED IN A MANNER APPROVED BY THE ENGINEER.
2. THE CONTRACTOR SHALL SUBMIT THE DETAILS FOR GATES AND CHAINLINK FENCE ADJACENT TO THEM TO THE ENGINEER. NO FENCE OR GATES SHALL BE ERECTED PRIOR TO THE APPROVAL OF THE VARIOUS DETAILS.
3. STEEL PIPES AND SHAPES SHALL WEIGH AT LEAST 95% OF THE WEIGHT SPECIFIED ON THIS SHEET. THEY MAY EXCEED THE SPECIFIED WEIGHT.

GATE POST CONCRETE BASE SCHEDULE			
USE	DIA.	A	B
GATE POST FOR DOUBLE LEAF GATES UP TO 24' SPAN	14"	3'-0"	3'-6"

(SEE NOTE 1) *FROM ANSI - H35.2(M)



CHAINLINK FENCE WITH TOP TENSION WIRE ADJACENT TO DOUBLE LEAF GATE

DOUBLE LEAF GATE (SHOWN WITH WELDED FRAME)

CHAINLINK FENCE WITH TOP RAIL ADJACENT TO DOUBLE LEAF GATE

PERMANENT FENCE GATE

N.T.S.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: JAK
DRAWN BY: JAK
SHEET CHK'D BY: JJF
CROSS CHK'D BY: STA
APPROVED BY: JJF
DATE: FEBRUARY 21, 2023

ENGENUITY INFRASTRUCTURE
GALLERIA: 2 BRIDGE AVE., SUITE 323
RED BANK, NJ 07701
732.741.3176
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SESC DETAILS 1

BLOCK 1815
LOT 204, 220, 235, 251
CHELSEA RD, STATEN ISLAND, NY

SOUTHWESTERN SECTION OF THE SAW MILL CREEK WETLAND MITIGATION BANK
NEW YORK ECONOMIC DEVELOPMENT CORP.
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JACLYN J. FLOR, P.E., P.P., C.M.E
CONSULTING ENGINEER

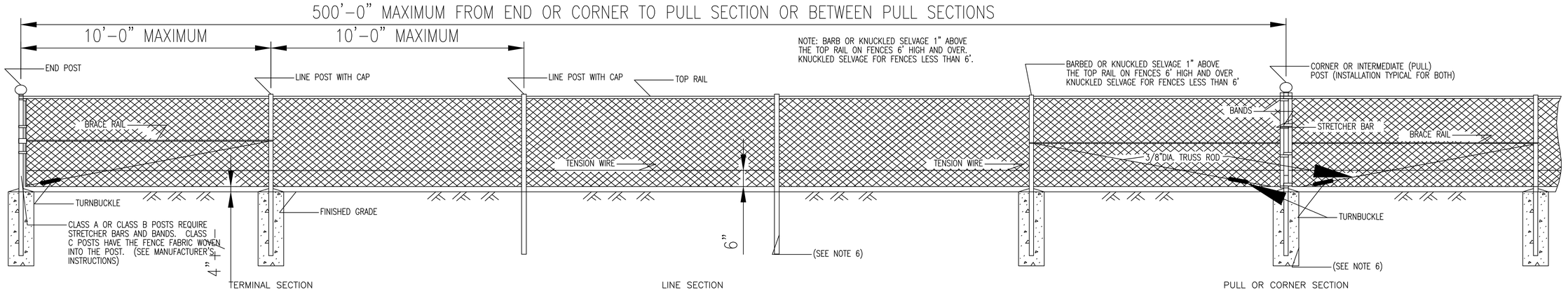
LICENSED PROFESSIONAL ENGINEER
STATE OF NJ LICENCE NO. 24GE045426
CERTIFICATE OF AUTHORIZATION 24GA28268000

DATE

PROJECT NO.WSP-00030
DRAWING **SESC-2**
SHEET NO. **11** OF **14**

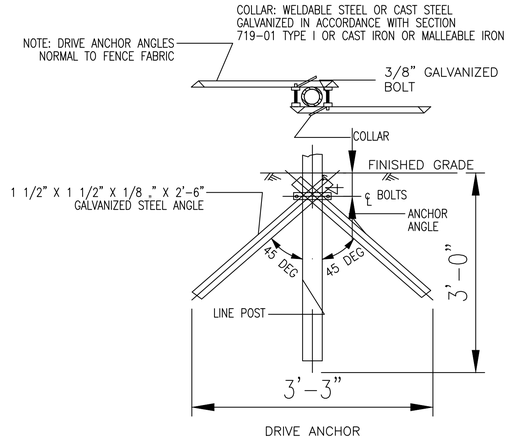
FILE NAME: N:\WSP\WSPG-00030 Sawmill Creek\Plans\WSPG-00030 SESC.dwg

NOT FOR CONSTRUCTION

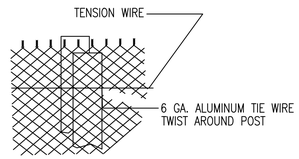


POST AND RAIL SECTION				
USE	SECTION	STEEL		
		NPS DESIGNATOR	O.D.	WEIGHT LBS/FT
TOP RAIL	CLASS B STEEL TUBING	1 1/4	1 11/16"	1.84
LINE POSTS FOR FENCES 6' AND UNDER	CLASS B STEEL TUBING	1 1/2	1 7/8"	2.28
LINE POSTS FOR FENCES GREATER THAN 6' AND EQUAL TO OR LESS THAN 8'	CLASS B STEEL TUBING	2	2 3/8"	3.12
LINE POSTS FOR FENCES GREATER THAN 8' AND EQUAL TO OR LESS THAN 10'	CLASS B STEEL TUBING	2	2 3/8"	3.12
LINE POSTS FOR FENCES OVER 10'	CLASS B STEEL TUBING	2 1/2	2 7/8"	4.64

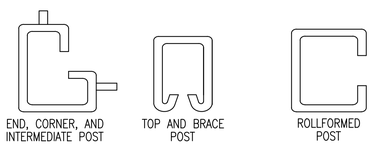
ACCESSORY	STEEL
FABRIC TIES FOR TOP AND BRACE	6 GA. ALUMINUM WIRE AT 24" C.C. MAX.
FABRIC TIES FOR LINE POSTS	6 GA. ALUMINUM WIRE AT 14" C.C. MAX.
FABRIC TIES FOR TENSION WIRE	11 GA. ALUMINUM WIRE AT 12" O.C.
BOTTOM TENSION WIRE	7 GA. GALVANIZED STEEL



DRIVE ANCHOR



SUGGESTED METHOD OF TYING TENSION WIRE TO LINE POST



CLASS "C" ROLLFORMED SECTIONS
(SEE POST AND RAIL SCHEDULE FOR DIMENSIONS)

NOTES:

1. POSTS, INCLUDING ENCASEMENT, SHALL BE SET INSIDE THE R.O.W. LINE SO THAT FENCING PLACED ON THE R.O.W. SIDE OF POSTS WILL BE AS NEARLY ON THE R.O.W. LINE AS POSSIBLE. WHEN DIRECTED BY THE ENGINEER. THE FABRIC SHALL BE PLACED ON THE OPPOSITE SIDE OF THE POSTS SO THAT THE FABRIC CAN BE PULLED TIGHT AGAINST THE POST.
2. POSTS IN ROCK – WHERE SUBSTANTIAL ROCK IS ENCOUNTERED A HOLE 1" LARGER IN DIAMETER THAN THE POST, AND OF 12" MIN. DEPTH FOR LINE POSTS, AND 18" MIN. DEPTH FOR ALL OTHER POSTS SHALL BE MADE. AFTER INSERTING THE POSTS. THE HOLES SHALL BE BACKFILLED WITH A HANDMIXED 1:2 MORTAR CONSISTING OF ONE PART PORTLAND CEMENT TWO PARTS FINE AGGREGATE MIXED TO A PLASTIC CONSISTENCY SHOWING NO SIGNS OF FREE WATER. THE HAND MIXING AND CONSOLIDATION OF THE MORTAR SHALL BE PERFORMED IN A MANNER APPROVED BY THE ENGINEER.
3. CORNER POSTS SHALL BE USED AT SHARP BREAKS IN VERTICAL GRADE, AND CHANGES IN HORIZONTAL ALIGNMENT OF 15 DEGREES AND OVER. PULL POSTS SHALL BE USED EVERY 500' ON STRAIGHT RUNS OF CHAINLINK FENCE OR AS DIRECTED BY THE ENGINEER.
4. THE CONTRACTOR SHALL SUBMIT THE DETAILS FOR THE CHAIN LINK FENCE IT PLANS TO ERECT TO THE ENGINEER. NO FENCE SHALL BE ERECTED PRIOR TO THE APPROVAL OF THE VARIOUS DETAILS.
5. STEEL PIPES AND SHAPES SHALL WEIGH AT LEAST 95% OF THE WEIGHT SPECIFIED ON THIS SHEET. THEY MAY EXCEED THE SPECIFIED WEIGHT.
6. THE CONTRACTOR SHALL HAVE THE OPTION OF SETTING THE LINE POSTS IN 10" DIA. BY 3' DEEP CONCRETE BASES WITH THE POSTS EMBEDDED 2'-5" OR USING METHODS OF DRIVING AND ANCHORING SPECIFIED BY THE MANUFACTURER EXCEPT THAT THE LINE POSTS WITH TRUSS RODS ATTACHED AND ALL END, CORNER AND INTERMEDIATE POSTS SHALL BE SET IN CONCRETE BASES. THE CONCRETE BASES SHALL BE A MINIMUM OF 10" DIA. BY 3' DEEP WITH THE POST EMBEDDED 2'-6" FOR FENCES 6' HIGH OR LESS AND 12"DIA. BY 3'-6" DEEP WITH THE POST EMBEDDED 3' FOR FENCES OVER 6' HIGH. FOR GATE POSTS SEE THE CURRENT STANDARD SHEET TITLED "GATES AND CHAINLINK FENCE ADJACENT TO GATES".
7. CHAINLINK FENCE WITH TOP RAIL SHALL NOT BE USED WITHIN 29'-6" OF TRAVELED WAY.

PERMANENT CHAIN LINK FENCE

N.T.S.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: JAK
DRAWN BY: JAK
SHEET CHK'D BY: JJF
CROSS CHK'D BY: STA
APPROVED BY: JJF
DATE: FEBRUARY 21, 2023

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SESC DETAILS 2

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SOUTHWESTERN SECTION OF THE SAW MILL CREEK WETLAND MITIGATION BANK
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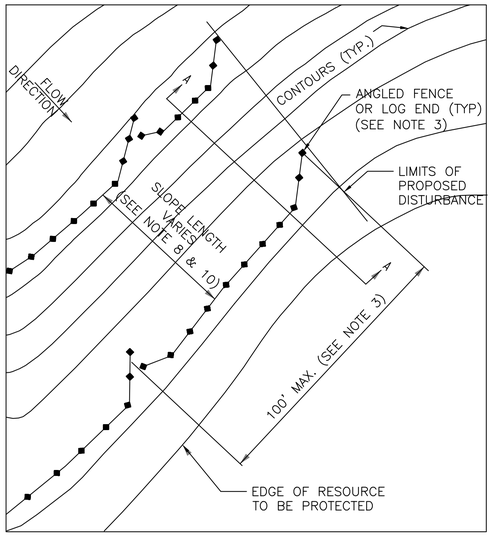
STATE OF NJ LICENCE NO. 24GE045426
CERTIFICATE OF AUTHORIZATION 24GA28268000

DATE

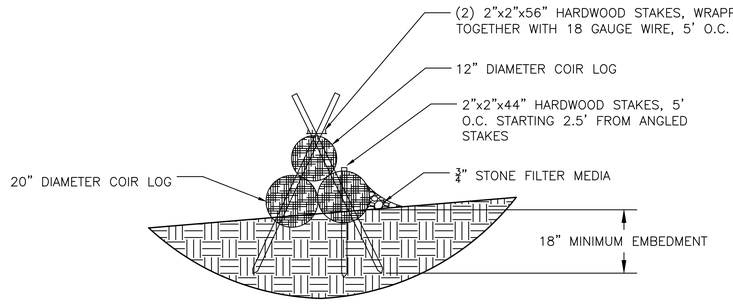
PROJECT NO.WSP-00030
DRAWING
SESC-3
SHEET NO.
12 OF **14**

FILE NAME: N:\WSP\WSPG-00030 Sawmill Creek\Plans\WSPG-00030 SESC.dwg

NOT FOR CONSTRUCTION



PLAN
EXAMPLE LAYOUT OF SILT FENCE OR SEDIMENT FILTER LOG

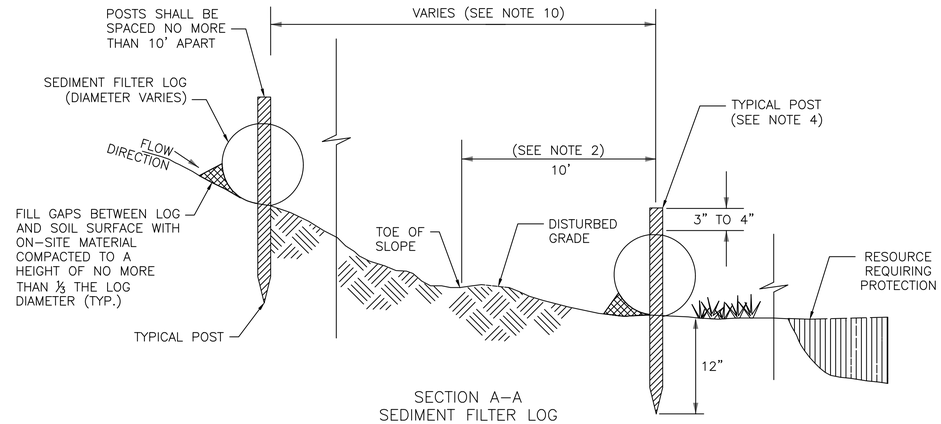


COIR LOG CHECK DAM

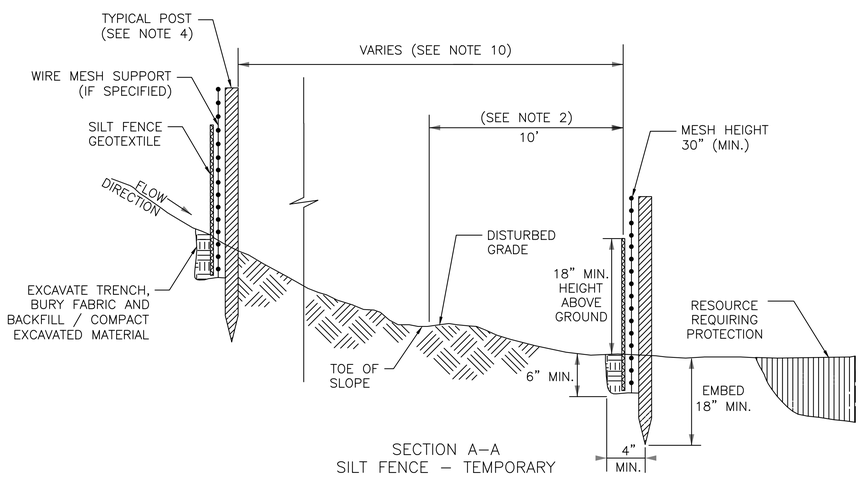
N.T.S.

NOTES:

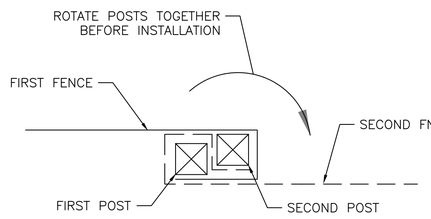
1. COIR LOGS SHALL BE 100% BIODEGRADABLE AND FREE OF POTENTIAL SEED CONTAINING MATERIAL.
2. EMBED BOTTOM COIR LOGS A MINIMUM OF 4" INTO EXISTING SOIL.



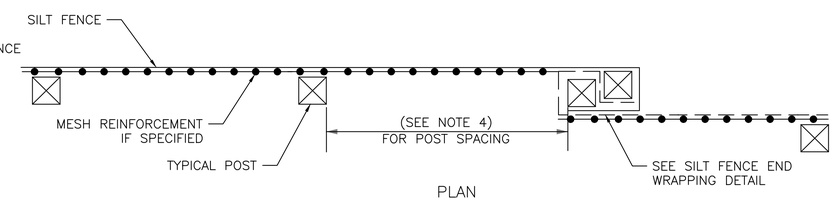
SECTION A–A
SEDIMENT FILTER LOG



SECTION A–A
SILT FENCE – TEMPORARY



SILT FENCE END WRAPPING DETAIL



PLAN
SILT FENCE PLACEMENT

SOIL EROSION AND SEDIMENT CONTROL NOTES

A. THE PRIMARY PURPOSE OF A SILT FENCE OR SEDIMENT LADEN RUNOFF BY IMPOUNDING WATER BEHIND THE FENCE OR LOG SO THAT SEDIMENT FALLS OUT OF SUSPENSION.

B. IDENTIFY ONSITE AND OFFSITE RESOURCES THAT NEED TO BE PROTECTED USING THE SILT FENCE OR SEDIMENT FILER LOG (E.G. WETLANDS,PONDS, WATERWAYS, OR ENVIRONMENTALLY SENSITIVE AREAS). SILT FENCE OR SEDIMENT FILTER LOGS ARE TYPICALLY USED WITH EROSION OR SEDIMENT CONTROL MEASURES, SUCH AS MULCH AND/OR ROLLED EROSION CONTROL FABRIC.

C. SILT FENCE OR SEDIMENT FILTER LOGS SHALL NOT BE USED IN OR ACROSS A FLOWING CHANNEL, OR AREAS OF CONCENTRATED FLOW, DO NOT USE SILT FENCE OR SEDIMENT FILTER LOGS AS A PERIMETER CONTROL, TO DEFINE PROPERTY LINES, OR DELINEATE A RESOURCE.

GENERAL NOTES

1. SILT FENCE OR SEDIMENT FILTER LOGS SHALL BE INSTALLED ON A LINE OF EQUAL ELEVATION (CONTOUR). IT MAY BE INSTALLED AT INTERMEDIATE POINTS UP SLOPES AS WELL AS AT THE BOTTOM.
2. FOR LOCATIONS THAT WARRANT PLACEMENT OF SILT FENCE OR SEDIMENT FILTER LOGS AT THE BASE OF SLOPES, SILT FENCE OR SEDIMENT FILTER LOGS SHALL BE PLACED A MINIMUM OF 10 FEET FROM THE TOE OF THE SLOPE, TO PROVIDE ADEQUATE AREA FOR SEDIMENT STORAGE AND FACILITATE MAINTENANCE OF THE SEDIMENT CONTAINMENT AREA.
3. THE ENDS OF A ROW OF SILT FENCE OR SEDIMENT FILTER LOGS SHALL BE ANGLED UP SLOPE TO PREVENT CHANNELIZED FLOW FROM BEING CONVEYED PAST THE ENDS OF THE FENCE. A SECTION OF SILT FENCE OF SEDIMENT FILTER LOGS SHOULD NOT EXCEED 100 FEET IN LENGTH.
4. WOOD POSTS FOR SILT FENCE SHALL HAVE A CROSS–SECTION AREA OF 3.5 SQUARE INCHES OR STEEL POSTS, SHALL BE "T" OR "U" SHAPE AND 1.33 POUNDS/FEET (MINIMUM) FOR STEEL. SPACING FOR THE PROVIDED SILT FENCE POSTS SHALL BE AS DESIGNATED ON THE DEPARTMENT APPROVED LIST FOR SILT FENCE. THE LENGTH OF SILT FENCE POSTS SHALL BE 40 INCHES. WOOD POSTS FOR SEDIMENT FILTER LOGS SHALL BE NOMINAL 2 X 2. THE LENGTH OF FILTER LOG POSTS SHALL BE 16" GREATER THAN THE DIAMETER OF THE LOG.
5. THE BOTTOM EDGE OF SILT FENCE SHALL BE BURIED A MINIMUM OF 6" BELOW GROUND. THE FENCE SHALL BE INSTALLED WITH THE POSTS ON THE DOWNSLOPE SIDE OF THE FABRIC.
6. WHERE ENDS OF GEOTEXTILE FABRIC COME TOGETHER, THEY SHALL BE OVERLAPPED AND FOLDED AND STAPLED TO PREVENT SEDIMENT BYPASS, OR THE END POSTS OF TWO SECTIONS SHALL BE WRAPPED AS SHOWN IN THE DETAIL FOR SILT FENCE END WRAPPING.
7. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATION REACHED ONE–HALF OF THE ABOVE GROUND HEIGHT OR WHEN BULGES DEVELOP IN THE FABRIC, SEDIMENT SHALL BE DISPOSED OF AS UNSUITABLE MATERIAL.
8. THE FOLLOWING ARE MAXIMUM SLOPE LENGTHS DISTANCE BETWEEN ROWS FOR SILT FENCE INSTALLATION:

SILT FENCE MAXIMUM SLOPE LENGTH (FEET)			
SLOPE	STEEPNESS	STANDARD**	REINFORCED***
*5–10%	20:1 TO 10:1	125	250
10–20%	10:1 TO 5:1	100	150
20–33%	5:1 TO 3:1	60	80
33–50%	3:1 TO 2:1	40	70
> 50%	> 2:1	20	30

* FOR SLOPES LESS THAN 5% SILT FENCE IS NOT REQUIRED UNLESS IN SENSITIVE AREAS OR HIGHLY ERODIBLE SOILS.

** STANDARD SILT FENCE IS FABRIC ROLLS STAPLED TO WOODEN POSTS DRIVEN 18 INCHES INTO THE GROUND

*** REINFORCED SILT FENCE IS FABRIC PLACED AGAINST WELDED WIRE MESH WITH ANCHORED STEEL POSTS DRIVEN 18 INCHES INTO THE GROUND

9. INSTALLATION OF SILT FENCE OR SEDIMENT LOG, INCLUDING EXCAVATION, BACKFILL, AND COMPACTION OF SOIL SHALL BE INCLUDED IN THE UNIT PRICE BID FOR ITEM.
10. SEDIMENT FILTER LOG POSTS SHALL BE SPACED NO MORE THAN 10 FEET APART, ENDS OF LOGS SHALL BE OVERLAPPED BY 24 INCHES AND STAKED SIDE BY SIDE. THE MAXIMUM SLOPE LENGTH DISTANCE BETWEEN ROWS SHALL NOT EXCEED THE FOLLOWING LIMITS:
11. INDEPENDENT SEDIMENT FILTER LOGS IN PLACE OF SILT FENCE ARE NOT ALLOWED WITH AREA INUNDATED BY MEAN HIGH WATER.

SEDIMENT FILTER LOG MAX SLOPE LENGTH (FEET)							
DIA. (IN.)	SLOPE %						
	2	5	10	20	25	33	50
12	250	225	125	65	50	40	25
18	275	250	150	70	55	45	30
24	350	275	200	130	100	60	35

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: JAK
DRAWN BY: JAK
SHEET CHK'D BY: JJF
CROSS CHK'D BY: STA
APPROVED BY: JJF
DATE: FEBRUARY 21, 2023

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SESC DETAILS 3

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CONSULTING ENGINEER

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CERTIFICATE OF AUTHORIZATION 24GA28268000

DATE

PROJECT NO.WSP–00030
DRAWING **SESC-4**
SHEET NO. **13** OF **14**

FILE NAME: N:\WSP\WSPG–00030 Sawmill Creek\Plans\WSPG–00030 SESC.dwg

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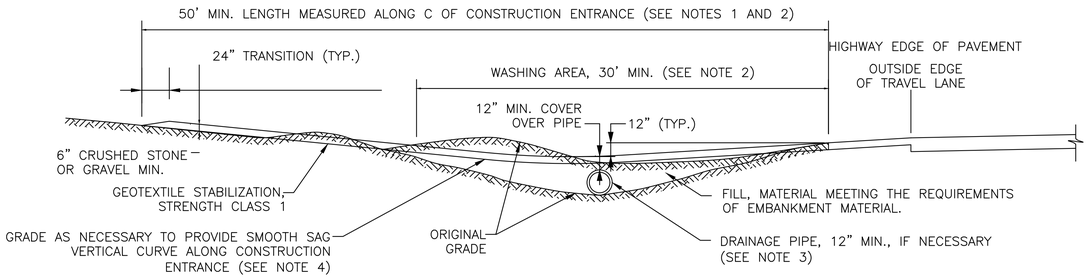
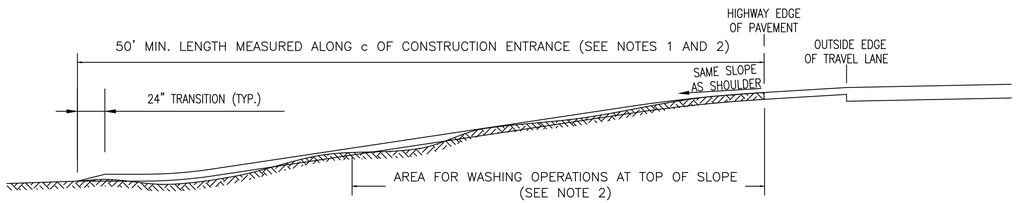
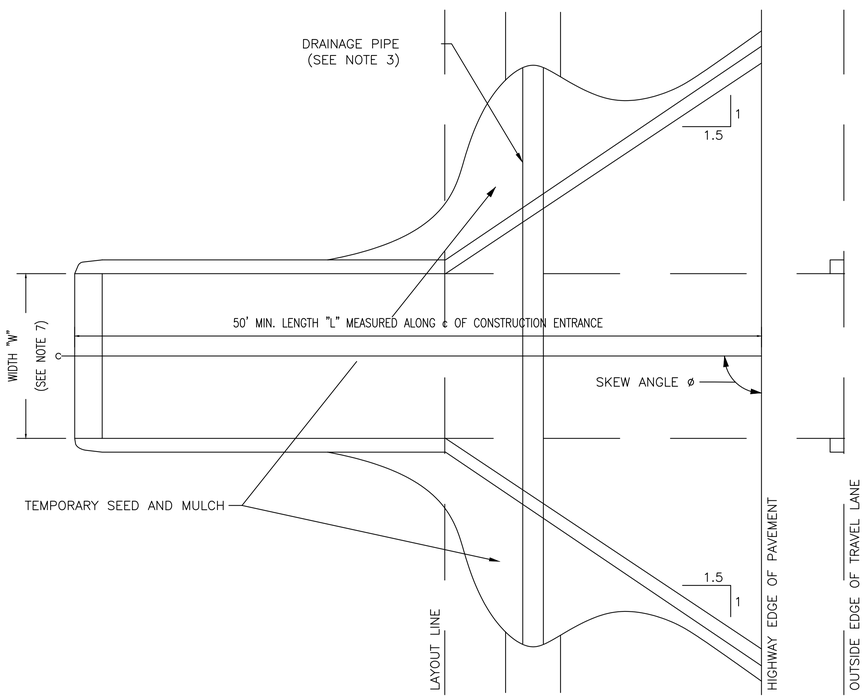


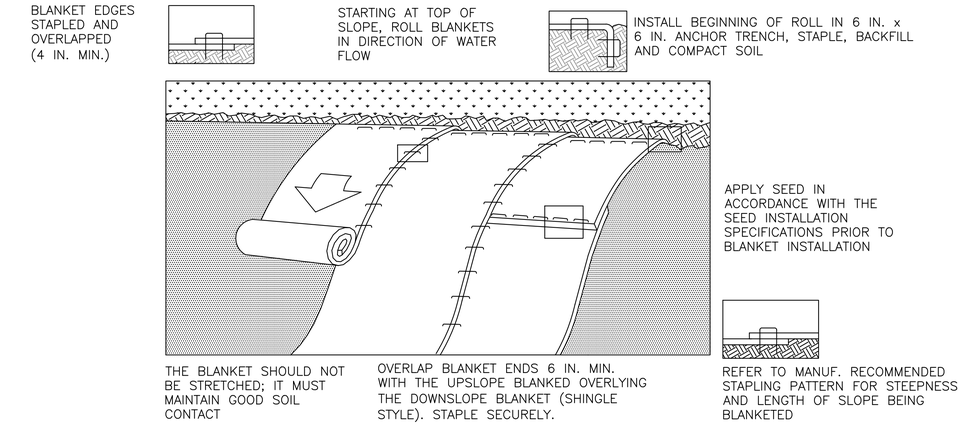
TYPICAL CONSTRUCTION ENTRANCE PROFILE
(CUT AND DITCH SECTIONS)



TYPICAL CONSTRUCTION ENTRANCE PROFILE
(FILL SECTIONS)



TYPICAL CONSTRUCTION ENTRANCE PLAN
(CUT/DITCH AND FILL SECTIONS)



EROSION CONTROL MATTING
N.T.S.

EROSION CONTROL MATTING NOTES:

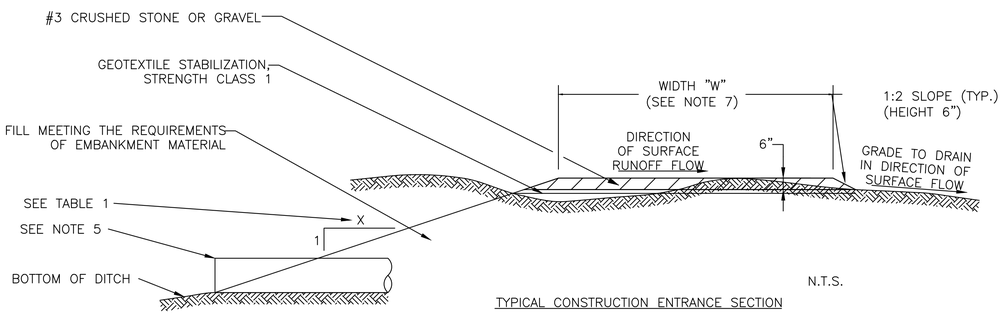
1. THE EROSION CONTROL BLANKET SHALL BE THE NORTH AMERICAN GREEN SC150BN OR EQUIVALENT, BIODEGRADABLE, AND FREE OF POTENTIAL SEED CONTAINING MATERIAL.
2. SEED SHALL BE APPLIED ACCORDING TO SEED INSTALLATION DESCRIBED IN THE SPECIFICATIONS, PRIOR TO INSTALLING THE BLANKET.
3. PROVIDE ANCHOR TRENCH AT TOE OF SLOPE IN SIMILAR FASHION AS AT TOP OF SLOPE.
4. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS, AND GRASS.
5. BLANKET SHALL HAVE GOOD CONTINUOUS CONTACT WITH UNDERLYING SOIL THROUGHOUT ENTIRE LENGTH. LAY BLANKET LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH SOIL. DO NOT STRETCH BLANKET.
6. THE BLANKET SHALL BE STAPLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
7. BLANKETED AREAS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT UNTIL SEED VEGETATION IS ESTABLISHED TO A MINIMUM UNIFORM 70% COVERAGE THROUGHOUT THE BLANKETED AREA, WHERE SEEDING OCCURS IN ACCORDANCE WITH THE PLANS. DAMAGED OR DISPLACED BLANKETS SHALL BE RESTORED OR REPLACED WITHIN 4 CALENDAR DAYS.
8. EROSION CONTROL MATTING IS NOT A CONTRACTUAL REQUIREMENT AND SHALL BE USED AS PART OF THE CONTRACTOR'S MEANS AND METHODS TO STABILIZE SLOPES. ALL EROSION CONTROL MATTING SHALL CONFORM TO THE NOTES, DETAILS AND SPECIFICATIONS.

CONSTRUCTION ENTRANCE NOTES:

A. THE PURPOSE OF A STABILIZED CONSTRUCTION ENTRANCE IS TO REDUCE OR ELIMINATE THE TRACKING OF SEDIMENT ONTO PUBLIC RIGHTS OF WAY OR STREETS.

NOTES:

1. MODIFICATIONS MAY BE REQUIRED TO MATCH FIELD CONDITIONS.
2. A 30' WASH AREA SHALL BE PROVIDED, ADDITIONAL GRADING MAY BE REQUIRED TO PROVIDE WASHING AREAS.
3. PROPOSED DRAINAGE PIPES SHALL BE SIZED WITH SUFFICIENT CAPACITY TO CARRY DITCH FLOWS (12" MIN.). ALTERNATIVE WAYS OF TRANSPORTING DITCH DRAINAGE ACROSS CONSTRUCTION ENTRANCES MAY BE PROPOSED BY THE CONTRACTOR FOR APPROVAL BY THE ENGINEER.
4. THE CONTRACTOR SHALL GRADE TO PREPARE AND SMOOTH ORIGINAL GROUND FOR PLACEMENT OF 6" OF #3 CRUSHED STONE OR GRAVEL ENTRANCE MATERIAL UP TO THE EDGE OF PAVEMENT.
5. DRAINAGE PIPES OVER 20" DIA. THAT ARE NOT BEHIND ROADSIDE BARRIER SHALL INCLUDE SAFETY END SECTIONS OR GRATING TO ENSURE TRAVERSABILITY.
6. LAYOUT DRIVEWAY OPENING PER TAPER METHOD OF LAYOUT FOR A MINOR COMMERCIAL DRIVEWAY ON STANDARD SHEET TITLED "DRIVEWAY ENTRANCE LAYOUT".
7. DETERMINE DRIVEWAY WIDTH "W" FROM THE MINOR COMMERCIAL DRIVEWAY CLASSIFICATION OF TABLE 1 ON STANDARD SHEET TITLED "DRIVEWAY DESIGN GUIDELINES".
8. PERIODIC MAINTENANCE MAY BE REQUIRED AND COST OF THIS MAINTENANCE WILL BE INCLUDED IN THE UNIT PRICE BID.



N.T.S.

TYPICAL CONSTRUCTION ENTRANCE SECTION

TABLE 1	
X	HIGHWAY SPEED CONDITION
2	ALL SPEEDS – PROTECTED BY BARRIER
3	< 50 MPH
6	w 50 MPH

REV. NO.	DATE	DRWN	CHKD	REMARKS

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APPROVED BY: JJF
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CERTIFICATE OF AUTHORIZATION 24GA28268000

DATE

PROJECT NO.WSP–00030
DRAWING **SESC-5**
SHEET NO. **14** OF **14**

FILE NAME: N:\WSP\WSPG–00030 Sawmill Creek\Plans\WSPG–00030 SESC.dwg

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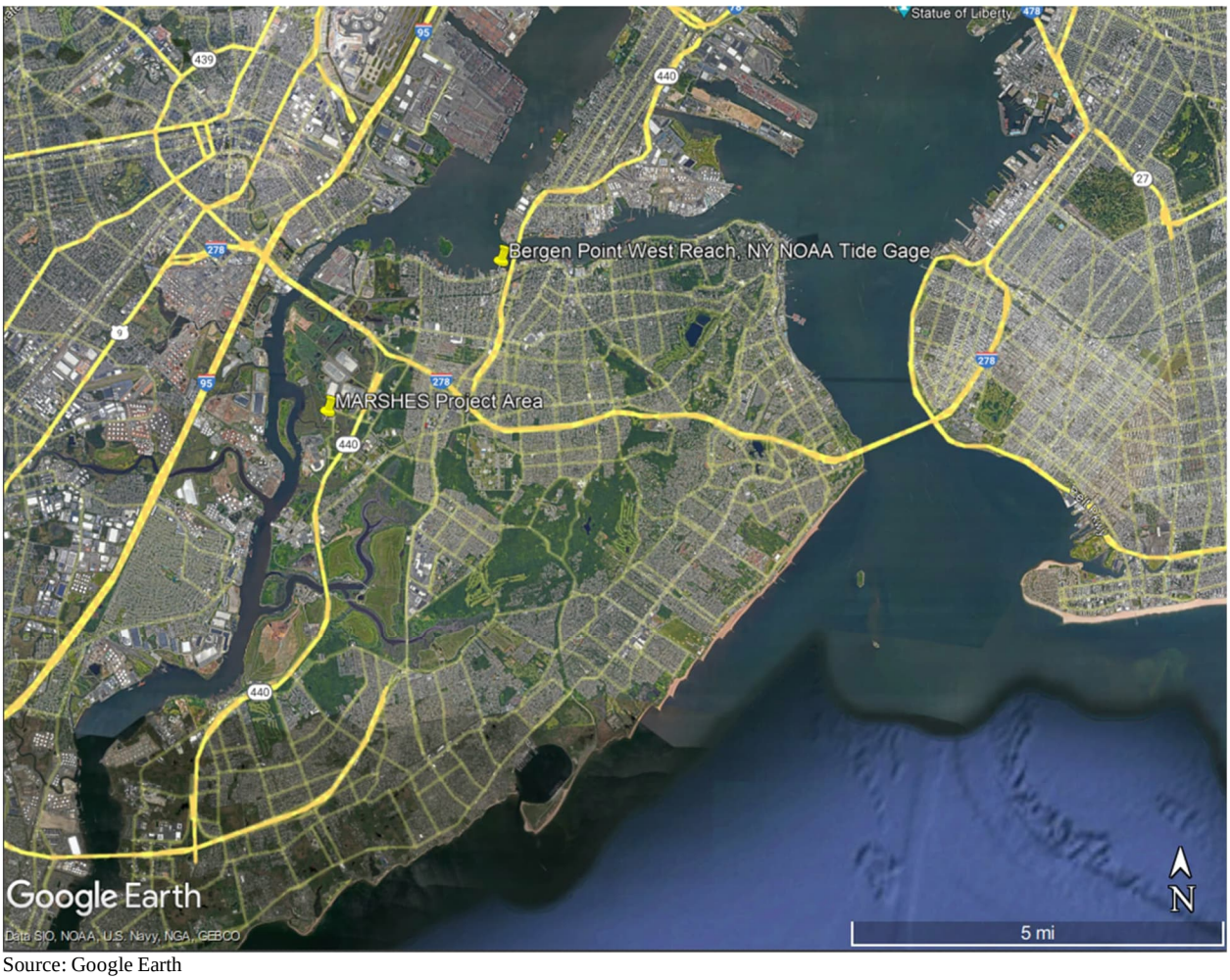
ATTACHMENT D-4
SIMULATING THE IMPACT OF SEA LEVEL RISE AT THE MARSHES WETLAND COMPLEX

Attachment 3
to Exhibit D

SIMULATING FUTURE IMPACTS OF SEA LEVEL RISE

The Southwestern Section design increases the portion of the site that is tidally influenced from Saw Mill Creek through the removal of remnant fill. In simulating future impacts of sea level rise on Southwestern Section, the most recent version of the Global and Regional Sea Level Rise Scenarios for the United States methodology was used (NOAA, 2022). One of the main goals of the project is to create resilient tidal wetlands in the face of sea level rise. This report provides guidance for incorporating the direct and indirect physical effects of projected future sea-level change across the project life cycle (50 years) in managing, planning, engineering, designing, constructing, operating, and maintaining Southwestern Section.

Historic trends in local Mean Sea Level are best determined from tide gauge records. The Center for Operational Oceanographic Products and Services, National Oceanographic and Atmospheric Administration (NOAA) provides historic information and local Mean Sea Level trends for tidal stations operated by NOAA/NOS in the US (see http://www.coops.nos.noaa.gov/sltrends/slmap.htm). The NOAA methodology recommends that stations used for sea level rise projections should have at least 40 years of historic tidal data. The nearest NOAA tide gauge to the project site with at least 40 years of historic tidal record is the Bergen Point, NY gauge (Station ID 8519483) as shown in Figure 1. The Bergen Point gauge station shares similar characteristics with the project site including coastal/estuarine location, bathymetry, topography, shoreline geometry, and hydrodynamic conditions. Because of this reason, coupled with the fact that the computed tidal datums on the project site are similar to the recorded tidal datums at the Bergen Point, NY, this gauge was used to project the sea level rise at the project site.



Source: Google Earth

Figure 1: Pilot Bank project location with reference to closest NOAA tide gauges

According to the NOAA methodology, sea level change projections are available for four recent projections to the local region: a high-rate projection, an intermediate high projection, an intermediate projection, and a projection of the historically measured rate (or low rate) as a baseline comparison. These scenarios are derived from the *2022 Sea Level Rise Technical Report* (Sweet et al., 2022) using the same methods as the USACE Sea Level Change Curve Calculator.

The NOAA methodology considers the entire range of possible future rates of sea-level change for planning studies and engineering designs. The four scenarios were developed by the U.S. Sea Level Rise and Coastal Flood Hazard Scenarios and Tools Interagency Task Force as input into the U.S. Global Change Research Program Sustained Assessment process and Fourth National Climate Assessment (Sweet et al., 2022). While these scenarios begin in 2005, they were adjusted to 2000 to be compared with the 2017 sea level rise scenarios. The four scenarios consider global mean sea level rise (GMSL), regional changes in ocean circulation, changes in Earth's gravity field due to ice melt redistribution, and local vertical land motion. The historic projection then uses a locally derived historic rate of sea level rise (Bergen Point, NY) that is extrapolated into the future without any change in the existing rate of sea level rise.

The data required for calculation of a sea level rise projection using the NOAA methodology are the relative sea level change rate at the location of the desired projection, construction start date and the project life span. For the purposes of the Southwestern Section projection, the relative sea level rise rate is variable by socioeconomic scenario detailed above, a construction start date of 2024 and project life span of approximately 50 years (to 2070) were used.

Based on the NOAA 2022 projections, the four scenarios of sea level rise at the project site are shown in Figure 3.

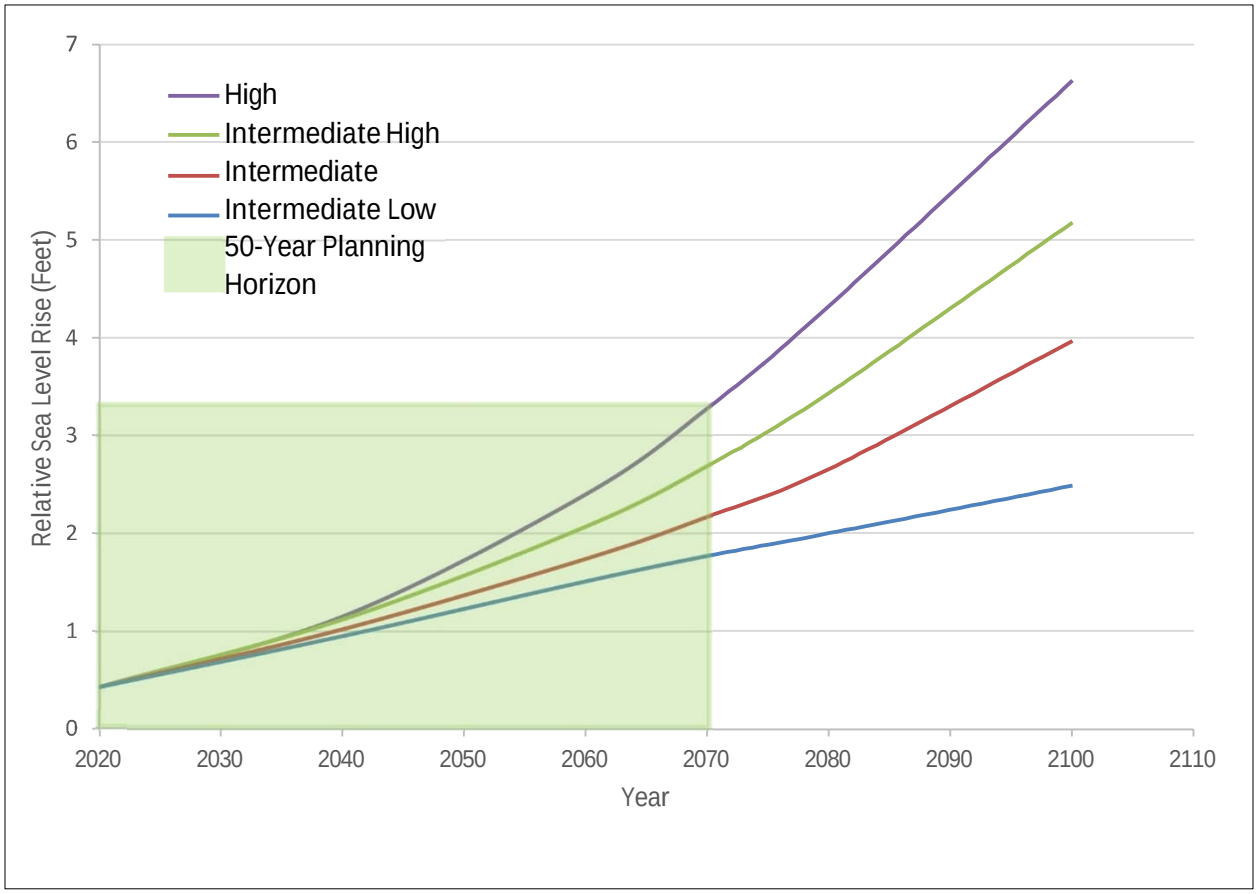


Figure 3: Projected relative sea level change (rise) following construction at Southwestern Section

To analyze the potential impacts of sea level rise on existing and proposed features such as bridges, marsh surfaces, and infrastructure, projected sea level rise values under the four scenarios were added to the current mean high-water elevation. Under the intermediate low-rate sea level rise scenario, 1.77 feet of sea level rise should be added to the current Mean High Water (MHW) elevation of 2.4 feet NAVD88, bringing MHW elevation up to 4.17 feet in NAVD88 by 2070. Under the intermediate rate sea level rise scenario, 2.17 feet of sea level rise should be added, bringing MHW elevation up to 4.57 feet NAVD88 by 2070. Under the intermediate high-rate sea level rise scenario, 2.69 feet of sea level rise should be added; bringing MHW elevation up to 5.09 feet in NAVD88 by 2070. Under the high-rate sea level scenario, 3.28 feet of sea level rise should be added; bringing the MHW elevation up to 5.68 feet in NAVD88 by 2070.

For Southwestern Section, no new structures are proposed at the project site. The existing structures in the vicinity of the project are all above elevation 7 feet NAVD88, which is well above the four projected sea level rise elevations of 4.17-, 4.57-, 5.09-, and 5.68-feet NAVD88.

Figures 4 show the extent of expected flooding under the intermediate low rate (yellow shading), intermediate rate (green+yellow shading), intermediate high rate (orange+green+yellow shading), and high rate (magenta+orange+green+yellow shading) sea level rise scenarios for the proposed site design.

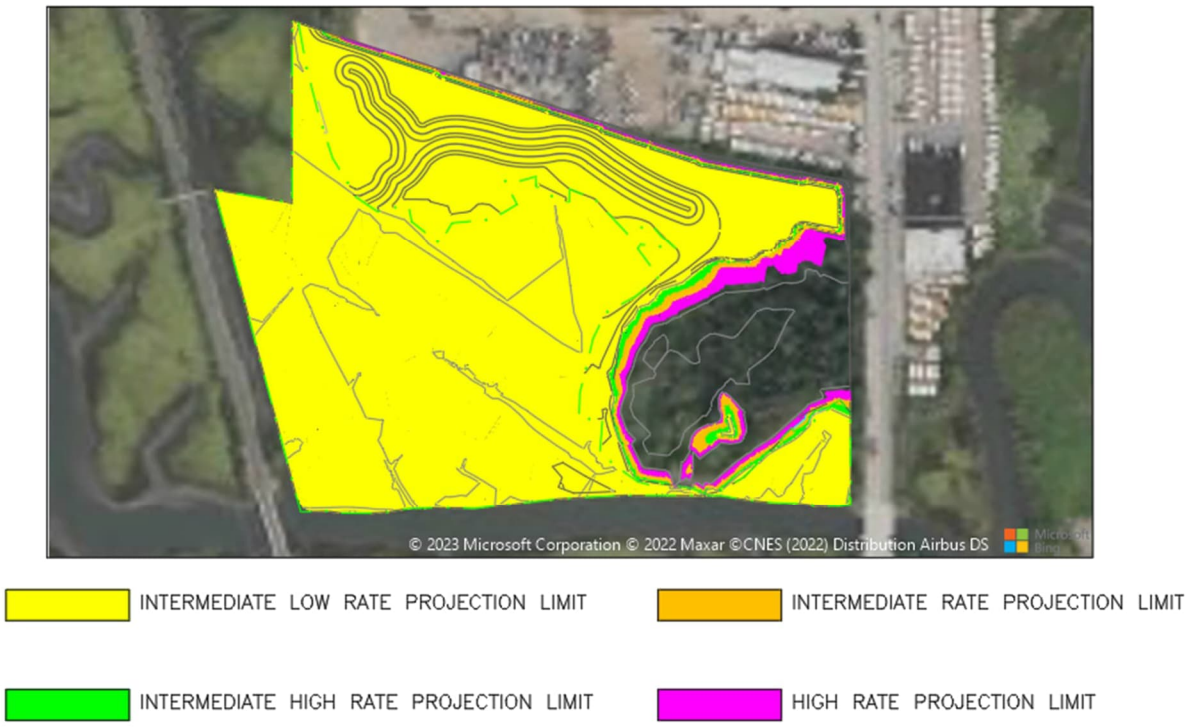


Figure 4: Projected sea level rise extent in the Southwestern Section area.

To determine the impact of sea level rise on the proposed Southwestern Section habitats, comparisons can be made between the designed habitat elevations of the site in 2024 to the forecasted habitat elevations in 2070 as a result of sea level rise. The proposed habitat design elevations and projected elevations for each scenario is detailed in Table 4 with a summary of the potential acreage change in habitat type under each scenario.

Table 4: Projected Habitat Elevation Range For Each Scenario

Scenario	Habitat	Projected Habitat Elevation Range (ft)
Current 2023	Open water/Mudflat	<1.5
	Low Marsh	1.5 - 2.5
	High Marsh	2.5 - 3.5
	Scrub shrub	3.5 - 5.0
	Upland	>5.0
Low Rate Sea Level Rise 2070 (1.77 Feet Increase)	Open water/Mudflat	<3.27
	Low Marsh	3.27 - 4.27
	High Marsh	4.27 - 5.27
	Scrub shrub	5.27 - 6.77
	Upland	>6.77
Intermediate Rate Sea Level Rise 2070 (2.17 Feet Increase)	Open water/Mudflat	<3.67
	Low Marsh	3.67 - 4.67
	High Marsh	4.67 - 5.67
	Scrub shrub	5.67 - 7.17
	Upland	>7.17
Intermediate High Rate Sea Level Rise 2070 (2.69 Feet Increase)	Open water/Mudflat	<4.19
	Low Marsh	4.19 - 5.19
	High Marsh	5.19 - 6.19
	Scrub shrub	6.19 - 7.69
	Upland	>7.69
High Rate Sea Level Rise 2070 (3.28 Feet Increase)	Open water/Mudflat	<4.78
	Low Marsh	4.78 - 5.78
	High Marsh	5.78 - 6.78
	Scrub shrub	6.78 - 8.28
	Upland	>8.28

Intermediate Low Rate Sea Level Rise

Based on this projected sea level rise scenario, the designed low marsh area of 3.20 acres in 2024 will decrease to 0.84 acres (73.7%) by 2070. The area of high marsh is projected to decrease from 4.19 acres in 2024 to 0.41 (90.21%) acres by 2070 under low-rate scenario due to increased frequency of inundation. Also, the open water/mudflat area would increase from 0.84 acres to 7.75 acres under this scenario, increasing 0.15 acres per year. This is a conservative assumption, however, as over time sediment will accrete and the marsh should mature to adapt and maintain its surface area and aquatic habitat features.

Intermediate Rate Sea Level Rise

For this projected sea level rise scenario, the designed eastern low marsh area of 3.2 acres in 2024 will decrease 0.40 acres (87.5% the proposed area conditions) by 2070 due to additional high marsh and scrub/shrub areas being inundated. The area of high marsh is projected to decrease from 4.19 acres in 2024 to 0.45 acres (89.4%) by 2070 under this scenario. The area of open water/mudflat would increase from 0.84 acres to 8.34 acres under this scenario, 0.16 acres per year.

Intermediate High Rate Sea Level Rise

Under the intermediate high sea level rise scenario the designed low marsh area of 3.2 acres in 2023 will decrease to 0.40 acres (87.4%) by 2070. The area of high marsh is projected to decrease from 4.19 acres in 2024 to 0.52 acres (87.7%) by 2070 due to increased frequency of inundation. However, in comparison with the intermediate rate sea level scenario high marsh will increase from 0.45 to 0.52 acres in the southeast area of Southwestern Section. Also, the open water/mudflat area would increase from 0.84 acres to 8.56 acres under this scenario, 0.168 acres till 2070.

High Rate Sea Level Rise

Under the high rate sea level rise scenario the designed eastern low marsh area of 3.2 acres in 2024 will decrease to 0.46 acres (85.7%). The area of high marsh is projected to decrease from 4.19 acres in 2024 to 0.51 acres (87.8%) by 2070. The area of open water/mudflat would increase from 0.84 acres to 8.79 acres under this scenario, representing 83.4% of the total area for Southwestern Section.

Summary

Under all four sea level rise scenarios, there would be no apparent effects to roads, parking, or infrastructure. However, higher tides from spring tide and storm surge events would rise beyond the mapped low sea level rise MHW line, possibly affecting roads and parking lots, on occasion. The potential impacts of future sea level rise will not change the number of credits generated by the Bank. The target aquatic and upland buffer habitats established during construction and the five-year monitoring period are the basis for the bank credits.

EXHIBIT E
FUNCTIONAL ASSESSMENT
FOR SOUTHWESTERN SECTION

Southwestern Section of the Saw Mill Creek Pilot Wetland Mitigation Bank Staten Island, New York

Functional (Ecological) Assessment

Submitted to:
The Interagency Review Team (IRT)
U.S. Army Corps of Engineers, Chair
New York, NY
Application Number NAN-2013-00259-EHA

Submitted by:
New York City Economic Development Corporation
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New York, NY

Prepared by:
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August 2023

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APPENDICES

These appendices are provided in the Saw Mill Creek MBI

1.0 INTRODUCTION

On behalf of the New York City Department of Small Business Services (the Permittee) and New York City Economic Development Corporation (NYCEDC), WSP USA Inc. (WSP) is submitting a request to modify the June 2015 Mitigation Banking Instrument (MBI), and the related federal and state permits, to add an additional 10.9 acres of proposed mitigation (Southwestern Section) to the Saw Mill Creek Pilot Wetland Mitigation Bank (Bank). To support the establishment of the Southwestern Section of the Bank, NYCEDC is employing a functional assessment methodology to determine wetland mitigation credits generated by the proposed ecological improvements. This approach is consistent with the *Final Rule for Compensatory Mitigation for Losses of Aquatic Resources* (33 CFR Parts 325 and 332 and 40 CFR Part 230) which encourages the use of functional assessment metrics as a basis to establish bank credits. It is also consistent with the June 2015 MBI for the Bank.

Specifically, 33 CFR 332.8(o)(3) states that "The number of credits must reflect the difference between pre- and post-compensatory mitigation project site conditions, as determined by a functional or condition assessment." This report provides:

- the basis and justification for the functional (ecological) assessment methodology, Uniform Mitigation Assessment Method (UMAM), at Southwestern Section of the Bank,
- a detailed description of UMAM,
- the findings of an initial application of the method,
- a discussion of how UMAM was adapted for use within tidal areas of New York City; and,
- the findings from the application of UMAM to the Southwestern Section of the Saw Mill Creek Pilot Mitigation Bank.

UMAM was developed with the purpose of providing a standardized methodology to assess functions of wetlands and surface waters for baseline conditions, the measurable reduction of functions due to impacts, and the amount of mitigation required to offset the impacts. The method also allows for the determination of functional uplift and the number of mitigation bank credits that could be generated for a proposed bank project.

Based on extensive coordination with the Interagency Review Team (IRT), the UMAM was used to evaluate credit generation for the 68-acre Eastern and Western Sections of the Pilot Bank and is included as Exhibit E of the Mitigation Banking Instrument (MBI) for the Pilot Bank.[1]

[1] The Eastern Section of the Bank was previously referred to as "East of Chelsea Road" or "Phase 1" and the Western Section of the Bank was previously referred to as "West of Chelsea Road" or "Phase 2".

2.0 MITIGATION BANK CREDIT GENERATION

The overall goal of compensatory wetland mitigation is to provide suitable compensation that will meet the federal policy of No-Net-Loss of wetland functions and services first established by Executive Order 11990 under President George H.W. Bush in 1990 and supported in subsequent administrations. Compensatory mitigation is typically provided in the form of wetland restoration, establishment (creation), enhancement or preservation, or a combination of these approaches. The expected outcome is a net increase in wetland functions and services.

The National Research Council published guidelines for the improvement of wetland mitigation (NRC, 2001) which included the use of wetland functional assessments to determine appropriate wetland mitigation ratios; this was further supported by the 2008 *Final Rule for Compensatory Mitigation for Losses of Aquatic Resources* (2008 Mitigation Rule). While there are many different models and approaches nationally, presently there are few models appropriate for use in the New York City region. In addition, the models or assessment methods are typically not designed to estimate the amount of mitigation required to compensate for impacts or estimate bank credit generation from mitigation actions.

For each mitigation approach, some U.S. Army Corps of Engineers (USACE) Regulatory Districts' and State agencies have employed the use of mitigation ratios to determine the amount of mitigation area required to offset a certain area of impact. This practice has also been extended to mitigation banks. The New York State Department of Environmental Conservation (NYSDEC) does not have set mitigation ratios for different mitigation approaches but addresses each mitigation project on a case by case basis.

With the implementation of the 2008 Mitigation Rule, the USACE and the United States Environmental Protection Agency (USEPA) clearly set a preference for the use of ecological assessments as the means to establish the number of credits generated from a mitigation bank. As stated in the §332.8(o)(3) of the Rule:

> "Credit production. The number of credits must reflect the difference between pre- and post-compensatory mitigation project site conditions, as determined by a functional or condition assessment or other suitable metric".

Presently, functional assessment tools have been used within the USACE New York District to demonstrate that a proposed mitigation approach would result in an ecological uplift if implemented and provided the justification to regulatory agencies to issue permits. The methods used have limitations in that the results are not quantifiable into a single unit and easily translated into mitigation credits. The use of UMAM as an ecological assessment method to determine the credits generated from a wetland mitigation bank offers several advantages over the alternative approach of using a more arbitrary and less scientific approach of applying negotiated mitigation ratios. The advantages include:

- Practical process that relies on reasonable scientific judgment;
- Can be applied within typical permit and bank development timeframes;
- The credit generation process is linked to a measurement of ecological uplift obtained from proposed actions;
- Method assesses both existing conditions and post-restoration conditions to generate an overall score or measurement of ecological uplift for a single assessment area, which is then converted to credits; and
- Provides consistent determination process and encourages collaboration between regulatory agencies and bank sponsors.

Based on these advantages, the use of UMAM was determined to be the preferred approach for defining the ecological uplift and credit generation for the Southwestern Section of the Pilot Bank.

3.0 DESCRIPTION AND APPLICATION OF THE UNIFORM MITIGATION ASSESSMENT METHOD

3.1 Description of Methodology

The Uniform Mitigation Assessment Method (UMAM) was developed in 2004 by the Florida Department of Environmental Protection (FDEP) and various Water Management Districts (WMDs) in response to the need to better track wetland functional losses and gains from impacts and mitigation projects and banks. The methodology provides a standardized framework to assess wetland functions for baseline and post-mitigation conditions for assessment areas using a qualitative description and quantitative scoring.

Part I of the assessment method is a qualitative characterization process that summarizes available descriptive information of the assessment area and surrounding features. Information sources include online databases, wetland field guides or other relevant publications, and information gained from a field visit. The purpose of the qualitative assessment is to provide enough detail about the assessment area to evaluate and identify the functions and wildlife resources associated with the site. This “frame of reference” informs the second part of the assessment method, the quantitative assessment.

Part II of the assessment method is a quantitative assessment of three broad Functional Assessment categories: Location and Landscape Support, Water Environment, and Community Structure. Each of these sections are characterized using a series of guidance statements defining the attributes or functions of the assessment area that are each scored on a scale of 0 to 10. A score of 10 indicates that the function or attribute is optimal within the assessment area, and a score of 0 indicates the function or attribute is absent. This portion of the assessment method relies on best professional judgment, site knowledge of the evaluator(s) and the interpretation of guidance statements.

For each of the three functional assessment categories, an overall score of the assessment area for current and proposed conditions is estimated (not averaged) based on the evaluators' interpretation of the individual attribute score assignments. The scores are then used to calculate mitigation ratios or mitigation bank credits for the assessment areas. The UMAM also includes score adjustments or modifiers for preservation, time lag, and risk factors.

While the methodology was originally prepared for use in Florida, it has since been used in other states. The qualitative assessment process in Part I is sufficiently general to be applicable to New York wetland systems since it relies on information obtained from State and local sources as well as a site visit. The field procedures and data collection conducted during the site visit corresponds to the same approach typically employed for a wetland mitigation site selection evaluation.

The quantitative assessment in Part II utilizes specific guidance statements that define attributes or functions of the assessment area. Since the method was developed for use in freshwater and tidal wetlands in Florida, certain aspects of the guidance statements and supporting documentation and examples are not applicable to tidal wetlands in the NYC region; however, the majority of the guidance statements are appropriate for use. In addition, the functional assessment categories of Location and Landscape Support, Water Environment, and Community Structure each encompass a range of attributes that cover tidal wetland functions and services associated with tidal wetlands in New York City. Table 1 depicts the correlation between UMAM functional assessment categories and corresponding tidal wetland functions and services described in the *New York State Salt Marsh Restoration and Monitoring Guidelines* (NYSDOS and NYSDEC, 2000).

Table 1: UMAM Functional Assessment Categories with Attribute Guidance Correlated to Tidal Wetland Functions and Services

UMAM Functional Assessment Category	Tidal Wetland Functions and Services, NY
Location and Landscape Support	Provision of Habitat
	Support of Food Web Dynamics
	Storage of Floodwater
Water Environment	Provision of Habitat
	Support of Food Web Dynamics
	Cycling of Nutrients
	Export of Organic Matter
	Attenuation of Wave Energy
	Enhancement of Sedimentation/Accretion
Community Structure	Provision of Habitat
	Primary Production
	Support of Food Web Dynamics
	Cycling of Nutrients
	Enhancement of Sedimentation/Accretion

3.2 Application of UMAM to the Southwestern Section of the Pilot Mitigation Bank

3.2.1 Potential Credit Generation

The potential credit generation using the UMAM methodology was first evaluated in 2013 using a subset of the Pilot Bank area that represents potential wetland enhancement, restoration, and buffer enhancement mitigation approaches.

The procedure as outlined above was followed beginning with Part I – Qualitative Characterization, which required the team to identify information sources that served the equivalent purpose and provided similar information to that required by the UMAM. Equivalent information was readily available from several sources, including the *New York State Salt Marsh Restoration and Monitoring Guidelines* (NYSDOS and NYSDEC, 2000), the *Ecological Communities of New York State, 2nd Edition* (NYNHP 2002), and various online data sources. Aerial photographs and *Bing* Birds-Eye View imagery was used to assess site conditions during the initial evaluation of UMAM procedures.

Part II of the methodology was completed utilizing a team approach to evaluate each attribute and assign scores following the guidelines included in the methodology. In the absence of detailed site knowledge, a conservative approach was taken when selecting attribute scores. Also, as part of this process, each question was evaluated for its relevance to tidal wetlands, particularly in the northeast and New York City region. This UMAM evaluation process was useful in evaluating functional category attributes that required rewording or removal to create a UMAM procedure that was more appropriate to the Pilot Bank site and region.

Based on extensive coordination with the IRT, the modified UMAM was used in 2015 to evaluate credit generation for the 68-acre Eastern and Western Sections of the Saw Mill Creek Pilot Wetland Mitigation Bank and is included as Exhibit E of the MBI.[2]

3.2.2 Modifications to UMAM

As noted, the UMAM process was evaluated during this preliminary application to identify areas where potential changes to the method may be required to adapt the procedure to use for coastal wetlands in the NYC area. Through the review the following items were noted:

- The main format, structure and scoring process of UMAM is appropriate for use with tidal wetlands and can be adopted for application in the NYC region.
- Some of the attribute statements could be reworded to clarify their intent and strengthen the overall assessment.
- Some attribute statements (three) can either be removed entirely due to their Florida-specific nature or incorporated into other subject-linked attribute statements.

[2] The Eastern Section of the Bank was previously referred to as "East of Chelsea Road" or "Phase 1" and the Western Section of the Bank was previously referred to as "West of Chelsea Road" or Phase 2.

- Additional attribute statements can be added to the Location and Landscape Support category to address societal or recreational benefits of coastal wetlands.
- The method should incorporate a comment section for each attribute to record the evaluator's justification for score selection.
- The guidance document requires revision to provide appropriate regional examples and further clarity on the evaluation and scoring of certain attributes.
- The score adjustments or modifiers for preservation, time lag, and risk factors did not affect the outcome for wetland mitigation banks.

Based on the evaluation of the UMAM procedure, several improvements and additions to the UMAM process were made. The changes range from items as simple as numbering each box on the assessment forms to correlate with the guidance text, to providing summary tables of descriptive information to facilitate completion of the site characterization. The modifications do not substantially change the procedures originally developed and tested by the University of Florida Howard T. Odum Center for Wetlands (UF-CFW) and the Florida Department of Environmental Protection (FDEP) in compliance with Chapter 62-345, Florida. The intent of the slight modifications is to increase the method's applicability to coastal wetlands in the New York City region. The Modified Uniform Assessment Method is described in detail in Appendix A and the modified UMAM Guidance Documents are provided as follows: Appendix A-Standardized Field Protocol; Appendix B-Location and Landscape Support Guidance Module; Appendix C-Water Environment Guidance Module; Appendix D-Community Structure Guidance Module; Appendix E-Expected Variation Guidance Module; and Appendix F-Adjustment Factors Guidance. The methodology and guidance documents will assist the evaluator in the proper use of the assessment method to evaluate coastal wetlands, surface waters, as well as upland mitigation areas.

3.2.3 Application of Modified UMAM to Southwestern Section of the Pilot Bank

The modified UMAM procedure was applied to the proposed 10.9-acre Southwestern Section of the Pilot Bank. Figure 1 outlines the Assessment Areas used in this evaluation. A field wetland delineation was conducted in May 2023 to accurately delineate the boundaries of the Assessment Areas used in this evaluation and to verify the extent of existing wetland within the Southwestern Section. A request for Jurisdictional Determination was submitted to the New York District of the United States Army Corps of Engineers on June 20, 2023. Representative photographs of the Assessment Areas are provided in Appendix H and the completed Part I and Part II information and score sheets are presented in Appendix I. The mitigation approaches applied to the assessment areas consist of wetland enhancement, wetland restoration (rehabilitation), wetland restoration (re-establishment) and upland buffer rehabilitation, similar to the mitigation approaches successfully designed and constructed at the Eastern Section of the Pilot Bank. These mitigation approaches follow the definitions provided in the 2008 Mitigation Rule and the NYSDEC Mitigation Guidance.

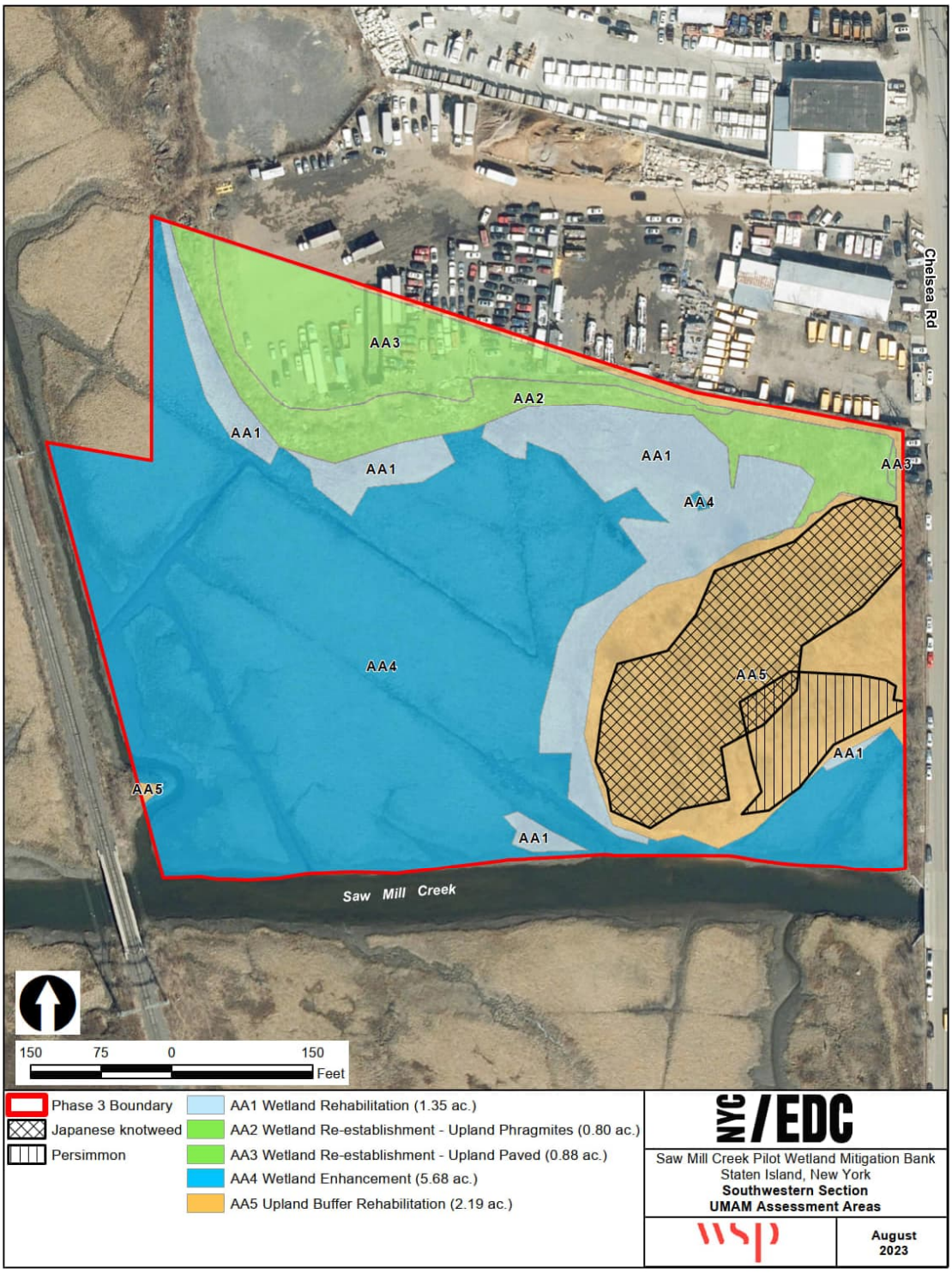

Figure 1. Assessment Areas

A similar procedure as outlined above for the initial UMAM assessment was followed. The Team began with Part I – Qualitative Characterization, which utilized readily available information from several sources, including the *New York State Salt Marsh Restoration and Monitoring Guidelines* (NYSDOS and NYSDEC, 2000), the *Ecological Communities of New York State, 2nd Edition* (NYNHP 2002), aerial imagery, and recent site visits and site observations.

Part II of the methodology was completed utilizing a team approach to evaluate each attribute and assign scores following the methods described in Part 4.0 and the functional category guidelines included in the Appendices. The results of the assessment are summarized in Table 2.

The credit generation for each mitigation approach was converted to a ratio. Overall, the method provides a credit generation ratio that is generally consistent with previously applied ratios for rehabilitation (~2:1), re-establishment (~1:1) and enhancement (~10:1). A main advantage of the credit generation ratio with the UMAM procedure is that it is based on an ecological assessment process that is sensitive to the attributes of an individual site assessment area and not the static application of a set of ratios.

Table 2: Summary of UMAM Mitigation Bank Credit Generation

Functional Assessment Category	AA1 - Wetland Restoration (Rehabilitation)		AA2 - Wetland Restoration (Re-establishment) - Upland Phragmites		AA3 - Wetland Restoration (Re-establishment) - Upland Paved		AA4 - Wetland Enhancement		AA5 - Upland Buffer Rehabilitation		Wetland Reference Site
	Current Condition	With Rehabilitation	Current Condition	With Re-establishment	Current Condition	With Re-establishment	Current Condition	With Enhancement	Current Condition	With Rehabilitation	Current Condition
Location & Landscape	4	7	2	7	0	8	6	7	5	8	8
Water Environment	4	9	0	10	0	10	7	9	0	0	9
Community Structure	3	10	0	10	0	10	9	9	4	9	9
Score	*0.367*	*0.867*	*0.067*	*0.900*	*0.00*	*0.93*	*0.73*	*0.87*	*0.45*	*0.85*	*0.87*
Functional Uplift (Delta)	0.500		0.833		0.93		0.13		0.40		n/a
Acres	1.35		0.80		0.88		5.68		2.19		7
Mit. Credits (relative functional gain x acres)	0.68		0.67		0.82		0.76		0.88		n/a
Mit. Ratio (Acres/credits)	2.00		1.20		1.07		7.50		2.50		n/a

The proposed credit ratios for Phase 3 are highlighted in blue.

The ecological uplift obtained for each mitigation approach varied by assessment area and was tied to key drivers that affected some attributes more than others, leading to a net increase in the functional category scores. The following sections summarize the general assessment area conditions, the proposed mitigation actions, and the factors affecting the functional improvements and attribute scoring.

Reference Standard Wetland

Reference standard wetlands provide examples of healthy ecosystems and indicate the potential for restoration of nearby disturbed sites. The functions and services of reference standard wetlands are characteristic of the least-altered wetlands. They provide a physical representation of functioning wetland ecosystems that can be observed and measured. Application of the UMAM to a Reference Standard Wetland provides an indication of the possible functional uplift that could be obtained by a nearby Mitigation Site or Bank.

An approximately 7-acre Reference Standard Wetland is located north of the Pilot Bank, on the west side of Chelsea Road. The Reference Wetland is bounded by the Williams-Transco underground natural gas pipeline to the south, railroad tracks to the west, and River Road to the north and east. While the Reference Site is near the Pilot Bank, the Reference Site is functionally superior to the Project Site as it generally lacks historic fill and non-native vegetation. The UMAM assessment of the Reference Standard Wetland generated a score of 0.87.

Location and Landscape Support attributes and related functions are fairly high due to the presence of a native plant community but are limited by surrounding land uses (railroad, pipeline, road) as is typical in this urban environment.

Water Environment attributes and functions are high due to the open tidal circulation in the wetland.

The Community Structure attributes and functions are high due to the diverse native plant community and the lack of invasive species.

Wetland Restoration (Rehabilitation) Assessment Area (AA1)

As defined by the 2008 Federal Rules for wetland mitigation (33 CFR 332.2), wetland restoration (rehabilitation) means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function but does not result in a gain in aquatic resource area.

The 1.35 acre wetland rehabilitation AA is adjacent to a paved vehicle storage lot and an upland fill area characterized by a high degree of invasive plant cover. The *Phragmites*-dominated wetland has very little connectivity to tidal flow, little microtopography, extremely low plant species diversity, and supports few wildlife species. The extent of the area dominated by *Phragmites* has been increasing over the past nine years and may continue to do so without intervention. This area would be restored through removal of debris, herbicide treatment and mowing/cutting of *Phragmites*, re-grading to provide suitable tidal marsh elevations, and replanting with native salt marsh grasses and shrubs. This area would be managed for any reinvasion by *Phragmites* through herbicide treatment under a long-term management plan and protected in perpetuity.

Rehabilitation activities would restore tidal hydrology, create appropriate microtopography, establish a native salt marsh plant community, and promote greater use by native wildlife, significantly improving Location and Landscape Support attributes and related functions. Additionally, improved connectivity would reduce the adverse effects of adjacent land condition and use. Rehabilitation activities of the adjacent, invasive-dominated upland buffer areas would further improve Location and Landscape Support functions.

Water Environment attributes and related functions would be much improved by proposed rehabilitation activities. Rehabilitation of tidal hydrology and microtopography would establish

native salt marsh plant community zonation, restore appropriate tidal soil moisture conditions, increase use by tidally-dependent wildlife species, and improve flushing of runoff from adjacent land uses and overall water quality.

Rehabilitation activities would dramatically improve the AA's plant community structure. The resulting plant community would be a healthy, thriving salt marsh characterized by a diversity of native species with abundant seed production and recruitment, and a high degree of plant cover. Any reinvasion by *Phragmites* would be minimal and managed under a long-term management plan.

Wetland Restoration (Re-establishment) Assessment Areas (AA2 and AA3)

As defined by the 2008 Federal Rules for wetland mitigation (33 CFR 332.2), wetland restoration (re-establishment) means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.

Approximately 1.68 acres of wetland would be re-established, consisting of approximately 0.80 acre of *Phragmites*-dominated and Japanese knotweed (*Reynoutria japonica*) dominated undeveloped disturbed upland (AA2) and approximately 0.88 acre of paved lot composed of fill material over former marshlands (AA3). Fill materials and the general elevation within AA2 would be graded to re-establish appropriate marsh plain elevations. Fill material in AA3 would be removed from the paved area and the entire area graded to marsh elevations. A tidal swale would be excavated to restore tidal flow and circulation and the marsh plain would be planted with appropriate native salt marsh grasses and shrubs to form low marsh along the channels and high marsh transitioning to a tidal scrub shrub.

The wetland re-establishment areas currently lack wetland functions and have minimal value as upland habitat. Restoration activities include the removal of upland fill and existing debris to create elevations that will support tidal salt marsh habitat. The areas would be graded to suitable tidal marsh elevations, a tidal swale will be excavated to restore tidal flow, microtopography will be established, and the marsh plain will be replanted with native salt marsh grasses and shrubs.

For re-establishment areas, the baseline scores for functional assessment categories reflect the non-wetland condition of the site and are scored with a 0 for each attribute. Restoration activities would restore tidal hydrology, create appropriate microtopography, establish a native salt marsh plant community, and promote greater wildlife use, significantly improving Location and Landscape Support attributes and related functions. Additionally, improved connectivity with other marsh habitats would reduce the adverse effects of adjacent land condition and use. Rehabilitation activities within the adjacent, invasive-dominated upland buffer areas would further improve Location and Landscape Support functions.

Water Environment attributes and related functions would be re-established by proposed restoration activities. Re-establishment of tidal hydrology and microtopography would facilitate native salt marsh plant community zonation, restore appropriate tidal soil moisture conditions, allow use of habitat by tidally-dependent wildlife species, and establish tidal flushing of runoff from adjacent land uses to improve overall water quality.

Restoration activities would re-establish the assessment area plant community structure. The resulting plant community would be a healthy, thriving salt marsh characterized by a diversity of native species with abundant seed production and recruitment, and a high degree of plant cover. Any reinvasion by *Phragmites* would be minimal and managed under a long-term management plan.

Wetland Enhancement Assessment Area (AA4)

The Final Rule for Compensatory Mitigation for Losses of Aquatic Resources (33 CFR 332.2) defines enhancement as the manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s).

The 5.68-acre wetland enhancement AA consists of functioning low and high tidal marsh dominated by native plant species. The AA is adjacent to a filled upland (former wetland), a paved vehicle storage lot, a *Phragmites*-dominated wetland, and an upland fill area characterized by a high degree of invasive plant cover. The AA has good connectivity to tidal flow, microtopography, typical plant species diversity, and supports expected wildlife species. The marsh also has a low percentage of *Phragmites* present in patches, assorted debris, and mosquito ditching throughout the site. Based on conditions within the site, it is expected that *Phragmites* will continue to spread into this area, threatening wetland habitats and degrading functions over time. In addition, these marshes are threatened by pervasive dumping in the area. This wetland area would be enhanced through herbicide treatment of *Phragmites* to prevent further degradation, and removal of debris, especially within tidal channels. This area would also be managed for any reinvasion by *Phragmites* through herbicide treatment under a long-term management plan to prevent future decline of these wetlands.

By enhancing these wetlands as part of a mitigation bank, the threat of illegal filling and dumping within the tidal wetland is minimized. The design would include impediments to dumping to the maximum extent possible. After site construction and planting, the site would be posted and frequently inspected.

Location and Landscape Support attributes and related functions would be improved through the protection of the native plant community. Restoration of the adjacent, invasive-dominated wetland areas would further improve habitat connectivity to adjacent natural plant communities.

Water Environment attributes and functions would be slightly improved due to the restoration of adjacent wetland areas and rehabilitation of upland buffers. In addition, the improvement of

the existing marsh health would result in a slight improvement in water quality related attributes and functions.

The Community Structure attributes and functions would also be improved through prevention of invasive species re-encroachment and maintaining a sustainable native plant community. The assessment area would be managed for invasive species and negative land management activities, such as ditching, debris disposal and filling, would be curtailed through the establishment of a long-term management plan.

Upland Buffer Rehabilitation Assessment Area (AA5)

As defined by the 2008 Federal Rules for wetland mitigation (33 CFR 332.2), buffer means an upland, wetland, and/or riparian area that protects and/or enhances aquatic resource functions associated with wetlands, rivers, streams, lakes, marine, and estuarine systems from disturbances associated with adjacent land uses. Upland buffers within the site will be rehabilitated to further protect and enhance adjacent wetlands and their associated functions. The 2.19-acre upland buffer rehabilitation AA has been degraded through the placement of fill material, cement and stone debris, and other debris such as tires, old utility poles, and trash. The upland buffer has an herbaceous zone and understory dominated by a mix of invasive plant species consisting of Japanese honeysuckle (*Lonicera japonica*), Morrow's honeysuckle (*Lonicera morrowii*), Japanese knotweed, oriental bittersweet (*Celastrus orbiculatus*) and some *Phragmites* on the periphery. Native plants observed in the herbaceous and understory layers include switchgrass (*Panicum* sp.), deer tongue (*Dichanthelium clandestinum*), late boneset (*Eupatorium serotinum*), wood reed grass (*Cinna arundinacea*) and common serviceberry (*Amelanchier arborea*). The canopy consists of black cherry (*Prunus serotina*), scarlet oak (*Quercus coccinea*), pin oak (*Q. palustris*), red oak (*Q. rubra*), tree of heaven (*Ailanthus altissima*), and honey locust (*Gleditsia triacanthos*). A portion of the understory also contains a large stand of persimmon (*Diospyros virginiana*), which is listed as a NYS threatened species. Areas of past fill material, including piles of asphalt, concrete and stone, and scattered trash were observed within the buffer area.

Enhancement activities would include removing the debris and fill material and replacing invasive plants with a native warms season grasses, forbs, and shrubs, and restoring wildlife habitat. Invasive species would be removed through herbicide application and/or cutting. After the enhancement activities, the site would be posted and frequently inspected to discourage dumping.

Location and Landscape Support attributes and related functions would be improved through the establishment of a native plant community, promoting greater wildlife use and improving functions as a buffer to wetlands. Additionally, improved connectivity would reduce the adverse effects of adjacent land condition and use. Enhancement of the adjacent, invasive-dominated wetland area (wetland enhancement area) and restoration of the filled uplands (wetland re-establishment area) would further improve habitat connectivity.

The upland buffer rehabilitation AA was not scored for Water Environment attributes per the methodology.

The Community Structure attributes and functions would also be improved through the replacement of an invasive species-dominated community with a sustainable native dominated coastal grassland. While there would be less structure and woody debris present, the grassland community would be more suitable for use by tidal marsh bird species and diamondback terrapins. The assessment area would also be managed for invasive species under a long-term management plan.

3.2.4 Proposed Mitigation Credits at the Southwestern Section of the Mitigation Bank

Based on the application of the Modified UMAM to the site, the credit ratios and credits in Table 3 are supported at the Southwestern Section of the Saw Mill Creek Tidal Wetland Mitigation Bank. However, to be conservative and to match the ratios in the approved June 2015 MBI for the Bank, the proposed credits for the Southwestern Section are provided in Table 4.

Table 3: Credits Based on UMAM Results

Mitigation Type	Acres	Ratio	Credits
Wetland Restoration (Rehabilitation)	1.35	2.0 : 1	0.68
Wetland Restoration (Re-establishment) – Upland Phragmites	0.80	1.20 : 1	0.67
Wetland Restoration (Re-establishment) – Upland Paved	0.88	1.07: 1	0.82
Wetland Enhancement	5.68	7.5 : 1	0.76
Upland Buffer Rehabilitation	2.19	2.5 : 1	0.88
Total	10.90		3.80

Table 4. Proposed Credits Based on MBI Credit Ratios

Mitigation Type	Acres	Ratio	Credits
Wetland Restoration (Rehabilitation)	1.35	2.14 : 1	0.63
Wetland Restoration (Re-establishment)	1.68	1.20 : 1	1.40
Wetland Enhancement (Tidal)	5.68	10 : 1	0.57
Upland Buffer Rehabilitation	2.19	6.69 : 1	0.33
Total	10.90		2.93

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Appendix H
Assessment Area Photographs

Photo 1: Paved Wetland Re-establishment Assessment Area (AA3), facing east, November 2021.

Photo 2: Debris piles located in the Upland Buffer Rehabilitation Assessment Area (AA5), facing west, November 2021.

Photo 3: Wetland Enhancement Assessment Area (AA4) facing west, November 2021.

Photo 4: Wetland Enhancement Assessment Area (AA4), facing north, November 2021.

Photo 5: Wetland Enhancement Assessment Area (AA4) transitioning to Upland Buffer Rehabilitation Assessment Area (A5), facing east, November 2021.

Photo 6: Upland Buffer Rehabilitation Assessment Area (AA5), facing north, November 2021.

Photo 7: Understory of Japanese knotweed in Upland Buffer Rehabilitation Assessment Area (AA5), facing south, November 2021.

Photo 8: *Phragmites*-dominated Wetland Rehabilitation Assessment Area (AA1), facing north, November 2021.

Photo 9: Edge of *Phragmites*-dominated Wetland Rehabilitation Assessment Area (AA1) transitioning to Wetland Enhancement Assessment Area (AA4), facing east, November 2021.

Photo 10: Filled material on edge of Wetland Re-establishment Assessment Area (AA2), facing northeast, November 2021.

Appendix I
Completed Assessment Area Data Forms

PART I – Qualitative Description
(See Section 4.4.1)

(1) Site/Project Name	(2) Application Number	(3) Assessment Area Name or Number
Southwestern Section of the Saw Mill Creek Wetland Mitigation Bank	NAN-2013-00259	AA1 - Wetland Restoration (Rehabilitation)

(4) Habitat Code	(5) Further classification (optional)	(6) Impact or Mitigation Site?	(7) Assessment Area Size
II.C. 4 Estuarine Cultural	Estuarine Impoundment Marsh	Mitigation	1.35

(8) Basin/Watershed Name/Number	(9) Affected Waterbody (Class)	(10) Special Classification (local/state/federal designation of importance)
HUC 02030104	Sawmill Creek, Class SD (impaired: floatables and oxygen demand)	DEC HM (high marsh) wetlands

(11) Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

AA hydrologically connected to Sawmill Creek and Arthur Kill, geographically adjacent to Sawmill Creek and Arthur Kill Complex(No. 18) (USFWS,NY Bight Study, 1997)

(12) Assessment area description

Phragmites-dominated marsh. Adjacent to past fill/development activities.

(13) Significant nearby features	(14) Uniqueness (considering the relative rarity in relation to the regional landscape)
Pralls Island; Sawmill Creek wetland complex; Sarnelli Brothers, Inc Trucking and Demolition, storage lot	AA is part of a unique natural system within the highly urbanized NY/NJ region

(15) Functions	(16) Mitigation for previous permit/other historic use
Habitat; Primary Production; Nutrient Cycling; Removal Contaminents; flood storage; (NYSDOS and NYSDEC 2000)	Bank credit development

(17) Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	(18) Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Red-winged blackbird, marsh wren. See also: Ecological Communities of NY State (NYNHP 2002); Salt Marsh Restoration and Monitoring Guidelines (NYSDOS and NYSDEC 2000)	Not expected to be present.

(19) Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

No evidence observed during site visits conducted between May and June 2013 and November 2021.

(20) Additional relevant factors:

Sources of stormwater runoff from adjacent land uses; connectivity to adjacent tidal marsh restricted by rail line and box culvert; adjacent invasive species present (Phragmites); potential for further encroachment from adajcent land use; potential for tide driven debris accumulation.

(21) Assessment conducted by:	(22) Assessment date(s):
WSP (formerly LBA PC)	10/30/2013, 11/24/2021

Table I.1: Anticipated Wildlife Utilization in Tidal Wetland Communities

Tidal Wetland Community	Common Name	Scientific Name
High marsh	salt marsh mosquitoes	*Aedes* spp.
	greenhead flies	*Tabanidae*
	coffeebean snail	*Melampus bidentatus*
	clapper rail	*Rallus longirostris*
	sharp-tailed sparrow	*Ammodramus caudacutus*
	marsh wren	*Cistothorus palustris*
	eastern meadowlark	*Sturnella magna*
	American black duck	*Anas rubripes*
Low marsh	clapper rail	*Rallus longirostris*
	willet	*Catoptrophorus semipalmatus*
	marsh wren	*Cistothorus palustris*
	seaside sparrow	*Ammodramus maritimus*
	fiddler crabs	*Uca* spp.
	ribbed mussel	*Geukensia demissa*
	mummichog	*Fundulus heteroclitus*
Salt shrub	marsh wren	*Cistothorus palustris*
Salt panne	mummichog	*Fundulus heteroclitus*
	sheepshead minnow	*Cyprinodon variegatus*

Source: Edinger, et al., 2002.; Louis Berger & Assoc., P.C., 2013

Table I.1: Summary of State and Federal Listed Species

NEW YORK NATURAL HERITAGE DATA	Common Name	Scientific Name	NY State Listing	Heritage Conservation Status	Type of Use/Occurrence
T&E documented at or near the site, generally within 0.5 mile	Least bittern	*Ixobrychus exilis*	Threatened		documented near site
	Pied-billed grebe	*Podilymbus podiceps*	Threatened		documented near site
Rare animals documented at or in vicinity of site	Cattle egret	*Bubulcus ibis*	Protected bird	Imperiled in NYS	foraging/breeding offsite
	Glossy ibis	*Plegadis falcinellus*	Protected bird	Imperiled in NYS	foraging/breeding offsite
	Little blue heron	*Egretta caerulea*	Protected bird	Imperiled in NYS	foraging/breeding offsite
	Snowy egret	*Egretta thula*	Protected bird	Imperiled in NYS	foraging/breeding offsite
	Yellow-crowned night-heron	*Nyctanassa violacea*	Protected bird	Imperiled in NYS	foraging/breeding offsite
	Southern leopard frog	*Lithobates sphenocephalus*	Special concern	Critically imperiled in NYS	foraging/breeding offsite
Plants listed as Endangered or Threatened	Nantucket juneberry	*Amelanchier nantucketensis*	Endangered	Critically imperiled in NYS	
	Persimmon	*Diospyros virginiana*	Threatened	Imperiled in NYS	documented at site
	Rose pink	*Sabatia angularis*	Endangered	Critically imperiled in NYS	
	Sweetbay magnolia	*Magnolia virginiana*	Endangered	Critically imperiled in NYS	
Rare species with historical records at the site or in the vicinity	Eastern mud turtle	*Kinosternum subrubrum*	Endangered	Critically imperiled in NYS	Historical occurrence
	Log fern	*Dryopteris celsa*	Endangered	Critically imperiled in NYS	Historical occurrence
	Orange fringed orchid	*Platanthera ciliaris*	Endangered	Critically imperiled in NYS	Historical occurrence
USFWS	Common Name	Scientific Name	Federal Listing		
Species may occur within the project boundary and/or may be affected by project	Piping plover	*Charadrius melodus*	Threatened		
	Roseate tern	*Sterna dougallii dougalli*	Endangered		

Source: USFWS, 2013; NYSDEC, NHP 2013; Louis Berger & Assoc., P.C., 2013

PART II – Quantification of Assessment Area (impact or mitigation)
(See Section 4.4.2)

Site/Project Name	Application Number	Assessment Area Name or Number
Southwestern Section of the Saw Mill Creek Wetland Mitigation Bank	NAN-2013-00259	AA1 - Wetland Restoration (Rehabilitation)
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Mitigation	WSP (formerly LBA PC)	10/30/2013, 11/24/2021

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

			current condition, w/o rehabilitation	with rehabilitation
Location and Landscape Support		a	5 - Adjacent habitats provide habitat to wildlife, though approximatley 50% of habitats are degraded by development and dominance of invasive plant species.	8 - Conversion of developed area and removal of invasive species in adjacent areas will improve wildlife support.
		b	4 - Phragmites and Japanese knotweed is present within & adjacent to AA.	8 - Invasives management will reduce Phragmites and Japanese knotweed cover.
		c	4 - Adjacent development and hydrological impairment are barriers.	7 - Improved hydrology and Phragmites & Japanese knotweed removal will improve wildlife access.
		d	4 - Hydrology of area is impaired; reduction of in tidal exchange.	8- Restoration to tidal conditions will improve connectivity
		e	3 - Effects of adjacent fill and development (industry/roads) impact habitat.	6 - Reduction in developed land, restoration of tidal flushing, removal/replacement of invasive species will reduce adverse effects from outside land use.
		f	4 - AA has reduced connectivity with downstream areas, impairs function.	7 - hydrologic improvements will provide greater benefits to surrounding areas
		g	3 - AA provides minimal downstream benefits.	5 - Improved connectivity provides more effective functions (nutrient cycling, sediment trapping).
		h	N/A to wetland areas	Not applicable, as AA is not an upland area.
current	with	i	2 - AA not horizontally or vertically extensive, little buffering ability.	3 - Hydrologic restoration would slightly improve buffering/storage functions.
4	7	j	7 - Elevation supports high marsh & scrub-shrub habitats and will allow SLR habitat migration.	7 - Negligible change of elevation with rehabilitation.

			current condition, w/o rehabilitation	with rehabilitation
Water Environment (n/a for uplands)		a	5 - Significant hydrologic restriction present.	9 - Tidal hydrology will be restored.
		b	4 - Dominance by Phramites in high marsh zone indicates significant alteration of tidal hydroperiod.	7 - Will be reconnected with regular/sping tidal flushing.
		c	7 - Water level indicators not apparent in dense Phragmites; soil moisture appears drier than typical of high marsh condition.	9 - Water level indicators will be distinct and appropriate for tidal marsh
		d	7 - Ditching, landfilling, road runoff, and railroad tracks cause alterations of flows/discharges and sediment depostion; bank erosion on Saw Mill Creek channel.	9 - Site management will reduce future risk of uncontrolled runoff, erosion, and deposition from sediments from offsite locations. Bank erosion will be repaired.
		e	2 - Atypical flow in Phragmites-dominated area.	8 - High marshzonation restored; tidal ebb and flow will be improved.
		f	4 - Hydrologic stress indicated by Phragmites monoculture.	9 - Reconnection with tidal hydrology will allieviate hydrologic stress.
		g	4 - Wildlife with specific hydrologic requirement (i.e. fiddler crab) not expected to be abundant in Phragmites monoculture	10 - Grading to achieve high marsh tidal elevations will restore habitat and increase use by tidal-dependent wildlife species.
		h	4 - Phragmites monoculture typical of water quality degradation/flow alteration.	10 - Native tidal marsh plant community indicative of good water quality and proper flows.
		i	8 - None observed, but potential for slight degradation from surrounding land use.	9 - Restoration and management will reduce potential from adjacent land use.
		j	3 - Assumed water quality impairment from adjacent land use runoff; tidal flow from estuary is listed as impaired for floatables and oxygen demand; poor hydrologic connectivity.	8 - Improved tidal flow will faciliate cycling and sequestration of nutrients and contaminants; prevent standing water.
		k	2 - Depths, currents, and light penetration not well suited for salt marsh community.	9 - Improvements will establish proper depth, currrents, and light penetration for a tidal marsh.
current	with	l	7 - Nearby shorelines are stable; 70 feet of active shoreline erosion observed.	9 - Shoreline is stable; erosion due to wind-generated wave energy not expected
4	9	m	6 - Elevations are higher due to buildup by Phragmites; tidal inundation limited.	9 - Improvements will establish proper elevation and tidal inundation a stable high marsh.

			current condition, w/o rehabilitation	with rehabilitation
Community structure		I	1 - Area is dominated by Phragmites.	10 - Area will be vegetated with native salt marsh species.
		II	1 - Phragmites comprises nearly all plant cover.	10 - Treatment would remove Phragmites cover and prevent future degradation.
		III	3 - Minimal evidence of seed production and recruitment.	10 - High degree of native plant seed production and recruitment expected.
1. Vegetation and/or		IV	N/A - no forest/tree cover in AA	N/A- No forest/tree cover AA
2. Benthic Community		V	N/A - No woody debris in AA	N/A - No woody debris in AA
		VI	3 - Dominance and recent expansion of invasive species cover indicator of distrubance within plant community.	9 - Native tidal marsh plant species expected to be in good condition as in adjacent areas.
		VII	2 - Past fill and lack of management resulted in Phragmites dominance.	10 - Long term management plan and conservation easement will support viable native salt marsh community
		VIII	3 - Poor microtopography and lack of channels in Phragmites dominated area.	9 - Excavation of tidal channels and grading to tidal marsh elevations will establish proper tidal topography.
current	with	IX	N/A, no SAV communities present	N/A, no SAV communities proposed
3	10	X	N/A to wetland areas	N/A to wetland areas

Score = sum of above scores/30

current	with
0.37	0.87

If Preservation as mitigation	
Preservation adjustment factor =	
Adjusted mitigation delta =	

For impact assessment areas	
Functional loss (impact x acres)	

(if uplands, divide by 20)

If mitigation	
Time lag (t-factor) =	1.00
Risk factor =	1.00

For Mitigation Assessment Areas	
Relative Functional Gain (RFG) Delta/(risk*t-factor)	0.50

Delta = [with-current]	
wetland	0.50
upland	0.00

Assessment Area Acreage	1.35

Mitigation Bank Credit Generation	
RFG * Assessment Area Acreage	**0.68**

PART I – Qualitative Description
(See Section 4.4.1)

(1) Site/Project Name	(2) Application Number	(3) Assessment Area Name or Number
Southwestern Section of the Saw Mill Creek Wetland Mitigation Bank	NAN-2013-00259	AA2 - Wetland Restoration (Re-establishment)

(4) Habitat Code	(5) Further classification (optional)	(6) Impact or Mitigation Site?	(7) Assessment Area Size
VI. D.	Phragmites-vegetated upland	Mitigation	0.80

(8) Basin/Watershed Name/Number	(9) Affected Waterbody (Class)	(10) Special Classification (local/state/federal designation of importance)
HUC 02030104	Sawmill Creek, Class SD (impaired: floatables and Oxy demand)	DEC HM (high marsh) wetlands

(11) Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

AA hydrologically connected to Sawmill Creek and Arthur Kill, geographically adjacent to Sawmill Creek and Arthur Kill Complex (No. 18) (USFWS NY Bight Study, 1997)

(12) Assessment area description

Upland primarily vegetated with Phragmites

(13) Significant nearby features	(14) Uniqueness (considering the relative rarity in relation to the regional landscape)
Pralls Island; Sawmill Creek wetland complex; Sarnelli Brothers, Inc Trucking and Demolition, storage lot	AA is part of a unique natural system within the highly urbanized NY/NJ region

(15) Functions	(16) Mitigation for previous permit/other historic use
The AA is an upland area and does not provide wetland functions, but does provide/support: Habitat; Food Web; Nutr. Cycling; OM export (leaf litter).	Bank credit development

(17) Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	(18) Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Redwing blackbird, house sparrow; starlings, small mammals. See also: Ecological Communities of NY State (NYNHP 2002)	Not expected to be present.

(19) Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

No evidence observed during site visits conducted between May and June, 2013 and Noveber 2021

(20) Additional relevant factors:

Dominated by invasive species, primarily Phragmites. Potential for further encroachment from adajcent land use; potential for tide driven debris accumulation.

(21) Assessment conducted by:	(22) Assessment date(s):
WSP (LBA PC)	10/30/2013, 11/24/2021

PART II – Quantification of Assessment Area (impact or mitigation)
(See Section 4.4.2)

Site/Project Name	Application Number	Assessment Area Name or Number
Southwestern Section of the Saw Mill Creek Wetland Mitigation Bank	NAN-2013-00259	AA2 - Wetland Restoration (Re-establishment)
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Mitigation	WSP (formerly LBA PC)	10/30/2013, 11/24/2021

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

		current condition, w/o re-establishment	with re-establishment
Location and Landscape Support	a	3 - Cover dominated by invasives species.	8 - No change in adjacent land use but adjacent wetland habitats would be fully connected; expands existing marsh size.
	b	2 - Predominance of cover by invasives species.	9 - Less than 5% cover of invasive plants in restoration areas; invasives expected to be removed/managed in adjacent areas
	c	4 - Surrounded by degraded habitats (invasive species) and developed lands.	8 - corridor slighly impeded; most expected species are highly mobile and not severly limited by barriers that remain.
	d	0 - Not accessible to wetland dependent fish & wildlife.	9 - AA will be accessible to fish with minimal barriers still present.
	e	2 - Surrounding land use developed or dominated by invasive species.	5 - Surrounding land uses will remain, however associated attributes like noise and industrial activities will be reduced with expansion of marsh area.
	f	0 - No existing connections to downstream wetlands.	7 - Hydrologic connection will be restored; nearby impairments to downstream wetlands remain (railroad, ditching in downstream
	g	2 - Minimal benefits from detritus; direct flow paths lacking.	6 - Improved connectivity provides more effective functions (nutrient cycling, sediment trapping).
	h	5 - Provides suboptimal buffer protection to adjoing wetlands.	N/A to wetland areas.
current	i	5 - Uplands have gradual slope that provides some buffering.	5 - Wetlands in AA will have gradual vertical relief and width to provide some buffering.
2	j	0 - Exisitng upland not within anticiapted near future tidal regime range.	6 - High marsh with transition to scrub shrub present; diversity of elevation/habitat types restored. Adjacent land use limiting extent.

		current condition, w/o re-establishment	with re-establishment
Water Environment (n/a for uplands)	a	0	9 - Hydrologic connection will be restored; nearby hydrologic impairments would remain (railroad, ditching in downstream wetlands).
	b	0	9 - Most indicators expected to be present and consistent with proposed hydroperiod
	c	0	10 - Soil moisture expected to be appropriate for the tidal marsh system.
	d	0	9 - Flow will be fully restored; normal deposition rates anticipated; site management will reduce future risk of uncontrolled runoff, erosion, and deposition from sediments from offsite locations.
	e	0	9 - Communitiy zonation expected to be appropriate.
	f	0	10 - Restored wetland will support target vegetation adapted to hydrologic regime.
	g	0	10 - Animals with specific hydrologic requirements (heron, terrapin, fiddler crab, mummichog) expected to be present.
	h	0	10 - Species tolerant of or associated with water quality degradation or flow alteration not expected.
	i	0	9 - Potential for slight degradation of water quality from immediately adjacent upland industrial area.
	j	0	7 - Estuary is listed as impaired for floatables and oxygen demand; improved flows will assist cycling of contaminants from uplands.
	k	0	10 - Depths, currents and light penetration sufficient for a salt marsh.
current	l	0	10 - Nearby shorelines are stable; shoreline erosion due to wind-generated wave energy not expected.
0	m	0	9 - Marsh expected to maintain stable elevation.

		current condition, w/o re-establishment	with re-establishment
Community structure	I	0 - Upland dominated by invasives species.	10 - Plant species composition expected to be appropriate to habitat type; native species expected to be dominant.
	II	0 - Predominance of cover by invasives species.	10 - Less than 5% cover by invasive species expected.
	III	0 - Predominance of invasives species; native recruitment not observed.	10 - High degree of native plant seed production and recruitment expected.
1. Vegetation and/or 2. Benthic Community	IV	N/A to uplands.	N/A for tidal marshes
	V	0 - Forest cover lacking.	N/A for tidal marshes
	VI	0 - Invasive species dominant cover.	10 - Plants expected to be in good condition.
	VII	N/A to uplands	10 - Restored wetland will be managed/maintained per MBI/conservation easement.
	VIII	0 - Altered by past fill placement; microtopography lacking.	10 - Microtopographic features are expected to be present and typical for the proposed habitat type.
current	IX	N/A to uplands	N/A - SAV communities not proposed
0	X	1 - Upland dominated by invasive species.	N/A to wetland areas

Score = sum of above scores/30	
current	with
0.07	0.90

If preservation as mitigation	
Enhancement adjustment factor =	
Adjusted mitigation delta =	

For impact assessment areas	
Functional loss (impact x acre)	

(if uplands, divide by 20)

If mitigation	
Time lag (t-factor)=	1
Risk factor=	1

For Mitigation Assessment Areas	
Relative Functional Gain (RFG) Delta/(risk*t-factor)	0.83

Delta = [with-current]	
wetland	0.83
upland	0

Assessment Area Acreage	0.80

Mitigation Bank Credit Determination	
RFG * Assessment Area Acres	**0.67**

PART I – Qualitative Description
(See Section 4.4.1)

(1) Site/Project Name	(2) Application Number	(3) Assessment Area Name or Number
Southwestern Section of the Saw Mill Creek Wetland Mitigation Bank	NAN-2013-00259	AA3 - Wetland Restoration (Re-establishment)

(4) Habitat Code	(5) Further classification (optional)	(6) Impact or Mitigation Site?	(7) Assessment Area Size
VI. D. 32 Urban Vacant lot	Unvegetated fill area	Mitigation	0.88

(8) Basin/Watershed Name/Number	(9) Affected Waterbody (Class)	(10) Special Classification (local/state/federal designation of importance)
HUC 02030104	Sawmill Creek, Class SD (impaired: floatables and oxygen demand)	Prveiously mapped DEC HM (high marsh) wetlands

(11) Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

AA geographically adjacent to Sawmill Creek and Arthur Kill Complex (No. 18) (USFWS NY Bight Study, 1997)

(12) Assessment area description

Formet tidal wetland, filled/paved lot used as vehicle storage and construction/demolition debris disposal

(13) Significant nearby features	(14) Uniqueness (considering the relative rarity in relation to the regional landscape)
Pralls Island; Sawmill Creek wetland complex; Sarnelli Brothers Inc. vehicle storage, trucking and demolition debris disposal	AA is adjacent to a unique natural system within the highly urbanized NY/NJ region
(15) Functions	**(16) Mitigation for previous permit/other historic use**
The AA is an upland area and does not provide wetland functions, but does minimally provide/support: Habitat; Food Web; Nutr. Cycling; OM export (leaf litter).	Bank credit development
(17) Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	**(18) Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)**
Feral cats, mice, common bird species such as starlings and sparrows. See also: Ecological Communities of NY State (NYNHP 2002)	Not expected to be present.

(19) Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

No evidence observed during site visits conducted between May and June 2013 and November 2021.

(20) Additional relevant factors:

Historic fill area.

(21) Assessment conducted by:	(22) Assessment date(s):
WSP (formerly LBA PC)	10/30/2013, 11/24/2021

PART II – Quantification of Assessment Area (impact or mitigation)
(See Section 4.4.2)

Site/Project Name	Application Number	Assessment Area Name or Number
Southwestern Section of the Saw Mill Creek Wetland Mitigation Bank	NAN-2013-00259	AA3 - Wetland Restoration (Re-establishment)
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Mitigation	WSP (formerly LBA PC)	10/30/2013, 11/24/2021

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

		current condition, w/o re-establishment	with re-establishment
Location and Landscape Support	a	0	8 - Not optimal as adjacent land use and partial connectivity limits wildlife support; restoration expands existing marsh size.
	b	0	9 - Minimal invasive cover (<5%) expected in restored areas; invasives expected to be removed/managed in adjacent areas.
	c	0	8 - Corridor slightly impeded; most expected species are highly mobile and not severly limited by barriers that remain.
	d	0	8 - AA will be accessible to fish with minimal barriers still present.
	e	0	6 - Surrounding land uses will remain, however associated attributes like noise and industrial activities will be reduced with expansion of the marsh area.
	f	0	8 - Hydrologic connection will be restored; nearby impairments to downstream wetlands (railroad, ditching in downstream wetlands) minimized by enhancement in AA2.
	g	0	6 - Improved connectivity will provide more effective functions (contaminant buffering from adjacent uplands, nutrient cycling, sediment trapping).
	h	0	N/A to wetland areas
current / with	i	0	7 - Wetlands in AA will have gradual vertical relief and width to provide some buffering.
0 / 8	j	0	7 - High marsh with scrub-shrub present,diversity of elevation/habitat types restored. Adjacent land use limits habitat migration.

		current condition, w/o re-establishment	with re-establishment
Water Environment (n/a for uplands)	a	0	9 - Hydrologic connection will be restored; nearby impairments (railroad, ditching in downstream wetlands) persist.
	b	0	10 - Most indicators expected to be present and consistent with proposed hydroperiod.
	c	0	10 - Soil moisture expected to be appropriate for the tidal marsh system.
	d	0	9 - Tidal flow will be fully restored; normal deposition rates anticipated; site management will reduce future risk of uncontrolled runoff, erosion, and deposition from sediments from offsite locations.
	e	0	9 - communitiy zonation expected to be appropriate
	f	0	9 - Restored wetland will support target vegetation adapted to hydrologic regime.
	g	0	10 - Animals with specific hydrologic requirements (heron, terrapin, fiddler crab, mummichog) expected to be present.
	h	0	10 - Species tolerant of or associated with water quality degradation or flow alteration not expected to be present.
	i	0	9 - Potential for slight degradation of water quality from immediately adjacent upland industrialized area.
	j	0	7 - Estuary is listed as impaired for floatables and oxygen demand; improved flows will assist cycling of contaminants from uplands.
	k	0	10 - Depths, currents, and light penetration expected to be appropriate for tidal marsh habitat.
current / with	l	0	10 - Shoreline is stable; shoreline erosion due to wind-generated wave energy not expected.
0 / 10	m	0	10 - Marsh expected to maintain stable elevation.

		current condition, w/o re-establishment	with re-establishment
Community structure	I	0	10 - Plant species composition expected to be appropriate to habitat type; native species expected to be dominant.
	II	0	10 - Less than 5% cover by invasive species expected.
	III	0	10 - High degree of native plant seed production and recruitment expected
1. Vegetation and/or 2. Benthic Community	IV	0	N/A - No forest/tree cover in AA
	V	0	N/A - No woody debris in AA
	VI	0	10 - Plants expected to be in good condition.
	VII	0	10 - Restored wetland will be managed/maintained per Banking Instrument/conservation easement.
	VIII	0	10 - Microtopographic features are expected to be present and typical for the proposed habitat type.
current / with	IX	0	N/A - No SAV communities proposed
0 / 10	X	0	N/A to wetland areas

Score = sum of above scores/30	
current	with
0.00	0.93

If preservation as mitigation	
Enhancement adjustment factor =	
Adjusted mitigation delta =	

For impact assessment areas	
Functional loss (impact x acres)	

(if uplands, divide by 20)

If mitigation	
Time lag (t-factor) =	1
Risk factor =	1

For Mitigation Assessment Areas	
Relative Functional Gain (RFG) Delta/(risk*t-factor)	0.93

Delta = [with-current]	
wetland	0.93
upland	0

Assessment Area Acreage	0.88

Mitigation Bank Credit Determination	
RFG * Assessment Area Acres	**0.82**

PART I – Qualitative Description
(See Section 4.4.1)

(1) Site/Project Name	(2) Application Number	(3) Assessment Area Name or Number
Southwestern Section of the Saw Mill Creek Wetland Mitigation Bank	NAN-2013-00259	AA4 - Wetland Enhancement

(4) Habitat Code	(5) Further classification (optional)	(6) Impact or Mitigation Site?	(7) Assessment Area Size
II.B.8 Estuarine Brackish Tidal Marsh	Estuarine Brackish Tidal Marsh	Mitigation	5.68

(8) Basin/Watershed Name/Number	(9) Affected Waterbody (Class)	(10) Special Classification (local/state/federal designation of importance)
HUC 02030104	Sawmill Creek, Class SD (impaired: floatables and oxygen demand)	DEC HM (high marsh) and IM (intertidal marsh) wetlands

(11) Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

AA hydrologically connected to Sawmill Creek and Arthur Kill, geographically adjacent to Sawmill Creek and Arthur Kill Complex (No. 18) (USFWS NY Bight Study, 1997)

(12) Assessment area description

Brackish high and low marsh, altered by mosquito ditching. Adjacent to railroad tracks, Chelsea Road and past fill/development activities.

(13) Significant nearby features	(14) Uniqueness (considering the relative rarity in relation to the regional landscape)
Pralls Island; Saw Mill Creek wetland complex; developed, paved land (Sarnelli Brothers, Inc Trucking and Demolition, auto storage lot, Chelsea Avenue)	AA is part of a unique natural system within the highly urbanized NY/NJ region
(15) Functions	**(16) Mitigation for previous permit/other historic use**
Habitat; Prim. Production; Food Web; Nutr. Cycling; OM export; Removal Contam; wave energy attenuation; flood storage;sedimentation/accretion (NYSDOS and NYSDEC 2000)	Bank credit development
(17) Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	**(18) Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)**
See Attached Table I.1: See also: Ecological Communities of NY State (NYNHP 2002); Salt Marsh Restoration and Monitoring Guidelines (NYSDOSand NYSDEC 2000)	See Attached Table I.2

(19) Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Based on site visits conducted between May and June, 2013: fiddler crabs, ribbed mussels, mummichogs, marsh snails, diamondback terrapin; yellow crowned and snowy egrets; osprey, mallard; clapper rail. Also observed in November 2021: great blue heron.

(20) Additional relevant factors:

Sources of stormwater runoff from adjacent land uses; connectivity to adjacent tidal marsh restricted by rail line and box culvert; adjacent invasive species present (Phragmites); potential for further encroachment from adajcent land use; potential for tide driven debris accumulation.

(21) Assessment conducted by:	(22) Assessment date(s):
WSP (formerly LBA PC)	10/30/2013,11/24/2021

PART II – Quantification of Assessment Area (impact or mitigation)
(See Section 4.4.2)

Site/Project Name	Application Number	Assessment Area Name or Number
Southwestern Section of the Saw Mill Creek Wetland Mitigation Bank	NAN-2013-00259	AA4 - Wetland Enhancement
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Mitigation	WSP (formerly LBA PC)	10/30/2013, 11/24/2021

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

		current condition, w/o enhancement	with enhancement
Location and Landscape Support	a	6 - Adjacent habitats provide habitat to wildlife, though approx. 50% of habitat are degraded by development and dominance of invasive plant species.	8 - Improvement in adjacent habitats.
	b	6 - Phragmites is present within/adjacent to site, has spread over past 9 years, potential to increase in coverage in future with changes in site elevations.	9 - Invasives would be removed/regularly treated to maintain under 5% cover condition
	c	7 - Type of fauna in tidal marsh dominant sites are less affected by the existing barriers. Tidal channel is present.	7 - No change
	d	7 - Some potential for contamination; impaired for oxygen levels in creek.	7 - No change
	e	5 - Disruptive magnitude of disturbance from adjacent development (industry/railroad) impacts habitat.	6 - No additional fill in future, reduction in developed land cover.
	f	7 - Fill in adjacent areas, railroad embankment, and tidal ditching impair function.	7 - Nearby impairments would remain.
	g	4 - Provides contaminant buffering from adjacent uplands.	4 - No change
	h	N/A to wetland areas	N/A to wetland areas
current	i	4 - More than 100 ft. width provide minimal support.	4 - Width will not change significantly.
6 (with: 7)	j	8 - Large area of high marsh and some scrub shrub areas will allow SLR habitat migration.	9 - Limited expansion of adjacent high marsh.

		current condition, w/o enhancement	with enhancement
Water Environment (n/a for uplands)	a	7 - AA has been ditched and overmarsh flow affected by railroad tracks.	7 - No change expected.
	b	9 - Water level not significantly affected by manmade barriers.	9 - No change expected.
	c	10 - No apparent soil moisture issues.	10 - No change expected.
	d	7 - Ditching, landfilling, road runoff, and railroad tracks cause alterations of flows/discharges and sediment deposition.	8 - Site management will reduce future risk of uncontrolled runoff, erosion, and deposition from sediments from offsite locations.
	e	9 - Appropriate community zonation present.	9 - Minor change with removal of invasive species
	f	8 - Appropriate for all strata, though mild effects due to ditching, alteration due to increased Phragmites cover, and constricted flow in Sawmill Creek.	9 - Reduction in influence of Phragmites on future high marsh tidal regime.
	g	10 - Animals with specific hydrologic requirement (i.e, muskrat, heron, terrapin, fiddler crab) expected to be present.	10 - No change expected.
	h	9 - No sign of hydrologic stress.	9 - No change expected..
	i	9 - None observed evidence in assessment area.	9 - Reduced risk of off-site contaminants.
	j	4 - Water quality impairment from adjacent land uses; tidal flow from estuary is listed as impaired for floatables and oxygen demand.	7 - Restoration of adjacent marsh will divert/educe runoff from adjacent industrial site.
	k	8- Depths, currents and light penetration sufficient for a salt marsh; listed as impaired for floatables and oxygen demand.	9 - Improved marsh health will slighlty improve water quality.
current	l	9 - Wave energy and fetch appropriate for community type.	9 - No change expected.
7 (with: 9)	m	9 - Marsh appears stable.	9 - No change expected.

		current condition, w/o enhancement	with enhancement
Community structure	I	9 - Some Phragmites presence (< 5%).	9 - Treatment would control any Phragmites expansion.
	II	9 - Phragmites present in small patches.	10 - treatment would remove Phragmites cover/prevent future degradation.
	III	10 - Plant cover appears total, sustained by seed production/recruitment.	10 - No change expected.
1. Vegetation and/or	IV	N/A - Attribute pertains to tree cover.	N/A - Attribute pertains to tree cover.
2. Benthic Community	V	N/A - Attribute pertains to woodland.	N/A - Attribute pertains to woodland.
	VI	9 - Plant condition is good.	9 - No change expected.
	VII	7 - Ditching has affected original high marsh community.	10 - Long term management plan funded through MBI and conservation easement will support viable native salt marsh community
	VIII	7 - Microtopography present; ditching present throughout marsh.	7 - No change proposed.
current	IX	N/A, no SAV communities present	N/A, no SAV communities present.
9 (with: 10)	X	N/A to wetland areas	N/A to wetland areas.

Score = sum of above scores/30

current	with
0.73	0.87

(if uplands, divide by 20)

Delta = [with-current]	
wetland	0.13
upland	0

If preservation as mitigation	
Preservation adjustment factor =	
Adjusted mitigation delta =	

If mitigation	
Time lag (t-factor)=	1
Risk factor=	1

Assessment Area Acreage	5.68

For impact assessment areas	
Functional loss (impact x area)	

For Mitigation Assessment Areas	
Relative Functional Gain (RFG) Delta/(risk*t-factor)	0.13

Mitigation Bank Credit Determination	
RFG * Assessment Area Ac.	**0.7573333**

PART I – Qualitative Description
(See Section 4.4.1)

(1) Site/Project Name	(2) Application Number	(3) Assessment Area Name or Number
Southwestern Section of the Saw Mill Creek Wetland Mitigation Bank	NAN-2013-00259	AA5 - Upland Buffer Rehabiliation

(4) Habitat Code	(5) Further classification (optional)	(6) Impact or Mitigation Site?	(7) Assessment Area Size
VI. C. 27- Succesional southern hardwood/invasive dominated	Invasive hardwoods and herbaceous	Mitigation	2.19

(8) Basin/Watershed Name/Number	(9) Affected Waterbody (Class)	(10) Special Classification (local/state/federal designation of importance)
HUC 02030104	Sawmill Creek, Class SD (impaired: floatables and oxygen demand)	None

(11) Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

AA hydrologically connected to Sawmill Creek and Arthur Kill, geographically adjacent to Sawmill Creek and Arthur Kill Complex (No. 18) (USFWS NY Bight Study,1997)

(12) Assessment area description

Adjacent to road and past fill/development activities. Upland area is largely dominated by invasive plants and scattered debris of cement and stone, and fill. Herbaceous cover is mostly a carpet of Japanese honeysuckle on the eastern half and Japanese knotweed on the western portion. There are a lot of fairly large black cherry trees, tree-of-heaven (Ailanthus), black locust, and oriental bittersweet.

(13) Significant nearby features	(14) Uniqueness (considering the relative rarity in relation to the regional landscape)
Pralls Island, Sawmill Creek wetland complex, Rt 440, Chelsea Road	AA is part of a unique natural system within the highly urbanized NY/NJ region

(15) Functions	(16) Mitigation for previous permit/other historic use
The AA is an upland area and does not provide wtland functions, but does provide/support: Habitat; Food Web; Nutr. Cycling; OM export (leaf litter).	Bank credit development

(17) Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	(18) Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Feral cats, mice, common bird species such as starlings and sparrows, deer. See also: Ecological Communities of NY State (NYNHP 2002)	Stand of state-threatened persimmon present within AA.

(19) Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Red-winged blackbird; no other observed species during site visits conducted between May and June, 2013 and November 2021.

(20) Additional relevant factors:

Sources of stormwater runoff from adjacent land uses; connectivity to adjacent upland habitat restricted by road and developed land; adjacent invasive species (Phragmites) present. Potential for further encroachment from adjacent land use; potential for tide driven debris accumulation.

(21) Assessment conducted by:	(22) Assessment date(s):
WSP (formerly LBA PC)	10/30/2013, 11/24/2021

PART II – Quantification of Assessment Area (impact or mitigation)
(See Section 4.4.2)

Site/Project Name	Application Number	Assessment Area Name or Number
Southwestern Section of the Saw Mill Creek Wetland Mitigation Bank	NAN-2013-00259	AA5 - Upland Buffer Rehabilitation
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Mitigation	WSP (formerly LBA PC)	10/30/2013, 11/24/2021

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

		current condition, w/o rehabilitation	with rehabilitation
Location and Landscape Support	a	4 - Site contains predomiantly invasive plants in understory and herbaceous layer.	9 - Invasive species will be removed, natives planted, and site maintained.
	b	4 - Majority of cover composed of invasive plants, adversely affecting functions.	8 - Invasives management will remove invasive plant cover and restore functions.
	c	5 - Partial impediments to wildlife access (adjacent developed land, road, rail line, extensive invasive cover).	8 - Increase in accessible habitats after nearby restoration and invasive removal.
	d	8 - Functional connection present.	8 - Functional connection somewhat less limited by expansion/enhancement of adjoining wetlands.
	e	5 - Adjacent roads and other land use, runoff, illegal dumping, and noise sources impact wildlife.	6 - No additional fills in future, slightly less disruptive magnitude of adjacent land use.
	f	5 - Assessment area provides some hydrologic connectivity to downstream/adjacent wetlands.	5 - Hydrologic connectivity maintained.
	g	3 - Provides minimal surface or groundwater benefit to downstream habitats.	3 - No change in condition.
	h	5 - Elevation, landscape position, and exisitng plant community provides some benefit as a buffer to adjacent wetlands.	8 - Restored native plant community and expansion of adjacent wetlands increase buffer benefits to adjacent wetlands.
current / with	i	N/A - AA is not a wetland	N/A - AA is not a wetland
5 / 8	j	4 - Upland area relatively high in elevation; marginal amount of area to accomodate wetland expansion.	4 - No change to elevations proposed.

		current condition, w/o rehabilitation	with rehabilitation
Water Environment (n/a for uplands)	a	N/A	N/A
	b	N/A	N/A
	c	N/A	N/A
	d	N/A	N/A
	e	N/A	N/A
	f	N/A	N/A
	g	N/A	N/A
	h	N/A	N/A
	i	N/A	N/A
	j	N/A	N/A
	k	N/A	N/A
current / with	l	N/A	N/A
0 / 0	m	N/A	N/A

		current condition, w/o rehabilitation	with rehabilitation
Community structure	I	4 - Majority of understory herbaceous plant species are non-native.	10 - Site will be enhanced through establishment of native plant community; long term manangent plan implemented.
	II	3 - Majority of plant species cover is non-native.	10 - Site will be enhanced through establishment of native species; long term manangent plan implemented
	III	3 - Native recruitment minimal and long term viability diminished by extensive invasive species cover.	10 - Native plant community designed with a sustainable population of native grassess/forbs; long term manangent plan implemented.
1. Vegetation and/or 2. Benthic Community	IV	4 - Deviation from normal successonal patterns - recruitment limited by invasive species cover.	9 - Forest structure will be improved through supplemental plants; invasive plant removal.
	V	5 - Some structural habitat in the form of cavities or logs present.	5 - No change in condition.
	VI	7 - Exisitng plant condition generally good.	7 - Native plant condition expected to be generally good.
	VII	3 - Site altered through fill/debris placement; lack of manangement.	9 - Long term management plan, conservation easement will support viable native forest community.
	VIII	5 - Past fill/debris placement altered natural topography.	7 - Natural microtopography restored to Site.
current / with	IX	N/A to uplands	N/A to uplands
4 / 9	X	3 - Woodland dominated by non-native, invasive species; below minimal habitat/life history support.	7 - Restored forest supports broader range of wildlife species; removal of invasives and dumping will improve habitat and life

Score = sum of above scores/30

current	with

(if uplands, divide by 20)

current	with
0.45	0.85

Delta = [with-current]	
wetland	0.00
upland	0.40

If preservation as mitigation	
Preservation adjustment factor =	
Adjusted mitigation delta =	

If mitigation	
Time lag (t-factor)=	1
Risk factor=	1

Assessment Area Acreage	2.19

For impact assessment areas	
Functional loss (impact x acres)	

For Mitigation Assessment Areas	
Relative Functional Gain (RFG) Delta/(risk*t-factor)	0.40

Mitigation Bank Credit Determination	
RFG * Assessment Area Ac.	**0.88**

PART I – Qualitative Description
(See Section 4.4.1)

(1) Site/Project Name	(2) Application Number	(3) Assessment Area Name or Number
Southwestern Section of the Saw Mill Creek Wetland Mitigation Bank	NAN-2013-00259	Wetland Reference Site

(4) Habitat Code	(5) Further classification (optional)	(6) Impact or Mitigation Site?	(7) Assessment Area Size
II.B.8 Estuarine Brackish Tidal Marsh	Estuarine Brackish Tidal Marsh	Mitigation	7.00

(8) Basin/Watershed Name/Number	(9) Affected Waterbody (Class)	(10) Special Classification (local/state/federal designation of importance)
HUC 02030104	Sawmill Creek, Class SD (impaired: floatables and Oxy demand)	DEC HM (high marsh)and IM (intertidal marsh) wetlands

(11) Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

AA hydrologically connected to Sawmill Creek and Arthur Kill, geographically adjacent to Sawmill Creek and Arthur Kill Complex (No. 18) (USFWS NY Bight Study, 1997)

(12) Assessment area description

Brackish high and low marsh.

(13) Significant nearby features	(14) Uniqueness (considering the relative rarity in relation to the regional landscape.)
Pralls Island; Saw Mill Creek wetland complex;	AA is part of a unique natural system within the highly urbanized NY/NJ region

(15) Functions	(16) Mitigation for previous permit/other historic use
Habitat;Prim. Production; Food Web; Nutr. Cycling; OM export; Removal Contam; wave energy attenuation; flood storage;sedimentation/accretion (NYSDOS and NYSDEC 2000)	None

(17) Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	(18) Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
See Attached Table I.1: See also:Ecological Communities of NY State (NYNHP 2002); Salt Marsh Restoration and Monitoring Guidelines(NYSDOSand NYSDEC 2000)	See Attached Table I.2

(19) Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Based on site visits conducted between May and July, 2013: fiddler crabs, ribbed mussels, mummichogs, marsh snails, yellow crowned and snowy egrets; osprey, mallard; clapper rail.

(20) Additional relevant factors:

Sources of stormwater runoff from adjacent land uses; connectivity to adjacent tidal marsh restricted by rail line and box culvert.

(21) Assessment conducted by:	(22) Assessment date(s):
LBA PC	8/21/13

PART II – Quantification of Assessment Area (impact or mitigation)
(See Section 4.4.2)

Site/Project Name	Application Number	Assessment Area Name or Number
Southwestern Section of the Saw Mill Creek Wetland Mitigation Bank	NAN-2013-00259	Wetland Reference Site
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Mitigation	WSP (formerly LBA PC)	8/21/13

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

		current condition	with enhancement
Location and Landscape Support	a	9 - Ddifference from ideal is the size of AA, minimal connectivity reduction, and adjacent land uses.	
	b	7 - Phragmites is present within/adjacent to site, limited potential for invasion/expansion into site.	
	c	8 - Type of fauna in tidal marsh dominant sites w/ few existing barriers; wide tidal channel is present.	
	d	8 - Minimal potential for contamination (stormwater runoff only, upland buffer); impaired for oxygen levels in creek.	
	e	8 - No additional fill in future, slightly less disruptive magnitude of adjacent land use.	
	f	9 - Railroad embankment separate marsh from Arthur Kill marsh; tidal access non restrictive.	
	g	4 - Provides contaminant buffering from adjacent uplands.	
	h	N/A to wetland areas	
current / with	i	6 - More than 100 ft. wide; provides storage, minimal surge protection.	
8	j	7 - Areas of high marsh, less scrub shrub areas, periphery mostly hardened edges (road, rail).	

		current condition	
Water Environment (n/a for uplands)	a	10 - Site is not ditched; overmarsh flow minimally affected by railroad berm.	
	b	10 - Water level not significantly affected by manmade barriers.	
	c	10 - No apparent soil moisture issues.	
	d	9 - Railroad berm may cause minor alterations of flows/discharges	
	e	9 - nearly optimal community zonation	
	f	9 - Appropriate for all strata, though mild effects due to ditching and constricted flow in Sawmill Creek	
	g	10 - Animals with specific hydrologic requirement (i.e, muskrat, heron, terrapin, fiddler crab) expected to be present.	
	h	9 - No sign of hydrologic stress.	
	i	9 - No observed evidence in AA.	
	j	7 - Water quality impairment from adjacent land use minimal (stormwater runoff).	
	k	4 - Listed as impaired for floatables and oxygen demand.	
current / with	l	9 - Wave energy and fetch appropriate for community type.	
9	m	9 - Marsh appears stable.	

		current condition	
Community structure	I	9 - Some Phragmites presence (< 2%).	
	II	9 - Phragmites present in small patches.	
	III	10 - Plant cover appears total.	
1. Vegetation and/or	IV	9 - Age and size distribution typical of system.	
2. Benthic Community	V	N/A - No woody debris in AA	
	VI	10 - Plant condition is good.	
	VII	8 - No ditching; natural gas line through high marsh.	
	VIII	10 - Microtopography present; no ditching.	
current / with	IX	N/A - no SAV in region	
9	X	N/A to wetland areas	

Score = sum of above scores/30

current	with
0.87	

(if uplands, divide by 20)

Delta = [with-current]	
wetland	0
upland	0

If preservation as mitigation	
Preservation adjustment factor =	
Adjusted mitigation delta =	

If mitigation	
Time lag (t-factor)=	1
Risk factor=	1

Assessment Area Acreage	7

For impact assessment areas	
Functional loss (impact x acres)	

For Mitigation Assessment Areas	
Relative Functional Gain (RFG) Delta/(risk*t-factor)	0.00

Mitigation Bank Credit Determination	
RFG * Assessment Area Ac.	0

Appendix J
List of Preparers

List of Preparers

Edward Samanns – Senior Lead Consultant, Natural Resources Management
Certified Professional Wetland Scientist #000402
Certified Ecologist
Certified Ecosystem Restoration Practitioner
M.S., Geography, Rutgers, 1991
B.S., Biology, Slippery Rock University, 1985

Peg McBrien, PE, PWS – Assistant Vice President, Ecological Engineering
Certified Professional Wetland Scientist #000972
M.S., Environmental Engineering, Northwestern University, 1989
B.A., Geology, Mount Holyoke College, 1986

Tom Shinskey – Principal Environmental Scientist
B.A., Natural Science, St. Anselm College, 1991
M.S., Biology, University of Massachusetts, 1994

Tara Stewart – Senior Environmental Scientist
B.S., Marine Biology, Stockton University, 1998
Certified Ecologist

Jordan Gilruth – Environmental Scientist
M.S., Marine Biology & Coastal Sciences, Montclair State University, 2018
B.S., Biology, Iona College, 2013

Heather Shaw – Senior Environmental Scientist/GIS
Professional Certification in Geomatics, Rutgers University, 1999
B.S., Rutgers University, 1996